Construction Documents

VOLUME 1 of 2

Conformed to include Addenda 1-9

New Amesbury Elementary School

Amesbury, Massachusetts

Set Number

CONSTRUCTION DOCUMENTS
for the
NEW AMESBURY ELEMENTARY SCHOOL
AMESBURY, MASSACHUSETTS

Date: 10 MARCH 2021

ARCHITECT: DiNISCO DESIGN, INC.
99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2858

OWNER'S PROJECT MANAGER: NV5
44 Pleasant Street
Watertown, MA 02472
(617) 744-3110

CIVIL ENGINEER: DGT Associates
1071 Worchester Road
Framingham, MA 01701
(508) 879-0030

LANDSCAPE ARCHITECT: BROWN SARDINA, INC.
24 Roland Street
Boston, MA 02129
(617) 482-4703

STRUCTURAL ENGINEER: FOLEY BUHL ROBERTS & ASSOCIATES
2150 Washington Street
Newton, MA 02462
(617) 527-9600

GEOTECHNICAL ENGINEER: GZA GeoEnvironmental, Inc.
31 State Street, 8th Floor
Boston, MA 02109
(617) 963-1000

FOODSERVICE CONSULTANT: CRABTREE MCGRATH ASSOCIATES, INC.
161 West Main Street
Manchester, NH 03103
(603) 647-9700

CODE CONSULTANT: HASTINGS CONSULTING, INC.
142 Hanlon Road
Holliston, MA 01746
(508) 397-8417

ACOUSTICAL CONSULTANT:	L.G. COPLEY ASSOCIATES 53 Barrett Street, PO Box 920479 Needham, MA 02492 (781) 455-8814
FIRE PROTECTION and PLUMBING ENGINEERS	VAV INTERNATIONAL, INC. 400 West Cummings Park S. 4700 Woburn, MA 01801 (781) 935-7228
MECHANICAL ENGINEER:	VAV INTERNATIONAL, INC. 400 West Cummings Park S. 4700 Woburn, MA 01801 (781) 935-7228
ELECTRICAL ENGINEER:	THOMPSON ENGINEERING COMPANY, INC. 10 City Square Boston, MA 02129 (617) 886-9066
TECHNOLOGY CONSULTANT:	EDVANCE TECHNOLOGY DESIGN, INC 300 Brickstone Square, Suite 201 Andover, MA 01880 (978) 256-9900
ENVIRONMENTAL CONSULTANT:	ECMS, INC. 288 Grove St., #391 Braintree, MA 02184 (617) 338-2121
TRAFFIC CONSULTANT:	PARE CORPORATION 8 Blackstone Valley Place Lincoln, RI 02865 (401) 334-4100
LEED CONSULTANT:	THE GREEN ENGINEER 23 Bradford Street Concord, MA 01742 (978) 369-8978

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Bidding Requirements
Contract Forms
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NOTICE TO BIDDERS

In accordance with Chapter 193 of the Acts and Resolves of 2004, an Act Further Regulating Public Construction in the Commonwealth, and M.G.L. Chapter 149, the City of Amesbury, the Awarding Authority, invites sealed bids from **pre-qualified filed subcontractors and pre-qualified general contractors** for the NEW AMESBURY ELEMENTARY SCHOOL, in accordance with the Contract Documents prepared by DiNisco Design, Inc., 99 Chauncy Street, Suite 901, Boston, MA 02111. The project consists of **new construction of a 98,196 SF elementary school and related site work**. **The estimated value of the General Contract is $47,000,000**.

This project is being Electronically Bid (E-Bid). All bids shall be submitted online at www.Projectdog.com. Hard copy bids will not be accepted by the Awarding Authority. Tutorials and Instructions are available online at www.Projectdog.com. Click here to download the Projectdog, Inc. Supplemental Instructions to Bidders for Electronic Bid Projects (E-Bid). For assistance, contact Projectdog Inc. at 978.499.9014.

Bids must be received no later than the dates and times specified below.

General bids and Filed Sub-bids will only be accepted from previously pre-qualified Bidders with the exception of SECTION 140001-ELEVATORS, for which no pre-qualification is required.

GENERAL BIDS will be received until **2:00 PM, prevailing time, on Tuesday, April 20, 2021** and publicly opened online forthwith.

FILED SUB-BIDS for the trades listed below will be received until **2:00 PM, prevailing time, on Tuesday, April 06, 2021** and publicly opened online forthwith.

SUBTRADES
SECTION 040001 - MASONRY
SECTION 050001 - MISCELLANEOUS AND ORNAMENTAL IRON
SECTION 070001 - WATERPROOFING, DAMPPROOFING AND CAULKING
SECTION 070002 - ROOFING AND FLASHING
SECTION 080001 - METAL WINDOWS
SECTION 080002 - GLASS AND GLAZING
SECTION 090002 - TILE
SECTION 090003 - ACOUSTICAL TILE
SECTION 090005 - RESILIENT FLOORING
SECTION 090007 - PAINTING
SECTION 140001 - ELEVATORS
SECTION 210001 - FIRE PROTECTION
SECTION 220001 - PLUMBING
SECTION 230001 - HEATING, VENTILATING AND AIR CONDITIONING
SECTION 260001 - ELECTRICAL

General Bids and Sub-bids shall be accompanied by a bid security deposit in an amount that is not less than five percent of the bid amount, considering all alternates.

The Bid Security in the form of cash, or a certified check, treasurer's or cashier's check issued by a responsible bank or trust company and made payable to the Owner must be submitted with a completed Cash Bid Bond Affidavit form and received by the Owner before the time of bidding. In addition, the Bidder must also submit a completed Cash Bid Bond Affidavit form with their E-Bid. Click here to download the Cash Bid Bond Affidavit PDF fill-in form.

Alternately, the Bid Security may be in the form of a Bid Bond, which shall be:

a) with a surety company qualified to do business in the Commonwealth of Massachusetts and satisfactory to Owner;

b) conditional upon the faithful performance by the principal of the agreements contained in the Bid; and

c) submitted with your E-Bid online at www.Projectdog.com.

Bid Forms and Contract Documents are available online at www.Projectdog.com. Enter the Project Code **841245** in the project locator box and select "Acquire Documents" to download documents. Alternatively, a free CD-ROM may be requested by contacting Projectdog – shipping & handling charges apply. All plan holders must have an active online account on www.Projectdog.com to acquire documents, receive project notifications, and to submit bids electronically.

Bidders may obtain one (1) full paper bid set for a refundable deposit of **$350.00** in the form of certified check or money order payable to Projectdog Inc. Bid sets may be mailed for a non-refundable shipping & handling fee of **$125.00** also payable to Projectdog Inc. Send request with check(s) to Projectdog Inc., 18 Graf Road – Unit 8, Newburyport, MA 01950. Alternatively, bid sets may be picked up at the offices of Projectdog Inc., Monday through Friday from 8:30 a.m. to 5:00 p.m. – please call ahead for availability. The full amount of the deposit will be refunded to all responsive Bidders who return the documents in good condition within ten (10) days post-bid. Otherwise, the deposit shall become the property of Projectdog Inc.

Bid documents will be available after **12:00 Noon, Wednesday, March 10, 2021** from Projectdog.com as outlined above.

A non-mandatory Pre-Bid Conference shall take place at **3:00 PM on Thursday, March 18, 2021** at 193 Lions Mouth Road, Amesbury, Massachusetts. Meet in the Cashman School Parking Lot near the Service Entry. Note: Attendees must follow proper COVID-19 protocols. Wearing a mask is mandatory.

Addenda, if issued, will be posted to the Projectdog website and shall be accompanied by email notification to every individual or firm on record as having received the Contract Documents. Hard copies of addenda will not be mailed or faxed. It shall be the sole responsibility of the Contractor to ascertain the existence of any and all addenda.

The CITY OF AMESBURY reserves the right to waive any informalities in or to reject any or all general bids if it be in the public interest to do so.

The CITY OF AMESBURY also reserves the right to reject any sub-bid if less than three sub-bids are received for a sub-trade or if bid prices are not acceptable without further competition.

INSTRUCTIONS TO BIDDERS

ARTICLE 1 – BIDDER'S REPRESENTATION

1.1 Each General Bidder or Sub-Bidder (hereinafter called "Bidder") by making a bid or sub-bid (hereinafter called "bid") represents that:

a. The Bidder has read and understands the Contract Documents and the bid is made in accordance therewith.

b. The Bidder has visited the site and is familiar with the local conditions under which the Work has to be performed.

1.2 Failure to so examine the Contract Documents and site will not relieve any Bidder from any obligation under the bid as submitted.

ARTICLE 2 – GENERAL BIDDER'S AND FILED SUB-BIDDER'S PREQUALIFICATION

2.1 **Only bidders who have been pre-qualified are eligible to submit bids for this project with the exception of SECTION 140001-ELEVATORS, for which no pre-qualification is required.**

2.2 General bids and filed sub-bids must be accompanied by (1) a Certificate of Eligibility issued by the Division of Capital Asset Management and Maintenance (DCAMM), showing that the Bidder has been approved to bid on projects the size and nature of this project, and (2) a Contractor Update Statement, DCAMM Form CQ3 (create a pdf file of the Certificate and browse & attach at www.projectdog.com).

2.3 The Division of Capital Asset Management and Maintenance (DCAMM) has revised the Prime/General and Sub-bidder Update Statements effective January 1, 2010. Please note that due to a typographical error, there is a revised Sub-bidder Update Statement form which issued February 5, 2010. Both forms are also available from DCAMM's web site www.mass.gov/dcam under "Contractor Certification".

2.4 The main revisions were to ensure that bidders include information that was not disclosed on their most recent Application for Certificate of Eligibility filed with the Division of Capital Asset Management and Maintenance (DCAMM). Please be careful to read all instructions on these forms if you are a bidder on a project being bid pursuant to M.G.L. Chapter 149 and/or 149A. If you have any questions regarding this matter, please contact the DCAMM Contractor Certification Office at (617) 727-9320.

2.5 It is the bidder's responsibility to obtain the necessary forms from DCAMM and make application to DCAMM in sufficient time for DCAMM to evaluate the application and issue a Certificate of Eligibility.

2.6 The Contractor Update Statement is not a public record as defined in M.G.L., Chapter 4, Section 7 and will not be open to public inspection.

ARTICLE 3 – EQUAL EMPLOYMENT OPPORTUNITY REQUIREMENTS

3.1 **Compliance with equal opportunity requirements of Appendix A, including the certifications of SECTION 00520 and SECTION 00530 are a prerequisite for receiving the award of the Contract.**

ARTICLE 4 – MBE AND WBE GOALS AND PARTICIPATION

4.1 The applicable goals for minority business enterprise (MBE) and woman business enterprise (WBE) participation established for this Contract are as follows:

- MBE – 4.2% of the CONTRACT Price
- WBE – 8.8% of the CONTRACT Price

General bidders must agree to comply with the requirements of Appendix B. The Owner has the discretion to determine whether compliance with the participation goals is feasible and may reduce or waive these goals. To reduce or waive the MBE/WBE participation goals, the apparent low General bidder must make this request in writing to the Owner no later than five (5) working days after the general bid opening. The request must be supported by documentation demonstrating good faith efforts have been made to meet the goals.

ARTICLE 5 – ELECTRONIC BID

5.1 This project is being Electronically Bid (E-Bid). All bids shall be submitted online at www.Projectdog.com. Hard copy bids will not be accepted by the Awarding Authority. Tutorials and Instructions are in Appendix C and available online at www.Projectdog.com.

ARTICLE 6 – REQUESTS FOR INTERPRETATION

6.1 All questions by prospective bidders as to the interpretations of the Information for Bidders, bid forms, form of contract, general and supplementary conditions, drawings, specifications or bonds, must be submitted in writing to DiNisco Design, Inc., 99 Chauncy Street, Boston, MA 02111, at least seven (7) days before the dates herein set for the opening of bids. Questions may be submitted via e-mail to Jim Shuttleworth (j.shuttleworth@dinisco.com) copying Tim Dorman at NV5 (tim.dorman@NV5.com). An interpretation of all questions so raised which, in the Architect's opinion requires interpretation, will be replied via Addenda. No other form of communication in this regard will be considered legal and binding. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under this bid as submitted. All addenda so issued shall be covered in the Bid and shall become part of the Contract Documents.

6.2 Bidding Documents and Addenda will be posted online at Projectdog.com. This site is the only official site for prospective bidders to obtain information and digital copies of official City bid documents. Bid Forms and Contract Documents are available online at www.Projectdog.com. Enter the Project Code 000000 in the project locator box and select "Acquire Documents" to download documents. Alternatively, a free CD-ROM may be requested by contacting Projectdog – shipping & handling charges apply. All plan holders must have an active online account on www.Projectdog.com to acquire documents, receive project notifications, and to submit bids electronically.

The City does not warrant, represent or guarantee the accuracy or completeness of any bid documents and/or information retrieved from any third party source, and the City is not responsible for any loss or damage including, but not limited to, time, money, or goodwill arising from errors, inaccuracies or omissions in any third party bid documents and/or information.

It is the responsibility of each prospective bidder to check the Projectdog website on a DAILY basis through the close of bids for any applicable addenda. Prospective bidders must download all bid documents for review and bid. It is the responsiblity of each prospective bidder to verify the completeness of their downloaded bid documents before submitting a bid and accompanying executed addenda acknowledgement and other required forms.

6.3 A notification of addenda will be emailed to all prospective bidders to email addresses furnished by them for such purposes. Bidders picking up sets of bid documents will be given all addenda issued to date and will be required to sign up for all documents, acknowledging receipt. Failure of any bidder to receive any such addenda or interpretation shall not relieve such bidder from any obligation under its bid as submitted, and each bidder must confirm for itself that it has received all addenda. All addenda so issued shall become part of the Contract Documents.

ARTICLE 7 – PREPARATION AND SUBMISSION OF BIDS

7.1 Bids shall be submitted electronically on the "Form for General Bid" or the "Form for Sub-Bid" at www.Projectdog.com as appropriate. The forms enclosed in the Project Manual shall not be extracted or used.

7.2 All entries on the bid form shall be made online. Any documents that are attached to the bid must be in pdf format.

7.3 Sums shall be expressed in both words and figures in the space indicated on the bid form. Where there is a discrepancy between the bid sum expressed in words and the bid sum expressed in figures, the words shall govern. Note: the electronic bid forms match the “word” amount to the numeric “figure” amount entered.

7.4 If a bid bond is used for deposit, it shall be in a form similar to A.I.A. Document A310, "Bid Bond;" shall be with a surety company satisfactory to the Awarding Authority and qualified to do business in Massachusetts; and shall be conditioned upon the faithful performance by the principal of the agreements contained in the bid.

7.5 Each sub-bidder is required to furnish bonds as required by M.G.L. Chapter 149 c. 149 Section 44D3/4. Costs for sub-contractor’s bond premiums shall be paid for by the sub-bidder in accordance with this section.

7.6 Bid Forms will be posted online at www.Projectdog.com with the Contract Documents. Watermarked Bid Forms included in the Project Manual should not be extracted or used for electronic bidding. All required Bid Forms must be completed and submitted in PDF formatted files. The Bidder must fill-in all required fields and signatures either digitally or manually (print, fill-in, and scan to PDF).

7.7 The Bidder shall access the Projectdog.com E-Bidding System by entering the Project Code **841245** in the project locator box then selecting "GC E-Bid" or "Sub E-Bid" from the project's "Project Details" page. The Bidder must enter their bid price as a numeric, whole dollar value only with no punctuation. The E-Bidding system automatically translates the numeric value into words and displays the bid price in both figures and words on the submitted bid form.

7.8 Bidders may upload ("Add File" or "Replace File"), review ("View File"), Save, submit ("Submit my E-Bid", or retract ("Retract my E-Bid" their E-Bid at any time prior to the designated deadline. The server clock is displayed on the project's E-Bidding page and is the time of record. Bidders must select "Submit my E-Bid" prior to the designated deadline to officially submit their E-Bid online. Once submitted, an E-Bid cannot be edited. To modify a submitted E-Bid, Bidders must retract their submission, make and Save any changes, and then submit the updated E-Bid. Upon submitting or retracting their E-Bid, Bidders will receive a convenience e-mail for informational purposes only. Bidders are encouraged to contact Projectdog if the email is not received.

7.9 Bidders are strongly encouraged to review their submitted E-Bid package by selecting "View My Bid Package" from the project's E-Bidding page. Uploaded files may be reviewed individually by selecting "View File". It is the Bidder's responsibility to confirm online that their E-Bid package has been submitted successfully. Timely submission of an E-Bid shall be the full responsibility of the Bidder. It is also the Bidder's responsibility to ensure that their submitted bid is 100% true, complete and accurate.

ARTICLE 8 – TAXES

8.1 The Awarding Authority is exempt from payment of the Massachusetts Sales Tax. The General Contractor will be provided a Certificate of Exemption number at the Pre-Construction Conference.

ARTICLE 9 – ALTERNATES

9.1 Each Bidder shall acknowledge all alternates listed.

9.2 Each Bidder shall bid on all Alternates by entering the dollar amount and selecting the "Add" or "Subtract" radio button necessitated by each Alternate listed in the corresponding space on the project's E-Bidding page. If an Alternate does not involve a change in dollar value, the Bidder shall so indicate by typing **"0"** for the dollar value of that Alternate and by selecting the **"Add"** radio button in the corresponding space on the project's E-Bidding page.

9.3 Filed Sub-Bidders

If the Alternate does not affect the sub-trade category of work, the Sub-Bidder shall so indicate by typing **"0"** for the dollar value of that Alternate and by selecting the **"Add"** radio button in the corresponding space on the project's E-Bidding page.

9.4 General Bidders shall enter on the Form for General Bid a single amount for each alternate which shall consist of the Sub-Bidder's amounts and the amount for work performed by the General Contractor.

9.5 The Low Bidder will be determined on the basis of the sum of the base bid and the alternates accepted. Alternates will be accepted in the order that they are listed.

ARTICLE 10 – ELECTRONIC SUBMISSION OF BIDS

10.1 Electronic Submission of Filed Sub-Bids

Sub-bids, including the security bid deposit bond or cash bid bond affidavit, DCAM Sub-bidder Certificate of Eligibility, and DCAM Sub-Bidder Update Statement shall be submitted electronically online at www.projectdog.com. No hard copy bids will be accepted.

You will receive an email confirming submission of your bid. Keep the email as a receipt that your bid was submitted. Note: you may modify your bid at any time prior to the bid date and time advertised. You will receive a new email each time you re-submit your bid.

10.1.1 Date and time for receipt of bids is set forth in the Notice to Bidders.

10.1.2 Timely submission of a bid online shall be the full responsibility of the Bidder. Note: The project countdown clock on the website is the official clock that will determine when the bids are due.

10.2 Electronic Submission of General Bids

General Bids, including the bid security deposit bond or cash bid bond affidavit, DCAM Certificate of Eligibility, and Prime / General Contractor Update Statement (CQ3) shall be submitted electronically online at www.projectdog.com. No hard copy bids will be accepted. You will receive an email confirming submission of your bid. Keep the email as a receipt that your bid was submitted. Note: You may modify your bid at any time prior to the bid date and time advertised. You will receive a new email each time you re-submit your bid.

10.2.1 Date and time for receipt of bids is set forth in the Notice to Bidders.

10.2.2 Timely submission of a bid online shall be the full responsibility of the Bidder. Note: The project countdown clock on the website is the official clock that will determine when the bids are due.

10.3 Cash bid security deposits, payable to the Awarding Authority (The City of Amesbury, MA), shall be either cash, certified check, or treasurer's or cashier's check issued by a responsible bank or trust company and must be submitted with the completed Cash Bid Bond Affidavit form and received by the Awarding Authority before the time of bidding. The **cash** bid deposit, **if used in lieu of a bid security deposit bond**, and completed Cash Bid Bond Affidavit form shall be hand delivered by appointment only or mailed to:

City of Amesbury, Treasurer's Office
62 Friend Street
Amesbury, MA 01913
(978) 388-8105 (call for appointment)

In addition, the Bidder must also submit a completed a Cash Bid Bond affidavit form with their e-bid. This form is available from the Projectdog website.

ARTICLE 11 – WITHDRAWAL OF BIDS

11.1 Withdrawal of Bids (Before Opening of Bids):

Any bid may be withdrawn (retracted) prior to the designated deadline by selected "Retract My E-Bid" from the project's E-Bidding page. Upon retracting, the Bidder will receive a convenience e-mail for informational purposes only. It is the Bidder's responsibility to review and confirm online that their bid has been retracted successfully.

11.2 Withdrawn bids may be resubmitted up to the time designated for the receipt of bids.

11.3 No bid of the three lowest General Bidders and the Sub-bidders they name on their general bids, and of the three lowest Sub-Bidders for each sub-trade shall be withdrawn within thirty days, Saturdays, Sundays, and legal holidays excluded, after the opening of the general bids.

ARTICLE 12 – AWARD

12.1 At its sole discretion, the Awarding Authority reserves the right to waive any informalities in or to reject any or all general and/or subcontractor bids if it be in the public interest to do so.

12.2 At its sole discretion, the Awarding Authority also reserves the right to reject any sub-bid if it determines that such sub-bid does not represent the bid of a person competent to perform the work as specified or if less than three sub-bids are received for sub-trade or if bid prices are not acceptable without further competition.

12.3 The Contract will be awarded to the lowest responsible and eligible bidder except in the event of substitution as provided under M.G.L. Chapter 149, Section 44E and 44F, in which case the procedure as required by said Section shall govern the award of the Contract.

12.4 As used herein, the term "lowest responsible and eligible Bidder" shall mean the General Bidder whose bid is the lowest of those Bidders demonstrably possessing the skill, ability, and integrity necessary for the faithful performance of the Work and who shall certify that he is able to furnish labor that can work in harmony with all other labor employed on the Work.

12.5 Refer to ARTICLE 3 – EQUAL EMPLOYMENT OPPORTUNITY REQUIREMENTS and ARTICLE 4 – MBE AND WBE GOALS AND PARTICIPATION for additional criteria for award of contract.

END OF SECTION

APPENDIX A

Supplemental Equal Employment Opportunity, Non-Discrimination and Affirmative Action Program

THE COMMONWEALTH OF MASSACHUSETTS

SUPPLEMENTAL EQUAL EMPLOYMENT OPPORTUNITY, NON-DISCRIMINATION AND AFFIRMATIVE ACTION PROGRAM

APPENDIX A

I. Definitions

For purposes of this contract,

"Minority" means a person who meets one or more of the following definitions:

(a) American Indian or Native American means: all persons having origins in any of the original peoples of North America and who are recognized as an Indian by a tribe or tribal organization.
(b) Asian means: All persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian sub-continent, or the Pacific Islands, including, but not limited to China, Japan, Korea, Samoa, India, and the Philippine Islands.
(c) Black means: All persons having origins in any of the Black racial groups of Africa, including, but not limited to, African-Americans, and all persons having origins in any of the original peoples of the Cape Verdean Islands.
(d) Eskimo or Aleut means: All persons having origins in any of the peoples of Northern Canada, Greenland, Alaska, and Eastern Siberia.
(e) Hispanic means: All persons having their origins in any of the Spanish-speaking peoples of Mexico, Puerto Rico, Cuba, Central or South America, or the Caribbean Islands.

"State construction contract" means a contract for the construction, reconstruction, installation, demolition, maintenance or repair of a building or capital facility, or a contract for the construction, reconstruction, alteration, remodeling or repair of a public work undertaken by a department, agency, board, or commission of the commonwealth.

"State assisted construction contract" means a contract for the construction, reconstruction, installation, demolition, maintenance or repair of a building or capital facility undertaken by a political subdivision of the commonwealth, or two or more political subdivisions thereof, an authority, or other instrumentality and whose costs of the contract are paid for, reimbursed, grant funded, or otherwise supported, in whole or in part, by the commonwealth.

II. Equal Opportunity, Non-Discrimination and Affirmative Action

During the performance of this Contract, the Contractor and all subcontractors (hereinafter collectively referred to as "the Contractor") for a state construction contract or a state assisted construction contract, for him/herself, his/her assignees and successors in interest, agree to comply with all applicable equal employment opportunity, non-discrimination and affirmative action requirements, including but not limited to the following:

In connection with the performance of work under this contract, the Contractor shall not discriminate against any employee or applicant for employment because of race, color, religious creed, national origin, sex, sexual orientation, genetic information, military service, age, ancestry or disability, shall not discriminate in the selection or retention of subcontractors, and shall not discriminate in the procurement of materials and rentals of equipment.

The aforesaid provision shall include, but not be limited to, the following: employment upgrading, demotion, or transfer; recruitment advertising, layoff or termination; rates of pay or other forms of compensation; conditions or privileges of employment; and selection for apprenticeship or on-the-job training opportunity. The Contractor shall comply with the provisions of chapter 151B of the Massachusetts General Laws, as amended, and all other applicable anti-discrimination and equal opportunity laws, all of which are herein incorporated by reference and made a part of this Contract.

The Contractor shall post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Massachusetts Commission Against Discrimination setting forth the provisions of the Fair Employment Practices Law of the Commonwealth (Massachusetts General Laws Chapter 151B).

In connection with the performance of work under this contract, the Contractor shall undertake, in good faith, affirmative action measures to eliminate any discriminatory barriers in the terms and conditions of employment on the grounds of race, color, religious creed, national origin, sex, sexual orientation, genetic information, military service, age, ancestry or disability. Such affirmative action measures shall entail positive and aggressive measures to ensure non-discrimination and to promote equal opportunity in the areas of hiring, upgrading, demotion or transfer, recruitment, layoff or termination, rate of compensation, apprenticeship and on-the-job training programs. A list of positive and aggressive measures shall include, but not be limited to, advertising employment opportunities in minority and other community news media; notifying minority, women and other community-based organizations of employment opportunities; validating all job specifications, selection requirements, and tests; maintaining a file of names and addresses of each worker referred to the Contractor and what action was taken concerning such worker; and notifying the administering agency in writing when a union with whom the Contractor has a collective bargaining agreement has failed to refer a minority or woman worker. These and other affirmative action measures shall include all actions required to guarantee equal employment opportunity for all persons, regardless of race, color, religious creed, national origin, sex, sexual orientation, genetic information, military service, age, ancestry or disability. One purpose of this provision is to ensure to the fullest extent possible an adequate supply of skilled tradesmen for this and future Commonwealth public construction projects.

III. Minority and Women Workforce Participation

Pursuant to his/her obligations under the preceding section, the Contractor shall strive to achieve on this project the labor participation goals contained herein. Said participation goals shall apply in each job category on this project including but not limited to bricklayers, carpenters, cement masons, electricians, ironworkers, operating engineers and those classes of work enumerated in Section 44F of Chapter 149 of the Massachusetts General Laws. The participation goals for this project shall be 15.3% for minorities and 6.9% for women. The participation goals, as set forth herein, shall not be construed as quotas or set-asides; rather, such participation goals will be used to measure the progress of the Commonwealth's equal opportunity, non-discrimination and affirmative action program. Additionally, the participation goals contained herein should not be seen or treated as a floor or as a ceiling for the employment of particular individuals or group of individuals.

IV. Liaison Committee

At the discretion of the agency that administers the contract for the construction project there may be established for the life of the contract a body to be known as the Liaison Committee. The Liaison Committee shall be composed of one representative each from the agency or agencies administering the contract for the construction project, hereinafter called the administering agency, a representative from the Office of Affirmative action, and such other representatives as may be designated by the administering agency.

The Contractor (or his/her agent, if any, designated by him/her as the on-site equal employment opportunity officer) shall recognize the Liaison Committee as an affirmative action body, and shall establish a continuing working relationship with the Liaison Committee, consulting with the Liaison Committee on all matters related to minority recruitment, referral, employment and training.

V. Reports and Records

The Contractor shall prepare projected workforce tables on a quarterly basis when required by the administering agency. These shall be broken down into projections, by week, of workers required in each trade. Copies shall be furnished one week in advance of the commencement of the period covered, and also, when updated, to the administering agency and the Liaison Committee when required.

The Contractor shall prepare weekly reports in a form approved by the administering agency, unless information required is required to be reported electronically by the administering agency, the number of hours worked in each trade by each employee, identified as woman, minority, or non-minority. Copies of these shall be provided at the end of each such week to the administering agency and the Liaison Committee.

Records of employment referral orders, prepared by the Contractor, shall be made available to the administering agency on request.

The Contractor will provide all information and reports required by the administering agency on instructions issued by the administering agency and will permit access to its facilities and any books, records, accounts and other sources of information which may be determined by the administering agency to effect the employment of personnel. This provision shall apply only to information pertinent to the Commonwealth's supplementary non-discrimination, equal opportunity and access and opportunity contract requirements. Where information required is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to the administering agency and shall set forth what efforts he has made to obtain the information.

VI. Access to Work Site

A designee of the administering agency and a designee of the Liaison Committee shall each have a right to access the work site.

VII. Solicitations for Subcontracts, and for the Procurement of Materials and Equipment

In all solicitations either by competitive bidding or negotiation made by the Contractor either for work to be performed under a subcontract or for the procurement of materials or equipment, each potential subcontractor or supplier shall be notified in writing by the Contractor of the Contractor's obligations under this contract relative to non-discrimination and equal opportunity.

VIII. Sanctions

Whenever the administering agency believes the General or Prime Contractor or any subcontractor may not be operating in compliance with the provisions of the Fair Employment Practices Law of the Commonwealth (Massachusetts General Laws Chapter 151B), the administering agency may refer the matter to the Massachusetts Commission Against Discrimination ("Commission") for investigation.

Following the referral of a matter by the administering agency to the Massachusetts Commission Against Discrimination, and while the matter is pending before the MCAD, the administering agency may withhold payments from contractors and subcontractors when it has documentation that the contractor or subcontractor has violated the Fair Employment Practices Law with respect to its activities on the Project, or if the administering agency determines that the contractor has materially failed to comply with its obligations and the requirements of this Section. The amount withheld shall not exceed a withhold of payment to the General or Prime Contractor of 1/100 or 1% of the contract award price or $5,000, whichever sum is greater, or, if a subcontractor is in non-compliance, a withhold by the administering agency from the General Contractor, to be assessed by the General Contractor as a charge against the subcontractor, of 1/100 or 1% of the subcontractor price, or $1,000 whichever sum is greater, for each violation of the applicable law or contract requirements. The total withheld from any one General or Prime Contractor or subcontractor on a Project shall not exceed $20,000 overall. No withhold of payments or investigation by the Commission or its agent shall be initiated without the administering agency providing prior notice to the Contractor.

If, after investigation, the Massachusetts Commission Against Discrimination finds that a General or Prime Contractor or subcontractor, in commission of a state construction contract or state-assisted construction contract, violated the provisions of the Fair Employment Practices Law, the administering agency may convert the amount withheld as set forth above into a permanent sanction, as a permanent deduct from payments to the General or Prime Contractor or subcontractor, which sanction will be in addition to any such sanctions, fines or penalties imposed by the Massachusetts Commission Against Discrimination:

No sanction enumerated under this Section shall be imposed by the administering agency except after notice to the General or Prime Contractor or subcontractor and an adjudicatory proceeding, as that term is used, under Massachusetts General Laws Chapter 30A, has been conducted.

IX. Severability

The provisions of this section are severable, and if any of these provisions shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall not affect or impair any of the remaining provisions.

X. Contractor's Certification

A bidder for a state construction contract or state assisted construction contract will not be eligible for award of the contract unless such bidder has submitted to the administering agency the following certifications, which shall be incorporated into the resulting contract:

a. Contractor's Equal Employment Certificate – SECTION 00530

b. Subcontractor's Equal Employment Certificate – SECTION 00540

XI. Subcontractor Requirements

Prior to the award of any subcontract for a state construction contract or a state assisted construction contract, regardless of tier, the Prime or General Contractor shall provide all prospective subcontractors with a complete copy of this Section entitled "Supplemental Equal Employment Opportunity, Non-Discrimination and Affirmative Action Program" and will incorporate the provisions of this Section by reference into any and all contracts or work orders for all subcontractors providing work on the Project. In order to ensure that the said subcontractor's certification becomes a part of all subcontracts under the prime contract, the Prime or General Contractor shall certify in writing to the administering agency that it has complied with the requirements as set forth in the proceeding paragraph.

APPENDIX B

Revised Overall Annual Program Participation Goals for
MBE & WBE Participation

Supplier Diversity Office Construction Reform Program
Municipalities General Guidelines, including
Attachments A, B, C and D; and Exhibits A, B and C

REVISED OVERALL ANNUAL PROGRAM PARTICIPATION GOALS FOR MBE & WBE PARTICIPATION ON CERTAIN STATE FUNDED BUILDING PROJECTS

Affirmative Marketing Program Announcement:

Pursuant to M.G.L. c 7c, §6 and M.G.L. c. 7, §61(l), the Supplier Diversity Office ("SDO") and the Division of Capital Asset Management and Maintenance ("DCAMM") have set new Overall Annual Program Goals for Minority Business Enterprise ("MBE") and Women Business Enterprise ("WBE") Participation. These new Overall Annual MBE and WBE Participation Goals apply to the total dollar amount of contracts awarded annually for construction work and design services on affected capital facility projects and state assisted building projects as those projects are defined in the above referenced laws and related Executive Orders.

Effective July 1, 2020, and until such time as the Overall Annual MBE and WBE Participation Goals may be revised, the MBE and WBE participation goals applicable to annual spending by those affected public awarding authorities on their building construction and design project awards are as follows:

Overall Annual Program Goals Applied to Awarded Projects

	Construction Awards	Design Awards
MBE Participation	4.2%	6.6%
WBE Participation	8.8%	15.0%

Important Note: *These are annual goals and are only applicable to the overall annual dollar value of contracts awarded by an awarding authority. These overall annual participation goals should not be applied in setting MBE and WBE participation goals on individual construction or design projects. Individual project goals shall be set using project specific information including project costs, MBE/WBE availability and other applicable factors.*

For those individual building construction or design contracts advertised for procurement on or after July 1, 2020 for which MBE and WBE Participation Goals are set, the MBE and WBE participation goals shall be established on a project by project basis and be listed as separate MBE and WBE participation goals in procurement documents and contracts.

MBE and WBE goals for individual building construction and design contracts shall be established on a project by project basis, using project specific information including estimated project costs, MBE/WBE availability, project specific and other applicable factors. Municipal public awarding authorities should contact SDO, and state public awarding authorities should contact DCAMM for additional information on setting project participation goals on individual projects, as well as their project compliance and participation reporting responsibilities.

OPERATIONAL SERVICES DIVISION
Gary J. Lambert
Assistant Secretary for Operational Services

THE COMMONWEALTH OF MASSACHUSETTS
Executive Office for Administration and Finance
OPERATIONAL SERVICES DIVISION
One Ashburton Place, Suite 1017
Boston, MA 02108-1552
Charles D. Baker
Governor
Karyn E. Polito
Lieutenant Governor
Michael J. Heffernan
Secretary

SUPPLIER DIVERSITY OFFICE
CONSTRUCTION REFORM PROGRAM
MUNICIPALITIES GENERAL GUIDELINES

The Supplier Diversity Office (SDO) issues the Construction Reform Program guidelines on the Municipality Guidelines webpage in accordance with the statutory standards set forth in Chapter 193 of the Acts of 2004, which includes a municipal affirmative marketing program for currently certified firms in the Commonwealth of Massachusetts.

THE BIDDING AND CONTRACT INSTRUCTIONS ON THE MUNICIPALITY GUIDELINES WEBPAGE MUST BE INCORPORATED INTO CONTRACT DOCUMENTS, AS REQUIRED BY CHAPTER 193 OF THE ACTS OF 2004.

Municipalities must incorporate Minority Business Enterprise (MBE) and Women Business Enterprise (WBE) goals into both their design and construction procurement for municipal contracts for the construction, reconstruction, alteration, remodeling, repair or demolition of any public building by any city or town that includes funding provided by the Commonwealth such as legislative appropriations, grant awards, reimbursements and municipal commitments to use state funds.

Only firms which are **currently** MBE or WBE **certified** by the Supplier Diversity Office (SDO) at the date of contract award will be counted for Construction Reform program purposes. The firm's current SDO state certification letter **shall serve as the sole and exclusive proof of state certification**.

Certification as a Disadvantaged Business Enterprise (DBE), certification as an MBE/WBE by any agency other than SDO, or submission of an application to SDO for certification as an MBE/WBE **shall not confer** MBE or WBE status on a firm for purposes of construction reform program participation credit.

Affirmative Marketing Participation Goals:
The combined goals below were established by the Division of Capital Asset Management and Maintenance (DCAMM) and the Supplier Diversity Office (SDO) and require a reasonable representation of both MBE and WBE firms:

Design Participation: Combined MBE/WBE goal of ~~(17.9%)~~ *21.6%
Construction Participation: Combined MBE/WBE goal of ~~(10.4%)~~ *13.0%

Documentation submitted with your signature means that you swear under the pains and penalties of perjury that you have read and understand it. Any false claims for MBE/WBE credit are subject to the Massachusetts False Claims Act and any applicable civil or criminal penalties as determined by the Massachusetts Attorney General's office.1

Questions and Contact Information:
Separate and individual PDF files are attached for your reference. All questions concerning the Construction Reform Act and the implementation of the new law may be directed to the SDO Director of Construction Reform at **617-502-8851** or by e-mail at **John.B.Fitzpatrick@state.ma.us**

1 See generally, MG.L. c.12, §§5A-5O, inclusive.

*MODIFIED PER CENTRAL REGISTER ISSUED UPDATED GOALS 6/2020

ATTACHMENT A

PROCEDURE FOR PRE-ADVERTISING ADJUSTMENT OF MBE/WBE PARTICIPATION GOALS

A. Affirmative Marketing Participation Goals:
The combined goals below were established by the Division of Capital Asset Management and Maintenance (DCAMM) and the Supplier Diversity Office (SDO) and require a reasonable representation of both MBE and WBE firms.

Design Participation: **Combined MBE/WBE goal of (~~17.9%~~)** *21.6%
Construction Participation: **Combined MBE/WBE goal of (~~10.4%~~)** *13.0%

All documentation submitted in connection with MBE/WBE credit must be true, accurate and correct to the best of your knowledge. Your signature on any MBE/WBE goal-related document means that you have read and understand it. Any false claims for MBE/WBE credit are subject to the Massachusetts False Claims Act and any applicable civil or criminal penalties as determined by the Massachusetts Attorney General's office. [1]

B. Criteria for Adjustment of Goals:
An Awarding Authority may file a written request for the adjustment of participation goals with the Executive Director of the SDO prior to the advertising of the contract.[2] Factors that may be considered include any or all of the following:

- Actual availability of SDO certified Minority-Owned Business Enterprises (MBE) or Women-Owned Business Enterprises (WBE);
- The geographic location of the project;
- The scope of work of the project including the opportunities for sub-contracting and subdividing the work and other relevant factors; and
- The SDO, at the request of the awarding authority or any perspective bidder may agree to assist in MBE/WBE outreach. The SDO is not required nor obligated to do this. It is a complementary service provided, and one the SDO strongly suggests be taken advantage of.

C. Project Thresholds:
Participation Goals[3] can be adjusted by the Awarding Authority without filing a formal request with SDO if the total estimated construction or design cost is $100,000 or less.

D. Supporting Documentation for Design and Construction Projects will include, but are not limited to the following:

1. Documents to support a reduction/waiver request should include a general description of the project, a copy of the detailed project estimates and the deadline for placement of project advertisement;
2. The reasons that the Awarding Authority or its representative is requesting a reduction/waiver of the MBE/WBE participation goals;
3. Documentation that there may be a lack of eligible MBE/WBEs to perform the design or construction contract work after reviewing the SDO Business Directory;
4. Documentation that all subcontracting opportunities were identified and made available to meet the MBE/WBE participation goals;
5. The Awarding Authority may also submit any other information supporting its request for adjustment of the MBE/WBE participation goals; and
6. All applicable sections of the **Massachusetts False Claims Act** as well as any related civil or criminal penalties as determined by the Massachusetts Attorney General are incorporated by reference into this document.[4]

E. Request for Adjustment of Design and Construction Goals:

1. Requests by an Awarding Authority for Adjustment of MBE/WBE Participation Goals must be submitted in writing no less than ten (10) working days before the deadline for placement of advertisements for the contract.
   Applications should be directed to the SDO Director of Construction Reform, One Ashburton Place, Room 1017, Boston, MA 02108 or by e-mail to: John.B.Fitzpatrick@state.ma.us,
2. Requests for adjustments on Design and Construction Goals must be applied for separately and are not interchangeable. Participation credits for modular projects can be awarded under either the design or construction goals, but not both.
3. The written request for the reduction/waiver must include the reasons for it and all supporting documentation.
4. The SDO will provide a written response prior to the advertising deadline.

---

[1] *See generally*, MG.L. c.12, §§5A-5O, inclusive.
[2] In rare instances after advertising and before bidding based on new information you may request an adjustment post-advertisement. Any adjustment granted must be the subject of an Addendum.
[3] For state-assisted building projects.
[4] *See generally*, MG.L. c.12, §§5A-5O, inclusive.

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ATTACHMENT B

PROCEDURES FOR PRE-BID REDUCTION/WAIVER OF MBE/WBE PARTICIPATION GOALS

A. Affirmative Marketing Participation Goals:

The combined goals below were established by the Division of Capital Asset Management and Maintenance (DCAMM) and the Supplier Diversity Office (SDO) and require a reasonable representation of both MBE and WBE firms.

Design Participation: **Combined MBE/WBE goal of (~~17.9%~~)** *21.6%
Construction Participation: **Combined MBE/WBE goal of (~~10.4%~~)***13.0%

All documentation submitted in connection with MBE/WBE credit must be true, accurate and correct to the best of your knowledge. Your signature on any MBE/WBE goal-related document means that you have read and understand it. Any false claims for MBE/WBE credit are subject to the Massachusetts False Claims Act and any applicable civil or criminal penalties as determined by the Massachusetts Attorney General's office. [1]

B. Criteria for Adjustment of Goals: [2]

Potential Bidders may request a written adjustment before bids are submitted. An awarding authority cannot grant an adjustment of goals. Only the SDO has the authority to do this. Written requests must demonstrate that there is no feasible way to meet established contract goals and that a **"Diligent Good Faith Effort"** was made to comply. The request for reduction/waiver will ultimately be decided by the SDO. Factors that may be considered include any or all of the following:

- Actual availability of certified Minority- and/or Women-Owned Business Enterprises (MBE/WBEs);
- The geographic location of the project;
- The scope of work of the project including the opportunities for sub-contracting and subdividing the work;
- Documentation that shows the Bidder attempted in a diligent good faith effort to fulfill contract goals and was unable to do so; and
- Other relevant factors;

Although the SDO is not obligated to do so, the SDO may agree to assist either an awarding authority or any potential bidder with its MBE/WBE outreach. **We strongly encourage you to use this service.**

C. Required Supporting Documentation from Potential Construction Bidders:

- Using the SDO Reduction/Waiver Request form, the Bidder must prove that notices were sent to certified firms.
- They must break down larger scopes of work into its smallest component parts so that the widest available pool of ready, willing and able certified MBE/WBE firms may participate;
- In the event that an individual scope of work was not made available to ready, willing and able certified firms in certain trade categories,[3] a bidder must explain why in writing. Follow up documentation such as phone logs, or e-mail may be required to determine with certainty whether the firms were interested in performing the work.
- Additional documentation of reasonable efforts on the part of the Bidder to assist a potential MBE/WBE firm may include items such as, but not limited to: (a) bonding, insurance, lines of credit or any other type of assistance; or (b) evidence that the Bidder placed advertisements in appropriate media and trade association publications.
- The Bidder shall also submit any other information reasonably requested by the Awarding Authority.

D. Process for Requesting Waiver/Reduction of Construction Goals:

Requests from prospective general Bidders to reduce or waive the MBE/WBE participation goals must be written. An awarding authority must receive such requests no later than **ten (10) working days** before the general bids are due. Requests submitted beyond this deadline will not be considered.

[1] *See generally,* MG.L. c.12, §§5A-5O, inclusive.
[2] Applies to waivers and reductions.
[3] Other than work performed by filed Sub-Bidders.

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ATTACHMENT C
MODEL BIDDING INSTRUCTIONS

A. Affirmative Marketing Participation Goals:
Each Municipality must enforce the current Affirmative Marketing Goals developed by the Division of Capital Asset Management and Maintenance (DCAMM) and Supplier Diversity Office (SDO) as follows: [1]

Design Participation: **Combined MBE/WBE goal of (~~17.9%~~)** *21.6%
Construction Participation: **Combined MBE/WBE goal of ~~(10.4%)~~***13.0%

All documentation submitted in connection with MBE/WBE credit must be true, accurate and correct to the best of your knowledge. Your signature on any MBE/WBE goal-related document means that you have read and understand it. Any false claims for MBE/WBE credit are subject to the Massachusetts False Claims Act and any applicable civil or criminal penalties as determined by the Massachusetts Attorney General's office. [2]

A. MBE and WBE Participation Requirements:

1. Compliance with the requirements of this Section is a pre-requisite for receiving a Contract Award. The Contractor must utilize a reasonable representation mix of both MBE and WBE firms whose collective participation either meets or exceeds the overall combined contract goal. Both MBE and WBE firms shall have an opportunity to work on public projects with a combined MBE/WBE goal.
2. Projects with a combined goal must include a reasonable representation of **both** MBE **and** WBE firms to meet or exceed the combined goal. Both categories must be reflected in the participation goals, e.g. bidders who meet the participation goals of one category, such as MBE, must still find WBE representation. Combined contract participation goals must be reported and tracked separately.
3. The MBE and WBE participation goals for this Contract are set forth above. The Awarding Authority reserves the right to accept and review written requests but does not have the authority to reduce or waive the MBE or WBE participation goals established for this contract. Waivers or reductions of MBE/WBE participation are contingent on the following: (a) MBE/WBE availability, (b) geographic location, (c) scope of work, (d) the percentage of work available for subcontracting to MBE/WBEs and/or (e) other relevant factors including documentation by General Bidder showing a **Diligent, Good Faith Effort** to secure commitments from MBE/WBE subcontractors. If these criteria are met, the Awarding Authority may submit the General Bidders request along with all the foregoing documentation to the Executive Director of the Supplier Diversity Office (SDO) for final determination.
4. All contracts shall provide MBE/WBE firms with contracting opportunities. If a bidder fails to make a subcontracting opportunity available to certified MBEs/WBEs, it must explain why in writing. The Bidder shall also demonstrate that, where commercially reasonable, subcontracts were divided into smaller scopes or tasks capable of being performed by MBE/WBEs.
5. A successful bidder must provide notice of: (a) each MBE/WBE solicited, and (b) each MBE/WBE listed in the SDO directory under the applicable trade category that was not solicited and reasons therefore. The Bidder shall also state the date that notices were mailed and provide a copy of the written notice(s) sent.
6. Reasonable follow up efforts include written notices sent to MBE/WBEs with telephone calls or personal visits in order to determine with certainty whether the MBE/WBEs were interested in performing the work. Phone logs or other documentation must be submitted.
7. A statement of the response received from each MBE/WBE solicited, including the reason for rejecting any MBE/WBE who submitted a bid or proposal may also be provided
8. If MBE/WBEs have difficulty obtaining bonding, insurance or lines of credit to participate in the project, prospective bidders must show reasonable efforts were made to assist MBE/WBEs to obtain bonding, insurance, or lines of credit.
9. Reasonable efforts may also include whether a Bidder placed advertisements in appropriate media and trade association publications announcing the Bidder's interest in obtaining bids or proposals from MBE/WBEs, and/or sent written notification to MBE/WBE economic development assistance agencies, trade groups and other organizations notifying them of the Contract and the work to be subcontracted by the Bidder to MBE/WBEs. The Bidder shall also submit any other information reasonably requested by the Awarding Authority to show that the Bidder has taken all possible reasonable steps to achieve the MBE/WBE participation goals.
10. If **filed Sub-Bids** are solicited for this Contract, requests to reduce or waive the MBE/WBE participation goals must be received by the Awarding Authority no later than ten (10) working days after the list of filed Sub-Bidders is sent by the Awarding Authority to persons who have taken out plans for the Contract. If there are no filed Sub-Bids solicited for this Contract, requests to reduce or waive the MBE/WBE participation goals for this Contract must be received by the Awarding Authority no later than ten (10) working days before the date set for the receipt of general Bids. **The Awarding Authority Will Not Consider Any Request To Reduce Or Waive The MBE/WBE Participation Goals For This Contract That Is Received After These Deadlines.**
11. Within five (5) working days after the opening of general Bids, the low Bidder shall submit the following documents to the Awarding Authority's Affirmative Marketing Construction Officer (AMCO): (a) a completed Schedule for Participation by MBE/WBE ("Schedule for Participation") in the form provided by the Awarding Authority showing MBE/WBE participation in amounts equal to or exceeding the MBE/WBE participation goals for this Contract, (b) a completed Letter of Intent in the form provided by the Awarding Authority for each MBE/WBE listed in the Schedule for Participation, and (c) the most recent SDO

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[1] Periodically, goals may be changed or adjusted. Check the SDO web site for current MBE/WBE participation goals.
[2] *See generally*, MG.L. c.12, §§5A-5O, inclusive.

certification letter for each MBE/WBE listed in the Schedule of MBE/WBE Participation showing that the MBE/WBE is certified in the area of work for which it is listed on the Letter of Intent.

12. Each Letter of Intent shall describe the work to be performed by the MBE/WBE (the "MBE/WBE Work") with enough specificity to allow an awarding authority to determine which specific items count for MBE/WBE participation credit. The Awarding Authority reserves the right to reject any Letter of Intent if the price to be paid for the MBE/WBE Work does not bear a reasonable relationship to the value of such work under the Contract.
13. Within five (5) working days after receipt of the Schedule for MBE/WBE Participation, Letters of Intent, and most recent SDO certification letter, the Awarding Authority shall review and either approve or disapprove the apparent low Bidder's submissions. If the apparent low Bidder has not submitted an appropriate Schedule for MBE/WBE Participation and appropriate Letters of Intent and SDO most recent certification letter establishing that the MBE/WBE participation goal for the project will be met, the apparent low Bidder will be considered ineligible for Award of the Contract and the Awarding Authority will Award the Contract to the second lowest eligible and responsible Bidder, subject to said Bidder's compliance with these conditions. If funds are insufficient to award to the second lowest Bidder, the project may have to be re-bid.
14. General Conditions of the Contract require the Contractor to submit, within thirty (30) days of the Contract Date, copies of current certification letters for all subcontractors, signed subcontracts with all subcontractors or a purchase order or invoice from each material supplier and/or manufacturer listed on the Schedule for MBE/WBE Participation.
15. A filed sub-Bidder is not required to submit a Schedule of MBE/WBE Participation with its Bid. It may submit a Letter of Intent with its Bid if it is a SDO certified MBE/ WBE. If a filed sub-Bidder intends to sub-subcontract work to a SDO certified MBE/WBE, and the awarding authority permits limited sub-sub-contracting for purposes of MBE/WBE participation, and the filed sub-Bidder wishes that sub-subcontract to be credited toward the participation goals for this Contract, the filed sub-Bidder should submit a Letter of Intent from that MBE/WBE with its Bid.

ATTACHMENT D
MODEL CONTRACT INSTRUCTIONS FOR
MUNICIPAL CONTRACTS AND STATE ASSISTED BUILDING PROJECTS

A. Affirmative Marketing Participation Goals:
The combined goals below were established by the Division of Capital Asset Management and Maintenance (DCAMM) and the Supplier Diversity Office (SDO) and require a reasonable representation of both MBE and WBE firms:

Design Participation: **Combined MBE/WBE goal of ~~(17.9%)~~** *21.6%
Construction Participation: **Combined MBE/WBE goal of ~~(10.4%)~~***13.0%

All documentation submitted in connection with MBE/WBE credit must be true, accurate and correct to the best of your knowledge. Your signature on any MBE/WBE goal-related document means that you have read and understand it. Any false claims for MBE/WBE credit are subject to the Massachusetts False Claims Act and any applicable civil or criminal penalties as determined by the Massachusetts Attorney General's Office. [1]

B. MBE/WBE Participation Credit:

1. MBE and WBE participation goals are not interchangeable.
2. Participation credit is only given for actual contract work performed by currently certified MBE, WBE or M/WBE firm.
3. If the firm awarded the contract is itself currently certified as a MBE/WBE, 100% participation credit will be given for the work performed.
4. If the prime contractor is not a certified firm, it shall only receive credit for the portion of work completed by the certified firm.
5. MBE/WBE participation credit will be given to a supplier **only** if they are regularly engaged in sales of equipment or supplies to the construction industry from an established place of businesses and bear the risk of loss for product sold prior to delivery to a customer.
6. A contractor can count only 10% of the contract price towards an MBE or WBE goal on DCAMM projects.

C. Establishing MBE/WBE Status:

1. A business will be eligible for participation credit only if it has been certified by the Supplier Diversity Office (SDO) as a minority business enterprise (MBE) or a woman business enterprise (WBE).
2. Certification as a MBE/WBE **by any other agency other than SDO does not** confer the status to the firm for the purposes of contract participation credit.
3. Participation credit shall only be given to firms which are certified at the time of contract award
4. A firm currently being initially reviewed as part of the certification process cannot be used by a contractor towards MBE/WBE participation credit.

D. Performance of Contract Work by MBE/WBEs:

1. Only currently certified MBE/WBE firms count towards participation goals. If during the course of a contract, a SDO certified MBE/WBE firm is decertified their participation credit will be counted up until the date of decertification
2. An awarding authority will not grant MBE/WBE participation credit unless the contract work is actually completed by a certified SDO MBE/WBE firm. No credit will be given for work done by others or for work not on a MBE/WBE schedule of participation.
3. Once a letter of intent and a MBE/WBE letter of participation are approved, a contractor may not perform this same work using its own staff without the prior express written prior approval of the Awarding Authority.
4. The Contractor shall monitor the performance of MBE/WBE Work to ensure that each scheduled MBE/WBE performs its own work with its own workforce.

[1] *See generally,* MG.L. c. 12, §§5A-5O, inclusive.

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5. The Contractor and each MBE/WBE subcontractor shall provide the Awarding Authority with all information and documentation necessary to ascertain whether or not an MBE/WBE has performed its own MBE/WBE Work with its own personnel, tools and equipment.
6. Failure to submit documentation to the Awarding Authority shall establish conclusively for the purpose of giving MBE/WBE participation credit under this Contract that such MBE/WBE did not perform such work.

E. Notification of Changes in MBE/WBE Work:

If during the performance of a contract, a contractor determines or has reason to believe that:

1. A scheduled MBE/WBE is unable or unwilling to perform its MBE/WBE Work;
2. There has been or will be a change in any MBE/WBE Work; or
3. That the Contractor will be unable to meet the MBE/WBE participation goal(s) for the Contract for any reason.

Then he/she shall immediately notify the Awarding Authority in writing. Any notice of a change in MBE/WBE Work shall include a revised Schedule of MBE/WBE Participation, and additional or amended Letters of Intent and related subcontracts, as needed.

F. Good Faith Efforts Needed to Support Changes/Reduction of MBE/WBE Participation Goals:

If there is a change or reduction in any MBE/WBE Work which will result in the Contractor failing to meet the MBE/WBE participation goal(s), then he/she shall undertake a diligent, good faith effort to make up the shortfall as follows:

1. The Contractor shall identify all items of the Work remaining to be performed under the Contract that they made available for subcontracting to MBE/WBEs along with that which wasn't along with reasons why.
2. The Contractor shall send written notices to all MBE/WBEs ready, willing and able to perform such work. The contractor will provide the Awarding Authority with documentation identifying: (i) each MBE/WBE solicited, and (ii) each MBE/WBE listed in the SDO directory under the applicable trade category that was not solicited and the reasons why. The Contractor shall also advise the Awarding Authority of the dates that notices were sent and provide a copy of the written notice(s) sent.
3. The Contractor shall make reasonable efforts to follow up on the written notices, including telephone calls or personal visits in order to determine with certainty whether the MBE/WBEs were interested in performing the work. Phone logs or other documentation must be submitted to the Awarding Authority upon request.
4. The Contractor shall make documented reasonable efforts to assist MBE/WBEs that need assistance in obtaining insurance, bonds, or lines of credit in order to perform work under the Contract. Supporting documentation will be provided to the Awarding Authority upon request.
5. The Contractor shall provide the Awarding Authority with a statement of the response received from each MBE/WBE solicited, including the reason for rejecting any MBE/WBE who submitted a proposal.
6. The Contractor shall take any additional measures including, without limitation, placing advertisements in appropriate media and trade association publications announcing the Contractor's interest in obtaining proposals from MBE/WBEs, and/or sending written notification to MBE/WBE economic development assistance agencies, trade groups and other organizations notifying them of the project and of the work available to be subcontracted by the Contractor to MBE/WBEs.

If the Contractor is unable to meet the MBE/WBE participation goals for this Contract after complying fully with each of the above requirements and is otherwise in full compliance with the terms of this provision, the Awarding Authority may reduce the MBE/WBE participation goals for this Contract to the extent that such goals cannot be achieved.

G. Suspension of Payment and/or Performance for Noncompliance:

If a reduction of MBE/WBE goals was given but sufficient good faith efforts (see above) were not documented, then after proper written notice, the Awarding Authority has the discretion to:

1. Suspend payment to the Contractor of an amount equal to the value of the work which was to have been performed by an MBE/WBE pursuant to the Contractor's Schedule of MBE/WBE Participation but which was not so performed, in order to ensure that sufficient Contract funds will be available if liquidated damages are assessed;
2. Suspend the Contractor's performance of this Contract in whole or in part.

Notice Required Prior to Suspension: The Awarding Authority shall give the Contractor prompt written notice of any action taken and shall give the Contractor and any other interested party, including any MBE/WBEs, an opportunity to present evidence to it that the Contractor is in compliance with the requirements, or that there is some justifiable reason for waiving the requirements in whole or in part. The Awarding Authority may invite SDO to participate in these proceedings

If, based on a totality of the circumstances, it can be shown that all reasonable steps were taken and that the Contractor is in full compliance with the requirements of this Attachment, or that the Contractor has met or will meet the MBE/WBE participation goals for this Contract, the Awarding Authority shall release any funds withheld and lift any related suspension of the Contractor's performance.

H. Liquidated Damages; Termination

If payment by the Awarding Authority or performance by the Contractor is suspended, and if the breach cannot be cured or that same contractor fails to take all reasonable and immediate efforts to comply with the MBE/WBE participation goals set forth in this Contract, subject to the notice provisions above:

1. The Awarding Authority may terminate this Contract; or
2. The Awarding Authority may retain from final payment to the Contractor, as liquidated damages, an amount equal to the difference between:
    a. The total of the MBE/WBE participation goals set forth in this Contract, and;
    b. The amount of MBE/WBE participation credit earned by the Contractor for MBE/WBE Work performed under this Contract minus the cost to restore the loss to the Awarding Authority.
3. Any liquidated damages will be assessed separately for MBE and WBE participation.

Discretionary Option to Review Any Additional Mitigating Evidence Prior to Final Decision: Before exercising its rights and remedies, the Awarding Authority may but is not required to give the Contractor and any other interested party a final opportunity to present evidence that the Contractor is in compliance with the requirements or that there is some justifiable reason for waiving the requirements of this Attachment in whole or in part. The Awarding Authority may invite SDO to participate in these proceedings.

EXHIBIT A

SCHEDULE FOR PARTICIPATION
BY MINORITY/WOMEN BUSINESS ENTERPRISES

Project Number_____
Project Location_____
Project Name _____

A. Filed Sub-bidders utilizing MBE/WBE firms, and MBE/WBE Sub-bidders attach to Filed Sub-bid.
B. General Contractor must submit to the Awarding Authority within five (5) working days of the opening of General Bids.

BIDDER CERTIFICATION:
The Bidder agrees that if awarded the contract it will expend at least the amount of the contract set forth below for MBE/WBE participation. For purposes of this commitment, the MBE and WBE designation means that a business has been certified by SDO as either a MBE, WBE or MBE/WBE. The Bidder must indicate the MBE/WBE firms it intends to utilize on the project as follows (attach additional sheets if necessary):

Company Name & Address	**MBE or WBE**	**Describe MBE/WBE Scopes of Work (clarify "Labor Only", "Material Only" or "Labor and Material")**	**If Supplier, Indicate Total Value of Supplies (60% of Total Counts toward Participation)**	**Total Dollar Value of Participation**
1.				
2.				
3.				
4.				
5.				

MBE Goal: $_____ **Total Dollar Value of MBE Commitment: $_____**

WBE Goal: $_____ **Total Dollar Value of WBE Commitment: $_____**

The undersigned hereby certifies that he/she has read the terms and conditions of the contract with regard to MBE/WBE participation and is authorized to bind the Bidder to the commitment set forth above.

Name of Firm_____

Business Address_____

Print Name_____

Authorized Signature _____

Title_____

Telephone No._____ Fax No._____

Date _____

EXHIBIT B

LETTER OF INTENT
MINORITY/WOMEN BUSINESS ENTERPRISES PARTICIPATION

(To be completed by MBE/WBE, and submitted by the General Bidder to the Municipal Affirmative Marketing Construction Officer (AMCO) within five (5) working days of the opening of General Bids or by Filed Sub-bidder with its bid.)

Project Number_____

Project Name _____

Project Location_____

To_____

Name of General Bidder/Sub-bidder

Indicate SDO Certification:
_____ MBE
_____ WBE
_____ M/WBE

1. This firm intends to perform work in connection with the above project.
2. This firm is currently certified by SDO to perform the work identified below, and has not changed its minority/women ownership, control, or management without notifying SDO within thirty (30) days of such a change.
3. This firm understands that if the General Bidder/Sub-bidder referenced above is awarded the contract, the Bidder intends to enter into an agreement with this firm to perform the activity described below for the prices indicated. This firm also understands that the above-referenced firm, as General Bidder/Sub-Bidder, will make substitutions only as allowed by the terms of the Contract.
4. This firm understands that under the terms of the contract, only work actually performed by an MBE/WBE will be credited toward MBE/WBE participation goals, and this firm cannot assign or subcontract out any of its work without prior written approval of the Awarding Authority, and that any such assignment or subcontracting will not be credited toward MBE/WBE participation goals.

MBE/WBE PARTICIPATION

Section/Item Number (If Applicable)	**Describe MBE/WBE Scopes of Work (Clarify" Labor Only", "Material Only" or "Labor and Material")**	**If Supplier, Indicate Total Value of Supplies (60% of Total Counts Toward Participation)**	**Dollar Value of Participation**

Total Dollar Value: $_____

Name of MBE/WBE Firm_____

Business Address_____

Print Name_____

Authorized Signature _____

Title_____

Telephone No._____ Fax No._____

Date _____

EXHIBIT C

CONTRACTOR PROGRESS PAYMENT REPORT
MINORITY/WOMEN BUSINESS ENTERPRISES PARTICIPATION

Project Number: _____

Project Name: _____

Project Location: _____

Date: _____

Periodical Payment No.: _____

General Contractor: _____

MBE and/or WBE: _____

One copy of this report is to be submitted for each Minority Business Enterprise (MBE) and/or Women Business Enterprise (WBE) at the time of submitting a request for payment. Copies of the report must be sent to the Minority Business Enterprise (MBE) and/or Women Business Enterprise (WBE) named above and to the municipalities Affirmative Marketing Construction Officer (AMCO). The AMCO will forward a copy of each Contractor Progress Payment Report to SDO on a quarterly basis.

1. The total price to be paid to the above-named Minority Business Enterprise _____ and/or Women Business Enterprise _____: $_____

2. The amount remitted to the Minority Business Enterprise and/or Women Business Enterprise as of the above date for work performed under this project: $_____

3. Balance due the Minority Business Enterprise and/or Women Business Enterprise as of the above date for work performed under the above-named project: $_____

4. Comments or explanation of amounts indicated under items 1 and 2 above: _____

   _____

   _____

   _____

   _____

5. We hereby certify that the information supplied herein (including pages attached) is correct and complete.

General Contractor:	**Minority and/or Women Business Enterprise**
_____	_____
(Signed)	**(Signed)**
_____	_____
(Title)	**(Title)**
_____	_____
(Date)	**(Date)**

APPENDIX C

Projectdog, Inc.
Supplemental Instructions to Bidders
for Electronic Bid Projects (E-Bid)

Projectdog, Inc

Supplemental Instructions to Bidders for Electronic Bid Projects (E-Bid)

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Attachment:

Bid Bond Affidavit

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Sign Up

Every user of Projectdog.com has a unique username and password for their account. **MANDATORY: All users must keep usernames and passwords PRIVATE and SECURE. Do not share accounts.**

1. Go to **www.Projectdog.com**.
2. Select the "Sign Up" (Fig 1).
3. Complete all required form fields and press Submit. An automatic email will be sent to the registered email.
4. Select the confirmation link in the email to complete the registration.



Fig 1

Login

1. Go to **www.Projectdog.com**.
2. Enter a registered email address and password (Fig 1).
3. Press Login.

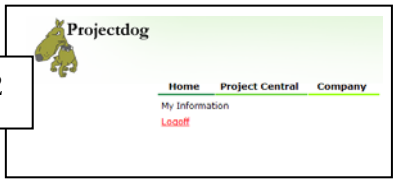

Fig 2

Logoff

1. Hover over Home (Fig 2).
2. Select "Logoff".

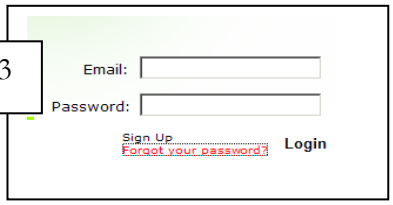

Fig 3

Forgotten Password

1. Select "Forgot your password?" (Fig 3).
2. Enter the e-mail address.
3. Select "Send Info". An automated e-mail will be sent with the password.

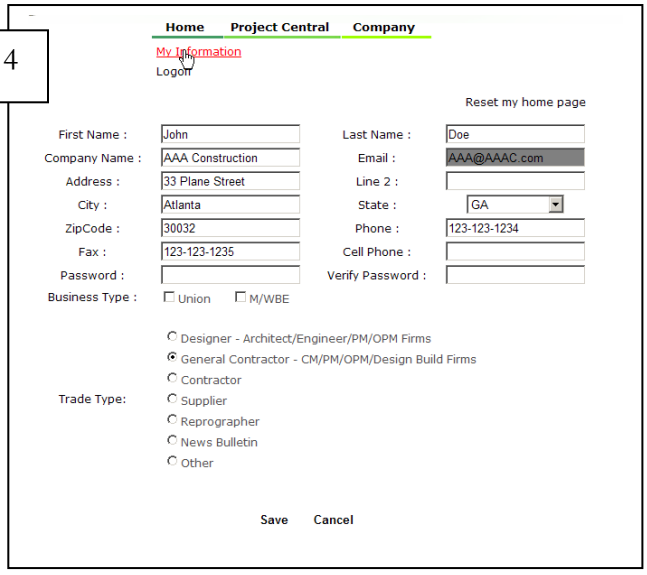

Fig 4

Account Information

View and edit user contact information. To change an email address, users must register a new account. Call Projectdog to have the old account removed.

1. Hover over Home (Fig 4).
2. Click "My Information".
3. Edit information as needed.
4. Click "Save" to finalize edits.

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Project Details

Utilize the search page (Fig 5) or enter a Project Code (Fig 6) to view a project's "Project Details" page (Fig 7).

Fig 5

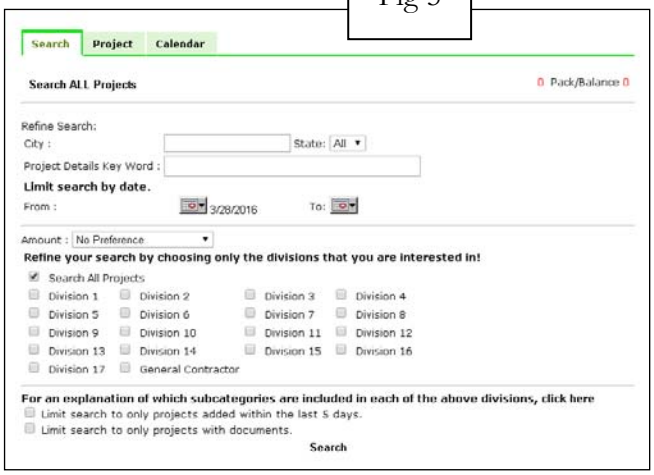
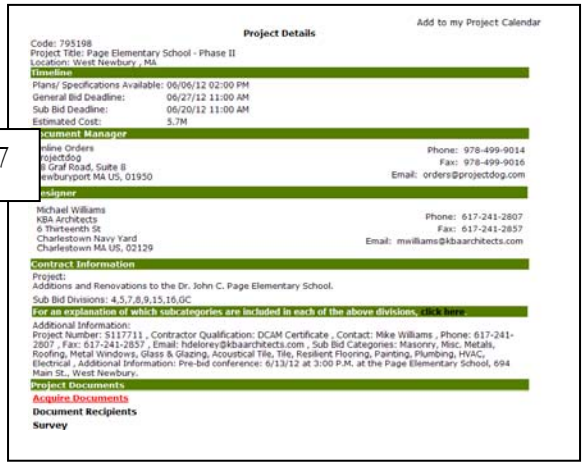


Fig 6



Fig 7



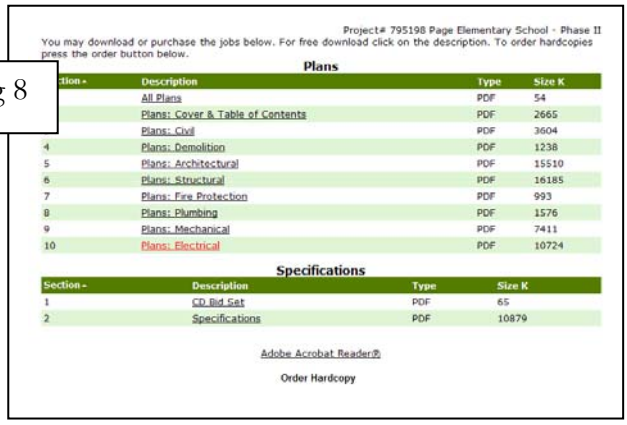
Acquire Documents

Download all project documents.

1. Click "Acquire Documents" link found on a project's "Project Details" page (Fig 7).
2. Respond to the Legal Notice after reviewing.
3. Click on any file description to open, review, or save a document (Fig 8).

   Users are automatically added to the project's "Document Recipients" list to receive update notifications upon viewing any document online.

Fig 8

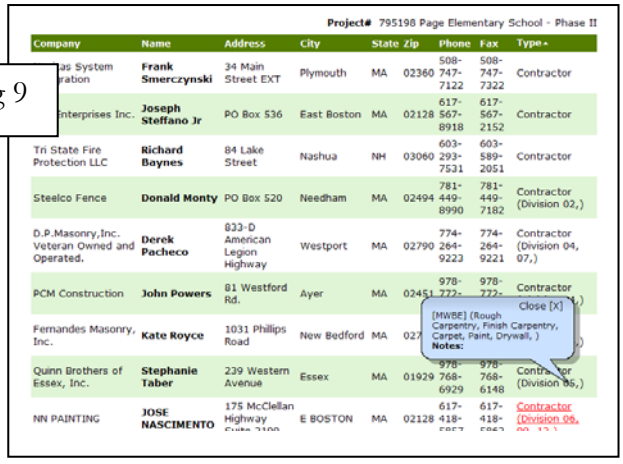


Document Recipients

Review all plan holders who have acquired documents.

1. Click "Document Recipients" link found on a project's "Project Details" page (Fig 7).
2. All potential bidders are listed and sorted by company type (Fig 9). Click on a column title to sort alphabetically.

Fig 9



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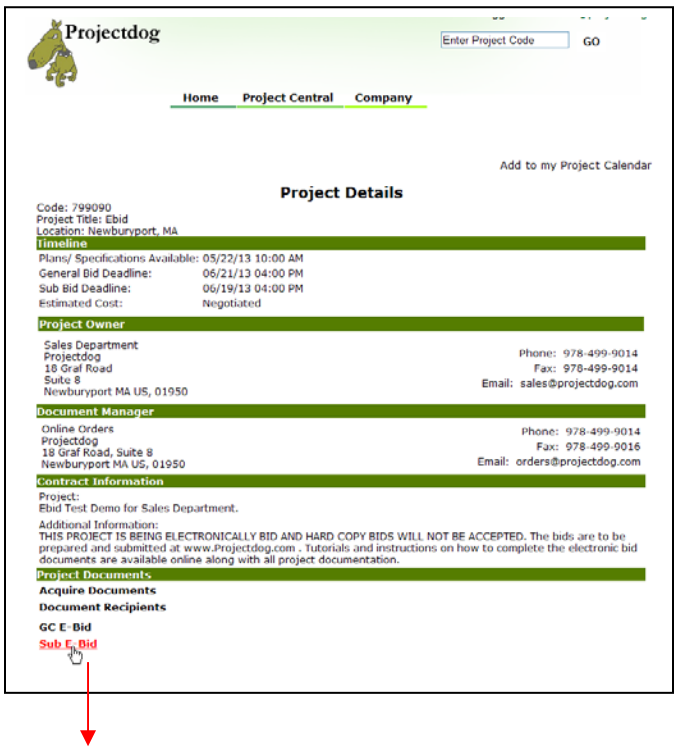
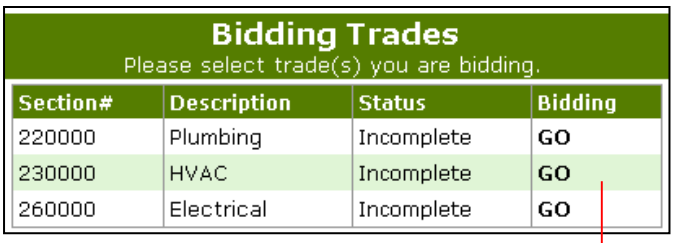
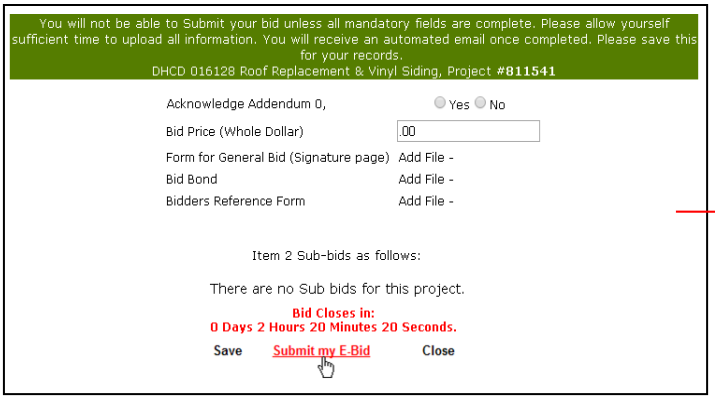
Electronic Bid (E-Bid)

This project is being **Electronically Bid** at www.Projectdog.com. Hard copy bids will not be accepted by the Awarding Authority. Go to www.Projectdog.com and Login with an existing account or click Sign Up to register for free. Enter a project code or search by keyword to access the "Project Details" page. Select "Acquire Documents" to download all bidding documents.









How to Submit an E-Bid

Complete and save all required forms as PDF files. Please be sure to sign all required signatures either digitally or manually.

1. Select the **GC E-Bid** or **Sub E-Bid** link located on the "Project Details" page.

   Subcontractors select a bidding trade;

   General Contractors will not be able to submit an E-Bid until the official sub bid tabulation is released by the Awarding Authority.

2. Answer / enter / upload all required areas. Enter all dollar value amounts as a whole dollar values only.

3. Select "Submit My E-Bid." Review the submitted bid package via the "View My Bid Package" link.

It's that simple!

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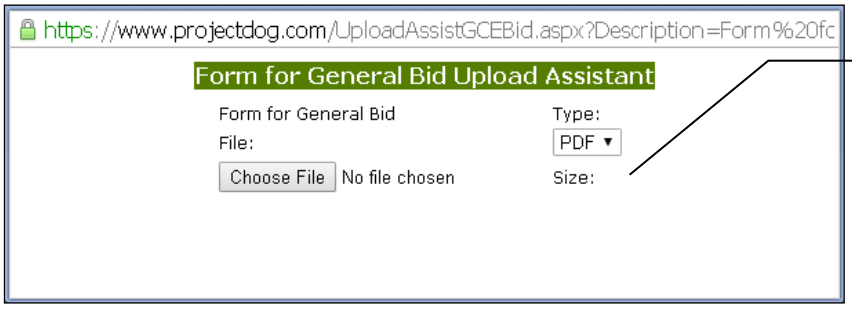
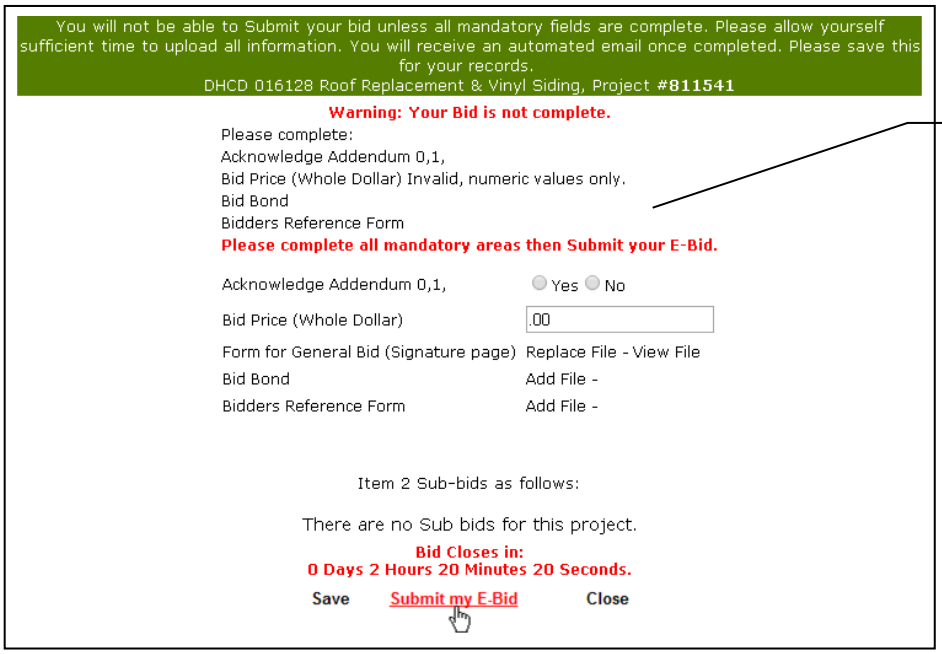


Add File

Click "Add File" on the E-Bid page to open the Upload Assistant window. Then click "Browse" or "Choose File" to upload a PDF file.



Warning

E-Bids cannot be submitted unless all areas are complete.

Save before adding files or closing the window or E-Bid data may need to be re-entered.

Projectdog.com server time is set to industry standards at time-a.nist.gov. Bidders are encouraged to update their computer clock.

Bidders may save, submit or modify an Electronic Bid (E-Bid) at any time prior to bid close. Once submitted, a bid cannot be edited. To modify a bid the bidder must retract the bid, make any necessary changes, and then submit the bid again. Upon submitting or retracting the bidder will receive a convenience email for informational purposes only. Bidders are encouraged to contact Projectdog if an email is not received.

It is the bidder's responsibility to review and confirm online that a bid has been submitted and/or retracted and that the bid is 100% true, complete and accurate. All bidders are required to review their submitted E-Bid via the "View My Bid Package" link.

If a bid is submitted prior to an addendum being issued the bidder will receive an automated email for informational purposes only stating the bidder must review the addendum, retract the bid, acknowledge all addenda, and submit the bid again. If a bidder fails to acknowledge addenda their bid may be rejected by the Awarding Authority.

Once the bid deadline has closed the E-Bid links are no longer available. All E-Bids are compiled in real time upon bid close and published forthwith on the "Project Details" page titled as "List of Bids Received". Official bid tabulations are posted at the discretion of the Awarding Authority.

For additional assistance, call Projectdog at (978) 499-9014 (M-F, 9AM-5PM).

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Bid Bond Affidavit

This document is an affidavit form that is drafted to serve as a statement wherein the person (Bidder) who signs it swears under penalty of perjury that the facts and information that are identified in this affidavit are true. **This affidavit is in lieu of an insurance Bid Bond certificate.**

Bidders submitting the Bid Bond Affidavit form and the 5% Bid Deposit in the form of cash, certified check, treasurer's or cashier's check issued by a responsible bank or trust company shall ensure that these documents are received by the Awarding Authority prior to the closing of the electronic bid.

Both the completed Bid Bond Affidavit form and the Bid Deposit shall be enclosed in a sealed envelope with the following information plainly marked on the outside:

DO NOT OPEN BEFORE: *[indicate DATE and TIME of bid opening]*

Project Name: _____
Project Number: _____
Bidder's Name: _____
Business Address: _____
Phone Number: _____

It is the Bidder's responsibility to ensure that the completed Bid Bond Affidavit form and Bid Deposit are submitted as stated above and received by the Awarding Authority prior to the closing of electronic bids. The completed Bid Bond Affidavit form must also be uploaded via the project E-bid "Bid Bond" link at www.Projectdog.com.

The Bidder understands and consents that any failure to do so whether his own or other fault may result in the rejection of said bid. The Bidder is solely responsible for the accuracy and value of the Bid Deposit. In the event that the Bid Deposit is less than the required amount as outlined in the project specifications the bid may be rejected.

Bid Deposit Amount (in figures): _____

☐ **CASH**

or

☐ **Certified, Treasurer's, or Cashier's Check**

Date: _____

Bidder's Name: _____

Business Address: _____

Signature: _____

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BID SUBMITTED BY:_____

FORM FOR GENERAL BID

TO THE AWARDING AUTHORITY
CITY OF AMESBURY, MA.

A. The undersigned proposes to furnish all labor and materials required for the NEW AMESBURY ELEMENTARY SCHOOL, Amesbury, MA in accordance with the accompanying Contract Documents, plans and specifications, prepared by DiNisco Design, Inc., 99 Chauncy Street, Suite 901, Boston, Massachusetts 02111, for the Contract Price specified below, subject to additions and deductions according to the terms of the Specifications.

B. The BID includes Addenda numbered _____.

C. The proposed CONTRACT PRICE is _____

_____DOLLARS ($_____).

FOR ALTERNATE NO. 1, ADD $_____ **SUBTRACT $**_____
FOR ALTERNATE NO. 2, ADD $_____ **SUBTRACT $**_____
FOR ALTERNATE NO. 3, ADD $_____ **SUBTRACT $**_____

D. The SUBDIVISION of the proposed Contract Price is as follows:

ITEM 1. The work of the general contractor, being all work other than that covered by ITEM 2,

_____

_____DOLLARS ($_____)

ITEM 2. Sub-Bids as follows:

(Note to General Bidders: In accordance with Chapter 193 of the Acts of 2004 all filed sub-bidders are required to furnish a performance bond and a labor and materials payment bond each in the sum of one hundred percent (100%) of their contract price and are required to carry the cost in their filed sub-bid price.)

Hard Copy ELECTRONIC BID Submissions Will Not Be Accepted

Amount

SECTION 040001 - MASONRY

Sub-bidder: _____ $_____

SECTION 050001 - MISCELLANEOUS AND ORNAMENTAL IRON

Sub-bidder: _____ $_____

SECTION 070001 - WATERPROOFING, DAMPPROOFING AND CAULKING

Sub-bidder: _____ $_____

SECTION 070002 - ROOFING AND FLASHING

Sub-bidder: _____ $_____

SECTION 080001 - METAL WINDOWS

Sub-bidder: _____ $_____

SECTION 080002 - GLASS AND GLAZING

Sub-bidder: _____ $_____

SECTION 090002 - TILE

Sub-bidder: _____ $_____

SECTION 090003 - ACOUSTICAL TILE

Sub-bidder: _____ $_____

SECTION 090005 -RESILIENT FLOORING

Sub-bidder: _____ $_____

SECTION 090007 – PAINTING

Sub-bidder: _____ $_____

SECTION 140001 – ELEVATORS

Sub-bidder: _____ $_____

ELECTRONIC BID
Hard Copy Submissions Will Not Be Accepted

ITEM 2. (Cont.) Sub-Bids as follows:

Amount

SECTION 210001 - FIRE PROTECTION

Sub-bidder: _____ $_____

SECTION 220001- PLUMBING

Sub-bidder: _____ $_____

SECTION 230001 - HEATING, VENTILATING AND AIR CONDITIONING

Sub-bidder: _____ $_____

SECTION 260001 - ELECTRICAL

Sub-bidder: _____ $_____

TOTAL OF ITEM 2 _____

_____ DOLLARS ($_____)

ELECTRONIC BID
Hard Copy Submissions Will Not Be Accepted

E. The undersigned agrees that, if he is selected as General Contractor, he will within five (5) days, Saturdays, Sundays, and legal holidays excluded, after presentation thereof by the Awarding Authority, execute a Contract in accordance with the terms of this general bid and furnish a performance bond and also a labor and materials payment bond, each of a surety company qualified to do business under the laws of the Commonwealth and satisfactory to the Awarding Authority and each in the sum of one hundred percent (100%) of the Contract Price, the premiums for which are to be paid by the General Contractor and are included in the Contract Price.

The undersigned agrees that he will comply with the non-discrimination and affirmative action minority manpower ratio and steps prescribed in Article 16 of the General Conditions, including compliance with the minority Subcontractor's requirements specified therein.

F. The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that he will comply with all laws and regulations applicable to award made subject to Section Forty-Four, A. of Chapter 149 of the General Laws.

G. The undersigned further certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity.

H. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth under the provisions of Section Twenty-Nine F of Chapter Twenty-Nine, or any other applicable debarment provisions of any other Chapter of the General Laws or any rule or regulations promulgated thereunder.

Date _____, 20_____.

_____
Name of General Bidder

By: _____
Title

_____
Business Address

If Bidder is a corporation, affix corporate seal here.

_____
City and State Zip

Note: If the bidder is a corporation, indicate state of incorporation under signature and affix corporate seal; if a partnership, give full names and residential address of all partners; and if an individual, give residential address if different from business address.

ELECTRONIC BID
Hard Copy Submissions Will Not Be Accepted

BID SUBMITTED BY:_____

FORM FOR SUB-BID

TO ALL GENERAL BIDDERS EXCEPT THOSE EXCLUDED

A. The undersigned proposes to furnish all labor and materials required for completing, in accordance with the Contract Documents and addenda, all the work specified in SECTION NO. _____TRADE _____of the specifications and in any plans specified in such Sections, prepared by DiNisco Design, Inc. for the NEW AMESBURY ELEMENTARY SCHOOL, Amesbury, MA, for the contract sum of:

_____ DOLLARS ($_____).

FOR ALTERNATE NO. 1, ADD $_____ SUBTRACT $_____
FOR ALTERNATE NO. 2, ADD $_____ SUBTRACT $_____
FOR ALTERNATE NO. 3, ADD $_____ SUBTRACT $_____

B. This sub-bid includes addenda numbered _____.

C. This sub-bid

☐ May be used by any general bidder except:

_____

☐ May only be used by the following general bidders:

_____

(To exclude general bidders, insert "X" in one box only and fill in blank following box. Do not answer C if no general bidders are excluded.)

D. In accordance with Chapter 193 of the Acts of 2004, the undersigned agrees that, if he is selected as a sub-bidder, he will, within five (5) days, Saturdays, Sundays, and legal holidays excluded, after presentation of a subcontract by the general bidder selected as the general contractor, execute with such general bidder a subcontract in accordance with the terms of this sub-bid and contingent upon the execution of the general contract, **will furnish a performance bond and a labor and materials payment bond, each of a surety company qualified to do business under the laws of the Commonwealth and satisfactory to the Awarding Authority and each in the sum of one hundred percent (100%) of the sub-bid Price, <u>the costs for which are to be included in the filed sub-bidder's Price</u>.**

Hard Copy Submissions Will Not Be Accepted
ELECTRONIC BID

E. The names of all persons, firms and corporation furnishing to the undersigned labor or labor and materials for the class or classes, or part thereof, of work for which the provisions of the section of the specifications for this subtrade require a listing in this paragraph, (including the undersigned if customarily furnished by persons on his own payroll) and in the absence of a contrary provision in the specifications the name of each such class of work or part thereto, and bid price for such class of work or part thereof are:

Name:	Class of Work:	Bid Price
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

(Do not give bid price for any class or part thereof furnished by the undersigned.)

F. The undersigned agrees that the above list of bids to the undersigned represents bona fide bids based on hereinbefore described plans, specifications and addends, and that, if the undersigned is awarded the contract, they will be used for the work indicated at the amounts stated, if satisfactory to the awarding authority.

G. The undersigned further agrees to be bound to the general contractor by the terms of the hereinbefore described plans, specifications (including all general conditions stated therein) and addenda, and to assume toward him all the obligations and responsibilities that he, by those documents, assumes toward the owner.

H. The undersigned offers the following information as evidence of his qualifications to perform the work as bid upon according to all the requirements of the plans and specifications:

1. Have been in business under present business name _____ years.

2. Ever failed to complete any work awarded?_____

ELECTRONIC BID
Hard Copy Submissions Will Not Be Accepted

3. List one or more recent buildings with names of general contractor and architect on which you served as a sub-contractor for work of similar character as required for the above-named building.

Building Type	Architect	General Contractor	Contract Amount
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

4. Bank Reference _____

I. The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that he will comply with all laws and regulations applicable to awards of subcontractors subject to Section Forty-Four F of Chapter 149 of the General Laws.

J. The undersigned further certifies under penalty of perjury that this sub-bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth under the provisions of Section Twenty-Nine F of Chapter Twenty-Nine, or any other applicable debarment provisions of any other Chapter of the General Laws or any rule or regulations promulgated thereunder.

K. The undersigned agrees that he will comply with the non-discrimination and affirmative action minority manpower ratio and steps prescribed in Article 16 of the General Conditions, including compliance with the minority Subcontractor's requirements specified herein.

Hard Copy Submissions Will Not Be Accepted
ELECTRONIC BID

Date _____

_____
Name of Sub-Bidder

By: _____
Name

_____
Title

_____
Business Address

If Bidder is a corporation,
affix corporate seal here.

_____
City and State Zip

Note: If the bidder is a corporation, indicate state of incorporation under signature and affix corporate seal; if a partnership, give full names and residential address of all partners; and if an individual, give residential address if different from business address.

ELECTRONIC BID
Hard Copy Submissions Will Not Be Accepted

SECTION 00310

LIST OF PREQUALIFIED GENERAL CONTRACTORS

PART 1 – GENERAL

1.01 GENERAL PROVISIONS

A. Attached is the list of prequalified General Contractors.

END OF SECTION

AMESBURY ELEMENTARY SCHOOL | AMESBURY, MA

10/22/20

PRE-QUALIFIED GENERAL CONTRACTORS

Bids will only be accepted from the General Contractors and Filed Sub-bid Subcontractors that have been pre-qualified by the Awarding Authority as listed below. At the time of bidding, all General Contractors and Filed Sub-bid Subcontractors must be certified by DCAMM and must submit a current DCAMM Certificate of Eligibility and signed DCAMM Update Statement (Form CQ 3).

General Contractors

Boston Building & Bridge Corp.
1094 Blue Hill Ave.,Milton, MA 02186

Brait Builders corp
506 Plain St Ste 201,Marshfield, MA 02050

Colantonio Inc.
16 Everett Street,Holliston, MA 01746

CTA Construction Co. Inc.
1432 Main Street,Waltham, MA 02451

Daniel O`Connell`s Sons
800 Kelly Way,Holyoke, MA 01040

Fontaine Bros. Inc.
510 Cottage Street,Springfield, MA 01104

J&J Contractors Inc.
101 Billerica Ave.,North Billerica, MA 01862

SECTION 00320

LIST OF PREQUALIFIED TRADE SUBCONTRACTORS

PART 1 – GENERAL

1.01 GENERAL PROVISIONS

A. Attached is the list of prequalified Trade Subcontractors.

END OF SECTION

AMESBURY ELEMENTARY SCHOOL | AMESBURY, MA

10/22/20

PRE-QUALIFIED FILED SUB-BID SUBCONTRACTORS

Bids will only be accepted from the General Contractors and Filed Sub-bid Subcontractors that have been pre-qualified by the Awarding Authority as listed below. At the time of bidding, all General Contractors and Filed Sub-bid Subcontractors must be certified by DCAMM and must submit a current DCAMM Certificate of Eligibility and signed DCAMM Update Statement (Form CQ 3).

Masonry

Acranon Masonry Inc.
79 Lyman Street,Northborough, MA 01532

Empire Masonry Corp
231 Norfolk St,Walpole, MA 02081

Fernandes Masonry
1031 Phillips Rd,New Bedford, MA 02745

Lighthouse Masonry Inc.
150 John Vertente Blvd.,New Bedford, MA 02745

Marmelo Bros. Construction
13 Ventura Drive,North Dartmouth, MA 02747

Miscellaneous & Ornamental Iron

Avid Ironworks Inc.
40 Rose Street,Springfield, MA 01104

Capone Iron Corporation
20 Turcotte Memorial Drive,Rowley, MA 01969

EDM Construction Inc.
125 East Main Street,Merrimac, MA 01890

North Shore Steel Co. Inc.
16 Oakville Street,Lynn, MA 01905

Quinn Brothers of Essex Inc.
239 Western Avenue,Essex, MA 01929

Ralphs Blacksmith Shop
36 Smith Street,Northampton, MA 01060

Roman Iron Works Inc.
29 Mystic Avenue,Somerville, MA 02145

United Steel Inc.
164 School Street,East Hartford, CT 06108

V & G Iron Works Inc.
1500 Shawsheen St,Tewksbury, MA 01876

Waterproofing, Dampproofing & Caulking

Acme Waterproofing Co. Inc.
21 Nightingale Ave,Quincy, MA 02170

Beacon Waterproofing
29 Smith Place ,Cambidge , MA 02138

Chapman Waterproofing Company
620 South Street,Holbrook, MA 02343

Folan Waterproofing
795 Washington Street,S. Easton, MA 02375

Gleeson Powers Inc.
10 Southville Rd.,Southborough, MA 01772

P.J. Spillane Co. Inc.
97 Tileston Street,Everett, MA 02149

Superior Caulking & Waterproofing Co. Inc.
1154 Park Street,Palmer, MA 01069

The Waterproofing Company
25 Chesterton Street,Boston, MA 02119

Roofing and Flashing

Capeway Roofing Systems Inc.
664 Sanford Rd,Westport, MA 02790

Feeley McAnespie Inc.
P.O. Box 280,Chelmsford , MA 01824

GIbson Roofs Inc.
369 Winter Street,Hanover, MA 02339

Greenwood Industries Inc.
640 Lincoln Street,Worcester, MA 01605

John F. Shea Co. Inc.
41 Hollingsworth St,Mattapan, MA 02126

Rockwell Roofing Inc., 44 Pond Street
Leominster, MA 01453

Silktown Roofing Inc.
27 Pleasant Street,Manchester, CT 06040

Stanley Roofing Company
42 mitchell rd,Ipswich, MA 01938

Titan Roofing Inc.
200 Tapley St,Springfield, MA 01104

Metal Windows

A & A Window Products Inc.
15 Joseph street,Malden, MA 02148

Chandler Architectural Products Inc.
255 Interstate Drive,West Springfield, MA 01089

Greenfield Glass
52 River ST,Greenfield, MA 01301

GVW INC.
1200 Bennington Street,East Boston, MA 02128

Kapiloff`s Glass
47 New Ashford Rd,Williamstown, MA 01267

Lambrian Construction Corp
420 Turnpike Street,Canton, MA 02021

Lizotte Glass Inc.
390 Race St.,Holyoke, MA 01040

Lockheed Window Corp.
Route 100,Pascoag, RI 02859

Modern Glass & Aluminum Inc.
42 Eastman Street,South Easton, MA 02356

R & R Window Contractors Inc.
One Arthur Street,Easthampton, MA 01027

The Cheviot Corp.
55 Fourth Ave,Needham, MA 02494

Glass & Glazing

A & A Window Products Inc.
15 Joseph street,Malden, MA 02148

Aluminum & Glass Concepts Inc.
210 Andover Street,Wilmington, MA 01887

Chandler Architectural Products Inc.
255 Interstate Drive,West Springfield, MA 01089

Greenfield Glass
52 River ST,Greenfield, MA 01301

GVW INC
1200 Bennington Street,East Boston, MA 02128

Kapiloff`s Glass
47 New Ashford Rd,Williamstown, MA 01267

Lizotte Glass Inc.
390 Race St.,Holyoke, MA 01040

Lockheed Window Corp.
Route 100,Pascoag, RI 02859

Modern Glass & Aluminum Inc.
42 Eastman Street,South Easton, MA 02356

R & R Window Contractors Inc.
One Arthur Street,Easthampton, MA 01027

Ceramic Tile

Ayotte & King for Tile.
165 Trilby Ave,Chicopee, MA 01020

Capital Carpet & Flooring Specialists Inc.
12 Walnut Hill Park,Woburn, MA 01801

Joseph Cohn and Son Tile & Terrazzo LLC
50 Devine Street,North Haven, CT 06473

Pavilion Floors Inc.
90 Commerce Way,Woburn, MA 01801

Acoustical Ceiling Tile

Central Ceilings
36 Norfolk Ave,S. Easton, MA 02375

H. Carr & Sons Inc.
100 Royal Little Drive,Providence, RI 02904

K&K Acoustical Ceilings Inc.
1881 Main St #7,Tewksbury, MA 01876

The Cheviot Corp.
55 Fourth Ave,Needham, MA 02494

Resilient Floors

Ayotte & King for Tile.
165 Trilby Ave,Chicopee, MA 01020

Capital Carpet & Flooring Specialists Inc.
12 Walnut Hill Park,Woburn, MA 01801

CJM Services Inc.
50 Kerry Place,Norwood, MA 02062

Pavilion Floors Inc.
90 Commerce Way,Woburn, MA 01801

Painting

Bello Painting Company Inc.
585 East St,Weymouth, MA 02169

Dandis Contracting Inc.
1020 Turnpike Street Unit #12,Canton, MA 02021

Homer Contracting Inc.
195 Broadway, Arlington, MA 02474

John W Egan Company Inc.
3 Border Street,West Newton, MA 02465

King Painting Inc.
50 High St Ste 22,North Andover, MA 01845

M.L. McDonald Sales Co.
Watertown, MA 02471

O Byrne Painting and Contracting Inc.
21 Old Farm Rd,Wayland, MA 01778

Select Paint and Finishes LLC
40 Lowell Rd Bldg #2,Salem, NH 03079

Elevators

Elevator contractors do not need to be prequalified to bid on this project.

Fire Protection

Carlysle Engineering
132 Brookside Ave.,Boston, MA 02130

Cogswell Sprinkler Co. Inc.
22 Canterbury Street,Worcester, MA 01452

Covenant Fire Protection
62 West Brook St,Manchester, NH 03101

E. Amanti & Sons Inc.
390 Highland Ave.,Salem, MA 01970

Hampshire Fire Protection Co. LLC
8 N Wentworth Avenue,Londonderry, NH 03053

Johnson Controls Fire Protection LP
95 Shawmut Road,Canton, MA 02021

Rustic Fire Protection
PO Box 1210,Norton, MA 02766

Yankee Sprinkler Co. Inc.
612 Plymouth Street,East Bridgewater, MA 02333

Plumbing

E. Amanti & Sons Inc.
390 Highland Ave.,Salem, MA 01970

Grasseschi Plumbing & Heating Inc.
1299 Grafton Street,Worcester, MA 01604

Harold Brothers Mechanical
44 Woodrock Road,Weymouth, MA 02189

Kneeland Plumbing & Heating Inc.
63 Hammond Street,Rowley, MA 01969

N.B. Kenney Company Inc.
68 Barnum Road,Devens, MA 01434

P.J. Dionne Co. Inc.
72 Jonspin Road,Wilmington, MA 01887

Robert W. Irvine & Sons Inc.
147 Blossom Street,Lynn, MA 01902

WF Lynch
50 Millbrook St ,Worcester , MA 01606

Heating, Ventilation & Air Conditioning

E. Amanti & Sons Inc.
390 Highland Ave.,Salem, MA 01970

Enterprise Equipment Co. Inc.
276 Libbey Parkway,Weymouth, MA 02189

General Mechanical Contractors
29-A Sword Street,Auburn, MA 01501

Harold Brothers Mechanical
44 Woodrock Road,Weymouth, MA 02189

N.B. Kenney Company Inc.
68 Barnum Road,Devens, MA 01434

WF Lynch
50 Millbrook st ,Worcester , MA 01606

Electrical

Annese Electric
280 Libbey Pkwy,Weymouth, MA 02189

Brothers Electrical Corp
18 Graf Road Unit 31, Newburyport, MA 01950

Jupiter Electric Inc.
140 Lafayette Rd,Salisbury, MA 01952

LeVangie Electric Co. Inc.
59 Old Webster Street,Hanover, MA 02189

Systems Contracting Inc.
7 Scobee Circle,Plymouth, MA 02360

Wayne J. Griffin Electric Inc.
116 Hopping Brook Road,Holliston, MA 01746

AIA® Document A101™ – 2007 SP

Standard Form of Agreement Between Owner and Contractor, for use on a Sustainable Project where the basis of payment is a Stipulated Sum

AGREEMENT made as of the day of in the year
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

City of Amesbury
62 Friend Street
Amesbury, MA 01913

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
Amesbury Elementary School
193 Lions Mouth Road
Amesbury, MA 01913

The Architect:
(Name, legal status, address and other information)

DiNisco Design, Inc.
99 Chauncy Street
Suite 901
Boston, MA 02111

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

AIA Document A201™–2007 SP, General Conditions of the Contract for Construction, for use on a Sustainable Project, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

Init.
/
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TABLE OF ARTICLES

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5 PAYMENTS

6 DISPUTE RESOLUTION

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8 MISCELLANEOUS PROVISIONS

9 ENUMERATION OF CONTRACT DOCUMENTS

10 INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, the Sustainability Plan, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date to be fixed in a notice to proceed issued by the Owner.

(Paragraphs deleted)

§ 3.2 The Contract Time shall be measured from the date of commencement.

§ 3.3 *The Contractor shall achieve Substantial Completion of the entire Work not later than* ***641 calendar days*** *from the date of commencement, shall achieve Final Completion within 60 days of the Substantial Completion, and as* ***defined in SECTION 011000-SUMMARY OF WORK, Paragraph 1.10E which describes Summer Phase Work Substantial Completion Requirements****.*

(Paragraphs deleted)

, subject to adjustments of this Contract Time as provided in the Contract Documents.

(Paragraphs deleted)

The Contractor shall be subject to the assessment of liquidated damages for each day of delay in achieving Substantial Completion f**or the entire Work, Substantial Completion for Summer Phase Work** and Final Completion, as set forth in Article 8.4 of the General Conditions of the Contract. The Owner's right to assess liquidated damages shall not preclude the Owner from the exercise of any other rights to recover damages on account of the Contractor's failure to achieve Substantial Completion and Final Completion within the time required, subject to adjustments of this Contract Time as provided in the Contract Documents.

(Paragraphs deleted)

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ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be _____ dollars ($ _____), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

§ 4.3 Unit prices,
(Paragraphs deleted)
are as set forth in SECTION 012200-UNIT PRICES.
(Table deleted)
(Table deleted)
(Paragraphs deleted)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month:

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the last day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the fifteenth day of the following month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than fifteen (15) days after the Architect receives the Application for Payment in accordance with Section 9.6 of the General Conditions.

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of five percent (5%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included.

.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of five percent (5 %);

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.3 Subtract the aggregate of previous payments made by the Owner; and

.4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of the General Conditions, AIA Document A201–2007 SP.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims;
(Paragraph deleted)

.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10 of AIA Document A201–2007 SP.

§ 5.1.8 Reduction or limitation of retainage, if any, shall be as set forth in Section 9.6 of the General Conditions and in accordance with M.G.L. Ch. 30 Section 39K.
(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007 SP, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made in accordance with Section 9.10 of the General Conditions and M.G.L. Ch. 30 Section 39K.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007 SP, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, Section 15.2 of AIA Document A201–2007 SP, the method of binding dispute resolution shall be as follows:

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(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

[ ] Arbitration pursuant to Section 15.4 of AIA Document A201–2007 SP

[X] Litigation in a court of competent jurisdiction

[ ] Other: *(Specify)*

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007 SP.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007 SP.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 SP or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Payments due and unpaid under the Contract shall bear interest
(Paragraphs deleted)
in accordance with M.G.L. Ch. 30 Section 39K.

§ 8.3 The Owner's representative:
(Name, address and other information)

NV5
70 Fargo Street, Suite 800
Boston, MA 02210

§ 8.4 The Contractor's representative:
(Name, address and other information)

§ 8.5
Neither the Owner's nor the Contractor's representative shall be changed without ten days written notice to the other party.

§ 8.6 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101–2007 SP, Standard Form of Agreement Between Owner and Contractor, for use on a Sustainable Project.

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§ 9.1.2 The General Conditions are AIA Document A201–2007 SP, General Conditions of the Contract for Construction, for use on a Sustainable Project.

§ 9.1.3 The Supplementary and other Conditions of the Contract are those contained in the Project Manual dated March 10, 2021 and are listed in the Project Manual Table of Contents.

Document	Title	Date	Pages

§ 9.1.4 The Specifications are those contained in the Project Manual dated October 2020 and are listed in the Project Manual Table of Contents.

Section	Title	Date	Pages

§ 9.1.5 The Drawings are listed in the Project Manual and a list of drawings is bound with the Drawings.

Number	Title	Date

§ 9.1.6 The Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

§ 9.1.7 The Sustainability
(Paragraphs deleted)
Plan is specified under SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS of the Specifications.
(Table deleted)
Other identifying information:

§ 9.1.8 Additional documents, if any, forming part of the Contract Documents:

.1
(Paragraphs deleted)
The bidding documents, consisting of the Notice to Bidders, Instructions to Bidders, completed Bid Form, sample forms and certificates, the portions of addenda relating to any of these documents, and the Contractor's performance and payment bonds.

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201–2007 SP.
(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201–2007 SP.)

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Type of Insurance or Bond	Limit of Liability or Bond Amount ($0.00)

This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
Kassandra Gove, Mayor City of Amesbury	
(Printed name and title)	*(Printed name and title)*

Jared Fulgoni
Superintendent of Schools
City of Amesbury

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Approved as to Legal Form:

_____

City Solicitor

In accordance with M.G.L. c. 44 Section 31C, this is to certify that an appropriation in the amount of this contract is available therefor and that the Mayor is authorized to execute the contract and approve all requisitions and change orders.

_____ _____

Angel A. Wills, Chief Financial Officer Shaunna Ring, Purchasing Agent

Account # _____

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FORM OF SECRETARY'S CERTIFICATE

RESOLVED: That the _____ ("Officer") of this Corporation, be and (s)he is hereby authorized and directed, on behalf of this Corporation, to enter into a Contract with, and deliver same to _____ for construction of _____ _____, said contract to be on such terms and conditions as such officer deems proper, and said officer is hereby further authorized and directed to execute and deliver any other documents and agreements, and to do and perform all other acts and things, deemed by such officer as necessary, convenient or proper hereby ratifying, approving and confirming all that said office has done or may do in the premises.

I, _____hereby certify that I am the duly elected and acting Secretary of _____, a corporation organized and existing under and by the virtue of the laws of the Commonwealth of _____having its principal place of business in _____: that I am the keeper of the corporate records and the seal of said corporation; that the foregoing is a true and correct copy of resolution duly adopted and ratified at a special meeting of the Board of Directors of said corporation duly convened and held in accordance with its by-laws and the laws of said Commonwealth on the _____ day of _____, 20_____, as taken and transcribed by me from the minutes of said meeting and compared by me with the original of said resolution recorded in said minutes and that is has not been rescinded and is still in full force and effect on the date thereof.

I also certify that from the date of the above resolution up to and including this date, _____ _____ was the duly elected and qualified _____ of _____.

IN WITNESS WHEREOF I have hereunto set my hand and seal this _____ day of _____20____

_____
(Secretary)

ELECTRONIC BID
Hard Copy Submissions Will Not Be Accepted

FORM OF TAX COMPLIANCE CERTIFICATE

Prior to the issuance of the contract, _____ shall attest under the penalties of perjury that it is in compliance with all the laws of the Commonwealth of Massachusetts relating to taxes. This statement is required in accordance with Massachusetts General Law Chapter 62C, Section 49A.

Pursuant to M.G.L. Chapter 62C, § 49A, I certify under the penalties of perjury that I, to the best of my best knowledge and belief, have filed all state tax returns and paid all state taxes, reported all employees and contractors, and withheld and remitted child support, as required by law.

(NAME OF COMPANY)

_____

_____
Social Security Number or Federal Identification Number

By _____
Corporation Officer or Authorized Representative

ELECTRONIC BID
Hard Copy Submissions Will Not Be Accepted

CONTRACTOR'S

EQUAL EMPLOYMENT CERTIFICATE

_____ certifies that they
(Contractor Name)

1. Will not discriminate in their employment practices;

2. Intend to use the following listed construction trades in the work under the contract

_____

_____; and

3. Will make good faith efforts to comply with the minority employee and women employee workforce participation ratio goals and specific affirmative action steps contained herein;

4. Are in compliance with all applicable federal and state laws, rules and regulations governing fair labor and employment practices; and

5. Will provide the provisions of the "Supplemental Equal Employment Opportunity, Non-Discrimination and Affirmative Action Program" to each and every subcontractor employed on the Project and will incorporate the terms of this Section into all subcontracts and work orders entered into on the Project.

6. Agree to comply with all provisions contained herein.

_____

(Signature of authorized representative of Contractor) Date

_____

(Printed name of authorized representative of Contractor and title)

ELECTRONIC BID
Hard Copy Submissions Will Not Be Accepted

SUBCONTRACTOR'S

EQUAL EMPLOYMENT CERTIFICATE

_____certifies that it

1. intends to use the following listed construction trades in the work under the contract:

   _____

   _____

   _____

   _____

2. will comply with the minority manpower ratio and specific affirmative action steps contained herein; and

3. will obtain from each of its subcontractors and submit to the Owner prior to the award of any subcontract under this contract the subcontractor certification.

ELECTRONIC BID
Hard Copy Submissions Will Not Be Accepted

_____

(signature of authorized representative of contractor)

_____ _____

(date) (name and title)

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That we _____
(Name of Contractor)

a _____ hereinafter called "Principal" and
(Corporation, Partnership, Joint Venture or Individual)

_____of _____, State of _____
(Surety) (City & State)

_____ hereinafter called the "Surety" and licensed by the State Division of Insurance to do business under the laws of the Commonwealth of Massachusetts, are held and firmly bound to the City/Town of _____, Massachusetts, hereinafter called "Owner", in the penal sum of
_____ Dollars
($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a certain contract with the Owner, dated the _____ day of _____, 20___ (the "Construction Contract"), for the construction described as follows: _____
_____.

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of the Construction Contract during the original term thereof, and any extensions thereof which may be granted by the Owner, with or without notice to the Surety, and if he shall satisfy all claims and demands incurred under the Construction Contract, and shall fully indemnify and save harmless the Owner from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the Surety's obligation under this Bond shall arise after (1) the Owner has declared the Principal in default of the Construction Contract or any provision thereof or (2) has declared that the Principal has failed, or is otherwise unable or unwilling, to execute the work consistent with, and in conformance to, the Construction Contract (collectively referred to as a "Contractor Default"). The determination of a Contractor Default shall be made solely by the Owner. The Owner need not terminate the Construction Contract to declare a Contractor Default or to invoke its rights under this Bond.

When the Surety's obligation under this Bond arises, the Surety, at its sole expense and at the consent and election of the Owner, shall promptly take one of the following steps: (1) arrange for the Principal to perform and complete the work of the Construction Contract: (2) arrange for a contractor other than the Principal to perform and complete the work of the Construction Contract; (3) reimburse the Owner, in a manner and at such time as the Owner shall decide, for all costs and expenses incurred by the Owner in performing and completing the work of the Construction Contract. Surety will keep Owner reasonably informed of the progress, status and results of any investigation of any claim of the Owner.

If the Surety does not proceed as provided in this Bond with due diligence and all deliberate speed, the Surety shall be deemed to be in default of this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner.

After the Surety's obligation under this Bond arises, the Surety is obligated, to the limit of the amounts of this Bond, for (1) the correction of defective work and completion of the Construction Contract; (2) additional design, professional services, and legal costs, including attorneys' fees, resulting from the Contractor Default or from the default of the Surety under this Bond; (3) any additional work beyond the Construction Contract made necessary by the Contractor Default or default of the Surety under this Bond; (4) indemnification obligation of the Principal, if any, as provided in the Construction Contract; and (5) liquidated damages as provided in the Construction Contract, or if none are so specified, actual and foreseeable consequential damages resulting from the Contractor Default or default of the Surety under this Bond.

Any proceeding, legal or equitable, under this Bond shall be instituted in any court of competent jurisdiction in the Commonwealth of Massachusetts.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Construction Contract or to the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Construction Contract or to the work or to the specifications.

IN WITNESS WHEREOF, this instrument is executed in _____ ( ) counterparts, each one of which shall be deemed an original, this the _____ day of _____, 20___.

ATTEST:

_____
Principal

_____ By _____
(Principal Secretary)

_____

_____

_____
(Address-Zip Code)

_____ (SEAL)
Witness as to Principal

_____

_____
(Address-Zip Code)

ATTEST:

_____
Surety

_____ By _____
(Attorney-in-Fact)

_____

_____
(Address-Zip Code)

_____ (SEAL)
Witness as to Surety

_____

_____
(Address-Zip Code)

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is a Partnership, all partners should execute Bond.

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That we _____

_____ a_____ _____
(Name of Contractor) (Corporation, Partnership, Joint Venture or Individual)

hereinafter called "Principal" and _____ of _____,
(Surety)

State of _____ hereinafter called the "Surety" and licensed by the State
(City and State)

Division of Insurance to do business under the laws of the Commonwealth of Massachusetts, are held and firmly bound to the City/Town of _____, Massachusetts, hereinafter called "Owner", in the penal sum of _____ Dollars ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a certain contract with the Owner, dated the _____ day of _____, 20___, for the construction described as follows:

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such work, and all insurance premiums on said work, and for all labor, performed in such work whether by subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of this contract or to the work or to the specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in ____ ( ) counterparts, each one of which shall be deemed an original, this the _____ day of _____, 20__.

ATTEST:

_____
Surety

_____ By _____
(Attorney-in-Fact)

_____

_____
(Address-Zip Code)

_____ (SEAL)
Witness as to Surety

_____

_____
(Address-Zip Code)

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is a Partnership, all partners should execute Bond.

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General Conditions of the Contract for Construction, for use on a *Sustainable Project*

for the following PROJECT:
(Name and location or address)
New Amesbury Elementary School
193 Lions Mouth Road, Amesbury, MA 01913

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

THE OWNER:
(Name, legal status and address)
City of Amesbury
62 Friend Street
Amesbury, MA 01913

THE ARCHITECT:
(Name, legal status and address)
DiNisco Design, Inc.
99 Chauncy Street, Ste 901
Boston, MA 02111

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, the Sustainability Plan, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.1.9 Special Definitions

§ 1.1.9.1 Sustainable Objective

The Sustainable Objective is the Owner's goal of incorporating Sustainable Measures into the design, construction, maintenance and operations of the Project to achieve a Sustainability Certification or other benefit to the environment, to enhance the health and well-being of building occupants, or to improve energy efficiency. The Sustainable Objective is identified in the Sustainability Plan.

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§ 1.1.9.2 Sustainable Measure
A Sustainable Measure is a specific design or construction element, or post occupancy use, operation, maintenance or monitoring requirement that must be completed in order to achieve the Sustainable Objective. The Owner, Architect and Contractor shall each have responsibility for the Sustainable Measure(s) allocated to them in the Sustainability Plan.

§ 1.1.9.3 Sustainability Plan
The Sustainability Plan is a Contract Document that identifies and describes: the Sustainable Objective; the targeted Sustainable Measures; implementation strategies selected to achieve the Sustainable Measures; the Owner's, Architect's and Contractor's roles and responsibilities associated with achieving the Sustainable Measures; the specific details about design reviews, testing or metrics to verify achievement of each Sustainable Measure; and the Sustainability Documentation required for the Project.

§ 1.1.9.4 Sustainability Certification
The Sustainability Certification is the initial third-party certification of sustainable design, construction, or environmental or energy performance, such as LEED®, Green Globes™, Energy Star or another rating or certification system, that may be designated as the Sustainable Objective or part of the Sustainable Objective for the Project. The term Sustainability Certification shall not apply to any recertification or certification occurring subsequent to the initial certification.

§ 1.1.9.5 Sustainability Documentation
The Sustainability Documentation includes all documentation related to the Sustainable Objective or to a specific Sustainable Measure that the Owner, Architect or Contractor is required to prepare in accordance with the Contract Documents. Responsibility for preparation of specific portions of the Sustainability Documentation will be allocated among the Owner, Architect and Contractor in the Sustainability Plan and may include documentation required by the Certifying Authority.

§ 1.1.9.6 Certifying Authority
The Certifying Authority is the entity that establishes criteria for achievement of a Sustainability Certification and is authorized to grant or deny a Sustainability Certification.

§ 1.2 Correlation and Intent of the Contract Documents
§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization
Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation
In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service
§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official

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regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 Transmission of Data in Digital Form

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Information and Services Required of the Owner

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.2.6 The Owner shall perform those Sustainable Measures identified as the responsibility of the Owner in the Sustainability Plan, including any approved changes, or as otherwise required by the Contract Documents. The Owner

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shall require that each of its contractors and consultants perform the services or work assigned to them in accordance with the Sustainability Plan.

§ 2.2.7 The Owner shall comply with the requirements of the Certifying Authority as they relate to the ownership, operation and maintenance of the Project both during construction and after completion of the Project.

§ 2.3 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents, including any Sustainable Measures identified as the responsibility of the Contractor in the Sustainability Plan.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.2.1 The Contractor shall meet with the Owner and Architect to discuss alternatives in the event the Owner or Architect recognizes a condition that will affect achievement of a Sustainable Measure or achievement of the Sustainable Objective. If any condition is discovered by, or made known to, the Contractor that will adversely affect the Contractor's achievement of a Sustainable Measure for which the Contractor is responsible pursuant to the

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Sustainability Plan, the Contractor will promptly provide notice to the Architect and meet with the Owner and Architect to discuss alternatives to remedy the condition.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, or requirements of the Certifying Authority, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.2.1 The Contractor shall include, with any request for substitution, a written representation identifying any potential effect the substitution may have on the Project's achievement of a Sustainable Measure or the Sustainable Objective. The Owner and Architect shall be entitled to rely on any such representation. In preparing this representation, the Contractor may request additional information from the Architect describing how the product, material or equipment, for which a substitution is proposed, was intended to satisfy the requirements of a Sustainable Measure or contribute toward achievement of the Sustainable Objective. The Architect shall respond to the Contractor's request in accordance with Section 4.2.14.

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§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 The Contractor shall perform the Sustainable Measures required to be performed by the Contractor in accordance with the Contract Documents; however, nothing contained in this Section 3.5 shall be construed as a guarantee or warranty by the Contractor that the Project will achieve the Sustainable Objective.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

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§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- **.1** allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- **.2** Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- **.3** whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site and Sustainability Documentation

§ 3.11.1 The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.2 The Contractor shall be responsible for preparing and completing the Sustainability Documentation required from the Contractor by the Contract Documents, including any Sustainability Documentation required to be submitted

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after Substantial Completion. The Contractor shall submit the Sustainability Documentation to the Architect in accordance with any schedules or deadlines set forth in, or as otherwise required by, the Contract Documents. In the absence of schedules or deadlines for submission of Sustainability Documentation in the Contract Documents, the Contractor will submit the Sustainability Documentation with reasonable promptness so that the Architect may submit the Sustainability Documentation to the Certifying Authority.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and

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other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.12.10.1 In the event the Contractor's design professional proposes the use of materials or equipment that have had limited testing or verification of performance, the Contractor shall discuss with the Architect and Owner the proposed use of such materials or equipment and potential effects on the Sustainable Objective that may occur if the materials or equipment fail to perform in accordance with the manufacturer's or supplier's representations. The Owner will render a written decision regarding the use of such materials or equipment in a timely manner. In the event the Owner elects to proceed with the use of such materials or equipment, the Contractor and Architect shall be permitted to rely on the manufacturer's or supplier's representations and shall not be responsible for any damages arising from the failure of the material or equipment to perform in accordance with the manufacturer's or supplier's representations.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project. The Contractor shall also recycle, reuse, remove or dispose of materials as required by the Contract Documents.

§ 3.15.2 The Contractor, in accordance with the Contract Documents, shall prepare and submit to the Architect and Owner a construction waste management and disposal plan setting forth the procedures and processes for salvaging, recycling or disposing of construction waste generated from the Project.

§ 3.15.3 If the Contractor fails to clean up in accordance with Section 3.15.1 and as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe

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that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work, including those that will impact the Contractor's achievement of its Sustainable Measures. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

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§ 4.2.4 Communications Facilitating Contract Administration
Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. If the Architect determines that implementation of a proposed change would materially impact a Sustainable Measure or the Sustainable Objective, the Architect shall notify the Owner, who may authorize further investigation of such change. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties, Sustainability Documentation and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

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§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, including the Sustainability Plan and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

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§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be

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responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- **.1** The change in the Work;
- **.2** The amount of the adjustment, if any, in the Contract Sum; and
- **.3** The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- **.1** Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- **.2** Unit prices stated in the Contract Documents or subsequently agreed upon;
- **.3** Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- **.4** As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

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§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- **.1** Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- **.2** Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- **.3** Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- **.4** Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- **.5** Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

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§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment

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or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or a separate contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- **.7** repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

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§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. Except for that portion of the Sustainability Documentation which by its nature must be provided after Substantial Completion, the Contractor shall submit all other Sustainability Documentation required from the Contractor by the Contract Documents no later than the date of Substantial Completion. Verification that the Project has achieved the Sustainable Objective, or the actual achievement of the Sustainable Objective, shall not be a condition precedent to issuance of a Certificate of Substantial Completion in accordance with Section 9.8.4.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

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§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. Verification that the Project has achieved the Sustainable Objective, or the actual achievement of the Sustainable Objective, shall not be a condition precedent to issuance of the final Certificate for Payment.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) all Sustainability Documentation required from the Contractor by the Contract Documents, (5) consent

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of surety, if any, to final payment and (6), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- **.1** liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents; or
- **.3** terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- **.1** employees on the Work and other persons who may be affected thereby;
- **.2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- **.3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or

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anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property
If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials
§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

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§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Liability Insurance

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- **.1** Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- **.2** Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- **.3** Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- **.4** Claims for damages insured by usual personal injury liability coverage;
- **.5** Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- **.6** Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- **.7** Claims for bodily injury or property damage arising out of completed operations; and
- **.8** Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 Owner's Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 Property Insurance

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract

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Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 Boiler and Machinery Insurance

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 Loss of Use Insurance

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that

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the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 Waivers of Subrogation
The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 Performance Bond and Payment Bond
§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK
§ 12.1 Uncovering of Work
§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of

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correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 Correction of Work

§ 12.2.1 Before or After Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If

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either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 Written Notice

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 Rights and Remedies

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 Tests and Inspections

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

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§ 13.7 Time Limits on Claims

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

.3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or

.4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

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§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- **.1** that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- **.2** that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- **.1** cease operations as directed by the Owner in the notice;
- **.2** take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- **.3** except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 Notice of Claims

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 Continuing Contract Performance

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

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§ 15.1.4 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 Claims for Additional Time

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons;

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work; and

.3 damages resulting from failure of the Project to achieve the Sustainable Objective or one or more of the Sustainable Measures including unachieved energy savings, unintended operational expenses, lost financial or tax incentives, or unachieved gains in worker productivity.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

Init.
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§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

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§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

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SUPPLEMENTARY CONDITIONS

Amending the General Conditions of the Contract for Construction
AIA Document A201 (2007 **SP** edition)

I. SUPPLEMENTARY CONDITIONS

The following addendum supplements, modifies, deletes and/or adds to the General Conditions. Where any Article, Paragraph or subparagraph in the General Conditions is supplemented by one of the following paragraphs, the provisions of such Article, Paragraph, or Subparagraph shall remain in effect and the supplemental provisions shall be considered as added thereto. Where any Article, Paragraph, or subparagraph in the General Conditions is amended, voided or superseded by any of the following paragraphs, the provisions of such Article, Paragraph or subparagraph not so amended, voided, or superseded shall remain in effect.

II. MODIFICATIONS TO VARIOUS ARTICLES OF THE AIA CONDITIONS

ARTICLE 1 GENERAL PROVISIONS

1.1.1 In the first sentence, delete "are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and" after "The Contract Documents".

Insert "between the Owner and Contractor (hereinafter the Agreement)" after "consist of the Agreement".

In the last sentence:

Delete "Unless specifically enumerated in the Agreement".

Delete "not" after "Contract Documents do".

Delete "other" after "sample forms,".

Delete "or" after "or proposal," and insert "and".

Delete "bidding requirements" after "relating to" and insert "those documents."

1.1.2 Add to the end of the sub-section:

The Contractor understands that the Architect's obligations under its agreement with the Owner are solely for the benefit of the Owner, and that in performing such obligations the Architect may consequently increase the burdens and expense of the Contractor, Subcontractors or material suppliers.

1.1.8 Delete "Claims" and insert "claims".

Delete "and certify termination of the Agreement under Section 14.2.2.".

1.1.9.1 Add to the end of the sub-section:

Refer to SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS in the Specifications for additional information and requirements.

1.2.1 Add to the end of the sub-section:

All Work mentioned or indicated in the Contract Documents shall be performed by the Contractor as part of this Contract unless it is specifically indicated in the Contract Documents that such Work is to be done by others. Should the Drawings or the Specifications disagree in themselves or with each other, the Contractor shall provide the better quality or greater quantity of Work unless otherwise directed by written addendum to the Contract.

1.2.1.1 Add new sub-section 1.2.1.1 as follows:

All work mentioned or indicated in the Contract Documents shall be performed by the Contractor as part of this Contract unless it is specifically indicated in the Contract Documents that such Work is to be done by others. In the event of any conflict, discrepancy or ambiguity among the Contract Documents, the documents shall be construed according to the following priorities:

Highest Priority: Modifications – later date to take precedence

Second Priority: Agreement

Third Priority: Addenda – later date to take precedence

Fourth Priority: General Conditions

Fifth Priority: General Requirements – Division 1

Sixth Priority: Drawings and Specifications

Among Drawings, large scale details shall control over small scale details, and figured dimensions shall control over Drawings not dimensioned. In the event of conflicts, discrepancies or ambiguities between the Drawings and the Specifications, or within either the Drawings or the Specifications, the Contractor shall provide the better quality or greater quantity of Work, or comply with the more stringent requirement, as applicable, unless otherwise directed by a Modification.

1.2.2 Add to the end of the sentence:

, except that the performance of filed sub-trade work shall comply with the provisions of chapter 149 of the General Laws of the Commonwealth of Massachusetts. The Contractor and all Subcontractors shall refer to all of the Drawings, including those showing primarily the Work of the mechanical, electrical and other specialized trades, and to all of the Sections of the Specifications, and shall perform all Work reasonably inferable therefrom as being necessary to produce the indicated results.

1.2.4 Add the following new sub-sections 1.2.4 to 1.2.12 as follows:
-1.2.12

§ 1.2.4 All indications or notations which apply to one of a number of similar situations, materials or processes shall be deemed to apply to all such situations, materials or processes wherever they appear in the Work, except where a contrary result is clearly indicated by the Contract Documents.

§ 1.2.5 Where codes, standards, requirements and publications of public and private bodies are referred to in the Specifications, references shall be understood to be to the latest revision prior to the date of receiving bids, except where otherwise indicated.

§ 1.2.6 Where no explicit quality or standards for materials or workmanship are established for Work, such Work is to be of good quality for the intended use and consistent with the quality of the surrounding Work and of the construction of the Project generally.

§ 1.2.7 All manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the manufacturer's written or printed directions and instructions unless otherwise indicated in the Contract Documents.

§ 1.2.8 The Mechanical, Electrical and Fire Protection Drawings are diagrammatic only, and are not intended to show the alignment, physical locations or configurations of such Work. Such Work shall be installed without additional cost to the Owner to clear all obstructions, permit proper clearances for the Work of other trades, and present an orderly appearance where exposed. Prior to beginning such Work, the Contractor shall prepare coordination drawings showing the exact alignment, physical location and configuration of the Mechanical, Electrical and Fire Protection installations and demonstrating to the Contractor's satisfaction that the installations will comply with the preceding sentence. A copy of the drawings shall be submitted to the Architect, and the Contractor shall revise and resubmit the drawings if so directed by the Architect.

§ 1.2.9 Exact locations of fixtures and outlets shall be obtained from the Architect as provided in subparagraph 3.2.5 before the Work is roughed in; Work installed without such information from the Architect shall be relocated at the Contractor's expense.

§ 1.2.10 Test boring or soil test information included with the Contract Documents or otherwise made available to the Contractor was obtained by the Owner for use by the Architects in the design of the Project or Work. The Owner does not hold out such information to the Contractor as a completely accurate indication of subsurface conditions, and no claim for extra cost or extension of time resulting from a reliance by the Contractor on such information shall be allowed except as provided in subparagraph 3.7.4.

§ 1.2.11 Where the Work is to fit with existing conditions or work to be performed by others, the Contractor shall fully and completely join the Work with such conditions or work, unless otherwise specified. Owner provided drawings showing existing conditions or construction are based on available documents and are not guaranteed to show actual existing conditions.

§ 1.2.12 The Contract is subject to, and shall be performed in accordance with, all laws, statutes, regulations, codes, ordinances, rules and orders of the United States of America, the Commonwealth of Massachusetts, the City of Amesbury, and other governmental or public agencies and authorities, and all amendments thereto, (collectively, “laws and regulations”) and any agreements between the Owner and any such governmental or public agencies and authorities, and other agreements or commitments, if any, referred to or incorporated in the Contract Documents, and where any provisions contained in the Contract Documents do not conform to or are inconsistent with such laws and regulations or agreements to which the Contract is subject or by which it is governed, such laws and regulations or agreements shall have precedence over any matters set forth in the Contract Documents.

1.5.1 Delete 1.5.1 and replace as follows:

§ 1.5.1 All Drawings, Specifications and copies thereof furnished by the Owner are and shall remain the Owner's property. They are to be used only with respect to this Project and are not to be used on any other project without the prior written consent of the Owner. With the exception of one contract set for each party to the Contract, such documents are to be returned or suitably accounted for to the Owner at the completion of the Work. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of any reserved rights.

ARTICLE 2 OWNER

2.1.2 Delete sub-section 2.1.2.

2.2.1 Delete the last three sentences.

2.2.3 In the first sentence insert “available” after “shall furnish”.

Delete the last sentence and replace as follows:

The Owner makes no warranty as to the accuracy or completeness of such information, and the Contractor shall exercise proper precautions relating to the safe performance of the Work.

2.2.4 Delete the last sentence.

2.2.5 Add to the end of the sub-section as follows:

All additional copies will be furnished upon request at the cost of reproduction.

2.3 Delete from the last sentence “, except to the extent required by Section 6.1.3” and add as follows:

The Contractor shall resume the Work after such stoppage promptly upon written notice to do so from the Owner. The Contractor shall remain responsible for maintaining the progress of the Work and shall not be entitled to any increase in the Contract Sum or Contract Time. The Contractor shall be responsible for all costs incurred by the Owner attributable to such an order to stop the Work.

2.4 In the second sentence:

Delete “Change Order” and replace with “Construction Change Directive”.

Insert “and Owner’s Project Manager’s” after “for the Architect’s”.

Delete the third sentence.

Add to the end of the section as follows:

The rights of the Owner hereunder are in addition to any other rights set forth in the Contract Documents or available at law or in equity.

2.5 Add new sub-section as follows:

§ 2.5 Commissioning
§ 2.5.1 The Owner may, through an independent commissioning agent, perform tests / inspections of building systems to validate the proper installation and performance of the Work. Refer to SECTION 019113-BUILDING COMMISSIONING REQUIREMENTS in the Specifications for additional information and requirements.

ARTICLE 3 CONTRACTOR

3.2.1 Delete “generally” after “the site, become”.

Add to the end of the sub-section as follows:

The Contractor shall not be entitled to any change in the Contract Time or Contract Sum on account of its failure, or that of any Subcontractor, to comply with the foregoing requirements.

3.2.2 Delete the beginning of the second sentence as follows:

These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however,

Delete the last sentence and replace as follows:

If the Contractor performs any construction activity that it knows or should know involves a recognized error, inconsistency or omission in the Contract Documents without such notice to the Architect, the Contractor shall assume appropriate responsibility for such performance and shall bear responsibility for the costs of any required correction.

3.2.3 Delete "not" after "Contractor is".

Delete ", but" after "public authorities" and create new sentence beginning with "The Contractor shall promptly".

3.2.4 Delete "claims" after "the Contractor shall make" and insert "a claim".

Delete the last sentence.

3.2.5 Add new sub-sections 3.2.5 to 3.2.7 as follows:
-3.2.7

§ 3.2.5 Any claim by the Contractor or Subcontractors that, in submitting their respective bids, they did not include all items as shown in the Contract Documents will be given no consideration for an adjustment of any kind. If any item is specified in a Section which would not normally furnish this item it shall be the responsibility of the Contractor to coordinate the situation with the Subcontractor, and if the item under consideration is not to be provided by the Subcontractor it shall be the responsibility of the Contractor to provide the work in question, without any additional cost to the Owner.

§ 3.2.6 The Contractor shall give the Architect timely notice of any additional Drawings, Specifications, or instructions required to define the Work in greater detail, or to permit the proper progress of the Work.

§ 3.2.7 The Contractor shall not proceed with any Work not clearly and consistently defined in detail in the Contract Documents, but shall request additional drawings or instructions from the Architect as provided in Sub-section 3.2.3. If the Contractor proceeds with such Work without obtaining further Drawings, Specifications or instructions, the Contractor shall correct Work incorrectly done at the Contractor's own expense.

3.3.1 Add to the end of the first sentence as follows:

which shall not be less than such state of skill and attention generally rendered by the contracting profession for projects similar to the Project in scope, difficulty and location. The Contractor shall adequately staff the Project to properly and thoroughly manage, schedule and supervise all construction activities.

Delete the last sentence.

3.3.2 Add the last sentence as follows:

This obligation shall also extend to the presence on the Site of suppliers of materials or equipment, their employees, contractors, and agents engaged in the Work.

3.3.4 Add new sub-sections 3.3.4 to 3.3.5 as follows:
-3.3.5

§ 3.3.4 The Contractor shall arrange for and attend job meetings with the Architect and such other persons as the Owner or the Architect may from time to time wish to have present. Job meetings shall be held at the site unless otherwise agreed by all parties and the schedule for job meetings shall be subject to the Owner's approval. If requested by the Owner, the Contractor shall prepare and circulate minutes of job meetings in a form acceptable to the Owner (or, at the Owner's election, meeting minutes will be prepared by the Architect or OPM). The Contractor shall be represented at such meetings by a principal, project manager, general superintendent or other authorized main office representative, as well as by the Contractor's own project superintendent. An authorized representative of any Subcontractor or Sub-subcontractor shall attend such meetings if requested by the Owner or the Architect or OPM. See sub-section 5.3.2.

§ 3.3.5 The Contractor shall be responsible for properly laying out the Work, and for all lines, elevations and measurements for all of the Work subject, however, to the Owner's obligations under Sub-section 2.2.3. Without limitation, the Contractor shall establish the building grades, lines, levels, column, wall and partition lines required by the various Subcontractors in laying out their Work. The Contractor shall verify the figures shown on the Drawings before laying out the Work and will be responsible for any errors or inaccuracies resulting from its failure to do so. If the Contractor, while laying out the Work, becomes aware of any conflicts between the Drawings or Specifications and the actual layout of the Work, or any conflicts or inconsistencies in the Drawings and Specifications themselves, the Contractor shall promptly notify the Architect and the Owner, without whose instructions the Contractor shall not adjust the matter except at its own risk.

3.4.1 Add to the last sentence as follows:

The word "provide" shall mean furnish and install complete, including connections, unless otherwise specified. The Contractor shall furnish labor that can and will work in harmony with all other elements of labor employed or to be employed on the Project. The Contractor warrants that its financial condition is sound and that the Contractor is capable of obtaining any bonds or increase in bond amounts now or hereafter required pursuant to the Contract Documents. The Contractor shall promptly advise the Owner of any occurrence, event, fact, or other matter that has had, will have, or might reasonably be predicted to have a material adverse effect upon the financial condition of the Contractor or its ability to properly perform the Contract. Directions, specifications and recommendations by manufacturers for installation, handling, sorting, adjustment and operation of their materials or equipment shall be complied with; but the Contractor shall nonetheless have the responsibility of determining whether such directions, specifications and recommendations may safely and suitable by employed in the Work, and of notifying the Owner in advance, in writing, of any deviation or modification necessary for installation safety or proper operation of the item.

3.4.3 Add to the end of the second sentence as follows:

, and the Contractor shall ensure that all workers to be employed on the Project have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration (OSHA) of at least 10 hours. The Contractor shall be responsible for maintaining all safety precautions at and around the Project site. On the Owner's request, the Contractor shall permanently remove from the Project site any employee of the Contractor or any Subcontractor who fails to comply with the requirements of the Contract Documents or whose presence or behavior is deemed by the Owner to be adverse to the success of the Project or the Owner's interests.

3.4.3.1 Add new sub-section 3.4.3.1 as follows:

§ 3.4.3.1 CORI Reporting: In accordance with G.L. c71m Section 38R, criminal offender record information ("CORI"), including the taking of fingerprints, from the Massachusetts Criminal History Systems Board, relating to any worker who is scheduled to work in or about areas of the School occupied by students. The Contractor and Subcontractors shall cooperate fully and immediately with a request from the Owner or OPM to identify the workers who may be placed in a position where they may have direct and unmonitored contact with the students. The Contractor and its subcontractors shall notify the OPM at least two weeks before any workers may be working in areas of the School property of an occupied school by the students and will provide a listing of the workers who they anticipate will be working in those areas. The Owner reserves the right to stop work if there has been a failure to comply with this paragraph, in which event the Contractor and Subcontractors shall have no claim for damages, delays or time extensions against the Owner. Refer to SECTION 011000-SUMMARY OF WORK of the Specifications for additional information and requirements.

3.4.4 Add new sub-sections 3.4.4 to 3.4.11 as follows:
-3.4.11

§ 3.4.4 No laborer, worker, mechanic, foreman or inspector working within this Commonwealth in the employ of the Contractor, Subcontractor or other person doing or contracting to do the whole or part of the work contemplated by the contract, shall be required or permitted to work more than eight hours in any one day or more than forty-eight hours in any one week, or more than six days in any one week, except in cases of emergency.

§ 3.4.5 Every employee under this contract shall lodge, board and trade where and with whom he elects, and neither the Contractor nor his agents or employees shall, either directly or indirectly, require as a condition of the employment of any person that the employee shall lodge, board or trade at a particular place or with a particular person.

§ 3.4.6 The Contractor shall pay to any reserve police officer employed by him in any city or town the prevailing rate of wage paid to regular police officers in such city or town.

§ 3.4.7 It is the obligation of the Contractor to assure that the Contractor and all of its subcontractors comply with the requirements of the Massachusetts Prevailing Wage Law, MGL c. 149 §26-27H. The Contractor shall be responsible for all loss, cost and damage suffered or incurred by the Owner as a result of any stop work order or other enforcement action taken by the Attorney General under the authority of MGL c.149 §27, and shall release, indemnify, hold harmless and defend the Owner, the Architect, their officers, employees and consultants, from and against all claims, actions, suits, fines, or administrative proceedings arising out of or related to the violation by the Contractor or any subcontractor of the said Prevailing Wage Law (or, in the case of the Contractor's defense obligation, the claimed violation thereof). Unless otherwise expressly provided in the Contract Documents, all payroll records required to be submitted to the Owner shall be delivered to a designated employee of the Owner, and not to the Architect.

§ 3.4.8 The Contractor is solely responsible for the proper and safe operation and maintenance of all utility systems within the construction limits, whether these are supplied by the Owner's distribution system or otherwise, until the Work is accepted by the Owner, and until the Owner has notified the Contractor that other arrangements have been made. The Contractor shall maintain and operate appurtenances within the construction area, which serve the distribution system, subject to periodic inspection by the Owner's operating personnel. Inspection by any representative or personnel of the Owner shall not relieve the Contractor or responsibilities in connection with operation and maintenance of these facilities and equipment. The Contractor shall notify the Owner's representatives at least 72 hours in advance of the desire to extend, connect, disconnect, turn on or off any mechanical, electric, water or other service from the authorized representatives of the Owner. All plumbing, heating, and electrical work, including installation of equipment and any other work to be performed by the Contractor, shall be carried out without interference with the Owner's normal operation. Where any work requires interruption of any service, the Contractor shall make advance arrangements with the Owner for dealing with such interruption.

§ 3.4.9 The Contractor shall furnish and pay for all water and electricity required to complete the installation of the Work. Refer to SECTION 015000-TEMPORARY FACILITIES AND CONTROLS in the Specifications for additional information and requirements.

§ 3.4.10 (NOT USED)

§ 3.4.11 The Contractor shall be responsible for materials which are removed from the Work or from the site, including the Owner's property, which are to be built back into the Work at a later time. The costs of damage to or loss of such materials while removed from the Work or the Owner's property shall be borne by the Contractor.

3.5 Add to the end of the first sentence as follows:

and, promptly after written notification of non-conformance, shall be repaired or replaced by the Contractor with Work conforming to such requirements.

Delete the second to last sentence.

3.5.2 -3.5.8 **Renumber sub-section 3.5.2 beginning "The Contractor shall perform the Sustainable Measures…" to 3.5.11, and add new sub-sections 3.5.2 to 3.5.10 as follows:**

§ 3.5.2 The Contractor shall be responsible for determining that all materials furnished for the Work meet all requirements of the Contract Documents. The Architect may require the Contractor to produce reasonable evidence that a material meets such requirements, such as certified reports of past tests by qualified testing laboratories, reports of studies by qualified experts, or other evidence which, in the opinion of the Architect, would lead to a reasonable certainty that any material used, or proposed to be used, in the Work meets the requirements of the Contract Documents. All such data shall be furnished at the Contractor's expense. This provision shall not require the Contractor to pay for periodic testing of different batches of the same material, unless such testing is specifically required by the Contract Documents to be performed at the Contractor's expense.

§ 3.5.3 If the Contractor proposes to use a material which, while suitable for the intended use, deviates in any way from the detailed requirements of the Contract Documents, the Contractor shall inform the Architect in writing of the nature of such deviations at the time the material is submitted for approval and request approval of the deviation.
The Architect shall judge the design and appearance of proposed substitutes, an may refuse to approve any substitute which, in the Architect's opinion, would be out of character or otherwise inconsistent with the character or quality of design of the Project. An item shall be considered equal to the item so named or described if, in the opinion of the Architect:

a. it is at least equal in quality, durability, appearance, strength and design.
b. it performs at least equally the function imposed by the general design for the work; and
c. it conforms substantially, even with deviations, to the detailed requirements for the items as indicated by the specifications.

§ 3.5.4 In informing the Architect of deviations or substitutions, the Contractor shall provide, upon request, evidence leading to a reasonable certainty that the proposed substitution or deviation will provide a quality of result at least equal to that otherwise attainable in accordance with the Contract Documents. If, in the opinion of the Architect, the evidence presented by the Contractor does not provide a sufficient basis for such reasonable certainty, the Architect may reject such substitution or deviation without further investigation.

By making requests for substitutions, the Contractor:

.1 represents that it has personally investigated the proposed substitute product and determined that it meets the conditions specified in Sub-section 3.5.4;

.2 represents that it will provide the same warranties and guarantees for the substitute product that it would for that specified;

.3 certifies that all cost data presented with respect to the proposed substitution are accurate and complete and include all related (direct and indirect) costs under the Contract, and waives all claims for additional costs related to the substitution that subsequently become apparent; and

.4 will coordinate the installation of the substitute, if approved, making such changes as may be required for the Work to be complete in all respects.

§ 3.5.5 Any additional cost, or any loss or damage arising from the substitution of any material or any method for those originally specified shall be borne by the Contractor, notwithstanding approval or acceptance of such substitution by the Owner or the Architect, unless such substitution was made at the written request or direction of the Owner or the Architect.

§ 3.5.6 The warranty provided in this paragraph 3.5 shall be in addition to and not in limitation of any other warranty required by the Contract Documents or otherwise prescribed by law.

§ 3.5.7 The Contractor shall procure and deliver to the Architect, no later than the date claimed by the Contractor as the date of Substantial Completion, all special warranties required by the Contract Documents. Delivery by the Contractor shall constitute the Contractor's guarantee to the Owner that the warranty will be performed in accordance with its terms and conditions.

§3.5.8 The Contractor shall guarantee all Work for a period of one year after Date of Substantial Completion, or by the terms of any special guarantee required by the Contract Documents. The Contractor shall, upon written notice from the Owner, promptly correct defective Work or Work not in accordance with the Contract Documents.

§ 3.5.9 The Contract Documents are intended to produce a building of consistent character and quality of design. All components of the building including visible items of mechanical and electrical equipment have been selected to have a coordinated design in relation to the overall appearance of the building. The Architect shall judge the design and appearance of proposed substitutions on the basis of their suitability in relation to the overall design of the Project, as well as for their intrinsic merits. The Architect will not approve as equal to materials or equipment specified proposed substitutions which, in the Architect's opinion, would be out of character, obtrusive, or otherwise inconsistent with the character or quality of design of the Project. In order to permit coordinated design of color and finishes the Contractor shall, if required by the Architect, furnish the substituted material in any color, finish, texture, or pattern which would have been available from the manufacturer(s) originally specified, at no additional cost to the Owner.

§ 3.5.10 No additional charge shall be made by the Contractor for attending meetings at the site to diagnose problems or to instruct the Owner's personnel in the proper operation or maintenance of the Work, or for making initial or seasonal adjustments (not including normal maintenance) of mechanical systems or other Work during the applicable warranty period. The Contractor shall provide such service promptly upon request from the Owner. In case of emergency, service shall be provided as necessary to avoid loss or damage or to maintain normal use of the premises.

3.6.1 Add new sub-section 3.6.1 as follows:

§ 3.6.1 The project is exempt from the Massachusetts Sales Tax to the extent permitted by G.L. c.64H, §6(f). The exemption number will be provided by the Awarding Authority to the Contractor.

3.7.1 Add to the end of the sub-section as follows:

Such permits and approvals shall include, without limitation, plumbing and electrical inspections, certificates of occupancy upon completion of the Work and permits for temporary occupancy or obstruction of sidewalks, streets or other public ways. Fees for local permits and inspections will be waived. The Contractor shall not use, occupy or obstruct, nor permit any Subcontractor or any other person performing the Work to use, occupy or obstruct, any lands or areas outside of the legal limits of the site, unless written permission satisfactory to the Owner has been obtained by the Contractor at the Contractor's sole cost. The Contractor shall arrange for all local policemen required to be present at or adjacent to the site for traffic control or other purposes. Refer to SECTION 011000-SUMMARY OF WORK in the Specifications for additional information and requirements.

3.7.2 Add to the end of the sub-section as follows:

If any of the Work is required to be inspected or approved by any public authority, the Contractor shall cause such inspection or approval to be performed and shall comply with any instructions or corrections ordered by the public authority.

3.7.3 Delete “knowing it” after “performs Work” and replace with “it knows or should know”.

3.7.4 Delete sub-section 3.7.4 and replace as follows:

§ 3.7.4 Concealed or Unknown Conditions. Claims for concealed or unknown conditions shall be governed by Chapter 30, Section 39N of the General Laws of the Commonwealth of Massachusetts, as amended.

3.7.5 Delete second and last sentences.

3.8 Delete section 3.8 in its entirety.

3.9.1 In the first sentence:

Insert “, in accordance with the Contract Documents,” after “shall employ”.

Insert “at all times” after “the Project site”.

3.9.4 Add new sub-sections 3.9.4 and 3.9.5 as follows:
-3.9.5

§ 3.9.4 The Contractor shall coordinate and supervise the Work performed by Subcontractors to the end that the Work is carried out without conflict between trades and so that no trade, at any time, causes delay to the general progress of the Work. The Contractor and all Subcontractors shall at all times afford each trade, any separate contractor, or the Owner, every reasonable opportunity for the installation of Work and the storage of materials.

§ 3.9.5 The Contractor shall provide the Owner and the Architect with contact information, including telephone numbers, of the Superintendent and Project Manager, by which they can be contacted at all times, including non-work hours, in the event of emergencies.

3.10.1 In the first sentence delete "promptly" after "The Contractor" and replace with "within twenty (20) days".

In the second sentence, insert "or as requested by the Architect" after "conditions of the Work and Project".

Add to the end of the sub-section as follows:

The construction schedule shall be in such form and contain such information as the Architect and Owner require. The construction schedule shall be resource loaded for the Contractor and all subcontractors, with each resource identified by name, description, unit of measure, and calendar assignment. For each class of work included in the Contractor's schedule of values, the construction schedule shall show the percentage of completion to be obtained and the total dollar value of the work to be completed as of the first of each month until Substantial Completion. All calculations shall be on the basis of work in place, but not including the value of materials delivered but not in place.

3.10.3 Add to the end of the sub-section as follows:

The Contractor's compliance with the construction schedule is a material obligation of the Contract.

3.10.4 Add new sub-sections 3.10.4, 3.10.5, and 3.10.6 as follows:
-3.10.6

§ 3.10.4 The Contractor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays. The construction schedule shall be updated every month (or more frequently if requested by the Owner) to reflect actual conditions (such updates are sometimes referred to in these General Conditions as "progress reports"). In the event any progress report indicates delays in achievement of any milestone date set forth in such schedule, the Contractor shall propose in written form an affirmative plan (the "Recovery Schedule") to correct the delay, including overtime and/or additional labor, if necessary, which Recovery Schedule shall indicate the date by which the progress of the Work will comply with the construction schedule, and shall be subject to the approval of the Owner and the Architect. In no event shall any progress report or Recovery Schedule constitute an adjustment in the construction schedule, Contract Time or any milestone date unless any such adjustment is agreed to by the Owner and authorized pursuant to a Change Order.

§ 3.10.5 In the event (i) that the performance of the Work, as of a milestone date, has not progressed or reached the level of completion required by the construction schedule, and (ii) the progress of the Work is not brought back into compliance with the construction schedule on the date proposed by the Recovery Schedule, or the Contractor otherwise fails to comply with the Recovery Schedule, the Owner shall have the right to order the Contractor to take corrective measures to expedite the progress of the Work, including, without limitation, (1) supplying additional manpower, equipment, and facilities, (2) working additional shifts or overtime, (3) working additional days, and (4) other similar measures (hereinafter referred to collectively as "Corrective Measures"). Such Corrective Measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents.

§ 3.10.6 The Contractor shall not be entitled to an adjustment in the Contract Sum in connection with Corrective Measures required by the Owner under or pursuant to Section 3.10.5. The Owner may exercise the rights furnished the Owner under or pursuant to Section 3.10.5 as frequently as reasonably necessary to ensure that the Contractor's performance of the Work complies with the milestone dates set forth in the construction schedule.

3.11.1 Add to the end of the sub-section as follows:

Without limitation, the Contractor shall keep at the site at all times a separate and complete set of blackline prints of the Drawings and Specifications on which shall be noted neatly, accurately and currently, as the Work progresses and in no event less often than monthly: (a) the progress of the Work installed by coloring in all pipe lines, ducts and other apparatus as constructed or installed, and (b) all revisions to the Work, including but not limited to plumbing, fire protection, electrical, HVAC and architectural work, wherever such Work was installed other than as shown on the Drawings or as described in the Specifications (with approval as required pursuant to the Contract Documents). The Contractor shall be responsible for assuring that the progress of the Work and all revisions are delineated by the specific trades involved on a current basis. The Owner and the Architect shall have access to such as-built Drawings at all times. When final as-built Drawings are found by the Architect to be complete, the Contractor shall furnish to the Architect the record set of Drawings in hard copy reproducible format with each sheet clearly marked "Record Drawing" and dated. In addition, the Contractor shall update the Drawings contained in the Architect's CADD files to reflect all changes during construction of the Work so as to make the CADD Drawings consistent with the Record Drawings. The Architect will make available to the Contractor the electronic CADD files for the Drawings prepared by the Architect for the Project. Delivery by the Contractor of the final as-built Record Drawings, and the CADD Drawings updated to reflect as-built conditions, shall be a condition to final payment, and furnishing of the Record Drawings and CADD Drawings may be carried on the punch list with a scheduled value determined by the Architect. Refer to SECTION 017839-PROJECT RECORD DOCUMENTS and SECTION 017700-PROJECT CLOSEOUT of the Specifications for additional information and requirements.

3.12.6 Add to the end of the sub-section as follows:

By approving and submitting Shop Drawings, Product Data, Samples, and similar submittals the Contractor thereby represents that the Contractor has determined and verified all dimensions, quantities, field dimensions, relations to existing work, coordination with work to be installed later, coordination with information on previously accepted Shop Drawings, Product Data, Samples, or similar submittals and verification of compliance with all the requirements of the Contract Documents. The accuracy of all such information is the responsibility of the Contractor. In reviewing Shop Drawings, Product Data, Samples, and similar submittals the Architect shall be entitled to rely upon the Contractor's representation that such information is correct and accurate.

3.12.10 Add to the end of the last sentence as follows:

, except as provided in Section 3.2.

3.12.11 Add new sub-section 3.12.11 as follows:

§ 3.12.11 When professional certification of materials, systems or equipment is required by the Contract Documents, the Owner shall be entitled to rely upon such certifications, and neither the Owner nor the Architect shall be expected to make an independent examination with respect to the performance of such materials, systems or equipment.

3.12.12 Add new sub-sections 3.12.12 to 3.12.13 as follows:
-3.12.13

§ 3.12.12 The Architect will review Shop Drawings, Product Date, Samples and similar submittals two times: once upon original submission and a second time if revisions or corrections are requested by the Architect. Submittals not initially approved by the Architect shall be corrected by the Contractor prior to the second submittal.

§ 3.12.12.1 The Contractor shall also reimburse the Owner amounts charged to the Owner by the Architect for reviewing Shop Drawings, Product Data, Samples and similar submittals which have to be revised and resubmitted after the second review by the Architect.

§ 3.12.12.2 The Contractor shall also reimburse the Owner amounts charged to the Owner by the Architect for evaluating deviations and substitutions proposed by the Contractor, for making revisions to the Contract Documents on account thereof, and for responding to requests for information and providing other services on account of such proposed deviations or substitutions, all regardless of whether such proposed deviations or substitutions are approved or rejected by the Architect.

§ 3.12.13 Refer to SECTION 013300-SUBMITTALS in the Specifications for additional information and requirements.

3.13 Add to the end of the section as follows:

The right of possession of the premises and the improvements made thereon by the Contractor shall remain at all times with the Owner. The Contractor's right to entry and use thereof arises solely from the permission granted by the Owner under the Contract Documents. The Owner shall not be liable to the Contractor, the Subcontractors, their employees, or anyone else with respect to the conditions of the premises, except only for a condition caused directly and solely by the negligence of the Owner.

3.14.3 Add new sub-section 3.14.3 as follows:

§ 3.14.3 The Contractor shall be responsible to install all required sleeves and inserts for any built-in building component. No finished materials or existing structural work shall be cut unless shown on the Contract Documents, without the Architect's approval after submittal of appropriate detail drawings. Cutting and patching of all building elements caused by failure to provide or properly locate sleeves, forms and inserts, incorrect location of Work or failure to cooperate with other trades, shall be completed by the Contractor without additional cost to the Owner. All such installation and repair work shall be carried out by mechanics skilled in the repair trade involved, with due regard to the trade practices and suitable protection of existing work all at no cost to the Owner and subject to the Owner approval.

3.15.1 Add "site" to the end of the second sentence.

3.15.3 Add to the end of the sentence as follows:

, and may deduct all costs thereof from any payment due the Contractor.

3.15.4 Add new sub-section 3.15.4 as follows:

§ 3.15.4 Without limitation, the Contractor shall be responsible for the removal of all crates, cartons and other flammable waste materials or trash from the work areas regardless of cause at the end of each working day or at more frequent intervals if required to maintain the site in a safe and orderly condition. At the completion of the Work, the Contractor shall remove all waste materials and rubbish from and about the site as well as all tools, construction equipment, machinery and surplus materials, and shall leave the site in a neat and clean condition satisfactory to the Owner. Immediately prior to the Architect's inspection for Substantial Completion, the Contractor shall completely clean the premises. Concrete and ceramic surfaces shall be cleaned and washed. Resilient coverings shall be cleaned, waxed and buffed. Woodwork shall be dusted and cleaned. Sash, fixtures and equipment shall be thoroughly cleaned. Stains, spots, dust, marks and smears shall be removed from all surfaces. Hardware and all metal surfaces shall be cleaned and polished. Glass and plastic surfaces shall be thoroughly cleaned on both sides by professional window cleaners. All damaged, broken or scratched glass or plastic shall be replaced by the Contractor at the Contractor's expense.

3.16 Insert ", Owner's representatives" after "provide the Owner".

3.18.1 Delete the first sentence and replace as follows:

To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, OPM, Architect, Architect's consultants, the Massachusetts School Building Authority (hereafter MSBA), and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, including claims, damage, loss or expense attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, including the Work, caused in whole or in part by the negligent or wrongful acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations, including those of indemnity, which would otherwise exist as to a party or person described in this section.

3.18.3 Add new sub-sections 3.18.3 to 3.18.5 as follows:
-3.18.5

§ 3.18.3 Nothing contained herein shall be construed to create a contractual relationship or cause of action between the Architect and the Contractor, except as expressly provided in Sub-section 3.18.1 above. The Contractor shall not bring any suit, action or other proceeding in law, equity, or arbitration against the Architect, or the officers or employees of the Architect, for the enforcement of any provisions of this Contract.

§ 3.18.4 With respect to any Liabilities of a type not covered by insurance and required to be provided hereunder or otherwise carried by the Owner or the Contractor, the Contractor's indemnity obligation under this Contract shall not extend to any loss or damage to the extent caused by the negligence of an Indemnitee. Accordingly, if any such uninsured Liability involves a claim of comparative or contributory negligence of an Indemnitee, all legal fees and expenses incurred in defending such claim, and any loss or damage determined to be payable as a result of the occurrence giving rise to the Liability (by settlement, judgment or otherwise) shall be apportioned between or among the responsible parties based upon relative degrees of fault, except in the instance of gross negligence or willful misconduct of the Contractor (in which case the Contractor's indemnity shall be absolute and complete and not reduced by the comparative or contributory negligence of an Indemnitee).

§ 3.18.5 If the Contractor has acknowledged its indemnification obligation with respect to a particular claim in accordance with the terms hereof, the Contractor shall assume, at its sole cost and expense, the defense of such claim. Counsel selected for such defense shall be reasonably acceptable to the Indemnitee. The Indemnitee shall be entitled (but not required) to participate in (but not control) such defense through its own counsel and at its own expense; provided that if the counsel selected by the Contractor advises that, due to actual or potential conflicts, separate counsel should represent the Indemnitee, the expense of such separate counsel shall be an indemnified expense in accordance with the terms hereof. If the Contractor does not acknowledge its indemnification obligation for a particular claim, or does not timely assume the defense thereof, the Indemnitee may defend such claim in such manner as it may deem appropriate. The Contractor shall be responsible for paying the Indemnitees, on a current basis, for all legal fees and expenses incurred by the Indemnitee in defending such claim within thirty (30) days of billing therefor. Notwithstanding its control of a defense, the Contractor shall not (i) make any admission or take any other action that is binding on, or otherwise attributable to any Indemnitee, or (ii) consent to any settlement, entry of judgment, or other disposition, in all instances without the prior written consent of the affected Indemnitee.

ARTICLE 4 ARCHITECT

4.1.1 Replace sub-section 4.1.1 as follows:

> The person variously referred to in the Contract Documents as the Architect or Engineer is one and the same, and is the person or organization identified in the Agreement, and includes his or its authorized representatives.

4.1.2 In the first sentence delete ", Contractor" after "consent of the Owner".

In the second sentence insert "of the Owner" after "Consent".

4.1.3 Delete sub-section 4.1.3.

4.2.1 In the first sentence delete "and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment."

4.2.3 In the first sentence delete "reasonably" after "will keep the Owner".

4.2.10 Delete sub-section 4.2.10.

4.2.11 Replace sub-section 4.2.11 as follows:

> § 4.2.11 The Architect will, if requested, interpret the requirements of the Contract Documents or evaluate the performance thereunder by the Contractor. The Architect will render, in writing, instructions and other interpretations, clarifications, decisions and approvals necessary for the proper execution and progress of the Work, with reasonable promptness. Either party to the Contract may request such interpretations from the Architect by written request to the Architect with a copy thereof given to the other party, or the Architect may initiate such instructions or interpretations. A request for interpretation or additional information concerning the Contract Documents shall be in a form prepared or approved by the Architect and shall include a reasonably detailed written statement that indicates the specific Drawings or Specifications as to which clarification or interpretation is requested, and the nature of the clarification or interpretation requested. The Architect may, as it judges desirable, issue as a part of such instructions or interpretations additional drawings, sketches, or other material indicating in greater detail the construction or design of the various parts of the Work, and provided such drawings or instructions are reasonably consistent with the previously existing Contract Documents, the Work shall be executed in accordance with such additional drawings or instructions without increase in the Contract Sum or extension of the Contract Time. If the Contractor

believes that a change in the Work has occurred by reason of the Architect's instructions or other interpretation or decision of the Architect hereunder, the Contractor shall give notice and proceed as provided in Section 15.1. The parties agree that the Architect's duties under this subparagraph shall be governed by Chapter 30, Section 39P of the General Laws of the Commonwealth of Massachusetts, as amended.

4.2.12 Delete the second sentence.

4.2.13 Replace sub-section 4.2.13 as follows:

§ 4.2.13 Decisions on matters relating to aesthetic effect shall be resolved by the Architect consistently with the intent expressed in the Contract Documents, subject however to the Owner's approval.

ARTICLE 5 SUBCONTRACTORS

5.2.1 Delete the last sentence.

5.2.2 In the second sentence insert "and legally permissible" after "has made reasonable".

5.2.3 Delete the last two sentences and replace as follows:

No increase in the Contract Sum or Contract Time shall be allowed for such change.

5.2.4 Add to the end of the sub-section as follows:

The applicable provisions of Chapter 149, Section 44F of the General Laws of the Commonwealth of Massachusetts shall apply to filed sub-bid subcontractors, including without limitation the obligation relative to subcontractor performance and payment bonds.

5.2.5 Add new sub-section 5.2.5 as follows:

§ 5.2.5 The Contractor when sub-contracting with sub-bidders that filed sub-bids pursuant to M.G.L. c. 149 § 44F shall use the form of subcontract set forth in M.G.L. c.149, § 44F. The form of subcontract for non-filed Subcontractors shall be submitted to the Owner for its approval, which shall not be unreasonably withheld or delayed. Each subcontract shall expressly provide for the contingent assignment referred to in Sub-section 5.4.1. The Contractor shall furnish the Owner with copies of executed subcontracts upon request.

5.3.1 Designate entirety of text under § 5.3 as sub-section 5.3.1.

5.3.2 Add new sub-section 5.3.2 as follows:

> § 5.3.2 When the presence of a subcontractor or sub-subcontractor is required at a job meeting, the subcontractor or sub-subcontractor shall be represented by an authorized representative who is empowered to make binding commitments on matters to be discussed at such meetings, such as costs, payments, change order, time schedules and manpower. Notices required under the Contract may be served on such representatives.

5.4.1 In sub-heading .1 delete "Section 14.2" and replace with "Article 14".

Add new sub-heading .3 as follows:

> .3 The Owner may further assign the subcontract to a successor contractor or other entity.

Delete last sentence of sub-section.

5.4.2 Delete sub-sections 5.4.2 and 5.4.3.
-5.4.3

ARTICLE 6 CONSTRUCTION BY OWNER OR SEPARATE CONTRACTORS

6.1.1 At the end of the first sentence delete "including those portions related to insurance and waiver of subrogation".

In the second sentence delete "Claim" after "shall make such" and replace with "claim".

6.1.4 Delete sub-section 6.1.4 and replace as follows:

> § 6.1.4 The Owner reserves the right to enter any part of the Project site at any time to inspect the Work or to perform other work with its own forces or separate contractors, or to address any emergency situation. Such access is not to be construed to mean partial occupancy by the Owner and no claim for increase in the Contract Time or Sum will be considered unless such Owner's contractors have delayed or damaged the Contractor's Work. The Contractor shall permit the Owner to place and install as much furniture, equipment and other material during the progress of the Work as is possible before completion of the various parts of the Work and agrees that such placing and installation of equipment shall not in any way evidence the completion or acceptance of the Work or any portion of it.

6.2.3 Delete the last sentence.

6.2.5 Delete sub-section 6.2.5.

ARTICLE 7 CHANGES IN THE WORK

7.2.2 Add new sub-section 7.2.2 as follows:

> § 7.2.2 Upon request of the Owner or the Architect, the Contractor shall without cost to the Owner submit to the Architect, in such form as the Architect may require, an accurate written estimate of the cost of any proposed extra Work or change. The estimate shall indicate the quantity and unit cost of each item of material, and the number of hours of work and hourly rate for each class of labor, as well as a description and the amounts of all other costs chargeable under the terms of this Article. Unit labor costs for the installation of each item of material shall be shown if required by the Architect. The Contractor shall promptly revise and resubmit each estimate if the Architect determines that it is not in compliance with the requirements of this Article, or that it contains errors of fact or mathematical errors. If required by the Architect, in order to establish the exact cost of new Work added or of previously required Work omitted, the Contractor shall obtain and furnish to the Architect bona fide proposals from recognized suppliers for furnishing any material included in such Work. Such estimates shall be furnished promptly so as to occasion no delay in the Work, and shall be furnished at the Contractor's expense. The Contractor shall state in the estimate any extension of time required for the completion of the Work if the change or extra work is ordered.

7.3.3 Delete the first sentence of the sub-section and replace as follows:

> If the Construction Change Directive provides for an adjustment to the Contract Sum, and if the Contract Documents include a unit price for the work that is the subject of such directive, such unit price shall be the basis of the adjustment to the Contract Sum, unless the Owner, in its sole discretion, chooses another method. If, however, the Contract Documents do not include a unit price for such work, the adjustment shall be based on one of the following methods, as selected by the Owner:

In sub-heading .2 delete “stated in the Contract Documents or” after “Unit prices”.

Add to the end of the sub-section as follows:

> Contract modification is permitted only in accordance with SECTION 012600-CONTRACT MODIFICATION PROCEDURES of the Specifications.

7.3.4 Delete sub-section 7.3.4 and replace as follows:

> § 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that, in the opinion of the Architect, application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner, the applicable unit prices shall be equitably adjusted.

7.3.5 In the first sentence add after "the Work involved and" as follows:

> , within five (5) calendar days from receipt of the Construction Change Directive,"

Insert "by written notice" after "advise the Architect".

Add to the end of the sub-section as follows:

> Failure to so advise the Architect within such 5-day period (1) shall be interpreted as Contractor's agreement with the proposed method of adjustment; (2) shall constitute an irrevocable waiver of any right of the Contractor to submit a claim on account of the method of adjustment; and (3) shall cause the Construction Change Directive to be deemed and constitute a Change Order.

7.3.6 In the second sentence delete "recorded as" after "immediately shall be" and replace with "deemed and shall constitute".

Add to the end of the sub-section as follows:

> Refer to SECTION 012600-CONTRACT MODIFICATION PROCEDURES in the Specifications for additional requirements.

7.3.7 Delete first sentence and replace as follows:

If the proposed method of adjustment in the Contract Sum is based on unit prices that are stated in the Contract Documents, such unit prices shall be the basis of any adjustment to the Contract Sum, unless the Owner has chosen another method pursuant to subparagraph 7.3.3. If the proposed method of adjustment is not based on such unit prices and the Contractor objects to the proposed method of adjustment, the Contractor must notify the Architect of such objection in writing within five (5) calendar days from Contractor's receipt of the Construction Change Directive. Failure to so object will irrevocably waive any such objections and claims on account of such method of adjustment, and the Construction Change Directive shall be deemed and shall constitute a Change Order. If the Contractor does so object, the adjustment to the Contract Sum shall be determined by the Architect on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit.

In sub-heading .4 insert "and" after "and insurance," and delete ", and sales, use or similar taxes related to the Work" after "permit fees".

Delete sub-heading .5 and replace as follows:

.5 A reasonable allowance for overhead and profit.

7.3.9 Delete the end of the first sentence starting after "Directive to the Owner," and replace as follows:

amounts for such changes in the Work shall not be included in Applications for Payment. Such amounts shall only be included in an Application for Payment after the adjustment for the Construction Change Directive has been included in a Change Order signed by the Owner and the Contractor.

7.3.11 Add new sub-section 7.3.11 as follows:

7.3.11 In Subparagraph 7.3.7, the allowance for the combined overhead and profit included in the total cost to the Owner for a change in the Work shall be based on the following schedule:

.1 For the Contractor, for work performed by the Contractor's own forces: 10 percent of the net cost. Net cost shall be the cost of labor and materials only. All other costs, such as, insurance and bonds shall be factored after the net cost total.

.2 For the Contractor, for work performed by one or more Subcontractors: 10 percent of the combined net cost of addition and deductions of the Subcontractors. Net cost shall be the cost of labor and materials only. All other costs, such as, insurance and bonds shall be factored after the net cost total.

.3 For each Subcontractor, for Work performed by the Subcontractor or his Sub-subcontractors: 10 percent of the combined net cost of their Work. Net cost shall be the cost of labor and materials only. All other costs, such as, insurance and bonds shall be factored after the net cost total.

.4 In any event, the total allowance for overhead and profit for a Change in the Work shall not exceed 20 percent of the net cost of the Work.

.5 For a Change in the Work resulting in a net deduction in costs, there shall be no allowance for overhead and profit.

.6 Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.6.

.7 Proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also. In no case will a change involving over $500 be approved without such itemization.

7.3.12 Add new sub-sections 7.3.12 to 7.3.12.3 as follows:
-7.3.12.3

§ 7.3.12 Work Performed Under Protest. The Contractor shall perform all work as directed by the Owner. If the Owner determines that certain work for which the Contractor has requested a Change Order does not represent a change in the Contract, the Contractor shall perform such work under protest and shall follow the Procedures described in subparagraphs 7.3.12.1 and 7.3.12.2, below and the claim procedures set forth in Article 15.

§ 7.3.12.1 The Contractor shall, on or before the first working day following commencement of such work or sustaining such damage, submit to the OPM and the Architect a written statement of the nature of such work or damage sustained. The Contractor will not be entitled to compensation for any portion of its Change Order claim related to work performed prior to the Owner's receipt of such written statement.

§ 7.3.11.2 On or before the second working day after the commencement of any such work or sustaining of such damage, and daily thereafter, the Contractor shall file with the OPM and the Architect itemized statements of the details and costs of such work performed or damage sustained, calculated pursuant to subparagraph 7.3.7; and unless such statements be made as required, its claim for such compensation shall be forfeited and

invalid and it shall not be entitled to payment on account of any such work or damage.

§ 7.3.12.3 If the Construction Change Directive is for work which is to be compensated on the basis of Time and Materials calculated pursuant to subparagraph 7.3.7, the Contractor shall maintain detailed records on a time and materials basis of work required by the Construction Change Directive. At the beginning of each day in which Time and Materials work is to be performed, the Contractor shall notify the OPM where and what type of work is to be performed; and at the end of each work day in which Time and Materials work was performed, the Contractor must obtain the signature of the OPM verifying actual time spent and materials used on the change. Costs submitted without the signed verification of the OPM will not be approved.

ARTICLE 8 TIME

8.2.2 In the first sentence delete ", except by agreement or instruction of the Owner in writing, prematurely".

8.2.4 Add new sub-sections 8.2.4 and 8.2.5 as follows:
-8.2.5

§ 8.2.4 Unless specifically required by law, no payment under this Contract shall be due until the construction schedule, required by Section 3.10, and conforming to the requirements of the General Requirements has been accepted by the Architect.

§ 8.2.5 If the Architect in reviewing any Application for Payment determines that the amount of completed Work in place as certified by the Architect is less than 90% of the Work in place required by the Contractor's construction schedule or schedule of values provided for in Section 9.2, or that there have been delays to critical paths and the Contract completion date will not be met, or that, in the Owner's sole discretion, there is reasonable concern that the Work will not be Substantially Complete by the date required in the Contract Documents, the Contractor shall be required to submit a recovery schedule with a written description of the steps the Contractor intends to take to put the Project back on schedule. At the Owner's option, the Contractor shall take some or all of the following actions at no additional cost to the Owner:

.1 Increase the number of workers on the site, in such quantities and trades as will substantially eliminate the backlog of work;

.2 Increase the number of working hours per shift, shifts per day, working days per week, amount of construction equipment, or any combination of the foregoing, sufficiently to substantially eliminate backlog of work; or

.3 Reschedule activities so that the completion dates initially scheduled will be met.

8.3.1 Insert "(except weather)" after "casualties or other causes".

Delete "pending mediation and arbitration" after "delay authorized by Owner".

Add to the end of the sub-section as follows:

, and this shall be the Contractor's sole remedy for such delay. Under no circumstances will the Contractor be entitled to an increase in the Contract Sum, or to any other damages, on account of or in connection with any delay, regardless of the cause of such delay, and Contractor agrees not to make any claim for such damages, including, but not limited, claims for damages on account of having to perform out-of-sequence work, claims for damages on account of loss of production, and claims for damages on account of hindrances or interference with the work.

8.3.3 Replace sub-section 8.3.3 as follows:

§ 8.3.3 No claim for extension of time shall be allowed on account of failure of the Architect to furnish Drawings, Specifications or instructions or to return Shop Drawings or Samples until 15 working days after receipt by the Architect of written demand for such instructions, Drawings, or Samples, and not then unless such claim be reasonable.

8.3.4 Add new sections 8.3.4 to 8.3.7 as follows:
-8.3.7

§ 8.3.4 No extension of time shall be granted because of seasonal or abnormal variations in temperature, humidity or precipitation, which conditions shall be wholly at the risk of the Contractor, whether occurring within the time originally scheduled for completion or within the period of any extension granted. There shall be no increase in the Contract Sum on account of any additional costs of operations or conditions resulting therefrom.

§ 8.3.5 The Contractor hereby agrees that the Contractor shall have no claim for damages of any kind against the Owner or the Architect on account of any delay in the commencement of the Work and/or any hindrance, delay or suspension of any portion of the Work, whether such delay is caused by the Owner, the Architect, or otherwise, except as and to the extent expressly provided in G.L. c. 30, §39N. The Contractor acknowledges that the Contractor's sole remedy for any such delay and/or suspension will be an extension of time as provided in this Article.

§ 8.3.6 This section is subject to M.G.L. c.30 §39O.

§ 8.3.6.1 The Owner may order the Contractor in writing to suspend, delay or interrupt all or any part of the work for such period of time as it may determine to be appropriate for the convenience of the Owner; provided, however, that if there is a suspension, delay or interruption for fifteen (15) days or more due to a failure of the Owner to act within the time specified in this Contract, the Owner shall make an adjustment in the Contract Sum for any increase in the cost of performance of this Contract but shall not include any profit to the Contractor on such increase; and provided further, that the Owner shall not make any adjustment in the Contract Sum under this provision for any suspension, delay, interruption or failure to act to the extent that such is due to any cause for which this Contract provides for an equitable adjustment of the Contract Sum under any other contract provisions.

§ 8.3.6.2 The Contractor must submit the amount of a claim under paragraph 8.3.6.1 to the Owner in writing as soon as practicable after the end of the suspension, delay, interruption or failure to act and, in any event, not later than the date of final payment under this Contract and, except for costs due to a suspension order, the Owner shall not approve any costs in the claim incurred more than twenty days before the Contractor notified the Owner in writing of the act or failure to act involved in the claim.

§ 8.3.6.3 In the event a suspension, delay, interruption or failure to act of the Owner increases the cost of performance to any Subcontractor, that Subcontractor shall have the same rights against the Contractor for payment for an increase in the cost of its performance as paragraphs 8.3.6.1 and 8.3.6.2 give the Contractor against the Owner, but nothing in paragraphs 8.3.6.1 and 8.3.6.2 shall in any way change, modify or alter any other rights which the Contractor or the Subcontractor may have against each other.

§ 8.3.7 If the progress of the Work is delayed by an act or neglect of the Contractor, a Subcontractor, Sub-subcontractor, or anyone directly or indirectly employed by them, so that the Substantial Completion date is extended beyond the date set forth in Paragraph 8.2, subject to adjustment of the Contract Time as provided for in the Contract Documents, then the Contractor shall reimburse the Owner upon demand for amounts charged by the Architect and the OPM for administration of the Contract during such extension.

8.4 Add new section 8.4 as follows:

§ 8.4 LIQUIDATED DAMAGES

§ 8.4.1 It is expressly understood and agreed, by and between the Contractor and Owner, that the time for the completion of the Work described herein is a reasonable time for the completion of same, taking into consideration the average climatic range and usual industrial and/or residential conditions prevailing in this locality. If the said Contractor shall neglect, fail or refuse to complete the Work within the times herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part consideration for the awarding of this Contract, to pay to the Owner $2,000.00, not as a penalty but as liquidated damages for such breach of contract, for each and every calendar day that the Contractor shall be in default after the time stipulated for completing the Work. The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amount is agreed to be the amount of damages which the Owner would sustain and said amount shall be deducted by the Owner from periodic payments.

ARTICLE 9 SCHEDULE OF VALUES

9.2 Add to the end of the section as follows:

, and shall be revised if later found by the Architect to be inaccurate. In addition, the Contractor shall submit to the Architect, at least 14 days before the first Application for Payment, a Cash Flow Schedule that shows the percentage completion to be obtained and the total dollar value of Work to be completed as of the first of each month until Substantial Completion. All calculations in the Cash Flow Schedule shall be on the basis of Work in place and shall exclude the value of materials delivered but not in place.

9.2.1 Add new sub-section 9.2.1 as follows:

§ 9.2.1 The Cash Flow Schedule shall be based on an orderly progression of the Work allowing adequate time for each operation (including adequate time for submission and review of submittals) and leading to a reasonable certainty of Substantial Completion by the date established in the Agreement. The Cash Flow Schedule will be reviewed by the Architect for compliance with the requirements of the Contract Documents. Unless specifically required by law, no payment under this Contract shall be due until the Cash Flow Schedule has been reviewed and approved by the Architect. The Architect's review of the Cash Flow Schedule shall not impose any duty on the Architect or the Owner with respect to the timing, planning, scheduling or execution of the Work. In particular if the Contractor proposes a Cash Flow Schedule indicating a date of Substantial Completion which is earlier than the Contract Time the Contractor shall not be entitled to additional payment or compensation of any kind if for any reason the full Contract Time is required to achieve Substantial Completion of the Work.

9.3.1.1 Delete sub-section 9.3.1.1.

9.3.2 Add to the end of the sub-section as follows:

The Owner may deduct the amount of such costs from payments due the Contractor. Where the Owner has approved payment for materials and equipment stored off-site, all costs for storage, insurance, transportation and other costs shall be borne solely by the Contractor. The Contractor shall assume responsibility to protect all such materials from loss or damage at no costs to the Owner, until they are finally incorporated into the Work, whether or not they have been paid for by the Owner. In approving payment for materials and equipment stored off-site, the Owner may require, without limitation, evidence that the off-site location is properly secure, proof of insurance, and segregation and/or marking of stored materials or equipment, and the ability of the Architect or Owners Representative to visit the location of the stored material, at the Contractor's expense, for verification purposes.

9.3.4 Add new sub-sections 9.3.4-9.3.5 as follows:
-9.3.5

§ 9.3.4 Each Application for Payment or periodic estimate requesting payment shall be accompanied by a certificate from each Subcontractor stating that the Subcontractor has been paid all amounts due the Subcontractor on account of previous applications for payment submitted by the Subcontractor, or else stating the amount not so paid and the reason for the discrepancy. In the event of any such discrepancy, the Contractor shall furnish the Contractor's own written explanation to the Owner through the Architect. Such certificate shall be in a form acceptable to the Owner. If requested by the Owner or the Architect, such certificates shall be provided by Sub-subcontractors or suppliers.

§ 9.3.5 On a schedule established by the Architect, generally one week prior to formal submission of each Application for Payment, the Contractor shall submit the Application for Payment in draft form, including all supporting materials, to the Architect and the Owner. The Contractor shall meet with the Architect as necessary to review the draft Application for Payment, and shall supply additional information as requested by the Architect or the Owner so as to substantiate all amounts to be included in the Application for Payment. Upon agreement of the parties, the Contractor shall formally submit the Application for Payment.

9.4.1 Insert at the beginning of the first sentence as follows:

Subject to the Contractor's compliance with Section 9.3 and the provisions of Section 9.6,

9.5.1 Add new sub-headings .8, .9, .10, .11, and .12 as follows:

.8 failure of the Contractor or mechanical or electrical trade subcontractors to comply with requirements of the General Requirements for maintaining record drawings. The Contractor shall check record drawings each month. Written confirmation that the record drawings are current will be required by the Architect before approval of the Contractor's monthly payment requisition;

.9 failure of the Contractor to provide required warranties under Section 9.3, claims for direct payment, or reasonable evidence indicating probable filing of such claims;

.10 costs incurred by the Owner under Section 10.2.5;

.11 failure of the Contractor to submit prerequisite documentation required by the General Requirements; or

.12 liquidated damages due the Owner pursuant to Section 8.4.

9.5.3 Delete sub-section 9.5.3.

9.6.1.1 Add new sub-section 9.6.1.1 as follows:

§ 9.6.1.1 No certificate for payment by the Architect, nor any progress payment made by the Owner, nor any partial or full use or occupancy of the Work or the Project by the Owner, shall constitute an acceptance of any Work not in accordance with the Contract Documents.

9.6.2.1 Add new sub-sections 9.6.2.1 to 9.6.2.5 as follows:
-9.6.2.5

§ 9.6.2.1 (a) Forthwith after the Contractor receives payment on account of a periodic estimate, the Contractor shall pay to each Subcontractor the amount paid for the labor performed and the materials furnished by that Subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the Subcontractor by the Contractor.

(b) Not later than the sixty-fifth day after each Subcontractor substantially completes his work in accordance with the plans and specifications, the entire balance due under the subcontract, less amounts retained by the Owner as the estimated cost of completing the incomplete and unsatisfactory items of work, shall be due the Subcontractor; and the Owner shall pay that amount to the Contractor. The Contractor shall forthwith pay to the Subcontractor the full amount received from the Owner less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the Subcontractor by the Contractor.

(c) Each payment made by the Owner to the Contractor pursuant to Subsections (a) and (b) of this Section for the labor performed and the materials furnished by a Subcontractor shall be made to the Contractor for the account of that Subcontractor; and the Owner shall take reasonable steps to compel the Contractor to make each such payment to each such Subcontractor. If the Owner has received a demand for direct payment from a Subcontractor for any amount which has already been included in a payment to the Contractor or which is to be included in a payment to the Contractor for payment to the Subcontractor as provided in Subsections (a) and (b), the Owner shall act upon the demand as provided in this Subsection 9.6.2.

(d) If, within seventy days after the Subcontractor has substantially completed the subcontract work, the Subcontractor has not received from the Contractor the balance due under the subcontract including any amount due for extra labor and materials furnished to the Contractor, less any amount retained by the Owner as the estimated cost of completing the incomplete and unsatisfactory items of work, the Subcontractor may demand direct payment of that balance from the Owner. The demand shall be by a sworn statement delivered to or sent by certified mail to the Owner, and a copy shall be delivered to or sent by certified mail to the Contractor at the same time. The demand shall contain a detailed breakdown of the balance due under the subcontract and also a statement of the status of completion of the subcontract work. Any demand made after substantial completion of the subcontract work shall be valid even if delivered or mailed prior to the seventieth day after the Subcontractor has substantially completed the subcontract work. Within ten days after the Subcontractor has delivered or so mailed the demand to the Owner and delivered or so mailed a copy to the Contractor, the Contractor may reply to the demand. The reply shall be by a sworn statement delivered to or sent by certified mail to the Owner, and a copy shall be delivered to or sent by certified mail to the Subcontractor at the same time. The reply shall contains a detailed breakdown of the balance due under the subcontract, including any amount due for extra labor and materials furnished to the Contractor and of the amount due for each claim made by the Contractor against the Subcontractor.

(e) Within fifteen days after receipt of the demand by the Owner, but in no event prior to the seventieth day after substantial completion of the subcontract work, the Owner shall make direct payment to the Subcontractor of the balance due under the subcontract, including any amount due for extra labor and materials furnished to the Contractor, less any amount (i) retained by the Owner as the estimated cost of completing the incomplete or unsatisfactory items of work, (ii) specified in any court proceedings barring such payment, or (iii) disputed by the Contractor in the sworn reply; provided that the Owner shall not deduct from a direct payment any amount as provided in part (iii) if the reply is not sworn to, or for which the sworn reply does not contain the detailed breakdown required by Subsection (d). The Owner shall make further direct payments to the Subcontractor forthwith after the removal of the basis for deductions from direct payments made as provided in parts (i) and (ii) of this Subsection.

(f) The Owner shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of Subsection (e) in an interest-bearing joint account in the names of the Contractor and the Subcontractor in a bank in Massachusetts selected by the Owner or agreed upon by the Contractor and the Subcontractor and shall notify the Contractor and the Subcontractor of the date of the deposit and the bank receiving the deposit. The bank shall pay the amount in the account, including accrued interest, as provided in an agreement between the Contractor and the Subcontractor or as determined by decree of a court of competent jurisdiction.

(g) All direct payments and all deductions from demands for direct payments deposited in an interest-bearing account or accounts in a bank pursuant to Subsection (f) shall be made out of amounts payable to the Contractor at the time of receipt of a demand for direct payment from a Subcontractor and out of amounts which later become payable to the Contractor and in the order of receipt of such demands from Subcontractors. All direct payments shall discharge the obligation of the Owner to the Contractor to the extent of such payment.

(h) The Owner shall deduct from payments to a Contractor amounts which, together with the deposits in interest-bearing accounts pursuant to Subsection (f), are sufficient to satisfy all unpaid balances of demands for direct payment received from Subcontractors. All such amounts shall be earmarked for such direct payments, and the Subcontractors shall have a right in such deductions prior to any claims against such amounts by creditors of the Contractor.

(i) If the Subcontractor does not receive payment as provided in Subsection (a) or if the Contractor does not submit a periodic estimate for the value of the labor or materials performed or furnished by the Subcontractor and the Subcontractor does not receive payment for same when due less the deductions provided for in Subsection (a), the Subcontractor may demand direct payment by following the procedure in Subsection (d) and the Contractor may file a sworn reply as provided in that same Subsection. A demand made after the first day of the month following that for which the Subcontractor performed or furnished the labor and materials for which the Subcontractor seeks payment shall be valid even if delivered or mailed prior to the time payment was due on a periodic estimate from the Contractor. Thereafter the Owner shall proceed as provided in Subsections (e), (f), (g) and (h).

§ 9.6.2.2 Any assignment by a Subcontractor of the rights under this section to a surety company furnishing a bond under the provisions of M.G.L. c.149, section 29 shall be invalid. The assignment and subrogation rights of the surety to amounts included in a demand for direct payment which are in the possession of the Owner or which are on deposit pursuant to Subsection (f) of Subsection 9.6.2.1 shall be subordinate to the rights of all Subcontractors who are entitled to be paid under this section and who have not been paid in full.

§ 9.6.2.3 "Subcontractor" as used in this Subsection 9.6.2 shall mean a person who files a sub-bid and receives a subcontract as a result of that filed sub-bid or who is approved by the Owner in writing as a person performing labor or both performing labor and furnishing materials pursuant to a contract with the Contractor. "Subcontractor" as used in other provisions of the Contract Documents shall, except as otherwise expressly provided, have the meaning set forth in Subsection 5.1.1.

§ 9.6.2.4 The Contractor or a Subcontractor shall enforce a claim to any portion of the amount of a demand for direct payment deposited as provided in Subsection (f) of Subsection 9.6.2.1 by a petition in equity in the superior court against the other and the bank shall not be a necessary party. A Subcontractor shall enforce a claim for direct payment or a right to require a deposit as provided in Subsection (f) of Subsection 9.6.2.1 by a petition in equity in the superior court against the Owner and the Contractor shall not be a necessary party. Upon motion of any party the court shall advance for speedy trial any petition filed as provided in this Section. M.G.L. c.231, § 59 and 59B shall apply to such petitions. A decree in any such proceeding shall not include interest on the disputed amount deposited in excess of the interest earned for the period of any such deposit. No person except a Subcontractor filing a demand for direct payment for which no funds due the Contractor are available for direct payment shall have a right to file a petition in a court of equity against the Owner claiming a demand for direct payment is premature, and such Subcontractor must file the petition before the Owner has made a direct payment to the Subcontractor and has made a deposit of the disputed portion as provided in part (iii) of Subsection (e) and in Subsection (f) of Subsection 9.6.2.1.

§ 9.6.2.5 In any petition to collect any claim for which a Subcontractor has filed a demand for direct payment the court shall, upon motion of the Contractor, reduce by the amount of any deposit of a disputed amount by the Owner as provided in part (iii) of Subsection (e) and in Subsection (f) of Subsection 9.6.2.1 any amount held under a trustee writ or pursuant to a restraining order or injunction.

9.6.3 Delete sub-section 9.6.3.

9.6.4 Delete "If the Contractor fails to furnish such evidence within seven days," from the beginning of the second sentence.

9.6.5 Delete sub-section 9.6.5.

9.6.7 Delete sub-section 9.6.7.

9.6.8 Add new sub-section 9.6.8 as follows:

§ 9.6.8 Notwithstanding the provisions of Section 9.6 all progress payments shall be made in accordance with Chapter 30, Sections 39F, 39G and 39K (as appropriate) of the General Laws of the Commonwealth of Massachusetts, as amended.

9.7 Delete section 9.7.

9.8.1 Add **after the first sentence** of the sub-section as follows:

In addition, Substantial Completion for the entire Project shall be achieved only when: (1) the Owner has beneficial occupancy and use of the entire Project for all its intended uses; (2) all Project systems included in the Work are operational and acceptable to the Owner; (3) all governmental inspections for the Project have been successfully completed, all governmental approvals and related paperwork have been delivered to the Owner, and final and unconditional certificates of occupancy for the entire Project have been delivered to the Owner, (4) the only remaining Work to be performed is minor in nature and the remaining Work may reasonably be performed without having a material adverse effect on or materially interfering with the Owner's occupancy and use of the Project and (5) all prerequisites to Substantial Completion defined in the Contract Documents have been completed.

9.8.2 Add to the end of the first sentence as follows:

together with the estimated value of completing or correcting such items (the "Punchlist") and (2) the permits and certificates referenced in Section 13.5. The Architect shall have the right to modify and supplement the Punchlist, including the estimated value of completion or correction.

9.8.5 Delete sub-section 9.8.5 and replace as follows:

> § 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor by the Architect. The certificate shall state the date of substantial completion, shall state any consequent responsibilities of the Contractor and the Owner in accordance with the Contract Documents. The Contractor shall complete and correct any incomplete and defective work within forty-five (45) calendar days from the date of Substantial Completion

9.8.6 Add new sub-section 9.8.6 as follows:

> § 9.8.6 Services provided by the Architect to conduct more than two (2) inspections of completed Work and any inspections beyond sixty (60) days after the date of substantial completion of any portion of the Work as stated in the Agreement shall be paid by the Contractor to the Owner. The Owner may deduct the cost of such services and inspections from payments due the Contractor.

9.9.1 Delete the end of the first sentence starting after "Work at any stage".

Delete the second sentence and replace as follows:

> Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner has accepted in writing the responsibilities assigned to it and the Contractor for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance.

Delete the second to last sentence.

9.9.3 Replace the "." at the end of the sub-section with "," and add the following:

> nor relieve the Contractor from its obligation to complete the Work, or its responsibility for loss or damage due to or arising out of defects in, or malfunctioning of, systems, materials, equipment or other elements of the Work, nor from other unfulfilled obligations or responsibilities of the Contractor under the Contract. The Contractor shall make no Claim for extension of the Contract Time or for damages of any kind arising directly or indirectly out of the exercise by the Owner of the rights reserved under this Section 9.9.

9.10.1 Add **after the second sentence** of the sub-section as follows:

By Final Completion, the Contractor shall have completed its performance of all Punchlist items, completed all balancing of mechanical and other applicable systems and all seasonal system adjustments that are reasonably necessary to proper functioning of the completed Project, delivered to the Owner all operations and maintenance manuals and completed related training for such manuals, and delivered to the Owner all required warranties and guarantees.

Add to the end of the sub-section as follows:

If, through no fault of the Architect, the Architect (including its subconsultants) is required to conduct more than two (2) inspections of the Work to determine final completion, the Contractor shall be responsible for any fees assessed by the Architect for Additional Services on account of such additional inspections. The Contractor shall promptly reimburse the Owner for any such additional fees or, if the same are not promptly reimbursed, the Owner may deduct such amounts due from amounts otherwise payable to the Contractor.

9.10.2 Delete sub-section 9.10.2 and replace with the following:

§ 9.10.2 Prior to and as a condition precedent to final completion and final payment, all of the following matters shall have been resolved and documents and items shall have been received and approved in writing by the Owner:

.1 final documents of similar nature to those required by the Contract Documents in connection with any Application for Payment hereunder;

.2 all final permits, approvals (including, without limitation, the approval of the Owner's insurance company, if required), certificates, affidavits and authorizations as required by Subsection 13.5.4, including an unconditional permanent and full Certificate of Occupancy, unless those permits, approvals, certificates, affidavits and authorizations are not received by the Owner solely for reasons as to which the Contractor or Subcontractors have no responsibility;

.3 formally prepared "as-built" drawings, records and related data including all field notes of all the Work all in accordance with the requirements of the Contract Documents;

.4 all operating and maintenance manuals as required by the Contract Documents, parts lists, the final version of the Project Directory, and repair source lists;

.5 all guarantees and warranties to which the Owner is entitled under the Contract Documents;

.6 satisfactory proof that all claims arising out of the Work have been released;

.7 acknowledgment of prior payments and waivers of lien (to the extent permitted by law) from all Subcontractors and the Contractor;

.8 the Architect's certificate certifying that the Work is complete;

.9 reasonable assurances that all practical orientation and operating instructions for all materials, systems, and equipment have been satisfactorily completed, and that all required training of Owner's personnel has been completed;

.10 a satisfactory report by the Contractor which is approved by the Architect that all mechanical systems have been and are properly balanced;

.11 an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or its property might in any way be responsible or encumbered, have been paid or otherwise satisfied;

.12 a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be cancelled or allowed to expire until at least 30 days' prior written notice has been given to the Owner;

.13 consent of surety, if required, to final payment;

.14 if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner;

.15 delivery of all spare parts required to be submitted pursuant to the Contract Documents;

.16 a general release of the Owner from the Contractor and, if requested, from any Subcontractor; and

.17 all sustainability documentation required from the Contractor is received.

If the final documentation submitted by the Contractor is not deemed complete by the Owner, or if the Owner deems the Work incomplete in any respect, the Contractor shall promptly complete any such Work and shall promptly resubmit the final documentation. Refer to SECTION 017823-OPERATION AND MAINTENANCE DATA and SECTION 019113-GENERAL COMMISSIONING in the Specifications for additional requirements.

9.10.3 Delete sub-sections 9.10.3 and 9.10.4.
-9.10.4

9.10.5 Insert "for payment for Work performed and of all other claims of which the payee knew or should have known at the time of final payment," after "claims that payee".

9.10.6 Add new sub-section 9.10.6 as follows:

§ 9.10.6 Notwithstanding anything in the Contract Documents to the contrary, final payment shall be made in accordance with the requirements of M.G.L.c.30, §39K (building projects) or §39G (public works projects), as amended.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

10.1.1 Add to the end of the sub-section as follows:

Such precautions and programs shall include, but are not limited to, compliance by the Contractor and all Subcontractors with all safety precautions and programs required by the Occupational Safety and Health Act and regulations promulgated thereunder, other applicable laws and regulations, the Contract Documents, and any insurance carrier providing insurance coverage for the Owner or the Contractor in connection with the Project. Without limiting the generality of the foregoing, the Contractor shall, promptly after issuance of the Notice to Proceed, prepare a written safety program which shall be submitted to the Owner and the Architect and issued to all Subcontractors and all forces employed on the work. Such program shall include regular safety meetings, and the Contractor shall prepare, circulate and maintain on file at the site minutes of all safety meetings.

10.2.1 In the first sentence change two instances of “reasonable” to “all necessary”.

Add new sub-heading .4 as follows:

.4 work or property of the Owner, its tenants, or other parties at or near the Project site with the Owner's permission.

10.2.5 At the beginning and end of the first sentence:

Delete “and” after “10.2.1.2”.

Insert “and 10.2.1.4” after “10.2.1.3”.

Delete the remainder of the first sentence as follows:

, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor.

Add to the end of the sub-section as follows:

Where the damage or loss presents an immediate danger to the public, the Owner, in its sole discretion and at the Contractor’s expense, may promptly remedy such damage or loss without prior notice to the Contractor.

10.2.9 Add new sub-sections 10.2.9 to 10.2.16 as follows:
-10.2.16

§ 10.2.9 The Contractor shall provide and maintain in good operating condition suitable and adequate fire protection equipment and services, and shall comply with all reasonable recommendations regarding fire protection made by the representatives of the fire insurance company carrying insurance on the Work or by the local fire chief or fire marshal. The area within the site limits shall be kept orderly and clean, and all combustible rubbish shall be promptly removed from the site. During any flame cutting and/or welding operation, incombustible curtains and blankets shall be used to intercept and catch hot metal, sparks and burning embers. The Contractor shall employ a watchperson equipped with portable fire extinguishing equipment to maintain a fire watch continuously during all flame cutting and welding operations and for four hours minimum thereafter. All fire doors shall be kept clear of rubbish and in operating condition and closed during non-working hours. The Contractors shall not allow any locking and blocking of any door in the building, except entrance doors during non-working hours.

§ 10.2.10 The Contractor shall at all times protect excavations, trenches, buildings and materials from rain water, groundwater, backup or leakage of sewers, drains and other piping, and from water of any other origin and shall remove promptly any accumulation of water. The Contractor shall provide and operate all pumps, piping and other equipment necessary to this end.

§ 10.2.11 The Contractor shall remove snow and ice which might result in damage or delay.

§ 10.2.12 During the progress of the Work and at all times prior to the date of Substantial Completion or occupancy of the Work by the Owner, whichever is earlier, the Contractor shall provide temporary heat, ventilation, and enclosure, adequate to permit the Work to proceed in a timely fashion, and to prevent damage to completed Work or Work in progress, or to materials stored on the premises. The use of the permanent heating and/or ventilation systems for temporary heat and/or ventilation shall be subject to the prior written approval of the Owner and Architect.

§ 10.2.13 [G.L. c.149, §44F(1)] The Contractor shall install weather protection and furnish adequate heat in the protected area from November 1 to March 31.

§ 10.2.14 The Contractor shall provide adequate facilities to keep the Site secure at all times when the Contractor's personnel are not present, from commencement of the Work until Substantial Completion, to assure that the Work, all materials and equipment stored at the Site, and all other property of the Owner located within the site limits or within other areas occupied or controlled by the Contractor, are fully and completely protected against loss or damage due to vandalism, theft, malicious mischief, pilferage or unexplained disappearance. If the Contractor fails to comply with the requirements of this Subsection 10.2.13, then the Owner may provide appropriate security, and charge the cost thereof to the Contractor. The Owner's provision of such security, or failure to do so, shall not relieve the Contractor of its sole responsibility to pay for loss or damage to such property due to vandalism, theft, malicious mischief, pilferage or unexplained disappearance, to the extent not covered by the Owner's insurance.

§ 10.2.15 The Contractor shall arrange for and provide all police details required by the local Police Department to be present at or adjacent to the site for traffic control purposes. The cost of police details so required shall be paid by the City. Refer to SECTION 011000-SUMMARY OF WORK for additional information and requirements.

§ 10.2.16 The Contractors shall protect and maintain in operation all pipelines, conduits, sewers, drains, poles, wiring and the like that in any way interfere with the Work, whether or not they are specifically show on the Drawings. The Contractor shall see that all such items are protected, supported and/or moved as necessary to adjust them to the Work.

10.3.1 Delete the second sentence and replace as follows:

The Contractor shall not cause or permit any introduction onto, under, or near the Owner's property of any hazardous materials or substances as defined by any applicable law, and shall not cause of permit any release, discharge, transportation, storage, or disposal of such materials or substances onto, under, or near the Owner's property or areas near the Owner's property. If the Contractor encounters or recognizes on the site any material known or reasonably believed to be hazardous, including but not limited to asbestos or polychlorinated biphenyl (PCB), the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and Architect in writing. The Contractor and the Owner shall cooperate in implementing measures to remove or contain said material and the Contractor shall comply with all directions of the Architect in the implementation of such removal or containment.

10.3.2 Delete sub-sections 10.3.2, 10.3.3, and 10.3.4.

10.3.3 In the first sentence insert the terms: "the OPM, MSBA," after "Architect's consultants".

10.3.5 In the first sentence replace "the Owner" with "and hold harmless the Owner, the Architect, the OPM and each of their consultants"

Delete the remainder of the sentence starting after "obligations under" and replace as follows:

Article 10 or for any violation of applicable law related to the Contractor's noncompliance with the provisions of this Article 10.

10.3.6 Delete sub-section 10.3.6.

10.3.7 Add new sub-section 10.3.7 as follows:

§ 10.3.7 The parties anticipate that certain hazardous substances and/or materials may be discovered at the site. When such conditions are set forth in the Contract Documents, the Contractor acknowledges that such conditions have been considered in establishing the Contract Time and Contract Sum. No extension of the Contract Time or increase in the Contract Sum shall be claimed or allowed with respect to any hazardous substances or materials located at the site which were disclosed in the Contract Documents. The Contractor shall strictly comply with all laws, regulations, rules, orders, ordinances and the like related to the excavation, storage, removal and disposal of any such hazardous substances or materials.

ARTICLE 11 INSURANCE AND BONDS

11.1.1 Add to the end of the sub-section the following:

The Contractor shall, before commencing performance of the Contract, provide by insurance for the payment of compensation and the furnishing of other benefits under M.G.L. c.152 to all persons to be employed under the Contract, and the Contractor shall continue such insurance in full force and effect during the term of the Contract. Sufficient proof of compliance with this Subsection must be furnished at the time of execution of this Contract. Failure to provide and continue in force such insurance as aforesaid shall be deemed a material breach of the Contract and shall operate as an immediate termination thereof. No cancellation of such insurance, whether by the insurer or by the insured, shall be valid unless written notice thereof is given by the party proposing cancellation to the other party and to the Owner at least fifteen days prior to the intended effective date thereof, which date shall be expressed in said notice.

11.1.1.1 -11.1.1.6 Add new sub-sections 11.1.1.1 to 11.1.1.6 as follows

11.1.1.1 Contractor's Commercial General Liability.

A. The Contractor shall purchase and maintain general liability coverage on the ISO form CG 00 01 or equivalent, including products and completed operations, on an occurrence basis. The form must be amended to state that the aggregate limit applies on a per location/project basis. The policy shall provide the following minimum coverage to protect the Contractor from claims with respect to the operations performed by Contractor and any employee, subcontractor, or supplier, or by anyone for whose acts they may be liable:

Bodily Injury &	$1,000,000 each occurrence, each person
Property Damage	$3,000,000 general aggregate annually
Products & Completed Operations	$1,000,000 annual aggregate
Personal & Advertising Injury	$1,000,000 each occurrence
Medical Expenses	$5,000

B. This policy shall include coverage relating to explosion, collapse, and underground property damage.

C. This policy shall include contractual liability coverage.

D. The completed operations coverage shall be maintained for a period of three (3) years after Substantial Completion and acceptance by the Owner. The Contractor shall provide renewal certificates of insurance to the Owner as evidence that this coverage is being maintained.

E. If the Work includes work to be performed within fifty (50) feet of a railroad, any exclusion for liability assumed under contract for work within fifty (50) feet of a railroad shall be deleted.

F. This policy shall include the Owner, the Architect, the OPM, the MSBA, the consultant of each, and anyone else requested by the Owner as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions, via endorsements CG 20 10 or ongoing operations and CG 20 37 for completed operations. This policy shall be primary and non-contributory with respect to any other insurance available to additional insureds.

G. The policy shall include endorsement CG 24 04, a Waiver of Subrogation in favor of the Owner and the MSBA.

11.1.1.2 Automobile Liability.

A. The Contractor shall purchase and maintain the following minimum coverage with respect to the operations of any owned, non-owned, and hired vehicles including trailers used in the performance of the work:

Bodily Injury & Property Damage $1,000,000 each accident, each person

B. The policy shall include a CA 99 48 Broadened Pollution Endorsement. If specified in Section 8 below, the Contractor, if hauling contaminants and/or pollutants, must adhere to Sections 29 and 30 of the Motor Carrier Act of 1980, which shall include coverage Form MCS-90.

C. The policy shall name the Owner and the MSBA as additional insureds.

D. The policy shall contain a Waiver of Subrogation in favor of the Owner and the Authority.

11.1.1.3 Contractor's Pollution Liability.

The Contractor shall purchase and maintain coverage for bodily injury and property damage resulting from liability arising out of pollution related exposures such as asbestos abatement, lead paint abatement, tank removal, removal of contaminated soil, etc. The insurance policy shall cover the liability of the Contractor during the process of removal, storage, transport and disposal of hazardous waste and contaminated soil and/or asbestos abatement. The policy shall include coverage for on-Site and off-Site bodily injury and loss of, damage to, or loss of use of property, directly or indirectly arising out of the discharge, dispersal, release or escape of smoke, vapors, soot, fumes, acids, alkalis, toxic chemicals, liquids or gas, waste materials or other irritants, contaminants or pollutants into or upon the land, the atmosphere or any water course or body of water, whether it be gradual or sudden and accidental. The policy shall also include defense and clean-up costs. The Owner, the OPM, the Architect, the MSBA, and the consultants of each shall be named as additional insureds and coverage must be on an occurrence basis. The amount of coverage shall be as follows:

Limit of liability	$1,000,000 per occurrence
	$3,000,000 aggregate

11.1.1.4 Worker's Compensation.

The Contractor shall, before commencing performance of the Contract, provide by insurance for the payment of compensation and the furnishing of other benefits under M.G.L. c.152 to all persons to be employed under the Contract, and the Contractor shall continue such insurance in full force and effect during the term of the Contract. Sufficient proof of compliance with this Sub-section must be furnished at the time of execution of this Contract. Failure to provide and continue in force such insurance as aforesaid shall be deemed a material breach of the Contract and shall operate as an immediate termination thereof. Cancellation of such insurance, whether by the insurer or by the insured, shall be valid unless written notice thereof is given by the party proposing cancellation to the other party and to the Owner at least fifteen days prior to the intended effective date thereof, which date shall be expressed in said notice:

The Contractor shall provide the following coverage in accordance with M.G.L. c. 149 §34S and c. 152, as amended:

Worker's Compensation	Statutory limits
Employer's Liability	$ 500,000 each accident
	$ 500,000 disease per employee
	$ 500,000 disease policy aggregate

The policy shall contain a Waiver of Subrogation in favor of the Owner and the MSBA.

11.1.1.5 Builder's Risk/ Installation Floater/Stored Materials.
The Contractor shall purchase and maintain coverage against loss or damage to the Work included in this Contract. Such coverage shall be on an “all risks” or equivalent form for loss or damage that occurs during the term of the Project. The General Contractor will be responsible for the payment of any deductible under such coverage. Such insurance shall cover the interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors on the Project, as their interests may appear.

The Contractor shall purchase and maintain coverage against loss or damage to the Work in accordance with the following requirements:

A. The Contractor shall purchase and maintain coverage against loss or damage on all Work included in this Contract in an amount equal to the Contract Price. Such coverage shall be written on an all risks basis or equivalent form and shall include, without limitation, insurance against perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, terrorism (“certified” and “non-certified”), collapse, earthquake, flood (if the project is not in an "A" or a "V" flood Zone), windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss. Unless otherwise specified in this Contract, the limits for earthquake and flood shall be the lesser of the Contract Price or $10,000,000. This policy and/or installation floater shall include transportation and Stored Materials coverage in an amount equal to the value of the stored materials as required in **C**. below.

B. When Work will be completed on existing buildings owned by the Owner, the Contractor shall provide an installation floater, in the full amount of the Contract Price. Such coverage shall be written on an all risks basis or equivalent form and shall include, without limitation, insurance against perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood (if the project is not in an "A” or a "V" flood Zone), windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss. Unless otherwise specified in this Contract, the limits for earthquake and flood shall be the lesser of the Contract Price or

$10,000,000. This policy and/or installation floater shall include transportation and Stored Materials coverage in an amount equal to the value of the stored materials as required in **C**. below.

C. The Contractor shall maintain insurance on delivered and/or stored material designated to be incorporated in the Work against fire, theft or other hazards. Any loss or damage of whatever nature to such material while stored at an off Site location shall be forthwith replaced by the Contractor at no expense to the Owner or the Authority.

D. The policy or policies shall specifically state that they are for the benefit of and payable to the Authority, the Owner, the Contractor, and all persons furnishing labor or labor and materials for the Contract Work, as their interests may appear. The policy or policies shall list the Authority, the Owner, the Contractor, and Subcontractors of any tier as named insureds.

E. Coverage shall include any costs for work performed by the Designer or any consultant as the result of a loss experienced during the term of this Contract.

F. Coverage shall include permission for temporary occupancy and a Waiver of Subrogation in favor of the Owner and the MSBA.

G. Coverage shall be maintained until final acceptance by the Owner of the Work and final payment has been made.

H. A loss under the property insurance shall be adjusted by the Contractor as fiduciary and made payable to the Contractor as fiduciary for the insureds. The Contractor shall pay the subcontractors their just shares of insurance proceeds received by the Contractor and shall require subcontractors to make payments to their sub-subcontractors in similar manner.

11.1.1.6 Umbrella Coverage

The Contractor shall provide Umbrella Coverage in a form at least as broad as primary coverages required by Sections 2, 3, 4 and 5 of this Article in the following amount unless a higher amount is specified in Section 8 below in which case the Contractor shall provide the higher amount:

Contract Price:	Limit of Liability:
$10,000,001 and over	$25,000,000 per occurrence

11.1.2 Delete sub-section 11.1.2 and replace as follows:

§ 11.1.2 The insurance required by Section 11.1.1 shall include all major divisions of coverage, and shall be on a comprehensive general basis including Premises and Operations (including X-C-U), Owner's and Contractor's Protective, Products and Completed Operations, and Owned, Non-owned, and Hired Motor Vehicles. Such insurance shall be written for not less than any limits of liability required by law or those set forth in the Contract Documents, whichever is greater.

All insurance shall be written on an occurrence basis, unless the Owner approves in writing coverage on a claims-made basis. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and any further period during which coverage is required to be maintained after final payment by the Contract Documents. The Owner, the OPM, the Architect and the MSBA shall be named an Additional Insured on all policies.

Coverage for such liability insurance shall be provided by a company or companies reasonably acceptable to the Owner and authorized to do business in Massachusetts. Contractor shall furnish to Owner written confirmation as to the insurance carrier's most current financial ratings prior to commencing work.

11.1.3 Add to the end of the sub-section as follows:

These certificates shall set forth evidence of all coverage required by Sections 11.1.1 and 11.1.2. The Contractor shall furnish to the Owner copies of any endorsements that are subsequently issued amending limits of coverage.

11.1.3.1 Add new sub-sections 11.1.3.1 and 11.1.3.2 as follows:
-11.1.3.2

11.1.3.1 The Contractor shall be responsible for having acceptable insurance coverage provided by or on behalf of all Subcontractors, with such insurance to be similar to that required of the Contractor under the Agreement and these General Conditions. The Contractor shall not allow any Subcontractor to commence Work on the Project prior to the Contractor’s receipt of certificates of insurance that are acceptable in form and limits to the Owner; the Owner shall have no obligation to pay the Contractor for any Work performed by a Subcontractor who has not supplied acceptable insurance certificates prior to starting its Work. The Owner shall be named an additional insured on all such certificates.

11.1.3.2 All insurance policies shall contain provisions or endorsements necessary to assure coverage of claims by one insured against another. All required insurance policies are to be endorsed to state that the Contractor's policies shall be primary to all other insurance available to the Owner and other specified additional insureds for liability arising out of or resulting from the Contractor's operations under the Contract, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable.

11.1.4 Insert "Owner's Project Manager" after (1) the Owner); insert "and the MSBA" after "the Architect's consultants"; and insert "and the MSBA" after "(2) the Owner".

11.2 Delete section 11.2 and replace as follows:

§ 11.2 OWNER'S LIABILITY INSURANCE
The Contractor shall procure and pay for an Owner's policy of Owner's protective liability insurance insuring the Owner and its officers, employees and agents against claims which may arise from operations under the Contract or relating thereto.

11.3.1 Delete sub-section 11.3.1 and replace as follows:

§ 11.3.1 The Contractor shall purchase and maintain property insurance upon the entire Work at the site to the full insurable value thereof. Coverage for such liability insurance shall be provided by a company or companies reasonably acceptable to the Owner. Contractor shall furnish to Owner written confirmation as to the insurance carrier's most current financial ratings prior to commencing work. Such insurance shall include the interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the work and shall insure against the perils of fire and extended coverage and shall include "all risks" insurance for physical loss or damage including without duplication, theft, vandalism and malicious mischief. This insurance shall also cover portions of the Work stored off the site or in transit. If this insurance is written with stipulated amounts deductible, the Owner shall not be responsible for any difference between the payments made by the insurance carrier and the claim. The policy shall contain a provision that coverages afforded under policies will not be canceled or allowed to expire until at least 30 days' written notice has been given to the Owner. The Owner shall be named insured within the policy.

11.3.1.1 Delete sub-sections 11.3.1.1, 11.3.1.2, 11.3.1.3, 11.3.1.4, and 11.3.1.5. -11.3.1.5

11.3.2 Delete sub-sections 11.3.2, 11.3.3, 11.3.4, 11.3.5, 11.3.6, and 11.3.7. -11.3.7

11.3.8 Delete the first sentence.

11.3.9 Delete sub-sections 11.3.9 and 11.3.10. -11.3.10

11.3.11 Add new sub-section 11.3.11 as follows:

> § 11.3.11 The Owner shall have the power to adjust and settle with its insurers any loss for which it has obtained insurance.
>
> Upon the occurrence of an insured loss, the Owner and the Contractor shall cooperate with each other and with each other's insurer in the submission of claims and related information and the distribution of any insurance proceeds. If after such a loss no other special agreement is made, replacement of damaged work shall be covered by an appropriate change order.

11.4.1 Delete "Owner shall have the right to require the".

Delete "to" after "Contractor" and replace with "shall".

Delete the end of the sentence starting after "obligations arising thereunder" and replace as follows:

> , each in the amount of 100% of the Contract Price, and each by a surety company qualified to do business under the laws of the Commonwealth of Massachusetts and acceptable to the Owner. The attorney-in-fact who signs the bonds on behalf of the surety, must affix to each bond a certified and current copy of the power of attorney. The Performance and Payment Bonds shall be written in a form satisfactory to the Owner. Such bonds shall remain in effect for the entire duration of the Contractor's warranty obligations.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

12.2.1 In the first sentence insert "Owner or" after "the Architect or".

In the second sentence insert "and OPM's" after "Architect's".

Add to the end of the sub-section as follows:

The Contractor shall bear the cost of any loss or damages to the Owner resulting from such failure or defect.

12.2.2.1 Delete the third sentence.

Add to the end of the sub-section as follows:

If the correction or repair of any of the Work is required to avoid impacts to the maintenance, operation or safety of any portion of the Project site or the Owner's property, the Owner reserves the right to undertake the repairs prior to notifying the Contractor or without waiting for the Contractor to respond, without waiving the Owner's rights under the warranties and the Owner's right to correct work under Section 2.4.

ARTICLE 13 MISCELLANEOUS PROVISIONS

13.1 Delete the end of the sentence following the words "by the law of the", and insert the words "Commonwealth of Massachusetts" at the end of the sentence as revised.

To the end of the section add the following:

"All applicable Federal, state and local laws, rules and regulations of all authorities having jurisdiction over the bidding, awarding and construction of the Work shall apply to the Contract throughout, and they will be deemed to be included in the Contract the same as though written out in full.

13.2.1 In the second sentence delete "Except as provided in Section 13.2.2".

13.2.2 Delete sub-section 13.2.2.

13.4.3 Add new sub-section 13.4.3 as follows:

§ 13.4.3 The Owner's rights and the Contractor's obligations under Section 3.18, Article 12 and any other provisions of the Contract Documents that contemplate continuing rights and obligations, respectively, shall survive expiration of the Contract Time and termination of this Agreement.

13.5.1 In the last sentence insert "and OPM" after both instances of "Architect".

13.5.2 In the first sentence insert "OPM after "Architect".

13.5.4 Delete sub-section 13.5.4 and replace as follows:

§ 13.5.4 The Contractor shall obtain and deliver promptly to the Architect any occupancy permit and any certificates of final inspection of any part of the Contractor's work and operating permits for any mechanical apparatus, such as elevators, escalators, boilers, air compressors, etc., which may be required by law to permit full use and occupancy of the premises by the Owner. Receipt of such permits or certificates by the Architect shall be a condition precedent to Substantial Completion of the Work.

13.7 Delete section 13.7.

13.7.1 Add new sub-section 13.7.1 as follows:

§ 13.7.1 It is expressly agreed that the obligations of the Contractor hereunder arise out of contractual duties, and that the failure of the Contractor to comply with the requirements of the Contract Documents shall constitute a breach of contract, not a tort, for the purpose of applicable statutes of limitation and repose. Any cause of action which the Owner may have on account of such failure shall be deemed to accrue only when the Owner has obtained actual knowledge of such failure, not before.

13.8 Add new section 13.8 as follows:

§ 13.8 LIMITATION OF LIABILITY

§ 13.8.1 The Owner shall be liable, if ever, only to the extent of its interest in the Project; and no officer, director, partner, agent or employee of the Owner shall ever be personally or individually liable with respect to this Contract or the Work. Each Subcontract shall include the foregoing limitation, which shall be effective if the Owner ever succeeds to the Contractor's rights and obligations under a Subcontract.

13.9 Add new section 13.9 as follows:

§ 13.9 DEFENSE OF SUITS

§ 13.9.1 The Contractor shall be responsible for, shall defend and pay all costs, attorneys' fees and liabilities both direct and indirect as a result of suits arising out of this Contract.

§ 13.9.2 Neither final acceptance nor occupation of the premises by the Owner shall relieve the Contractor of responsibility for all claims for labor, materials, and equipment arising out of this Contract.

§ 13.9.3 The Contractor shall indemnify and hold harmless the Owner and the Architect, the OPM, the MSBA and their agents and employees from and against all claims, damages, losses, and expenses including attorneys' fees arising out of or resulting from the performance of the work.

13.10 Add new sections 13.10 to 13.16 as follows:
-13.16

§ 13.10 Foreign Corporations – If the Contractor is a foreign corporation, it shall comply with M.G.L. c.181, §§ 3, 4 and 5 (and other applicable provisions of M.G.L. c.181), and M.G.L. c.30, § 39L.

§ 13.11 Certification of Tax Compliance – By entering into a Contract with the Owner, the Contractor certifies under the penalties of perjury, pursuant to M.G.L. Chapter 62C, Cetion 49A(b), that it has complied with all laws of the Commonwealth of Massachusetts relating to taxes, to the reporting of employees and Contractors, and to the withholding and remitting of child support.

§ 13.12 Conflict of Interest – The Contractor understands that the Massachusetts Conflict of Interest Law, Chapter 268A of the Massachusetts General Laws, applies to the Contractor with respect to the services required to be provided under this contract. The Contractor and its officers, employees, agents, Subcontractors and affiliated agencies shall not participate in any activity which constitutes a violation of the Massachusetts Conflict of Interest Law or which creates an appearance of a violation of the Massachusetts Conflict of Interest Law.

§ 13.13 International Boycott – The Contractor shall not participate in or cooperate with an international boycott, as defined in Section 999 (b)(3) and (4) of the Internal Revenue Code, as amended, or engage in conduct declared to be unlawful by Section 2 of Chapter 151E of the Massachusetts General Laws.

§ 13.14 Non-Collusion – By entering into this Contract with the Owner, the Contractor certifies under penalties of perjury that its bid has been made and submitted in good faith and without collusion or fraud with any person. As used in this certification, the word “person” shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

§ 13.15 Independent Contractor Status – The Contractor shall provide services under any Contract with the Owner as an independent contractor and not as an employee of the Owner. No employee, agent or representative of the Contractor shall be entitled to receive any benefits of employment with the Owner, including without limitation salary, overtime, vacation pay, holiday pay, sick leave, health insurance, life insurance, pension, or deferred compensation.

§ 13.16 All contractual requirements required by law and Executive Order shall be deemed to be included in this contract as if fully set forth herein.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

14.1.1 Insert in the beginning of the first sentence as follows:

Provided that the Contractor is not in breach of any of its obligations under the Contract,

Delete sub-headings .1, .2, and .4.

Add to the end of sub-heading .3 as follows:

or Owner fails for 30 days to pay Contractor any sum finally determined to be due, whichever is later.

14.1.2 Delete sub-section 14.1.2.

14.1.3 Delete sub-section 14.1.3 and replace as follows:

§ 14.1.3 If one of the above reasons exists, the Contractor may, upon seven days written notice to the Owner and Architect and unless Owner or Architect do not remedy such suspension or failure within that time, terminate the Contract and recover from the Owner payment for Work properly executed and for all materials or equipment not incorporated in the Work, but delivered and suitably stored at the site. The payment for materials or equipment stored at the site shall be conditioned upon submission by the Contractor of bills of sale or such other evidence as is satisfactory to the Owner to establish the Owner's title to such material or equipment or otherwise protect the Owner's interest.

In lieu of terminating the Contract as aforesaid, Contractor may, seven days after written notice to the Owner and Architect and unless Owner and Architect do not remedy such suspension or failure within that time, stop the Work until payment is made of all such amounts due Contractor. The provisions of this paragraph are not intended to preclude Contractor from submitting a Claim for an adjustment in Contract Sum or Contract Time or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

14.1.4 Delete sub-section 14.1.4.

14.2.1 Delete "repeatedly" from the beginning of sub-headings .1 and .3.

Insert new sub-headings .4 and .5 after sub-heading .3 as follows:

.4 becomes the subject of a voluntary petition in bankruptcy or any voluntary proceeding related to insolvency, receivership, liquidation or comparable proceeding or any assignment for the benefit of creditors or becomes the subject of an involuntary petition in bankruptcy or any involuntary proceeding related to insolvency, receivership, liquidation or comparable proceeding or any assignment for the benefit of creditors.

.5 submits three successive Applications for Payment, each of which indicate that the actual Work completed is less than 90 percent of the values estimated in the construction schedule (submitted by the Contractor pursuant to Section 3.10.1) to be completed by the respective dates.

14.2.2 In the first sentence delete ",upon certification by the Initial Decision Maker that sufficient cause exists to justify such action,".

Delete the second sentence of sub-heading .3.

14.2.4 In the first sentence:

Insert "all costs and losses incurred by the Owner on account of the Contractor's failure to comply with the Contract Documents and" after "the Work, including".

Insert "and Owner's Project Manager's" after "for the Architect's".

Delete the last sentence of the sub-section and replace as follows:

The Owner shall be entitled to hold all amounts due the Contractor at the date of termination until all of the Owner's damages have been established, and to apply such amounts to such damages.

14.3.2 Insert ", subject to compliance with the conditions of Section 8.3." at the end of the first sentence.

Delete the second sentence.

14.4.2 In sub-heading .3 delete "and" after "all existing contracts" and replace with "except for subcontracts, if any, that Owner elects to assume, terminate all".

14.4.3 Delete sub-section 14.4.3 and replace as follows:

§ 14.4.3 In the event that the Contract is terminated for the Owner's convenience, the Contractor shall be reimbursed in accordance with the Contract Documents for all Work properly performed up to the termination date, and for all materials or equipment not incorporated in the Work, but delivered and suitably stored at the site. Payment for materials or equipment stored at the site shall be conditioned upon submission by the Contractor of bills of sale or such other evidence as is satisfactory to the Owner to establish the Owner's title to such material or equipment or otherwise protect the Owner's interest. The Contractor shall not be entitled to payment for overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

15.1.1 Delete sub-section 15.1.1 and replace as follows:

§ 15.1.1 DEFINITION
The word "Claim" shall mean a written demand by the Contractor for an increase in the Contract Time or the Contract Sum. The Contractor is responsible for substantiating its Claims. The word "Claim" shall not include claims by the Owner. The Owner may withhold from the Contractor the value of any claims against the Contractor in accordance with Massachusetts General Laws, including, but not limited to, Sections 39G and 39K of Chapter 30.

15.1.2 Delete sub-section 15.1.2 and replace as follows:

§ 15.1.2 NOTICE OF CLAIMS
Contractor must initiate Claims within fourteen (14) calendar days after occurrence of the event giving rise to such Claim by written notice to the Architect and the Owner. Such written notice must (1) be signed by the Contractor; (2) conspicuously identify on its face that the notice serves as a notice of claim; (3) explain in sufficient detail the basis of the Claim; (4) identify the date of the event giving rise to such Claim; and (5) state the exact dollar amount of the increase in the Contract Sum being requested, if any, and the number of days extension to the Contract Time sought, if any.

15.1.3 Add after the word “Claim” as appearing in the first sentence as follows:

or any other dispute hereunder

Delete “Section 9.7 and” after “as provided in”.

Delete the final sentence.

15.1.4 Delete sub-section 15.1.4 and replace with the following:

§ 15.1.4 Claims for Additional Cost
If the Contractor believes that it has incurred or will incur additional costs as a result of any acts or omissions of the Owner or the Architect, including any interpretations, instructions or orders, whether oral, written, by Drawings, or otherwise, or as a result of any other event, circumstance or occurrence, the Contractor shall promptly (and in any event within the time period specified in Subsection 15.1.2) so notify the Architect and the Owner in writing of such Claim as provided in Subsection 15.1.2 and shall not proceed with the Work relating to such Claim until the Contractor has received a further written order to proceed except, as provided in Section 10.4, in the case of an emergency affecting life or property. No Claim by the Contractor on account of such interpretations, instructions or orders, or other acts, omissions, events, circumstances or occurrences shall be valid unless the Contractor has so notified the Architect and the Owner, before proceeding, and has received a further written order to proceed.

15.1.5.1 In the second sentence delete “of cost and” after “include an estimate”.

15.1.5.2 Delete sub-section 15.1.5.2.

15.1.5.3 Add new sub-sections 15.1.5.3 to 15.1.5.4 as follows:
-15.1.5.4

§ 15.1.5.3 The Contractor shall give prompt written notice to the Architect and the Owner of any cause which will result (or has resulted) in delay for which the Contractor claims or intends to claim an extension of the Contract Time, including those causes which the Owner or the Architect is responsible for or has knowledge of, such as any acts or omissions of the Owner or the Architect, including interpretations, instructions or orders, whether oral, written, by Drawings or otherwise, or any other event, circumstance or occurrence. Such notice shall be given as soon as practicable after the occurrence of the event or circumstance giving rise to the delay, and in any event not later than 21 days after such event, circumstance or occurrence. Such written notice shall (1) explicitly state

that a time extension is claimed; (2) state in detail the circumstances which form the basis of the delay; and (3) describe as fully as practicable at the time the date of commencement and duration or expected duration of the delay and its effect on the schedule for the various parts of the Work. The Contractor shall provide such supporting documentation as the Owner or Architect may require, including, where appropriate, a time impact analysis or a revised construction schedule indicating all of the activities affected by the circumstances which form the basis for the Claim. The submission of such written notice within the time period provided above shall be a condition precedent to any extension of the Contract Time, otherwise the Claim shall be waived. In addition, if the Contractor fails (other than for reasons beyond the Contractor's control) to give notice of a delay promptly following the occurrence of the event or circumstance giving rise to the delay, and if such failure to promptly give notice causes damage or prejudice to the Owner by affecting the Owner's ability to mitigate such delay or the costs or other consequences arising from such event, circumstance or occurrence or the delay resulting therefrom, then the Contractor shall be responsible for the costs or delays incurred as a result of such failure of the Contractor to provide prompt notice, notwithstanding that the Contractor submits notice within such 21-day period.

§ 15.1.5.4 Whenever the Contractor claims an extension of the Contract Time, only the unavoidable delay caused to completion of the Work as a whole shall be considered in measuring or evaluating the extent of the delay. If, for example, remaining work can be re-sequenced, or extra work can be (or could have been) performed along with the regular work called for by the Contract Documents so as to eliminate a delay in the progress or completion of the Work or some part thereof, without causing necessary delay to such regular work, no Claim for extension of the Contract Time shall be granted. The Contractor shall have the burden of demonstrating the effect of the claimed delay on the Contract Time. In any event, even though a cause of delay meets all of the above conditions, any extension shall be granted only to the extent that the effect of such cause cannot be (or could not have been) avoided or mitigated by the exercise of all reasonable precautions, efforts and measures (including planning, scheduling and rescheduling), whether before or after the occurrence of the cause of delay. No extension shall be granted for any delay which, in whole or in part, results from or arises out of the act or omission of the Contractor or its Subcontractors or others performing the Work. Any extension of the Contract Time allowed hereunder shall be net of any contingency or “float” time included in the Progress Schedule.

As soon as practicable after giving notice of a Claim, the Contractor shall submit to the Owner and the Architect a Contractor Change Request as provided in Article 7. The Contractor understands and agrees that the requirements of Section 15.1 are to be strictly adhered to and that none of the requirements of the Contract Documents relating to Claims shall be waived by the Owner by course of dealing, orally or informally, and that neither the Architect nor any other representative of the Owner is authorized to waive any such requirements.

15.1.6 Delete sub-section 15.1.6.

15.2.1 In the third sentence:

Delete "mediation" after "condition precedent to" and replace with "litigation".

Delete the end of the sentence beginning after "payment is due".

15.2.2 Delete sub-section 15.2.2 and replace as follows:

§ 15.2.2 The Initial Decision Maker will review Claims and within 30 days of the receipt of the Claim take one or more of the following actions: (1) request additional supporting data from the Contractor; (2) notify the Contractor that the Initial Decision Maker requires additional time to resolve the Claim; and/or (3) reject the Claim in whole or in part.

15.2.3 Delete the last sentence.

15.2.4 Delete sub-section 15.2.4 and replace as follows:

§ 15.2.4 If the Architect requests the Contractor to furnish additional supporting data in connection with a Claim, the Contractor shall provide such data within ten (10) calendar days of such request. If the Contractor is of the opinion that it is impossible to provide such data within such time, the Contractor shall notify the Architect of such opinion in writing within such ten-day period. If the Architect determines that it is impossible for such data to be provided within such ten-day period through no fault of the Contractor, the Contractor shall provide such data within 30 calendar days of the Architect's request, unless the Architect fixes another date, in which case the data must be submitted by the date so fixed. Failure of the Contractor to provide such data within the time prescribed herein shall result in the irrevocable waiver of the Claim.

15.2.5 Delete the last sentence and replace as follows:

> The rejection of a claim by the Architect and any decisions of the Owner with respect to the same, and the interpretations by the Architect of the plans, drawings and specifications, shall be final and binding on the Contractor in accordance with Section 39J of Chapter 30 of the Massachusetts General Laws.

15.2.6 Delete sub-section 15.2.6 in its entirety.

15.2.7 Delete the capitalized word, "Claim," and replace with lower-case word, "claim," in the first and second sentences.

15.2.8 Delete sub-section 15.2.8.

15.3 Delete sections 15.3 and 15.4 in their entirety.
-15.4

16. Add Article 16 as follows:

16 CONTRACTOR'S ACCOUNTING METHOD REQUIREMENTS

§ 16.1 The word defined herein shall have the meaning stated below whenever they appear in this Article 16:

§ 16.1.1 "Contractor" means any person, corporation, partnership, joint venture, sole proprietorship, or other entity awarded a Contract as defined in Subsection 16.1.2.

§ 16.1.2 "Contract" means any contract awarded or executed pursuant to M.G.L. c.7, §38A1/2 - 380, inclusive, and any contract awarded or executed pursuant to M.G.L. c. 25A, §1 1C, M.G.L. c. 30, §39M, or M.G.L. c.149, §44A-44H, inclusive, which is for an amount or estimated amount that exceeds the dollar amount set forth in M.G.L. c.30, §39R.

§ 16.1.3 "Records" means books of original entry, accounts, checks, bank statements and all other banking documents, correspondence, memoranda, invoices, computer printouts, tapes, discs, papers and other documents or transcribed information of any type, whether expressed in ordinary or machine language.

§ 16.1.4 "Independent Certified Public Accountant" means a person duly registered in good standing and entitled to practice as a certified public account under the laws of the place of his residence or principal office and who is in fact independent. In determining whether an accountant is independent with respect to a particular person, appropriate consideration should be given to all relationships between the accountant and that person or any affiliate thereof. Determination of an accountant's independence shall not be confined to the relationships existing in connection with the filing of reports with Owner.

§ 16.1.5 "Audit," when used in regard to financial statements, means an examination of records by an independent certified public accountant in accordance with generally accepted accounting principles and auditing standards for the purpose of expressing a CERTIFIED opinion thereon, or, in the alternative, a qualified opinion or a declination to express an opinion for stated reasons.

§ 16.1.6 "Accountant's Report," when used in regard to financial statements, means a document in which an independent certified public accountant indicates the scope of the audit which he has made and sets forth his opinion regarding the financial statements taken as a whole with a listing of noted exceptions and qualifications, or an assertion to the effect that an overall opinion cannot be expressed. When an overall opinion cannot be expressed the reason therefor shall be stated. An accountant's report shall include as a part thereof a signed statement by the responsible corporate officer attesting that management has fully disclosed all material facts to the independent certified public accountant, and that the audited financial statement is a true and complete statement of the financial condition of the Contractor.

§ 16.1.7 "Management," when used herein, means the chief executive officers, partners, principals, or other person or persons primarily responsible for the financial and operational policies and practices of the Contractor.

§ 16.1.8 Accounting terms, unless otherwise defined herein, shall have a meaning in accordance with generally accepted accounting principles and auditing standards.

§ 16.2 Subsection 16.1.2 hereof notwithstanding:

§ 16.2.1 The Contractor shall make, and keep for at least six years after final payment, books, records, and accounts which in reasonable detail accurately and fairly reflect the transactions and dispositions of the Contractor.

§ 16.2.2 Until the expiration of six years after final payment, the Owner and office of inspector general shall have the right to examine any books, documents, papers or records of the Contractor or of his Subcontractors that directly pertain to, and involve transactions relating to, the Contractor or his/her Subcontractors.

§ 16.2.3 If the agreement is a contract as defined herein, the Contractor shall describe any change in the method of maintaining records or recording transactions which materially affect any statements filed with the Owner, including in his description the date of the change and reasons therefor, and shall accompany said description with a letter from the Contractor's independent certified public accountant approving or otherwise commenting on the changes.

§ 16.2.4 If the agreement is a contract as defined herein, the Contractor has filed a statement of management on internal accounting controls as set forth in Section 16.3 below prior to the execution of the contract.

§ 16.2.5 If the agreement is a contract as defined herein, the Contractor has filed prior to the execution of the contracts and will continue to file annually, an audited financial statement for the most recent completed fiscal year as set forth in Section 16.5 below.

§ 16.3 Every Contractor awarded a contract shall file with the Owner a statement of management as to whether the system of internal accounting controls of the Contractor and its subsidiaries reasonably assures that:

.1 transactions are executed in accordance with management's general and specific authorization;

.2 transactions are recorded as necessary:

(i) to permit preparation of financial statements in conformity with generally accepted accounting principles, and

(ii) to maintain accountability for assets;

.3 access to assets is permitted only in accordance with management's general or specific authorization; and

.4 the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action was taken with respect to any difference.

§ 16.4 Every Contractor awarded a contract shall also file with the Owner a statement prepared and signed by an independent certified public accountant, stating that he has examined the statement of management on internal accounting controls, and expressing an opinion as to

.1 whether the representations of management in response to this Section and Section 16.2 above are consistent with the result of management's evaluation of the system of internal accounting controls; and

.2 whether such representations of management are, in addition, reasonable with respect to transactions and assets in amounts which would be material when measured in relation to the applicant's financial statements.

§ 16.5 Every Contractor awarded a contract by the Commonwealth or by any political subdivision thereof shall annually file with the Division of Capital Asset Management and Maintenance during the term of the contract a financial statement prepared by an independent certified public accountant on the basis of an audit by such accountant. The final statement filed shall include the date of final payment. All statements shall be accompanied by an accountant's report.

17. Add Article 17 as follows:

17 NON-DISCRIMINATION AND AFFIRMATIVE ACTION REQUIREMENTS

§ 17.1 Refer to SECTION 00100-INSTRUCTIONS TO BIDDERS, Article 3 and Appendix A for contractual requirements.

18. Add Article 18 as follows:

18 EQUAL MBE AND WBE GOALS AND PARTICIPATION

§ 18.1 Refer to SECTION 00100-INSTRUCTIONS TO BIDDERS, Article 4 and Appendix B for contractual requirements.

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Part B
Specifications

Division 1
General Requirements

SECTION 011000

SUMMARY OF WORK

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

C. The General Contractor is responsible for the work of this Section unless otherwise noted herein.

1.02 CONTRACT CONDITIONS SPECIFICALLY REQUIRED BY LAW

A. This Contract is subject to all State and local laws, and all amendments thereto, and where any requirements contained herein do not conform to such statutes governing that construction work of this Contract, the statutes shall govern.

B. Special attention shall be given to the requirements of Chapter 30, Section 9 (1), of the General Laws of the Commonwealth of Massachusetts, and all amendments thereto, concerning conformity of work with the Contract Documents; deviations; certificates; penalties; and the provisions contained herein are hereby made a part of this Contract as if set forth in full herein.

C. Every employee in public work shall lodge, board, and trade where and with whom he elects; and no person or his agents or employees under Contract with the Commonwealth, a county, city, or town, or with a department, board, commission, or officer acting therefor for the doing of public work shall directly or indirectly require as a condition of employment there in that the employee shall lodge, board, or trade at a particular place or with a particular person, and compliance with this provision of law is a condition of this Contract.

D. The General Contractor shall, before commencing performance of this Contract, provide by insurance for the payment of compensation and furnishing of other benefits under the General Laws, Chapter 152, to all persons to be employed under this Contract, and the General Contractor shall continue such insurance in full force and effect during the term of this Contract.

1.03 WORK UNDER THIS CONTRACT

A. The work to be performed under this Contract, NEW AMESBURY ELEMENTARY SCHOOL, is as follows:

1. Furnish all plant, labor, equipment, appliances and materials and perform all operations required for the construction of the NEW AMESBURY ELEMENTARY SCHOOL, Amesbury, MA, including all designated site development scope of work.

B. The work described by:

1. These Specifications, as enumerated in the "Table of Contents".
2. Plans as numbered on List of Drawings.
3. Addenda issued during the bidding period which are hereby made a part of the Specifications.
4. The printed form of Contract.

C. The distribution of work in these Specifications.

1. It is intended to be described under the appropriate trade.
2. May be redistributed, except as directed herein, provided no controversy will arise among the trades and progress will not be delayed.

D. The committing of nuisances on the land of the Project and adjacent property shall be rigorously prohibited and adequate steps taken to prevent it.

1.04 OFF-SITE REMOVAL OF SOILS

A. Topsoil and excavated soils from the limit of work areas not scheduled to be used on site shall be removed from site and disposed. Refer to SECTION 312000-EARTHWORK for quantities and protocol.

B. Refer to the “Transportation Routes for Construction Vehicles” map appended to SECTION 013100-PROJECT PROCEDURES.

1.05 WORK TO BE PERFORMED UNDER SEPARATE CONTRACTS

A. Telecommunications system.

B. Computer networking.

C. Furnishings and equipment.

1.06 EQUIPMENT

A. Equipment noted N.I.C. (Not In Contract) on the drawings will be purchased by the Owner under a separate contract and will be delivered to the building and installed by the equipment supplier. Movable equipment and furniture purchased by the Owner will be received and placed in position by the Owner or the Owner’s installer.

1.07 ITEMS PROVIDED BY THE OWNER

A. The following items are to be furnished by the Owner for installation under the designated SECTIONS:

1. Liquid soap dispensers, hand sanitizer dispensers, toilet tissue dispensers and paper towel dispensers: SECTION 062000-FINISH CARPENTRY.

1.08 COORDINATION, COOPERATION, AND GIVING INFORMATION

A. The General Contractor shall give full cooperation to all Subcontractors and shall furnish all information necessary to permit the Work to be installed satisfactorily and with the least possible interference or delay.

B. Structural material shall not be relocated, altered, or changed in any way to accommodate the work.

C. Obtain detailed information from the manufacturer of all equipment to be furnished and provided as to method of installing. At the start of construction check all Contract Documents including all Drawings and all sections of the specifications for equipment requiring electrical connections and service and verify electrical characteristics of equipment prior to roughing.

D. The General Contractor shall coordinate the exchange of shop drawings between Subcontractors.

E. The General Contractor shall transmit to the Subcontractors, as soon as possible after approval, two copies of approved shop drawings of equipment which require connections, or such equipment as specified under other sections of the specifications.

F. Equipment and systems shall not be installed without first coordinating the location and installation of equipment and systems with the Contractor and all other Subcontractors. Notify the General Contractor of congested and problem areas prior to installation of Work or preparation of shop drawings and do not proceed with the installation in problem areas until instructed by the General Contractor. Any material installed or Work performed in violation of this requirement shall be readjusted and corrected without charge.

G. When additional work, change to the work, or a revision or modification of the Work is authorized, provide the required additional material, equipment, personnel and workmen to prevent delays in the Work and to complete the Work within the time limit of the Contract.

H. For additional information refer to the General Conditions of the Contract.

1.09 CUTTING, CORING AND PATCHING

A. All necessary cutting, drilling, grouting and patching to fit together properly the several parts of the work shall be performed by the General Contractor, except as may be specifically noted otherwise under any particular sub-trade section of the specifications.

1.10 CONSTRUCTION PHASING/SIMULTANEOUS OCCUPANCY

A. The existing Cashman Elementary School will remain in use by the Owner during and after the construction of the new Amesbury Elementary School. All work in the Cashman Elementary School and at the portions of the site reserved for Cashman School use as shown on the Phasing Drawings shall be coordinated to minimize disruption to school operations.

1. All existing systems, security and means of egress must be maintained. If such systems, security and egress elements require disruption because of construction, temporary alternative systems in full compliance with all relevant codes must be provided, at no additional cost to the Owner, to insure the continuing function of school's operations.

B. Attention is called to the fact that this facility is a public school, and all necessary precautions shall be taken to ensure the continuous safety of the staff, students and visitors occupying the facility during all phases of the work.

C. Refer to the Phasing Plan Drawings and other Contract Documents for information concerning phasing:

1. All work in and around the Cashman Elementary School must be completed during summer vacation and school break periods. The work performed in Phase 2 and Phase 4, corresponding to the Cashman Elementary School summer vacation 2021 and 2022, must be commenced after the final day of classes in June and be completed, including all required permits for occupancy and other inspections, prior to the start of school in August. Full beneficial use of the Cashman Elementary School, entry drive, parking lot, service area and pedestrian walkways is required during Phases 1, 3 and 5 as shown on the Phasing Drawings.

2. Summer Phase Substantial Completion requirements:

Portion of the Work	Substantial Completion Date
Phase 2: Any and all work commenced in Phase 2 affecting the full operation of the Cashman Elementary School including: the entry drive, roads, parking lot, service area and pedestrian walkways and temporary patching of same.	August 23, 2021
Phase 4: All work indicated on Phasing Drawing G.0.07 (Phase 4) and work indicated on G.0.05 (Phase 2) deferred to Phase 4, required for the full operation of the Cashman Elementary School including: the entry drive, parking lot, service area and pedestrian walkways.	August 21, 2022

D. The General Contractor shall submit to the Owner a Construction Progress Schedule showing the project phases for approval. Refer to SECTION 013310-PROGRESS SCHEDULE.

E. For additional information refer to the Owner and General Contractor Agreement and the General Conditions of the Contract.

1.11 CERTIFIED WELDERS

A. Structural welds shall be made only by operators who have been qualified by tests, as prescribed in the "Standard Qualification Procedure" of the American Welding Society, to perform the type of work required.

B. Pipe welds shall be made only by operators who have been qualified by the National Certified Pipe Welding Bureau and the operator's qualification record shall be submitted to the Architect before any work is performed.

C. Shop welding shall be in accordance with the "Code for Welding in Building Construction."

1.12 EXAMINATION OF SITE AND DOCUMENTS

A. All trade bidders shall visit the site and examine all Contract Documents before submitting a bid. Inspect and be thoroughly familiar with same and conditions under which work will be carried out. Neither the Owner nor the Architect will be responsible for errors, omissions and/or charges for extra work arising from General Contractor or Subcontractor's failure to familiarize themselves with Contract Documents or existing conditions. By submitting a bid, the trade bidder agrees and warrants that he has examined the site and the Construction Documents, that he is familiar with the conditions and requirements of both and where they require, in any part of the work, a given result to be produced that the Contract Documents are adequate and that he will produce the required result.

B. **A non-mandatory Pre-Bid Conference has been scheduled for Thursday, March 18, 2021 at 3:00 PM at the Cashman School parking lot near the service entry at 193 Lions Mouth Road – held at the site. Note: Attendees must follow proper COVID-19 protocols. Wearing a mask is mandatory.**

1.13 EXISTING UTILITIES

A. Existing active utility lines indicated on the Drawing, including without limitation, cables, ducts, conduits, and piping shall, if damaged, be immediately repaired, inspected by the utility company, protected and maintained in use at no additional cost to the Owner.

B. The General Contractor shall notify the Owner in writing ten days in advance of the proposed time for shutting down or interrupting any utilities, services, or facilities which may affect the operation of other buildings, services, or facilities of the Owner. Unless otherwise authorized by the Owner, he shall schedule and coordinate his work that such interruption will occur on weekends, holidays, or before or after the normal working day of the Owner's facilities. In no case shall any shutdown or interruption of any utilities, services, or facilities be made without the approval and authorization of the Owner.

C. In the event that an active utility line is encountered which is not indicated on the drawings, immediately notify the utility company and the Architect of the exact location, size and type of utility line encountered. Such utility line, if damaged, shall be immediately repaired, inspected by the Utility Company, protected and maintained in use by the General Contractor. If the Architect determines that such line be relocated, abandoned, cut and capped, or other wise altered, the General Contractor shall consult the Utility Company and has the applicable site subcontractor perform required work. The Contract price will be adjusted in accordance with the terms of the Owner and General Contractor Agreement.

D. The Owner will cooperate fully, at the General Contractor's request in assisting the General Contractor and their site subcontractor in locating and identifying underground utilities.

E. The General Contractor must notify "Dig-Safe" of contemplated excavation, demolition, or explosive work in public or private ways, and any Utility Company Right of Way or Easement. They are located in Wilmington, MA, telephone number 811 or 1-888-344-7233.

1. This notification must be made at least 72 hours prior to the work, but not more than sixty days before the contemplated work. Such notice shall set forth the name of the street or the route number of said way and an accurate description of the location and nature of the proposed work.
2. The Owner requires that the notification be sent to "Dig-Safe" by Certified Mail.
3. "Dig-Safe" is required to respond to the notice within 72 hours from the time said notice is received by designating at the locus the location of pipes, mains, wires or conduits.
4. The General Contractor shall not commence work until "Dig-Safe" has responded as noted above. The work shall then be performed in such a manner, and with reasonable precautions taken to avoid damage to utilities under the surface in said areas of work.

1.14 OWNER RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS

A. The Owner reserves the right to perform work related to the Project with its own forces and to award separate contracts in connection with other portions of the Project or other work on the premises under these or similar Conditions of the Contract. If the General Contractor claims that delay or additional cost is involved because of such action by the Owner, he shall make such claim as provided elsewhere in the Contract Documents.

B. When separate contracts are awarded for different portions of the Project or other work on the premises, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner/Contractor Agreement.

C. The Owner will provide for the coordination of the work of its own forces and of each separate contractor with the Work of the General Contractor, who shall cooperate therewith as provided under article below entitled MUTUAL RESPONSIBILITY.

1.15 MUTUAL RESPONSIBILITY

A. The General Contractor shall afford the Owner and separate contractors/vendors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work and shall connect and coordinate his Work with theirs in accordance with the Contract Documents.

B. It is the intent of the Owner to award separate contracts for the work noted in paragraph 1.04:

1. Wiring and related equipment for various systems shall involve spaces within the building.

2. Furnishings and equipment items are to be installed in the building the final weeks of the construction period.

C. With regard to the separate contracts noted in paragraph B above, it is intended that all wiring by run concealed in partitions, ceilings, and similar items as regards to insuring a complete installation. Accordingly, the General Contractor shall give the Owner a minimum of 60 calendar day notice relative to the time that these areas will be ready for work by the separate contractors and coordinate these working schedules to accommodate the work of these separate contractors.

D. In order for the General Contractor to sufficiently coordinate this work and give proper notice to the Owner, the Owner, upon request, will give the General Contractor a detailed scope of work for these separate contracts including time schedules involved within 120 days of the Notice to Proceed.

E. Any specific provisions for these separate Contractors other than as noted above, are indicated on the contract drawings or in other SECTIONS of this specification.

1.16 ON-SITE OWNER'S REPRESENTATIVE AND OWNER'S PROJECT MANAGER (OPM)

A. An on-site Owner's representative shall be engaged by the Owner through the open representative. The representative shall represent the Owner and the Architect, and the representative will keep close watch over the progress of the work, but he shall have no authority to speak for or in any manner bind the Owner or the Architect.

B. The Owner designates the Owner's Project Manager (at times referred to in the Contract Documents as the "OPM"), to represent the Owner during the progress of the Project. The Owner's Project Manager shall report to and advise the Owner in accordance with the agreement between those parties. The Owner's Project Manager shall not, by undertaking to represent the Owner, incur any obligation to the General Contractor, and nothing stated herein shall act to create any contractual relationship between the General Contractor and the Owner's Project Manager. The Owner's Project Manager shall not have the authority to direct changes in the Work, or to agree to an adjustment of the Contract Time or the Contract Sum.

1.17 TESTS AND INSPECTIONS

A. The General Contractor shall coordinate and provide access for such tests and inspections of workmanship and materials as may be required by the Building Code, State or municipal laws, or as called for under the various SECTIONS of the Specifications.

B. All expense attached to such tests and inspections, unless otherwise specified under the various SECTIONS of the Specifications shall be borne by the applicable subcontractor, who shall furnish all labor, tools, instruments, water, temporary power and light, construction and equipment necessary for these tests and inspections. Records of all tests and inspections shall be furnished to the Architect. The General Contractor's applicable Subcontractor's shall remove all temporary work, materials, and equipment upon completion of test and inspections.

C. Where in the various SECTIONS of the Specifications, inspection and testing of materials, processes, and the like is called for, the selection of bureaus, laboratories, and/or agencies for such inspection and testing shall be subject to approval of the Architect.

D. Should any material or work be found, after testing or inspection, to be defective or inferior, such material and/or work shall be removed and replaced with new sound materials and/or work as approved by the Architect. The removal and replacement herein called for shall be at the applicable subcontractor's expense.

1.18 MATERIALS AND WORKMANSHIP

A. All materials required for the performance of this Contract shall be new and of best quality of kinds specified, all subject to the approval of the Architect. The use of old or second-hand materials is strictly forbidden except if called for in the CONTRACT DOCUMENTS. The General Contractor shall, if required by the Architect, furnish satisfactory evidence as to the kind and quality of material and workmanship. Materials shall be used in accordance with the manufacturer's printed instruction unless otherwise specified. Upon request of the Architect to the General Contractor, the manufacturer's representative shall go to the site and instruct the mechanics in the use of the materials or shall supervise their use.

B. For the execution of the work to be performed under this Contract and for the manufacturer or transportation of any of the materials or appliances to be used or installed, the General Contractor shall employ only such labor throughout as will not interfere with the speedy and uninterrupted completion of the building. All work shall be done by mechanics skilled in their trade.

C. All materials shall be ordered, manufactured, and delivered at such times and in such manner as tol insure the speedy and uninterrupted progress of the work, the least obstruction to the premises; and such materials shall be so distributed as to cause no overloading at any point. If any material so stored obstructs the progress of any portion of the various parts of the work, they shall be moved from place to place or from the premises, as the Architect may direct, at the expense of the Subcontractor involved.

D. Before making any shipment of materials to the building, the General Contractor shall ascertain whether the building is in a condition to receive the shipment. Where this provision is neglected, and material is delivered to the building when the latter is not in condition to receive it, such materials shall be stored elsewhere at the expense of the Subcontractor involved.

E. After signing of the Contract, the substitution will not be permitted of any materials or method of construction, unless otherwise approved by the Architect.

1. Should the specified materials or construction not be available through reasons beyond the control of the General Contractor, the question shall be immediately referred to the Architect for decision before proceeding with the work.

F. The General Contractor and his Subcontractors shall carry on the work with the greatest reasonable speed, consistent with first-class workmanship, and without interfering with or delaying the work of others.

G. Any materials delivered, or work performed, contrary to the CONTRACT DOCUMENTS and approved shop drawings, shall be removed by the General Contractor or the Subcontractor at fault, at his own expense, and the same shall be replaced with other materials or work satisfactory to the Architect. The General Contractor or Subcontractor at fault shall also assume the cost of replacing the work which may be disturbed while making good the defective work.

H. The Architect, however, reserves the right to allow such defective materials or workmanship to stand, in which case an amount equal to the difference in value between the work and material provided and that specified shall be deducted form the amount due or to become due under the Contract. If a suitable mutually agreeable credit cannot be worked out defective material or workmanship shall be replaced.

I. Any specified materials or work shown on the Drawings which the General Contractor cannot guarantee against defects shall be called to the attention of the Architect in writing before installation in the building. Installation without such notice shall bind the General Contractor to his full guarantee.

1.19 GLASS BREAKAGE

A. The General Contractor shall be responsible for all breakage of glass, from the time construction operations commence until the project is occupied by the Owner. The General Contractor shall replace all broken glass and deliver the building with all glazing intact, labels removed, and clean.

1.20 TIMES FOR COMPLETION AND LIQUIDATED DAMAGES

A. Refer to the Owner-General Contractor Agreement **and the General Conditions of the Contract.**

B. Liquidated damages apply for the Substantial Completion of the entire Work and the Substantial Completion of the Interim Summer Phase Work (Phase 2 and Phase 4, corresponding to school summer vacations 2021 and 2022) required for the full operation of the Cashman Elementary School. (See Paragraph 1.10.E.1).

1.21 WAGE RATES

A. There shall be paid each laborer or mechanic of the General Contractor or Subcontractor engaged in work on the project under this Contract in the trades of occupations listed in SECTION 018300-PREVAILING WAGE RATES, not less than the hourly wage rate as stated therein and list opposite the same, regardless of any contractual relationship which may be alleged to existing between the General Contractor or any Subcontractor and such laborers and mechanics.

1.22 MANUFACTURER PREFERENCE

A. Attention is directed to the provisions of General Laws of Massachusetts (Ter. Ed.), Chapter 7, Section 22, Paragraph 17, which states as follows: "A preference in the purchase of supplies and materials, other considerations begin equal, in favor, first, of... supplies and materials and materials manufactured and sold within the Commonwealth; second, to supplies materials manufactured and sold elsewhere within the United States."

1.23 COMPENSATION PAID TO POLICE OFFICERS

A. The General Contractor shall pay to any police officers employed by him the prevailing wage rate paid to regular police officers in the City. Such police officers shall be covered by Workmen's Compensation Insurance and Employer's Liability Insurance by the General Contractor.

B. For additional information refer to the Agreement and General Conditions Between Owner and General Contractor.

1.24 BUILDING PERMIT

A. The City of Amesbury **waives the fees for all permits required by the City** in conjunction with the work of this project. Nonetheless, it is the responsibility of each Trade to apply for and obtain the necessary permits for the execution of the work.

B. NPDES Permit: The General Contractor shall be responsible for preparing and submitting and securing a NPDES (National Pollutant Discharge Elimination System) permit from EPA and DEP. This involves preparing a Pollution Prevention Plan.

1. At least 48 hours prior to any work or equipment going on site, an EPA NPDES Notice of Intent form must be postmarked and sent to the U.S. EPA at Storm Water Notice of Intent (4203), 401 M Street S.W., Washington, D.C. 20460.

2. A copy of the Pollution Prevention Plan must be kept on the site at all times.

3. Once the work of this contract is complete, and all disturbed soil is stabilized or revegetated the contractor shall file a Notice of Termination with the EPS.

4. The necessary forms and other information necessary to complete this work can be obtained from the Regional EPA Office.

5. The General Contractor shall likewise secure a NOI from the DEP for NPDES. The General Contractor must secure this permit prior to starting any sitework. The Owner's Representative will supply these forms to the General Contractor.

1.25 SALES TAX EXEMPTION

A. All materials and items which will be incorporated into the project, and which will become the property of the Owner upon completion of said project, will be exempt from the Massachusetts Sales Tax. The Owner will provide to the General Contractor the Sales Tax Exemption Number, applicable for the project, and said number shall be included when ordering materials for the project.

B. For additional information refer to the General Conditions of the Contract, Article IV, Item 17 for additional information.

1.26 MANDATORY CRIMINAL RECORD (CORI) CHECKS

A. Section 2 of Chapter 385 of the Act of 2002 amends M.G.L. c.71 § 38R to require that all schools conduct criminal background checks on current and prospective employees, volunteers and school transportation providers. Further, the law stipulated that schools may also perform CORI checks on subcontractor or laborers commissioned to do work on school ground who may have direct and unmonitored contact with children.

B. CORI PROCEDURE FOR CONTRACTORS AND THEIR LABORERS

1. Effective immediately, all contractors shall submit CORI request forms for their laborers who will be on Amesbury school property.

2. Each contractor shall identify the manager who will verify each CORI request form in person. Verification shall include confirmation of the following information for approval by the City.

a. Name on driver's license matches name on CORI request.

b. DOB on driver's license matches DOB on CORI request.

c. Signature on driver's license matches the person submitting the CORI request.

d. Photo on driver's license matches the person submitting the CORI request.

e. SSN on CORI request matches SSN in contractor's payroll records.

3. The Contractor shall then submit the bundled applications, verified by the approved manager, to Amesbury Public Schools for processing through the APS Office of the Superintendent (hereafter APSOS), 5 Highland Street, Amesbury, MA 01913.

4. APSOS will inform the Contractor of the names of those contractors and their laborers who are approved to work on the APS school property.

5. The Contractor will maintain an approved list at the job site. The approved list will include the laborer's name and driver's license number. The City's project manager assigned to each school work site and the General Contractor shall be responsible for visually verifying a contractor's and/or laborer's driver's license to ensure that said contractor's and/or laborer's information matches the information on the approved list.

6. All costs associated with the procedures are the responsibility of each applicable subcontractor/vendor.

C. Once Public Facilities receives confirmation that a person's CORI has been successfully performed and is in compliance with State and City criteria, that person may access the site.

D. Refer to Attachment A to this Section for the CORI Request Form.

E. All costs associated with the procedures are the responsibility of each applicable subcontractor / vendor.

F. Refer to the General Conditions of the Contract, Article IV, Item 8 for additional information.

1.27 SPECIAL PROVISION ON SCHOOL PROPERTY

A. Prior to beginning Work of the Contract, the General Contractor shall meet with the Owner, Project Manager, and Architect to determine procedures regarding site conditions, hours of operations, truck routes and any other restrictions regarding the use of the site areas surrounding the construction.

B. During all times when school buses are entering or leaving the school sites, the General Contractor shall not allow the use of any heavy trucks, operable heavy equipment, and the like within 10 yards of roadways, paved areas, entrance and exit routes used by school buses.

C. The General Contractor shall keep all public and private access roads and walks clear of any obstruction, including debris caused by this work during the entire term of the Contract. Access roads and fire lanes on and about the site, and around the existing building, shall be kept open and free at all times for building egress, movement of vehicular traffic and passage of emergency vehicles.

1. Parking for worker's vehicles shall be only within a designated area within the construction fencing.

1.28 SPECIAL CONTROLS

A. No trades worker, construction supervisor or any other of the General Contractor's personnel (or subcontractors) shall speak with any student or other young person in the school, at any time, for any reason. The ONLY exception will be in matters of an immediate threat to life safety.

B. The following are special provisions concerning Worker Conduct for this project:

1. All workers on the project are required to conduct themselves in a professional manner. Abusive or obscene language or gestures will not be tolerated. Soliciting or harassing students, faculty or staff for any reason is prohibited.

2. Use of any tobacco products, alcohol or drugs on School property is prohibited. Violators will be subject to arrest; no warning will be issued.

3. Workers shall wear shirts at all times, with no offensive text or images.

C. Loud and/or abusive language – Due to the work being performed within an operating school, the General Contractor's and Subcontractors' personnel shall exercise caution to refrain from loud and/or abusive language.

D. The Owner reserves the right to have any worker barred from the construction site for violation of these rules.

1.29 SCHOOL CALENDARS

A. Following this Section are Attachment B (school calendar for school year 2020-2021). The calendar is provided for the Contractor's information only. The 2021-22 and 2022-2023 school year calendars will be issued to the General Contractor when available. The calendars are subject to change by the School Committee.

1.30 COVID-19

A. The General Contractor shall be solely responsible for the implementation of and adherence to all applicable regulations and guidelines from federal, state and local authorities, in place at the time the bid is submitted, in the performance of the work of this contract which pertain to the COVID-19 pandemic, all costs for which shall be included in the Contract Price.

END OF SECTION

ATTACHMENT A

CORI
Request Form and Application

AMESBURY PUBLIC SCHOOLS

5 Highland St., Amesbury, MA 01913

CRIMINAL OFFENDER RECORD INFORMATION (CORI) ACKNOWLEDGEMENT FORM

The Amesbury Public Schools is registered under the provisions of M.G.L. c. 6, § 172 to receive CORI for the purpose of screening current and otherwise qualified prospective employees, subcontractors, volunteers, license applicants, current licensees, and applicants for the rental or lease of housing.

As a prospective or current employee, subcontractor, volunteer, license applicant, current licensee, or applicant for the rental or lease of housing, I understand that a CORI check will be submitted for my personal information to the DCJIS. I hereby acknowledge and provide permission to the Amesbury Public Schools to submit a CORI check for my information to the DCJIS. This authorization is valid for one year from the date of my signature. I may withdraw this authorization at any time by providing the Amesbury Public Schools with written notice of my intent to withdraw consent to a CORI check.

The Amesbury Public Schools may conduct subsequent CORI checks within one year of the date this Form was signed by me provided, however, that the Amesbury Public Schools must first provide me with written notice of this check.

By signing below, I provide my consent to a CORI check and acknowledge that the information provided on this Acknowledgement Form is true and accurate.

_____ _____

SIGNATURE **DATE**

AES Building Project _____

SCHOOL AND DEPARTMENT **POSITION**
(e.g. volunteer, teacher, coach, etc.)

_____ _____ _____

LAST NAME **FIRST NAME** **MIDDLE NAME**

__ __/__ __/__ __ __ __ _X_ _X_ _X_-__ __ -__ __ __ __ _____

DATE OF BIRTH* **SOCIAL SECURITY NUMBER* (6 digits)** **GENDER**

_____ _____

PLACE OF BIRTH (TOWN/CITY/STATE) **MOTHER'S MAIDEN NAME**

PRIOR LAST NAMES, MAIDEN or Alias (if applicable) _____

Address: _____

Former Address (es) (5 yrs. prior): _____

Telephone number _____

_____ _____ _____ _____

Driver's License No. /Issuing State **Height** **Weight** **Eye Color**

The above information was verified by reviewing the following form of non-expired government issued photographic identification:

☐**MA Driver's License** ☐**MA Identification** ☐**Passport** ☐**Other** _____

Requested By: _____ Carol L. Bartlett

VERIFYING EMPLOYEE **SIGNATURE OF CORI AUTHORIZED EMPLOYER**

Rev. 5-12

ATTACHMENT B

SCHOOL CALENDAR
2020-2021

AMESBURY PUBLIC SCHOOLS 2020-2021

01-001 August 2020						
S	M	T	W	Th	F	S
	3	4	5	6	7	
	10	11	12	13	14	
	17	TI	TI	TI	21	
	24	25	26	T	T	
	ST					

19-095 January 2021						
S	M	T	W	Th	F	S
					V	
	4	5	6	7	8	
	11	12	13	14	15	
	H	19	20	21	22	
	25	26	PRT	28	29	

13-181 June 2021						
S	M	T	W	Th	F	S
		1	2	3	4	
	7	8	9	10	11	
	14	15	16	17	M	
	M	M	M	M	25	
	28	29	30			

20-021 September 2020						
S	M	T	W	Th	F	S
		1	2	3	V	
	H	8	9	10	11	
	14	15	16	17	18	
	21	22	PRT	24	25	
	28	29	30			

15-110 February 2021						
S	M	T	W	Th	F	S
	1	2	3	4	5	
	8	9	10	11	12	
	H	V	V	V	V	
	22	23	24	25	26	

Calendar Codes

- Indicates No School Days
- ER = Early Release Day
- H = Holiday
- M = No School: Make-up Days
- PD = Professional Development
- PRT = Prof. Release Time Day
- ST = Student 1st Day
- T = Teacher/Staff Only
- TI = New Teacher Induction Days
- V = School Vacation

21-042 October 2020						
S	M	T	W	Th	F	S
				1	2	
	5	6	7	8	9	
	H	13	14	15	16	
	19	20	PRT	22	23	
	26	27	28	29	30	

22-132 March 2021						
S	M	T	W	Th	F	S
	1	2	3	4	PD	
	8	9	10	11	12	
	15	16	17	18	19	
	22	23	24	25	26	
	29	30	PRT			

STUDENT YEAR: 181

SCHOOL STARTS: 8/31/2020

SCHOOL ENDS: 6/17/2021 (181ST DAY)

17-059 November 2020						
S	M	T	W	Th	F	S
	2	PD	4	5	6	
	9	10	H	12	13	
	16	17	18	19	20	
	23	24	ER	H	V	
	30					

16-148 April 2021						
S	M	T	W	Th	F	S
				1	H	
	5	6	7	8	9	
	12	13	14	15	16	
	H	V	V	V	V	
	26	27	28	29	30	

SCHOOL HOURS: **DISMISSAL TIMES:**

		ER	PRT
7:30-2:30	**High School**	10:50	11:30
7:40-2:25	**Middle School**	10:50	11:30
8:30-3:00	**Elementary**	11:30	12:00

Approved: February 3, 2020

17-076 December 2020						
S	M	T	W	Th	F	S
		1	2	3	4	
	7	8	9	10	11	
	14	15	PRT	17	18	
	21	22	ER	V	H	
	V	V	V	V		

20-168 May 2021						
S	M	T	W	Th	F	S
	3	4	5	6	7	
	10	11	12	13	14	
	17	18	19	20	21	
	24	25	26	27	28	
	H					

2020-2021 SCHOOL YEAR

ATTACHMENT C

SCHOOL CALENDAR
2021-2022

AMESBURY PUBLIC SCHOOLS 2021-2022

0-000 August 2021						
S	M	T	W	Th	F	S
	2	3	4	5	6	
	9	10	11	12	13	
	16	17	18	19	20	
	23	TI	TI	TI	27	
	T	PD				

20-020 September 2021						
S	M	T	W	Th	F	S
			ST	2	V	
	H	7	8	9	10	
	13	14	15	16	17	
	20	21	PRT	23	24	
	27	28	29	30		

20-040 October 2021						
S	M	T	W	Th	F	S
					1	
	4	5	6	7	8	
	H	12	13	14	15	
	18	19	PRT	21	22	
	25	26	27	28	29	

18-058 November 2021						
S	M	T	W	Th	F	S
	1	PD	3	4	5	
	8	9	10	H	12	
	15	16	17	18	19	
	22	23	ER	H	V	
	29	30				

17-075 December 2021						
S	M	T	W	Th	F	S
			1	2	3	
	6	7	PRT	9	10	
	13	14	15	16	17	
	20	21	22	ER	H	
	V	V	V	V	V	

20-095 January 2022						
S	M	T	W	Th	F	S
	3	4	5	6	7	
	10	11	PRT	13	14	
	H	18	19	20	21	
	24	25	26	27	28	
	31					

15-110 February 2022						
S	M	T	W	Th	F	S
		1	2	3	4	
	7	8	PRT	10	11	
	14	15	16	17	18	
	H	V	V	V	V	
	28					

22-132 March 2022						
S	M	T	W	Th	F	S
		1	2	3	4	
	7	8	9	10	11	
	14	15	PD	17	18	
	21	22	23	24	25	
	28	29	30	31		

15-147 April 2022						
S	M	T	W	Th	F	S
					1	
	4	5	6	7	8	
	11	12	13	14	H	
	H	V	V	V	V	
	25	26	27	28	29	

21-168 May 2022						
S	M	T	W	Th	F	S
	2	3	4	5	6	
	9	10	11	12	13	
	16	17	18	19	20	
	23	24	25	26	ER	
	H	31				

13-181 June 2022						
S	M	T	W	Th	F	S
			1	2	3	
	6	7	8	9	10	
	13	14	15	16	17	
	M	M	M	M	M	
	27	28	29	30		

Calendar Codes

- Indicates No School Days
- ER = Early Release Day
- H = Holiday
- M = No School: Make-up Days
- PD = Professional Development
- PRT = Prof. Release Time Day
- ST = Student 1st Day
- T = Teacher/Staff Only
- TI = New Teacher Induction Days
- V = School Vacation

STUDENT YEAR: 181

SCHOOL STARTS: 9/1/21

SCHOOL ENDS: 6/17/22

SCHOOL HOURS:		DISMISSAL TIMES: ER	PRT
7:30-2:30	High School	10:50	11:30
7:40-2:25	Middle School	10:50	11:30
8:30-3:00	Elementary	11:30	12:00

Approved: 2/22/21

2021-2022 SCHOOL YEAR

SECTION 012200

UNIT PRICES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 UNIT PRICES

A. The predetermined Unit Prices for items of work set forth in the Schedule of Unit Prices attached to this Section shall be used to determine adjustments to the Contract Sum when changes in the work involving said items are made in accordance with the Contract Documents.

B. **Unit Prices listed under ADDITIONS have been computed at net cost plus overhead, profit and all other charges.** Unit Prices listed under DEDUCTIONS have been computed at net cost alone. Unit Prices shall apply until the date of Substantial Completion established at the time of Contract signing. If the date of Substantial Completion has been modified by Change Order, Unit Prices may be adjusted at the discretion of the Owner by Change Order.

C. **Unit Prices for excavation include the costs of sheeting and bracing, pumping and dewatering and all other costs in connection therewith**.

D. All materials, methods of installation, and definitions of terms set forth under the various Unit Price items in the Schedule of Unit Prices shall be as indicated in the Contract Documents.

1.03 APPLICABILITY OF UNIT PRICES

A. The payment lines shall be as indicated in the Contract Documents.

B. Prior to commencing removal or placement of materials set forth in the Schedule of Unit Prices, the General Contractor shall notify the Architect in sufficient time to permit **in-place measurements** to be taken on behalf of the Owner. Only quantities which have been approved in writing by the Architect will be considered in the determination of adjustments to the Contract Sum.

C. Performance of work which is not required under the Contract Documents or which is not authorized by Change Order, whether or not such work items are set forth hereunder as a Unit Price item, shall not be considered cause for any extra payment on account of the Contract. The Contractor will be held fully responsible for such unauthorized work, including the performance of all corrective measures required by the Architect.

SECTION 012200

SCHEDULE OF UNIT PRICES

		Additions	Deductions
1.	General excavation by machine. Material left on site as directed.	$ 7.50/CY	$ 6.00/CY
2.	General excavation by machine. Material removed from site.	17.00/CY	13.60/CY
3.	Trench excavation by machine. Material left on site as directed.	12.00/CY	9.60/CY
4.	Trench excavation by machine. Material removed from site.	22.00/CY	17.60/CY
5.	Hand excavation to 6' depth. Material left on site as directed.	75.00/CY	60.00/CY
6.	Hand excavation to 6' depth. Material removed from site.	85.00/CY	68.00/CY
7.	Hand excavation per each foot of additional depth below 6'. (Add to items 5 and 6)	100.00/CY	80.00/CY
8.	Rock excavation encountered in general excavation using explosives. Material left on site as directed.	80.00/CY	72.00/CY
9.	Rock excavation encountered in general excavation using explosives. Material removed from site.	100.00/CY	80.00/CY
10.	Rock excavation encountered in trenches and piers using explosives. Material left on site as directed.	105.00/CY	84.00/CY
11.	Rock excavation encountered in trenches and piers using explosives. Material removed from site.	115.00/CY	92.00/CY
12.	Rock excavation encountered in general excavation using non-blasting methods. Material left on site as directed.	90.00/CY	72.00/CY
13.	Rock excavation encountered in general excavation using non-blasting methods. Material removed from site.	100.00/CY	80.00/CY

		Additions	Deductions
14.	Rock excavation encountered in trenches and piers using non-blasting methods. Material left on site as directed.	$105.00/CY	$84.00/CY
15.	Rock excavation encountered in trenches and piers using non-blasting methods. Material removed from site.	115.00/CY	92.00/CY
16.	Removal of boulders over 2 Cu.Yd. encountered in general excavation. Material left on site as directed.	66.00/CY	52.80/CY
17.	Removal of boulders over 2 Cu.Yd. encountered in general excavation. Material removed from site.	86.00/CY	68.80/CY
18.	Removal of boulders over 1 Cu.Yd. encountered in trench excavation. Material left on site as directed.	66.00/CY	52.80/CY
19.	Removal of boulders over 1 Cu.Yd. encountered in trench excavation. Material removed from site.	86.00/CY	68.80/CY
20.	Dense graded crushed stone or gravel, in place, compacted as specified.	26.00/CY	20.00/CY
21.	Structural fill (sand-gravel, gravel borrow), in place, compacted as specified.	36.00/CY	14.40/CY
22.	Drainage fill/crushed stone, in place, compacted	29.00/CY	28.80/CY
23.	Common fill (ordinary borrow), in place, compacted as specified.	18.00/CY	14.40/CY
24.	Granular Fill (aka Free Draining Granular Borrow)	38.00/CY	30.40/CY
25.	Sand fill around pipes in trenches, in place, as specified.	$31.00/CY	$24.80/CY
26.	3000 psi concrete, in place, not including forms and reinforcing.	$214.00/CY	$171.20/CY
27.	4000 psi concrete, in place, not including forms and reinforcing.	$217.00/CY	173.60/CY

		Additions	Deductions
28.	5000 psi (site) concrete, in place, not including forms and reinforcing.	$235.00/CY	$188.00/CY
29.	Form work for footings and foundation walls as per contact area including stripping.	$15.00/SF	$12.00/SF
30.	Reinforcing steel, in place including accessories.	1.25/LB	1.00/LB
31.	Bituminous binder course pavement in place	13.75/SY	11.00/SY
32.	Bituminous curbing installed	4.50/LF	3.60/LF
33.	Removal & disposal of buried asbestos-containing pipe and fitting insulation, including required hand excavation	50.00/LF	40.00/LF
~~34.~~	~~Loading, Transporting and disposal of petroleum/hazardous materials Impacted soil.~~		
	~~a. natural soil below RCS-1~~	~~51.20/ton~~	~~41.00/ton~~
	~~PLUS one time approval fee~~	~~250.00~~	~~250.00~~
	~~b. urban fill below RCS-1~~	~~51.20/ton~~	~~41.00/ton~~
	~~PLUS one time approval fee~~	~~250.00~~	~~250.00~~
	~~c. in-state lined landfill reuse~~	~~51.20/ton~~	~~41.00/ton~~
	~~PLUS one time approval fee~~	~~250.00~~	~~250.00~~
	~~d. in-state/out-of-state recycling, or thermal treatment~~	~~60.00/ton~~	~~48.00/ton~~
	~~e. out-of-state RCRA Subtitle D~~	~~103.00/ton~~	~~82.40/ton~~
	~~f. out-of-state RCRA Subtitle C, hazardous waste treatment~~	~~264.00/ton~~	~~211.20/ton~~
	~~PLUS MA Tax~~	~~56.00/ton~~	~~56.00/ton~~
	~~g. out-of-state RCRA, Subtitle C hazardous waste direct~~	~~273.50/ton~~	~~218.80/ton~~
	~~PLUS MA Tax~~	~~56.00/ton~~	~~56.00/ton~~
	~~h. solid waste~~	~~20.00/ton~~	~~16.00/ton~~

		Additions	Deductions
35.	**Imported Amended Lawn and Planting Topsoil**	**$32.00/CY**	**$25.60/CY**

END OF SECTION

SECTION 012300

ALTERNATES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. The schedule attached to this SECTION lists all the Alternates which appear in the Contract Documents, and the Sections of the Specifications which are affected by each Alternate. Consult the individual Section for detailed requirements of each Alternate.

1.03 GENERAL INSTRUCTIONS

A. Each Sub-Bidder shall be held fully responsible for examining the scope of the Alternates generally defined herein and for recognizing any modifications to his work caused by any Alternate whether or not his particular trade SECTION is mentioned therein.

B. Filed Sub-Bidders shall enter only the amount of addition or subtraction necessitated by the scope of the Alternate which pertains to the work of his trade in the FORM FOR FILED SUB-BID. In the event an alternate does not involve a change in the amount of the base bid, the Bidder shall do indicate by using the words **"No Change"**, "**Zero"**, **"N.C."** or otherwise clearly indicating there no change in the **Base Bid** in the space provided for that alternate. If the space is left blank, it is assumed that there is no change for that alternate.

C. All SECTIONS of work which are affected by the Alternates but which are not designated as Trade Sub-Bid Sections will be considered work to be performed by the General Contractor.

D. The work of the various trades to be performed under Alternates shall be in strict accordance with the requirements of the particular trade SECTION of the SPECIFICATIONS.

E. Bid prices for each Alternate shall include overhead, profit, and all other expense incidental to the Work under each Alternate.

1.04 LIST OF ALTERNATES

A. **ALTERNATE NO. 1 (ADD)**

1. Install conduit for additional EV Charging Station at the designated handicapped parking places as shown on the Drawings and as specified in SECTION:

   260001-ELECTRICAL.

B. **ALTERNATE NO. 2 (ADD)**

1. Provide electrical infrastructure and capacity for future conversion to all electric kitchen as shown on the Drawings and as specified in SECTION:

   260001-ELECTRICAL

C. **ALTERNATE NO. 3 (ADD)**

1. Provide and install warewash equipment, Food Service Item 81, at RECYCLE ROOM of the New Amesbury Elementary School, consisting of ventless warewasher and conveyor; electrical and plumbing connections as shown on the Drawings and as specified in SECTIONS:

   114000-FOODSERVICE EQUIPMENT
   220001-PLUMBING
   260001-ELECTRICAL

END OF SECTION

SECTION 012500

SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

1.02 SUMMARY

A. This Section includes procedural requirements for substitutions of product submittals for the following Section of work:

1. SECTION 012300 - ALTERNATES for products selected as an alternate.
2. SECTION 012600-CONTRACT MODIFICATION PROCEDURES for submittal requirements for products by specified manufacturers, and for “approved equal” products. if applicable.
3. Divisions 02 through 33 for specific requirements and limitations for substitutions under each Section.

B. The intent of this Section is for the General Contractor or Subcontractor to document all submittals in a side-by-side comparison and any deviation from the specified product including performance data and other specified compliance such as, but not limited to, LEEDv4-S.

1.03 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, systems from those required by the Contract Documents and proposed by the General Contractor or Subcontractor.

B. All side-by-side comparisons shall be based upon the Basis for Design manufacturer/product.

1.04 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use facsimile of the form attached to this Section as “Attachment A – Substitute Request Form” (pages 2 of 2.)
2. Documentation: Show compliance with requirements for substitutions and the following:

a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

b. Coordination information, including a list of changes or revisions needed to other parts of the Work, and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, available colors and finishes, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

e. Samples, where applicable or requested.

f. Certificates and qualification data, where applicable or requested.

g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.

h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.

j. Detailed comparison of General Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

k. Cost information, including a proposal of change, if any, in the Contract Sum.

l. General Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.

m. General Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify the General Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

    a. When the General Contractor requests a substitution, the Architect requires more time to review the submittal in order to evaluate the proposed substitution and need not respond within the time established for review of submittals under Division 01 Section "Submittal Procedures." On major items of work, submit requests for substitutions in a timely fashion, well in advance of the time at which the product has to be ordered, allowing sufficient time for Architect's review**.**

    b. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.

1.05 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

1.06 PROCEDURES

A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

1.07 SUBSTITUTIONS

A. The Owner and the Architect will consider substitutions only after the Contract has been executed, not during bidding, and only when one of the following conditions applies:

    1. The substitution is proposed for cause (sole determination of the Architect).

    2. The substitution will provide a clear benefit to the Owner, such as the same performance and quality at a lower cost, or better performance and quality at the same cost, or an improved construction schedule.

    3. The proposed substitution is an "equal" as defined by M.G.L. Ch. 30, s. 39M(b).

B. General Contractor's Representation: By making a request for a substitution, the General Contractor makes the following representation:

    1. General Contractor has investigated the proposed substitution and determined that it is equal or superior to the specified product, material or item.

2. Cost data presented is complete and includes all adjustments to the Contract Sum for the substitution and for associated changes to other Work, and the General Contractor will make no claims for additional costs related to the substitution which subsequently become apparent.

3. General Contractor shall coordinate the installation of the accepted substitution, making such changes as may be required in other portions of the Work.

4. Same warranty will be furnished for proposed substitution as for specified product.

5. Same maintenance service and source of replacement parts if available.

6. Proposed substitution will have no adverse effect on other trades and shall not affect or delay progress schedule.

7. Proposed substitution does not affect dimensions and functional clearances.

8. Coordination, installation, and changes in the Work as necessary for accepted substitution will be correct in all respects.

C. General: Where specifications name manufacturers, or name products and manufacturers, whether or not the words "or equal" appear in the specifications or are construed to be included in the specifications by virtue of statutory requirements applicable to public work, proposal of an unnamed product or a product by an unnamed manufacturer shall be in accordance with these requirements for product substitutions.

D. Substitutions: Submit requests for substitution not later than 60 days prior to time required for preparation and review of related submittals.

1. Requests received less than the indicated number of days from the General Contractor's scheduled submittal date may be rejected without review by the Architect.

2. Conditions: Architect will consider the General Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

    a. Requested substitution does not require extensive revisions to the Contract Documents.

    b. Requested substitution is consistent with the Contract Documents and will produce indicated results.

    c. Requested substitution provides sustainable design characteristics that specified product provided for achieving LEEDv4-S prerequisites and credits.

    d. Substitution request is fully documented and properly submitted.

e. Requested substitution will not adversely affect General Contractor's construction schedule.

f. Requested substitution has received necessary approvals of authorities having jurisdiction.

g. Requested substitution is compatible with other portions of the Work.

h. Requested substitution has been coordinated with other portions of the Work.

i. Requested substitution provides specified warranty.

j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

E. Proposed substitutions that may have an adverse effect on LEEDv4-S point totals for the School will not be considered.

1. All proposed substitutions shall be accompanied by an substitution request form signed by the manufacturer, supplier and General Contractor and Subcontractor, if applicable, stating that such proposed substitution does not affect the LEEDv4-S point total for the School.

END OF SECTION

ATTACHMENT A

Substitution Request Form

ATTACHMENT A

SUBSTITUTION REQUEST FORM

Project: _____ Architect's Project No.: _____

_____ Substitution Request No.: _____

To: _____ Date: _____

_____ From: _____

Re: _____ Contact For: _____

Section Title: _____ Description: _____

Section No. _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No./Color: _____

Installer: _____ Address: _____ Phone: _____

History: ☐ New Product ☐ 1-4 years old ☐ 5-10 years old ☐ More than 10 years old

Differences between proposed substitution and specified Basis of Design manufacturer and product: ____

_____

_____

☐ Side-by-Side comparative data (Refer to attached Example.) - **REQUIRED**

Reason for not providing specified item: _____

_____

Similar Installation:

Product: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain: _____

_____

ATTACHMENT A

Savings to Owner for accepting substitution:_____ ($_____)

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ Other

---

LEEDv4-S Credit Impact: This substitution

The project LEEDv4-S Credit Score. ☐ Will affect ☐ Will NOT affect

Explain in detail, on separate attachment, as required.

Credit # _____ Impact on points: _____

LEEDv4-S Materials Credit Documentation Sheet: The complete form ☐ has ☐ has not been attached for both the proposed substitution and the originally specified product for comparison.

The undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as state above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Payment will be made for changes to building design, including A/E design, detailing and construction costs caused by the substitution.
- Coordination, installation and changes in the Work as necessary for accepted substitution will be correct in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

Attachments: _____

_____

ARCHITECT'S REVIEW AND ACTION

☐ Substitution approved – Make submittals per Division 01 SECTION "Substitution Procedures"
☐ Substitution approved as noted – Make submittals per Division 01 SECTION "Substitution Procedures"
☐ Substitution rejected – Use specified materials.
☐ Substitution request received too late – Use specified materials.

Signed by: _____ Date: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ Other

SECTION 012600

CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Procurement and Contracting Requirements and other Division 01 General Requirements apply to this Section.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Requirements:

1. SECTION 013320 - CONSTRUCTION PROGRESS DOCUMENTATION for information required to justify changes to Contract Time.

1.03 MINOR CHANGES IN THE WORK

A. The Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, by a field order.

1.04 OWNER-INITIATED PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If required, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within 14 days after receipt of Proposal Request, submit a Change Order Request estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
3. Include supporting data.

1.05 CONTRACTOR-INITIATED PROPOSALS

A. General Contractor Initiated Proposals: If latent or changed conditions require modifications to the Contract, the General Contractor may initiate a claim by submitting a Change Order Request to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

B. Supporting Data: Provide the following information with each Change Order Request:

1. Rationale for Change Order Request – Refer to the *General Conditions of the Contract* for additional information.
2. Include a detailed list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor directly attributable to the change. Prior to submission of any change order request, the General Contractor and each subcontractor shall submit the Request for Approval of Wages and Rates for Change Order Pricing (Attachment A).
5. For changes requesting an extension of Contract Time, include an analysis of CPM schedule showing how proposed change affects the critical path in accordance with the General Conditions, and with Division 01 Section "Construction Progress Documentation." Analysis shall include, but not be limited to, changes in activity duration, start and finish times, activity relationship, and available float.
6. Include entire Work required in association with the change in Change Order Request, including all costs sought by the General Contractor to perform the proposed change.
7. Submit statement and breakdown for each change substantiating labor burden for the General Contractor and each subcontractor. The labor burden shall not exceed 30%, unless documentation acceptable to the Owner is provided to substantiate a greater value.
8. Provide bona fide prices based on actual wages and material costs. Substantiate costs of materials by providing prices from material suppliers on their letterhead. Where requested, furnish survey data to substantiate quantities.
9. Itemize work which is to be performed by employees of the General Contractor. Include number of labor hours and hourly rate for each class of labor.
10. For work which is to be performed by subcontractors, provide pricing proposals on letterhead of proposed subcontractor. Subcontractor pricing proposals shall include same supporting data required of the General Contractor specified in this Section.
11. Include cost of general conditions, superintendence, overhead and profit in the percentage mark-up described in General Conditions of the Contract. No separate or additional amount for General Conditions work, superintendence, overhead or profit will be approved.

12. The cost of tools and small tools, known as "tools of the trade," will not be charged to the Owner nor otherwise included in the cost of the proposed change.

13. Prices shall remain valid for a minimum of 90 days from the date of the initial pricing approval to execution of the Change Order by the Owner.

14. Travel time and mileage to and from the site is overhead.

C. Change Order Request Form: Use attached forms (Attachment B), equivalent Construction Specification Institute (CSI) forms (Forms 13.6A, C and D), or substantially similar forms acceptable to the Architect. Form shall include worksheet summary and worksheet details.

1.06 CONSIDERATION OF PROPOSALS

A. Consideration and Acceptance of Price Proposal:

1. Incomplete Change Order Requests, and Change Order Requests that are not in compliance with the requirements of this Section, will be returned to the General Contractor without review. Such proposals shall be revised by the General Contractor and returned to the Architect within the same time period specified above for submittal of proposals; there shall be no extension of time for such resubmittals.

a. Change Order Requests that contain errors of fact or mathematical errors will be considered incomplete and non-compliant and may, at the Architect's discretion, be returned under this provision.

2. The Architect will review and act on Change Order Requests within 21 days of receipt. The Architect's review, at the discretion of the Architect, may include consideration of costs listed in Means "Construction Cost Data" or a similar database, and on conversations with local manufacturers and suppliers.

3. **Within 10 calendar days after receipt of the Architect's review comments, make requested revisions and resubmit.**

4. The Architect will promptly notify the General Contractor whether the pricing is accepted or will direct the General Contractor to make additional changes.

5. When the General Contractor’s proposal is approved by the Architect, the Architect will prepare a Change Order for execution by the Owner, the Architect, and the General Contractor.

B. No extensions of Contract Time nor increase in the Contract Sum will be considered if the additional time or additional cost is a consequence of the General Contractor’s failure to submit an estimate within the specified time, regardless of whether the proposal request or change order request was initiated by the Owner or the General Contractor.

1.07 ADMINISTRATIVE CHANGE ORDERS

A. Unit Price Adjustment: Refer to SECTION 012200-UNIT PRICES for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit price work.

1.08 CHANGE ORDER PROCEDURES

A. Upon the Owner's approval of a Change Order Request, the Architect will issue a Change Order for signatures of the Owner and General Contractor, as provided in the General Conditions of the Contract.

B. Approval Process: After preparation of the Change Order, subsequent execution and approval procedures will be as follows:

1. The General Contractor will sign the Change Order.
2. The Architect will present the Change Order with the General Contractor’s signature to the City for approval and the Owner’s signatures.
3. A copy of the fully executed Change Order signed by the Owner will be distributed to signatories for record.

1.09 CONSTRUCTION CHANGE DIRECTIVE (CCD)

A. Construction Change Directive: Architect may issue a Construction Change Directive. Construction Change Directive instructs General Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. At the beginning of each day in which time and material work is to be performed, notify the Owner's on-site project representative where and what type of work is to be performed. At the end of each workday in which time and material work is performed, present to the Owner's project representative for signing an itemized accounting of actual time spent and materials used on the change.
    a. Costs submitted without the signed verification of the project representative will not be approved.
    b. Signature of project representative does not constitute approval of the proposed change. Final approval of proposed change is predicated upon review of the complete Proposal Request with documentation by Architect
2. After completion of change, submit a Change Order Request with supporting documents as indicated.

1.10 CHANGE LOG

A. Maintain log at project site indicating each Proposal Request, Change Order Request, Construction Change Directive and Change Order. Indicate item number, date submitted and current status for each. Provide log for review by Architect, Project Manager, or Owner at project progress meetings and other times when requested.

END OF SECTION

Attachment A

Request for Approval of Wages and Rates for Change Order Pricing

PROJECT NAME | PROJECT NO. | GC:

REQUEST FOR APPROVAL OF WAGES AND RATES FOR CHANGE ORDER PRICING

NAME OF SUBCONTRACTOR:

This form must be completed, submitted and approved prior to the submission of any change order price proposals. Complete the below for every Trade and Classification that is likely to work on the project. If any contractor seeks to utilize a total hourly wage rate (wages plus benefits) for change order pricing that is in excess of the applicable published prevailing wage rate, then this form must be completed, submitted (with backup documentation - i.e. union agreement) and approved prior to the submission of any change order price proposals. The information supplied below must be consistent with certified payroll submissions.

DIRECT LABOR COSTS

			SUBCONTRACTOR PROPOSED RATES FOR APPROVAL							
A	B	C	D	E	F	G	H	I	J	K
Trade Description (e.g, Carpenter, Pipefitter, Electrician, etc.)	Classification (Foreman, Journeyman, Apprentice)	Prevailing Wage Rate (Per Contract Specifications)	Hourly Base Wage Rate	Health & Welfare	Pension Annuity	Supple-mental Unemp	Other Allowable Benefits	Base Wages (subject to ins/taxes)	Total Hourly Labor Cost	Excess Fringes
								$ -	$ -	$ -
								$ -	$ -	$ -
								$ -	$ -	$ -
								$ -	$ -	$ -
								$ -	$ -	$ -
								$ -	$ -	$ -
								$ -	$ -	$ -
								$ -	$ -	$ -

INSURANCE AND TAXES RATES

Item Description	Rate Per Base Wage Cost
Workmen's Compensation Insurance	
State Unemployment	
Federal FICA	
General Liability Insurance	

	L	0.00%
Proposed Insurance and Taxes Rate	Default Rate	30.00%

APPROVAL

Owner Authorized Representative

GC Authorized Representative

NOTES:

- Contractor may utilize a rate of 30% for insurance/taxes without providing documentation. **If a rate in excess of 30% is requested, documentation must be provided and only the four items listed above may be included.'**
- Attach all relevant supporting documentation such as union wage rate sheets, insurance carrier verification letters, workers compensation rate tables, etc.
- Excess fringes are those fringes required to be paid per union contract which exceed the contract prevailing wage. DCAM will reimburse these costs, once approved, as cost only (i.e., no markups allowed). Not all excess fringe benefits are reimbursable by DCAM. If any dollar value is claimed under column H, provide all necessary supporting documentation. Note that the following benefits are explicitly not allowed: Union Dues, Vacation Funds, Uniforms.

Attachment B

Change Request Forms

12-19-13 Version

SUBCONTRACTOR CHANGE REQUEST

Lower-tier Subs, Use SUB-SUBCONTRACTOR Form, NOT this form

Project Name:		PROJ. NO.		GC	
PCO NUMBER:		PCO DESC.			
DATE:					

FIRM SUBMITTING CHANGE REQUEST:

DIRECT LABOR: SUBCONTRACTOR

Use only Prevailing Wage Rates or Owner-Approved Wages and Rates
If any work is performed by a lower tier sub, labor rates must be approved by the Owner prior to executing any changes, and those costs presented on a Sub-Subcontractor Change Request Form.

Trade	Classification (Foreman, Journeyman, Apprentice)	Total Hrs. Worked	These values shall be taken from the "REQUEST FOR APPROVAL FOR CHANGE ORDER PRICING" form, after its approval by the CM and Owner			Total Direct Labor Cost
			Total Hourly Labor Costs (Item I from Wage Approval Sheet)	Total Base Cost Wages + Fringe	Base Wage Rate for Ins/Taxes (Item D from Wage Approval Sheet)	
				$ -		$ -
				$ -		$ -
				$ -		$ -
				$ -		$ -
				$ -		$ -
				Total Base Wages	$ -	
					TOTAL BASE and FRINGE DIRECT LABOR COSTS	$ -

MATERIALS: SUBCONTRACTOR: (For extensive material lists, attach detailed backup and enter as a lump sum below)

Material Description	Qty	Unit	Cost Per Unit	Total
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
			TOTAL MATERIALS COST:	$ -

EQUIPMENT: SUBCONTRACTOR: (For extensive equipment lists, attach detailed backup and enter as a lump sum below)

Equipment Description	Qty	Unit	Cost Per Unit	Total
				$ -
				$ -
				$ -
				$ -
			TOTAL EQUIPMENT COST:	$ -

LUMP SUM SERVICES PROVIDED TO SUBCONTRACTOR (Not Typical. Contact GC for Direction):

Description of Lump Sum Service - attach backup	Total
	$ -
	$ -
	$ -
	$ -
TOTAL LUMP SUM SERVICES COST:	$ -

SUBTOTAL OF SUBCONTRACTOR'S DIRECT COSTS (ITEMS 1, 2, 3, and 4)		$ -
SUBCONTRACTOR'S ALLOWED O&P MARK-UP ON ALLOWABLE DIRECT COSTS (10% OF ITEM 5)	10.00%	$ -

INSURANCE AND TAXES ON SUBCONTRACTOR BASE LABOR ONLY:

Total Base Wages Subject to Insurance and Taxes from Item 1 above	$ -	
Insurance & Taxes Rate (30%, or as approved on "REQUEST FOR APPROVAL FOR CHANGE ORDER PRICING" form)		
TOTAL COST INSURANCE AND TAXES ON LABOR		$ -

TOTAL COST OF WORK PERFORMED BY SUBCONTRACTOR (ITEMS 5, 6, and 7) :	$ -
TOTAL COST OF WORK PERFORMED BY SUB-SUBCONTRACTOR(S) (Item 7 on attached Sub-Sub Form):	
**** ALLOWABLE MARKUP ON SUB-SUBCONTRACTOR'S WORK (By Contract, 10% of Item 5 on attached Sub-Sub Form)**	
TOTAL COST OF WORK INCLUDED IN THIS CHANGE REQUEST (ITEMS 9+10) :	$ -

SUBCONTRACTOR BOND

Approved bond premium percentage x item 11. x **ITEM 11:** $ -

TOTAL CHANGE PROPOSAL AMOUNT, including bond cost $ -

Additional Notes:

Change proposals must include a cover letter on company letterhead identifying the PCO number, a description of the scope of work and the total cost of the Change Request.

**** By Contract, the maximum aggregate mark-up allowed on direct allowable costs is 10%, and may be shared between Sub and Sub-Subs, where applicable.**

CHANGE REQUEST TO OWNER

Project Name:		PROJ. NO.		G.C.	
PCO NUMBER:		PCI DESC.			
DATE:					

1. DIRECT LABOR: GC's Labor:

Use only Prevailing Wage Rates or Owner-Approved Wages and Rates \
If any work is performed by a lower tier sub, labor rates must be approved by the Owner prior to executing any changes, and those costs presented on a Sub-Subcontractor Change Request Form.

Trade	Classification (Foreman, Journeyman, Apprentice)	Total Time Worked	These values shall be taken from the "REQUEST FOR APPROVAL FOR CHANGE ORDER PRICING" form, after its approval by the GC and Owner			Total Direct Labor Cost
			Total Hourly Labor Costs (Item I from Wage Approval Sheet)	Total Base Cost Wages + Fringe	Base Wage Rate for Ins/Taxes (Item D from Wage Approval Sheet)	
				$ -		$ -
				$ -		$ -
				$ -		$ -
				$ -		$ -
				Total Base Wages	$ -	
					TOTAL BASE and FRINGE DIRECT LABOR COSTS	$ -

2. MATERIALS: GC: (For extensive material lists, attach detailed backup and enter as a lump sum below)

Material Description	Qty	Unit	Cost Per Unit	Total
				$ -
				$ -
				$ -
			TOTAL MATERIALS COST:	$ -

3. EQUIPMENT: GC: (For extensive equipment lists, attach detailed backup and enter as a lump sum below)

Equipment Description	Qty	Unit	Cost Per Unit	Total
				$ -
				$ -
			TOTAL EQUIPMENT COST:	$ -

4. LUMP SUM SERVICES PROVIDED TO GC (POLICE DETAIL, UTILITIES, ETC.):

Description of Lump Sum Service - attach backup	Total
	$ -
	$ -
TOTAL LUMP SUM SERVICES COST:	$ -

5. SUBTOTAL OF GC'S DIRECT COSTS (ITEMS 1, 2, 3, and 4) $ -

6. GC's ALLOWED O&P MARK-UP ON ALLOWABLE DIRECT COSTS (10% OF ITEMS 2+3+4) 10.00% $ -

7. INSURANCE AND TAXES ON GC BASE LABOR ONLY:

Total Base Wages Subject to Insurance and Taxes from Item 1 above $ -

Insurance & Taxes Rate (30%, or as approved on "REQUEST FOR APPROVAL FOR CHANGE ORDER PRICING" form)

TOTAL COST INSURANCE AND TAXES ON LABOR $ -

8. TOTAL COST OF WORK PERFORMED BY CM (ITEMS 5, 6, and 7) : $ -

9. TOTAL COST OF WORK PERFORMED BY SUB and SUB-SUBSUBCONTRACTOR(S) (Item 13 on attached Subcontractor change Forms):

10. ** ALLOWABLE MARKUP ON SUB and SUB-SUBCONTRACTOR'S WORK (By Contract, 10% of Item 5 on attached Forms)

11. TOTAL COST OF WORK INCLUDED IN THIS CHANGE REQUEST (ITEMS 8+9+10) : $ -

12. GC's Bond's and Insurance $ -

13 TOTAL CHANGE PROPOSAL AMOUNT, including GL and Bond cost $ -

Additional Notes:

12-19-13 Version

SUB-SUBCONTRACTOR CHANGE REQUEST

First-Tier Subs, Use Subcontractor Pricing Form, NOT this form

Project Name:		PROJ. NO.		GC	
PCO NUMBER:		PCO DESC.			
DATE:					
FIRM SUBMITTING CHANGE ORDER:		SUB TO:			

1. DIRECT LABOR: SUB-SUBCONTRACTOR:

Use only Prevailing Wage Rates or Owner-Approved Wages and Rates
All Labor Rates must be approved by the Owner prior to issuance of change orders

Trade	Classification (Foreman, Journeyman, Apprentice)	Total Hrs. Worked	These values shall be taken from the "REQUEST FOR APPROVAL FOR CHANGE ORDER PRICING" form, after approval by the CM and Owner			Total Direct Labor Cost
			Total Hourly Labor Costs (Item I from Wage Approval Sheet)	Total Base Cost Wages + Fringe	Base Wage Rate for Ins/Taxes (Item D from Wage Approval Sheet)	
				$ -		$ -
				$ -		$ -
				$ -		$ -
				$ -		$ -
				Total Base Wages	$ -	

TOTAL BASE, EXCESS AND DIRECT LABOR COSTS $ -

2. MATERIALS: SUB-SUBCONTRACTOR: (For extensive material lists, attach detailed backup and enter as a lump sum below)

Material Description	Qty	Unit	Cost Per Unit	Total
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
			TOTAL MATERIALS COST:	$ -

3. EQUIPMENT: SUB-SUBCONTRACTOR: (For extensive equipment lists, attach detailed backup and enter as a lump sum below)

Equipment Description	Qty	Unit	Cost Per Unit	Total
				$ -
				$ -
				$ -
				$ -
			TOTAL EQUIPMENT COST:	$ -

4. LUMP SUM SERVICES PROVIDED TO SUB-SUBCONTRACTOR (Not Typical, Contact GC for direction):

Description of Lump Sum Service - attach backup	Total
	$ -
	$ -
	$ -
	$ -
TOTAL LUMP SUM SERVICES COST:	$ -

5. SUBTOTAL OF DIRECT COSTS (ITEMS 1, 2, 3, and 4) $ -

6. INSURANCE AND TAXES ON SUBCONTRACTOR BASE LABOR ONLY:

Total Base Wages Subject to Insurance and Taxes from Item 1 above $ -
Insurance & Taxes Rate (30%, or as approved on "REQUEST FOR APPROVAL FOR CHANGE ORDER PRICING" form)

TOTAL COST INSURANCE AND TAXES ON LABOR $ -

7. TOTAL COST OF WORK PERFORMED BY SUB-SUBCONTRACTOR: $ -

Additional Notes:

All change proposals must include a cover letter on company letterhead identifying the PCO number, a description of the scope of work and the total cost of the proposed change order. ** *NOTE: Total allowable markup of Direct Costs, per Contract, is 10%, and will be identified on the First-tier Subcontractor's Change Request Form.* **

SECTION 012900

PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Procurement and Contracting Requirements are hereby made a part of this SECTION.

1.02 SUMMARY

A. The work included under this SECTION is:

1. Schedules of Values.
2. Projected Applications for Payment Report.
3. Applications for Payment.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is specified under the following SECTIONS:

1. SECTION 012200 - UNIT PRICES for administrative requirements governing the use of unit prices.
2. SECTION 013320 - CONSTRUCTION PROGRESS DOCUMENTATION for administrative requirements governing the preparation and submittal of the General Contractor's construction schedule.
3. SECTION 013300 - SUBMITTALS for administrative requirements governing the preparation and submittal of the submittal schedule.
4. SECTION 013300 - SUBMITTALS for administrative requirements governing submittal of cost breakdown information required for LEEDv4-S documentation.

1.04 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of General Contractor's construction schedule.

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
   a. Application for Payment forms with continuation sheets.
   b. Submittal schedule.

c. Items required to be indicated as separate activities in General Contractor's construction schedule.

B. Format and Content: The General Contractor shall provide Schedules of Values shall equal the total Contract Sum. Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

   a. Project name and location.

   b. Name of Architect.

   c. Architect's project number.

   d. General Contractor's name and address.

   e. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703.

3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:

   a. Related Specification Section or Division.

   b. Description of the Work.

   c. Name of subcontractor.

   d. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

      1) Labor.

      2) Materials.

      3) Equipment.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents.

   a. No single line item shall exceed $25,000.

   b. Include separate line items under General Contractor and subcontracts for LEEDv4-S documentation and submittal requirements in each section of the work with such requirements.

   c. Include separate line items for sitework and each major area, floor, or wing of building or building. Include subschedule by phase for each major element of Work.

5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

    a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.

6. Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items. Include the following:

    a. Bonds.

    b. Insurance premiums.

    c. Project mobilization.

    d. Project demobilization.

    e. Construction fence erection and maintenance. Temporary utilities.

    f. Temporary water.

    g. Waste removal.

    h. Temporary heat and enclosure.

    i. Construction indoor air quality (IAQ) management.

    j. Temporary signage.

    k. General Contractor’s Project Manager.

    l. General Contractor’s Assistant Project Manager.

    m. Superintendent.

    n. Assistant Superintendent.

    o. Field offices, initial installation, rental, maintenance and removal.

    p. Temporary toilets.

    q. General Contractor’s Construction Schedule and monthly construction schedule updates.

    r. Superintendent's daily reports.

    s. Coordination drawings.

    t. Progress photographs.

    u. Daily clean-up.

    v. Cleaning at the time of Substantial Completion of each portion of the Work.

    w. Submission and approval of bound warranties.

    x. Final Cleaning by portion of the Work.

    y. LEED documentation schedule

7. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.05 APPLICATIONS FOR PAYMENT

A. Applications for Payment shall be prepared for the School based upon their respective Schedule of Values. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion and final Application for Payment involve additional requirements.

B. Payment Application Times: Applications for Payment shall be submitted to the Architect by the last day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.

1. At least 7 calendar days before submitting the Application for Payment, prepare and submit to Architect a draft Application for Payment reflecting anticipated percentages completed for each activity. The Architect and Owner's Project Manager will review and transmit comments to the General Contractor. Make changes or adjustments to the percentages of completion reported in the Application for Payment to reconcile with the assessment of the actual progress of the Work as determined by the Architect and Owner's Project Manager, sign the Application, and submit it for payment.

a. Make changes or adjustments required by the Architect and Owner's Project Manager and submit the Application for Payment in a form that will be approved by the Architect in order to receive Payment for the amount not in dispute. If the General Contractor disagrees with the percentages accepted by Architect and Owner's Project Manager, General Contractor may, in a separate letter or accounting, identify disparities and explain reasons for disagreement and transmit to Architect.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of the General Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the schedule of values.

2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.

3. Amounts of Change Orders executed (signed by all parties) before last day of construction period covered by the Application may be included, to the extent work under that Change Order was performed during the period covered by the Application for Payment. Do not include amounts of Construction Change Directives until they have been included in an executed Change Order; do not include amounts for Change Orders which have been issued but not executed.

4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.

2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.

3. Provide summary documentation for stored materials indicating the following:

   a. Materials previously stored and included in previous Applications for Payment.

   b. Work completed for this Application utilizing previously stored materials.

   c. Additional materials stored with this Application.

   d. Total materials remaining stored, including materials with this Application.

   e. Provide detailed inventory of materials sufficient to reorder materials precisely.

   f. Provide Right of Entry into storage facility.

4. Materials Stored Off Project Site:

   a. Provide transportation and housing costs for Architect or Owner's Representative to storage location to verify stored materials.

   b. Payment will not be made for materials stored outside of the continental United States.

F. Transmittal: Submit four signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. Attach waivers of lien and similar required attachments to one copy.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Attachments: With each Application for Payment, submit the following documentation.

1. Certification of receipt of payment from subcontractors, sub-subcontractors and suppliers for the construction period covered by the previous Application for Payment, in accordance with Paragraph 9.3.4 of the General Conditions. Submit these certifications in a form acceptable to the Owner.
2. Record Documents: Written statement that the General Contractor has checked the project Record Drawings and that they are current for each trade, and in compliance with SECTION 017839 - PROJECT RECORD DOCUMENTS.
3. Construction photographs taken no more than 10 days prior to the date of the Application for Payment.
4. Updated the General Contractor's Construction Schedule.
5. General Contractor's Daily Reports for the previous month.
6. Wage rate report for previous Application for Payment period, correct, and in statutory form approved by the Owner, "Wage Rate Requirements" including workforce participation goals tracking information.
7. General Contractor's Progress Payment Report on Minority/Women Business Enterprises Participation (attached as Appendix to the General Conditions of the Contract).
8. Monthly indoor air quality test reports as required by SECTION 018119-INDOOR AIR QUALITY MANAGEMENT PLAN.
9. LEEDv4-S Tracking Log.
10. Current LEEDv4-S Sustainable Materials Worksheet.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. List of General Contractor's principal consultants.
3. List of General Contractor's staff assignments, including emergency contact information.
4. Schedule of Values.
5. Material status report listing outstanding long-lead items with status of delivery noted. "Long lead" shall mean more than 6 weeks for fabrication and delivery.
6. Sustainability submittal for LEEDv4-S for project materials cost data, according to SECTION 013300 - SUBMITTALS.

7. General Contractor's construction schedule (preliminary if not final), according to SECTION 013320 - CONSTRUCTION PROGRESS DOCUMENTATION.
8. Action plan for LEEDv4-S.
9. Submittal schedule (preliminary if not final).
10. Copies of building permits.
11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
12. Initial progress report.
13. Report of preconstruction conference.
14. Site utilization plan, in accordance with SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS.
15. Full installation of Owner's Project Manager's Office trailer in accordance with SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS.

I. Second Application for Payment: Provide the following additional start-up information.

1. General Contractor's weather protection plan, in accordance with SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS.
2. General Contractor's plan for temporary heating during the months of November through March, in accordance with SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS
3. Completel CPM schedule, approved by the Architect.
4. General Contractor's waste management plan required by SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

J. Application for Payment at Substantial Completion: After the Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificates of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
3. Warranties.

K. Final Payment Application: After completing project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "General Contractor's Affidavit of Payment of Debts and Claims."
5. MA Document 0706A, "General Contractor's Affidavit of Release of Liens."
6. MA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

END OF SECTION

SECTION 013100

PROJECT PROCEDURES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 WORK SEQUENCE

A. Conform to requirements of the Orders of Conditions, SECTION 013500 with particular attention called to the following:

1. Not less than 30 days prior to beginning earthwork operations, the General Contractor shall submit the Stormwater Pollution Prevention Plan (SWPPP) to the Conservation Commission for approval.
2. Construct temporary drainage and siltation controls as shown on the drawings.
3. Construct Flood Compensation Area before placing any fill materials.

1.03 CONTRACTOR USE OF SITE

A. Use of the Site:

1. Confine operations to areas within the contract Limit of Work line as indicated on the Drawings.
2. Portions of the site beyond area in which construction operations is indicated are not to be disturbed.

B. Site Access:

1. The hours of on-site operations are from 7:00 AM to 6:00 PM Monday through Friday and 7:00 AM to 12:00 PM noon on Saturdays. Construction vehicles and equipment shall not be started before 7:00 AM.
   a. The work day may be extended to a full day on Saturdays with prior approval of the Building Inspector. No construction or activity whatsoever (except for interior finishing) shall take place on Sundays.
2. Comply with the City of Amesbury requirements for the transportation to and from the site.
3. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.

4. Keep the driveways and parking areas serving the existing building clear at all times. Do not use these areas for storage of materials.

5. Keep adjacent sidewalks clear for continued use by the public.

6. Refer to the map in "Attachment A – Transportation Routes for Construction Vehicles" appended to this Section. Note that:

   a. Construction vehicles shall not queue up on city streets.

   b. Construction vehicle traffic is forbidden through downtown Amesbury on Friend Street, Market Street, Main Street, Sparhawk Street and all residential side streets.

C. The General Contractor shall control dust on site and shall keep roadways clean of dirt and debris from construction operations. Refer to SECTION 015000 – TEMPORARY FACILITIES AND CONTROLS.

1.04 OWNER OCCUPANCY

A. Owner Occupancy:

1. Cooperate fully with the Owner's Representative during construction operations to minimize conflicts and to facilitate Owner's operations at and around the existing Cashman Elementary School.

2. Perform the Work so as not to interfere with the Owner's operations.

B. Installation Sequencing:

1. Examine materials and installations performed by others before starting next stage or adjacent work.

2. Notify Architect immediately of unsatisfactory conditions which hinder or restrict correct installation of next stage or adjacent work.

3. Start of next stage or adjacent work will be construed as acceptance of previous or adjacent work.

4. Any work requiring subsequent removal or replacement due to unsatisfactory or defective work shall be at the General Contractor's expense.

C. Contract Document Review:

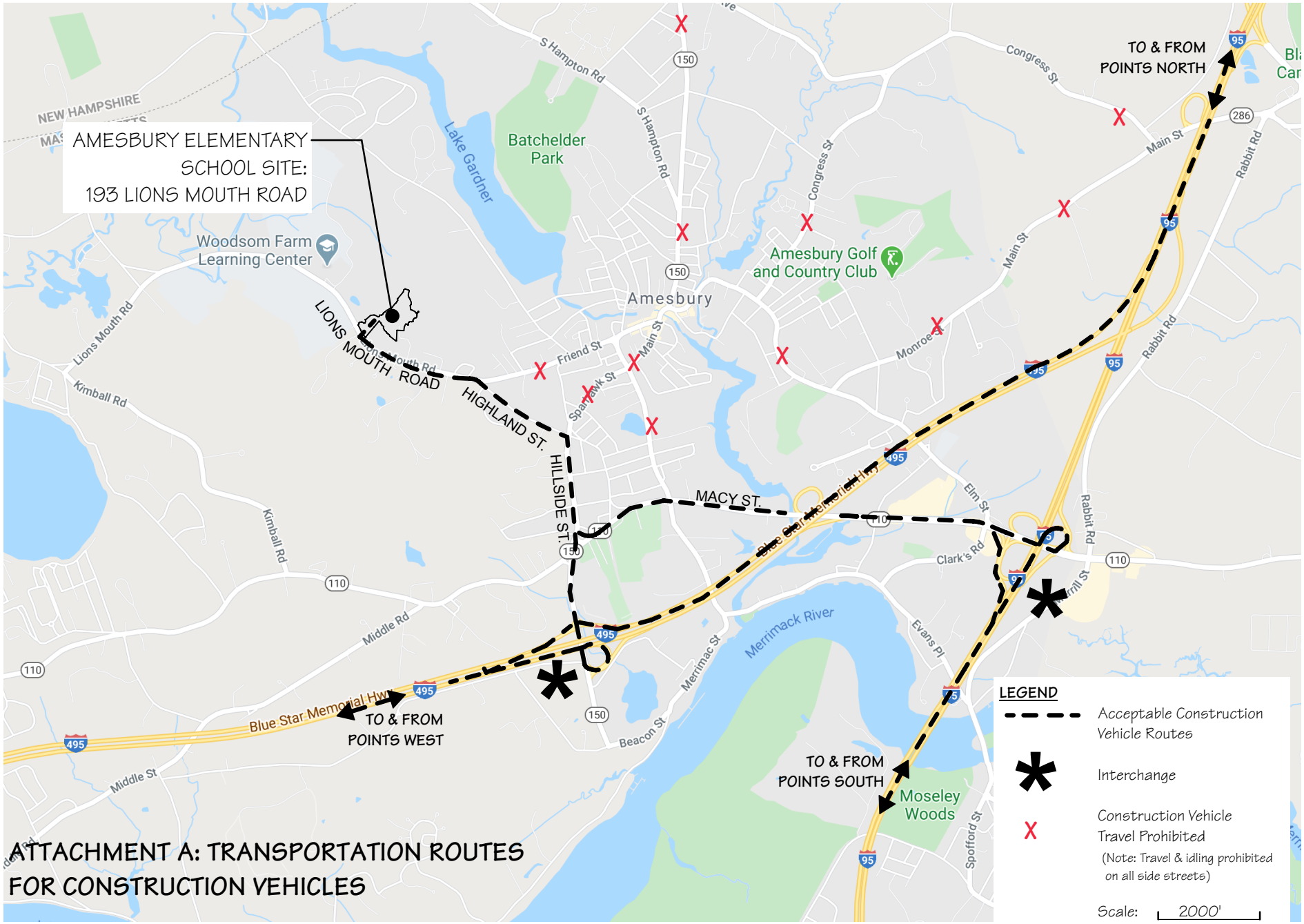
1. Before execution of work, the General Contractor shall review all Drawings and Specifications and shall immediately report all errors, discrepancies, and/or omissions discovered to the Architect, in writing, with one set of Contract Documents marked in red pencil, clearly indicating the discrepancies.

2. Omissions from the Drawings and/or the Specifications or the misdescription of details of Work which are manifestly necessary to carry out the intent of the Drawings and Specifications, or are customarily performed, shall not relieve the General Contractor from performing such omitted or misdescribed details of the Work; but shall be performed as if fully and correctly set forth and described in the Drawings and Specifications, using the most appropriate method, with final approval issued by the Architect to alleviate conflicts of scheduling, Drawings, Details, and/or Specifications.

END OF SECTION

ATTACHMENT A

Construction Vehicle Transportation Routes



ATTACHMENT A: TRANSPORTATION ROUTES FOR CONSTRUCTION VEHICLES

SECTION 013200

PROJECT MEETINGS

PART 1 GENERAL

1.01 PRE-CONSTRUCTION MEETING

A. Prior to the start of construction there will be a project meeting to discuss methods of construction and completion of the project.

B. Representatives of the following shall be required to attend this meeting:

1. Owner
2. Owner's Project Manager
3. Architect
4. General Contractor
5. Applicable Municipal Agencies

C. General Contractor shall make specified Pre-Construction submissions including the following, if not already submitted:

1. Type list of sub-contractors, with addresses and telephone numbers, and name of principal contract.
2. Certificates of insurance.
3. Performance and labor and material payment bonds.
4. Construction Schedule.
5. Schedule of Values.

D. Agenda will include the following items:

1. Tentative construction schedule.
2. Critical work sequencing and long-lead items.
3. Major equipment deliveries and priorities.
4. Designation of responsible personnel.
5. Submittal of shop drawings, project data, and samples.
6. Processing applications for payment.
7. Procedures for maintenance of record documents.
8. Procedure for field changes, RFIs, change estimates, change orders, and other CA documents.

9. Use of premises and existing buildings.
10. Location and maintenance of temporary storage buildings, field offices, and other temporary structures.
11. Lines of communication.
12. Work restrictions and working hours.
13. Owner's occupancy requirements.
14. Responsibility for temporary facilities and controls.
15. Procedures for disruptions and shutdowns.
16. Parking availability.
17. Equipment deliveries and priorities.
18. Site security procedures.

1.02 PROGRESS MEETINGS

A. Attend weekly meetings at the site of the work during the course of the Contract. The dates of such meetings shall be as mutually agreed upon between the General Contractor, the Architect, and the Owner's Project Manager.

B. Project meetings shall be chaired by the Owner's Project Manager. The agenda will include the following:

1. Review approved minutes of previous meeting; insert corrections and comments.
2. Review work progress since last meeting.
3. Note field observations, problems, and decisions.
4. Identify problems which impede planned progress.
5. Plan progress during next work period.
6. Include 2-week look-ahead/look-back schedule for discussion at each meeting.
7. Review submittal logs and schedules; expedite to maintain schedule.
8. Deliveries.
9. Access.
10. Site utilization.
11. Temporary facilities and controls, including stormwater controls.
12. Cleanliness of city streets and dust control.
13. Maintenance of quality and work standards.
14. Field observations.
15. Status of RFIs.

16. Status of Proposal Requests, Proposed Change Orders, Construction Change Directives and Change Orders.

17. Pending charges, claims and disputes.

18. Documentation of information for payment requests.

19. Review changes proposed by Owner for effect on construction schedule and completion date.

20. Complete other current business.

D. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

END OF SECTION

SECTION 013300

SUBMITTALS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 ELECTRONIC DOCUMENT PROCEDURES REQUIREMENTS

A. Summary:

1. All documents including but not limited to shop drawing and product data submittals, RFI's, PR's, PCO's, reports, and other CA forms shall be transmitted to Architect and Owner's Project Manager in electronic (PDF) format using Submittal Exchange, BIM 360, Procore, EADOC or an equal web based service acceptable to the Architect designed specifically for transmitting submittals between construction team members with user-definable alerts and email notifications.
2. The intent of electronic submittals is to expedite the construction process by reducing paperwork, improving information flow, and decreasing turnaround time.
3. The electronic document process is not intended for color samples, color charts, or physical material samples.

B. Procedures for Documents and Submittals:

1. Document Preparation - The General Contractor may use any or all of the following options:
    a. Subcontractors and Suppliers provide electronic (PDF) documents to the General Contractor via Submittal Exchange's website.
    b. Subcontractors and Suppliers provide paper documents to the General Contractor (subject to approval of the General Contractor) who electronically scans and converts to PDF format.
    c. Subcontractors and Suppliers provide paper documents to Scanning Service which electronically scans and converts to PDF format.

2. The General Contractor shall review and **apply electronic stamp certifying that the submittal complies with the requirements of the Contract Documents** including verification of manufacturer / product, dimensions and coordination of information with other parts of the work.

3. The General Contractor shall transmit each submittal or document to Architect using Submittal Exchange's website service.

4. Architect / Engineer review comments will be made available on the Submittal Exchange website for downloading. The General Contractor will receive email notice of completed review.

5. The General Contractor shall provide one (1) hard (paper) copy of all approved submittals to both the Superintendent and the OPM Field Representative for use at the site. Submittals shall be provided weekly at the regularly scheduled job meeting.

6. Distribution of reviewed submittals to subcontractors and suppliers is the responsibility of the General Contractor.

7. Submit paper copies of reviewed submittals or documents at project closeout for record purposes in accordance with Section 017700 – PROJECT CLOSEOUT.

C. Additional Requirements:

1. **The cost of website submittal service vendor shall be paid in full by the General Contractor and included in his Contract Price.**

2. Training is available regarding use of website and PDF submittals.

3. Internet Service and Equipment Requirements:

a. Email address and Internet access at the General Contractor's main office.

b. Adobe Acrobat (www.adobe.com), Bluebeam PDF Revu (www.bluebeam.com), or other similar PDF review software for applying electronic stamps and comments.

1.03 SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND ADDITIONAL REQUIRED SUBMITTALS

A. Related Documents

1. Consult the individual Sections of the Specifications for the specific submittals required under those Sections and for further details and descriptions of the requirements.

2. Refer to the General Conditions for the General Contractor's responsibilities in the reviewing, approving and submittal of shop drawings, product data and samples.

B. General Procedures for Submittals

1. The General Contractor shall transmit each submittal to the Architect sufficiently in advance of performing related work or other applicable activities, so that the installation will not be delayed by processing times, including disapproval and re-submittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. No extension of time will be authorized because of the General Contractor's failure to transmit submittals to the Architect sufficiently in advance of the work.

2. The General Contractor shall transmit each submittal in a sequence which will not result in the approval having to be later modified or rescinded by reason of a subsequent submittal which should have been processed earlier or concurrently for coordination.

3. Only submittals received from and bearing the stamp of approval by the General Contractor will be considered by the Architect. Submittals shall be accompanied by a transmittal notice stating name of project, date of submittal, "To", "From", (General Contractor, Subcontractor, Installer, Manufacturer, Supplier), Specification Section and paragraph number, or Drawing Number to which the submittal refers, purpose of submittal (first submittal, re-submittal), description, remarks, distribution record, signature of transmitter.

4. On the transmittal, or on a separate sheet attached to the transmittal, the General Contractor shall direct attention to any deviations including minor limitations and variations, from the requirements of the Contract Documents. Deviation shall be highlighted on the submittals.

5. All costs for printing, preparing, packaging, submitting, resubmitting and mailing or delivering submittals specified in this Section shall be included in the General Contractor's Contract Price.

C. Architect's Action

The Architect will review the General Contractor's submittal and return them with one of the following actions recorded thereon by appropriate markings:

1. Final Unrestricted Release: Where marked "Approved as Submitted" or "Revised, no exceptions taken" the work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents. Acceptance of the work will depend upon that compliance.

2. Final-But-Restricted Release: When marked "Approved as Noted", “Approved with comments”, “Reviewed - Make corrections noted”, “Reviewed - Note markings/comments attached,” the work covered by the submittal may proceed provided it complies with the Architect's notations or corrections on the submittal, and complies with the requirements of the Contract Documents. Acceptance of the work will depend upon these compliances.

3. Returned for Resubmittal: When marked “Revise and Resubmit,” or "Not Approved," the work covered by the submittal (purchasing, fabrication, delivery or other activity) should not proceed. The submittal should be revised or a new submittal resubmitted without delay, in accordance with the Architect's notations stating the reasons for returning the submittal.

4. No claim for extension of time shall be allowed on account of failure of the Architect to return shop drawings or samples until 15 working days after receipt by the Architect by registered or certified mail of written demand for such, and not then unless such claim be reasonable. Refer to General Conditions.

D. Submission of Shop Drawings

1. Shop Drawings shall be complete, give all information necessary or requested in the individual Sections of the Specifications, and also show adjoining work and details of connection thereto.

2. Shop Drawings shall be for whole systems. Partial submissions will not be accepted.

3. The Architect reserves the right to review and approve Shop Drawings only after approval of related Product Data and Samples.

4. Shop Drawings shall be properly identified and contain name of Project, name of firm submitting the Shop Drawings, Shop Drawing number, date of Shop Drawing and of revisions. The General Contractor’s stamp of approval and sufficient spaces near the title block for the Architect's stamp.

5. The General Contractor shall submit to the Architect one electronic copy of each Shop Drawing. Each submittal shall be accompanied by transmittal notice.

6. When the submittal is electronically returned by the Architect with stamp "Revise and Resubmit" or "Not Approved" the General Contractor shall correct the original drawing or prepare a new drawing and resubmit an electronic copy thereof to the Architect for approval. This procedure shall be repeated until the Architect's approval is obtained. Unless written notice has been given, the Architect's approval of a resubmitted shop drawing, product data, sample, of similar submittal shall not constitute approval of any changes not requested on the prior submittal.

7. When the submittal is electronically returned by the Architect with the stamp "Approved as Submitted" or “Revised, no exceptions taken” or "Approved as Noted", “Approved with comments”, “Reviewed - Make corrections noted”, “Reviewed - Note markings/comments attached,” the General Contractor shall provide and distribute such number of prints thereof necessary for his own and his subcontractors' use.

E. Submission of Product Data

1. The General Contractor shall submit to the Architect electronically copies of Product Data. All such data shall be as specified in the applicable SECTION and as specified herein. Identification of the specific material or equipment being submitted shall be clearly made in ink. Data of general nature will not be accepted.
2. Product Data shall include complete information of materials, dimensions, recommended applications, available options, complete color range (where product is exposed to view), name and address of manufacturer, installation instructions and any other data necessary to determine acceptability of the product and compliance with the Contract Documents.
3. Product Data shall be accompanied by transmittal notice. The General Contractor’s stamp of approval shall appear on the printed information itself, in a location which will not mar legibility.
4. Product Data electronically returned by the Architect with the stamp "Not Approved," shall be resubmitted until the Architect's approval is obtained.
5. When the Product Data are acceptable, the Architect will stamp them "Approved as Submitted" or “Revised, no exceptions taken” or "Approved as Noted", “Approved with comments”, “Reviewed - Make corrections noted”, “Reviewed - Note markings/comments attached,” and return electronically to the General Contractor. The General Contractor shall provide and distribute such number of additional copies for his own and his subcontractors' use.

F. Submission of Samples

1. Unless otherwise specified in the individual Section, the General Contractor shall submit two specimens of each sample.
2. Samples shall be of adequate size to permit proper evaluation of materials.
3. Samples which can be conveniently mailed shall be sent directly to the Architect, accompanied by transmittal notice. On the transmittal notice the General Contractor shall stamp his approval of Samples submitted.

4. All other Samples shall be delivered at the field office of the Project Representative with Sample identification tag attached and properly filled in. Transmittal notice of Samples so delivered with the General Contractor's stamp of approval, shall be mailed to the Architect.

5. If Sample is rejected by the Architect, a new sample all be resubmitted in the manner specified herein above. This procedure shall be repeated until sample is approved in writing by the Architect.

6. Samples will not be returned unless return is requested at the time of submission. The right is reserved to require submission of samples whether or not particular mention thereof is made in the Specifications.

1.04 SUBMITTAL SCHEDULE

A. The General Contractor shall submit within fifteen (15) days of the award of the contract a Submittal Schedule in the form of a Bar Graph. The General Contractor shall update the Submittal Schedule weekly and submit with each requisition for payment. The Submittal Schedule shall identify by date by which the submittals are required under each section of the specification.

B. The Submittal Schedule shall relate to the orderly progress of work with critical dates indicated for review to maintain delivery of materials.

C. Failure of the General Contractor adhering to the agreed upon Submittal Schedule, may be considered by the Architect in reviewing the progress of the work, for processing of approving payment applications, or evaluating claims for delay or additional costs.

D. The Submittal Schedule shall be updated weekly and tracked using computerized tracking software.

1.05 DOCUMENTS AND SAMPLES AT THE SITE

A. The General Contractor shall maintain at the site for the Owner one record copy of all drawings, specifications, addenda, change orders and other modifications, in good order and marked currently to record all changes made during construction, and approved shop drawings, product data and samples. These shall be available to the Architect and shall be delivered to him for the Owner upon completion of the work.

1.06 PROGRESS SCHEDULE / CASH FLOW

A. At least 10 working days prior to the first Application for Payment, the General Contractor shall submit to the Architect a progress schedule showing the percentage completion to be obtained and the total dollar value to be completed as of the first of each month until Substantial Completion, for each class of work included in the Schedule of Values.

B. Refer to SECTION 013320-CONSTRUCTION PROGRESS DOCUMENTATION for other requirements.

1.07 SCHEDULE OF VALUES

A. Prior to the first request for payment the General Contractor shall submit to the Architect and the Owner a Schedule of Values of the various portion of the work including quantities when requested, aggregating the total contract sum and divided so as to facilitate payments for work under each SECTION. The Schedule shall be prepared in such form as specified or as the Architect or the Owner may approve, and it shall include data to substantiate its accuracy. Each item in the Schedule of Values shall be used as a basis for review and approval of the General Contractor's requests for payment.

1. The Schedule of Values shall be broken down with as a minimum both labor and material line items and of sufficient detail to be able to properly and accurately review as determined by the Architect.
2. A separate line item shall be provided for record drawings, closeout documents and training.
3. A separate line item shall be provided for LEEDv4-S submittals and documentation.
4. A separate line item shall be provided for dust control.

1.08 COORDINATION DRAWINGS

A. Prior to the fabrication and installation of underground and under slab utilities, mechanical and electrical systems, the General Contractor shall coordinate the preparation and distribution of coordination drawings as follows:

1. The HVAC subcontractor shall prepare electronic copies of drawings showing HVAC ductwork, piping and equipment with respect to structure, ceiling heights, and other similar constraints as well as the location of major items of plumbing, electrical and fire protection equipment.
2. The General Contractor shall route the electronic drawings to the plumbing, fire protection and electrical subcontractors, who shall add the work of their respective trades. The General Contractor shall add any items of work by other sections that must be coordinated with the mechanical and electrical work.
3. The General Contractor shall coordinate with the respective subcontractors the location, elevation, and routing of all piping, conduits and equipment within ceiling and chase construction, and in mechanical rooms.
4. The General Contractor shall coordinate with the respective Trades the points of supports of equipment and devices mounted at the underside of the deck and beams showing all required unistrut channels and beam clamps.

5. Note that CADD disks shall be obtained from the engineers for the purpose of preparing record drawings (refer to SECTION 017839-PROJECT RECORD DOCUMENTS) and these CADD files may be used for the preparation of the coordination drawings.

B. Coordination drawings (5 prints each) shall be submitted to the architect for review. Areas of unresolved conflict shall be highlighted.

C. Uncoordinated plumbing, fire protection, HVAC and electrical items that interfere with the work of other trades, structure, hung ceilings and other finished construction shall be relocated at no cost to the owner.

D. Refer to SECTION 210001-FIRE PROTECTION, SECTION 220001-PLUMBING, SECTION 230001-HVAC and SECTION 260001-ELECTRICAL for additional coordination requirements.

1.10 REQUESTS FOR INFORMATION ("RFI")

A. The General Contractor may submit requests for information to the Architect to help facilitate the General Contractor's performance of the Contract. Prior to submitting each request for information, the General Contractor shall first carefully study and compare the Contract Documents, field conditions, other Owner provided information, Subcontractor prepared Coordination Drawings, and prior Project correspondence and documentation to determine that the information to be requested is not reasonably obtainable from such sources.

B. Each request for information shall be submitted to the Architect, in writing, on such form and with such accompanying information as the Architect may require for such purpose. Each request for information shall identify the specific sources which were reviewed by the General Contractor in its efforts to determine that information requested, and a statement to the effect that the information being requested could not be determined from such sources.

C. The General Contractor shall submit each request for information sufficiently in advance of the date by which such information is required in order to allow the Architect sufficient time, in the Architect's professional judgment, to permit adequate review and response and to permit the General Contractor compliance with the latest construction schedule.

D. Upon receipt of the Architect's RFI Response without an acknowledgement that a Proposal Request is to follow, and the General Contractor believes the RFI response results in a change in Contract Sum or Contract Time, the General Contractor shall notify the Architect immediately in writing. No work shall proceed without the Architect's written approval. Refer to the *General Conditions of the Contrac*t.

E. The General Contractor shall maintain a log at the Project site that sequentially numbers and lists each request for information. This log shall also contain the Drawing(s) reference and Specification section to which the request pertains, the date of the request, to whom the request was made, by whom the request was made, the nature of the request, and the Architect's resolution thereof. This log shall be reviewed at each Project meeting and the resolution of requests for information shall be made part of the minutes of such meetings.

F. The Architect may return to the General Contractor any request for information that does not meet the above criteria with that requests' deficiencies noted instead of providing a detailed response.

1.11 SAMPLE CLASSROOM

A. Prior to completing interior finishes in classrooms, the General Contractor and all applicable subcontractors shall complete a typical classroom as designated by the Architect for review and approval. The sample classroom shall include, as a minimum, the following:

1. Gypsum wallboard, including finish painting.
2. Ceiling grid and acoustical tile system, complete with tiles, light fixtures and register/diffusers.
3. Floor finishes in accordance with the finish schedule and approved color schedule.
4. Any specified wall soffits, including light fixtures, as may be specified.
5. Sufficient temporary power to satisfactorily provide electrical source for all specified lighting in room.
6. Typical window installation.

B. Samples may be built in place as final work and may be asked for by Architect out sequence with the normal progress of the work so the Architect can establish a benchmark for the balance of the work to follow.

1.11 LEEDv4-S SUBMITTALS

A. LEEDv4-S submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, ***submit duplicate copies as a separate submittal to verify compliance*** with indicated LEED requirements.

1. ***Only*** submit those elements of the general submittals that pertain directly to LEEDv4-S credit. LEEDv4-S submittals that contain material that is irrelevant to the credit requirements will be rejected.

2. LEEDv4-S submittals must be accompanied by a completed Materials Credit Documentation LEEDv4 MATERIALS REPORTING FORM.

3. Refer to SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS for complete LEED Requirements.

END OF SECTION

SECTION 013320

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. General Contractor's construction schedule.
3. Daily construction reports.
4. Material location reports.
5. Site condition reports.
6. Special reports.

B. Related Requirements:

1. SECTION 013300-SUBMITTALS for submitting schedules and reports.

1.03 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the Project.

C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or General Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

F. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.04 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file.
2. Disk electronic file in Primavera P6.
3. Five paper copies.

B. Startup construction schedule.

1. The Architect will not approve Construction Schedule. Submittal of schedule shall not relieve the General Contractor of responsibility for timing, planning and scheduling Work, nor impose any duty on the Architect or Owner with respect to the timing, planning or scheduling of the Work.

C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

D. General Contractor Construction Schedule: Submit 11 by 17 inch color copies displaying entire schedule for entire construction period.

1. Submit a working electronic copy of schedule in both PDF and native file format, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

E. CPM Reports: Concurrent with CPM Schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of all activities sorted in ascending order of total float.

F. Construction Schedule Updating Reports: Submit with Applications for Payment in both PDF and native file format.

G. Three Week Look-Ahead: Submit weekly, by the end of the day prior to weekly job meetings.

H. Look-Ahead and Look-Back Gantt Charts: Submit at monthly intervals.

I. Daily Construction Reports: Submit at weekly to Owner's on-site clerk of the Works, and at monthly intervals to Architect.

J. Field Condition Reports: Submit at time of discovery of differing conditions.

K. Special Reports: Submit at time of unusual event.

L. Qualification Data: For scheduling consultant.

1.05 QUALITY ASSURANCE

A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013200 Project Meetings. Review methods and procedures related to the preliminary construction schedule and General Contractor’s construction schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.

3. Discuss constraints, including phasing, work stages, area separations and partial Owner occupancy.

4. Review delivery dates for Owner-furnished products.

5. Review schedule for work of Owner's separate contracts.

6. Review time required for review of submittals and resubmittals.

7. Review requirements for tests and inspections by independent testing and inspecting agencies.

8. Review time required for Project closeout and Owner startup procedures, including commissioning activities.

9. Review and finalize list of construction activities to be included in schedule.

10. Review submittal requirements and procedures.

11. Review procedures for updating schedule.

1.06 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate General Contractor’s construction schedule with the list of subcontracts, submittal schedule, progress reports, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.

2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 PRODUCTS

2.01 GENERAL CONTRACTOR'S CONSTRUCTION SCHEDULE - GENERAL

A. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
2. Extend schedule to include maintenance-related work which extends beyond completion of contract, including maintenance of plantings, post-occupancy adjustments to door hardware, and elevator maintenance.

B. Activities: Treat each wing, and story, each major area of the site, and phase as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in General Contractor's construction schedule with submittal schedule.
4. Startup and Testing Time: Include not less than 15 days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work under More Than One Contract: Include a separate activity for each contract.

3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.

4. Owner-Furnished Products: Include a separate activity for each product. Include delivery as directed by the Owner." Delivery dates indicated stipulate the earliest possible delivery date.

5. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.

    b. Limitations of continued occupancies.

    c. Uninterruptible services.

    d. Partial occupancy before Substantial Completion.

    e. Use of premises restrictions.

    f. Provisions for future construction.

    g. Seasonal variations.

    h. Environmental control.

6. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

    a. Submittals.

    b. Mockups.

    c. Fabrication.

    d. Sample testing.

    e. Deliveries.

    f. Installation.

    g. Tests and inspections.

    h. Adjusting.

    i. Curing.

    j. Startup and placement into final use and operation.

    k. Commissioning.

7. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

    a. Structural completion.

    b. Temporary enclosure and space conditioning.

    c. Permanent space enclosure.

    d. Completion of mechanical installation.

e. Completion of electrical installation.

f. Substantial Completion.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion of each phase, final completion, commissioning and building flush out.

E. Computer Scheduling Software: Prepare schedules using current version of P6 for Windows operating system.

2.02 STARTUP CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit startup horizontal bar-chart-type construction schedule within 15 calendar days of date established for the Notice to Proceed.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work. Include the following in skeleton diagram:

1. Milestone dates.

2. An illustration of a feasible schedule for completion of the entire Work within Contract Time.

2.03 GENERAL CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. CPM Schedule: Prepare General Contractor's construction schedule using a time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 90 days after date established for the Notice to Proceed.

a. Failure to include any work item required for performance of this Contract shall not excuse the General Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.

2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.

3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to correlate with Contract Time.

C. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup construction schedule, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    a. Preparation and processing of submittals.
    b. Mobilization and demobilization.
    c. Delivery.
    d. Fabrication.
    e. Utility interruptions.
    f. Installation.
    g. Work by Owner that may affect or be affected by the General Contractor's activities.
    h. Testing and commissioning.
    i. Punch list and final completion.
    j. Activities occurring following final completion.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
    a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

D. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.

E. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:

1. General Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Main events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.

F. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

2.04 RECOVERY SCHEDULE

A. Furnish sufficient forces, offices, facilities and equipment at no cost to the Owner, and work such hours as necessary, within any local restrictions or agreements incorporated into the Contract, to ensure the prosecution of the work in accordance with the current schedule.

B. When periodic update indicates the Work is 21 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which the General Contractor intends to regain compliance with the schedule.

1. Provide revised schedule at no additional cost to Owner, unless the Owner is solely responsible for the event or occurrence which has caused the schedule slippage.

a. Provisions to recover schedule may include increasing hours of work, number of shifts, number of workers or quantity of equipment; or working overtime, Saturdays, Sundays or holidays. Work outside of agreed working hours may be granted, provided the General Contractor gives reasonable notice to the Owner.

b. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

c. Include detailed narrative for remaining work based on most recent schedule.

d. Conform to detailed requirements for the General Contractor's construction schedule.

e. Schedule shall represent the General Contractor's current work sequence plan and shall forecast completion of remaining work within remaining contract duration.

2.05 SCHEDULE PROGRESS REPORTS

A. Two-Week Look Ahead: Prepare list of anticipated tasks to be completed during the next two-week period. Identify trade, area of Work, and task duration. Identify issues that may adversely affect task completion.

B. Monthly Report: Evaluate the status of the work as of the date of the pencil requisition of each month to show actual progress and to identify problem areas. Update construction schedule and print schedule summary in Gantt Chart format. Include Change Orders and Construction Change Directives in updated schedule. Prepare written narrative reporting on the progress of the Work as shown in the Gantt Chart Schedule.

C. Look-Ahead Gantt Chart: Show activities extracted from the current CPM Construction Schedule. Display each activity to be performed during the coming month, with one line for each activity and one column for each calendar day.

1. Provide two bars for each activity. Use top bar to show duration and Early Start/Late Start dates as shown in current CPM schedule. Leave bottom bar blank, to be marked up during the course of the month to show actual work completed.

2. Display in red activities which are on the critical path.

3. Prepare and attach written description of the resources and personnel intended to be utilized per day during the period covered, and the percentage completion and total dollar value of each activity to be completed or partially completed up to first day of the following Gantt Chart period.

D. Look Back Gantt Chart: Show activities extracted from the current approved CPM construction schedule. Display only activities performed during previous month with one line for each activity and one column for each calendar day.

1. Provide 2 bars for each activity. Use top bar to show the duration and Early Start/Late Start dates as shown in current approved CPM schedule. Mark up bottom bar to show actual achievement for each activity. If an activity is not completed in the period covered by one Gantt Chart, but continues into the next month, include percentage completed at the beginning and at the end of the period covered by each chart.
2. Display in red activities which are on the critical path.

2.06 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Accidents.
8. Meetings.
9. Unusual events (refer to special reports).
10. Stoppages, delays, shortages, and losses.
11. Emergency procedures.
12. Orders and requests of authorities having jurisdiction.
13. Construction Change Directives received and implemented.
14. Services connected and disconnected.
15. Equipment or system tests and startups.
16. Partial completions and occupancies.
17. Substantial Completions authorized.

B. Site Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.07 SPECIAL REPORTS

A. General: Submit special reports directly to Owner's project Manager within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by the General Contractor’s personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 EXECUTION

3.01 GENERAL CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Utilization of Float Time: Float time is to be expended judiciously, for the benefit of the Project as a whole, and not for the convenience of the General Contractor or the Owner. Neither the General Contractor nor the Owner "owns" the project float time; the float time belongs to the Project.

1. Begin each activity promptly upon the completion of previous activities on which it depends. If the General Contractor completes activity on the scheduled "early finish date" or sooner, the General Contractor shall not expend the "float time" for that activity (if any) but rather reserve it as a safeguard against possible impediments or delays which may occur later in the progress of the Work.

B. General Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

C. Distribution: Distribute copies of approved schedule to Architect, Project Manager (4 copies and 1 copy of the data disk), separate contractors, testing and inspecting agencies, and other parties identified by the General Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION

SECTION 013500

ORDER OF CONDITIONS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 ORDER OF CONDITIONS

A. The **New Amesbury Elementary School** is a project subject to the regulations of the **City of Amesbury's Conservation Commission** (DEP File No. 002-1260). A copy of the Order of Conditions annotated with the respective responsibilities of the General Contractor, Owner and Design Team is attached to this SECTION (see ATTACHMENT A).

B. It shall be the responsibility of the General Contractor to be familiar with the Order of Conditions and to perform the specified work of this Contract in compliance with the requirements stipulated therein. The General Contractor is responsible to complete the work and to obtain the City of Amesbury's Conservation Commission acceptance for all work included under the Order of Conditions.

C. Upon completion of the work**, the General Contractor shall obtain from the Conservation Commission a signed Certificate of Compliance**, which certifies that the work regulated by the respective agencies have been satisfactorily completed.

D. The City will record the Certificates of Compliance with the Essex County Registry of Deeds.

1.03 PLANNING BOARD DECISION

A. The **New Amesbury Elementary School** is a project subject to the regulations of the **City of Amesbury's Planning Board**. A copy of the Board's decision, dated February 8, 2021, annotated with the respective responsibilities of the General Contractor, Owner and Design Team is attached to this SECTION (see ATTACHMENT B).

B. It shall be the responsibility of the General Contractor to be familiar with the Planning Board Decision and to perform the specified work of this Contract in compliance with the requirements stipulated therein.

END OF SECTION

Attachment A

City of Amesbury Conservation Commission
Order of Conditions

ANNOTATED

Abbreviations:

Owner	City of Amesbury
OPM	Owner's Project Manager
Arch	Project Architect
Civil	Project Civil Engineer
GC	General Contractor
All	Applies to all project entities.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
002-1260
MassDEP File #

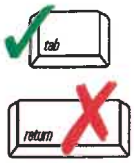
eDEP Transaction #

Amesbury
City/Town

A. General Information

Please note: this form has been modified with added space to accommodate the Registry of Deeds Requirements

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. From: Amesbury
Conservation Commission

2. This issuance is for (check one): a. ☒ Order of Conditions b. ☐ Amended Order of Conditions

3. To: Applicant:

Kassandra — a. First Name
Gove — b. Last Name
Mayor, City of Amesbury — c. Organization
Amesbury City Hall, 62 Friend Street — d. Mailing Address
Amesbury — e. City/Town
MA — f. State
01913 — g. Zip Code

4. Property Owner (if different from applicant):

a. First Name
b. Last Name
City of Amesbury — c. Organization
d. Mailing Address
e. City/Town
f. State
g. Zip Code

5. Project Location:

193 Lion's Mouth Road — a. Street Address
Amesbury — b. City/Town
50 and 37 — c. Assessors Map/Plat Number
50-6, 50-16, 50-42, and 37-4 — d. Parcel/Lot Number

Latitude and Longitude, if known: 42d8568m16s — d. Latitude; 70d9493m17s — e. Longitude

A. General Information (cont.)

6. Property recorded at the Registry of Deeds for (attach additional information if more than one parcel):

Essex South
a. County

b. Certificate Number (if registered land)

5833, 5843, 9963 and 5342
c. Book

124, 244, 317 and 49
d. Page

7. Dates: 12.7.20 (a. Date Notice of Intent Filed) 3.1.2021 (b. Date Public Hearing Closed) 3.8.2021 (c. Date of Issuance)

8. Final Approved Plans and Other Documents (attach additional plan or document references as needed):

Amesbury Elementary School, Amesbury, MA Notice of Intent
a. Plan Title

DiNisco Design
b. Prepared By

As noted on each sheet
c. Signed and Stamped by

2.22.2021
d. Final Revision Date

As noted on each sheet
e. Scale

See Attachment to Order of Conditions and Appendix
f. Additional Plan or Document Title

g. Date

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:

a. ☒ Public Water Supply
b. ☒ Land Containing Shellfish
c. ☒ Prevention of Pollution
d. ☐ Private Water Supply
e. ☒ Fisheries
f. ☒ Protection of Wildlife Habitat
g. ☒ Groundwater Supply
h. ☒ Storm Damage Prevention
i. ☒ Flood Control

2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

Approved subject to:

a. ☒ the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.

B. Findings (cont.)

Denied because:

b. ☐ the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**

c. ☐ the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**

3. ☒ Buffer Zone Impacts: Shortest distance between limit of project disturbance and the wetland resource area specified in 310 CMR 10.02(1)(a) — 1 ft. restoratio

Inland Resource Area Impacts: Check all that apply below. (For Approvals Only)

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. ☐ Bank	a. linear feet	b. linear feet	c. linear feet	d. linear feet
5. ☒ Bordering Vegetated Wetland	0 a. square feet	0 b. square feet	n/a c. square feet	n/a d. square feet
6. ☐ Land Under Waterbodies and Waterways	a. square feet	b. square feet	c. square feet	d. square feet
	e. c/y dredged	f. c/y dredged		
7. ☐ Bordering Land Subject to Flooding	a. square feet	b. square feet	c. square feet	d. square feet
Cubic Feet Flood Storage	e. cubic feet	f. cubic feet	g. cubic feet	h. cubic feet
8. ☐ Isolated Land Subject to Flooding	a. square feet	b. square feet		
Cubic Feet Flood Storage	c. cubic feet	d. cubic feet	e. cubic feet	f. cubic feet
9. ☐ Riverfront Area	a. total sq. feet	b. total sq. feet		
Sq ft within 100 ft	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	g. square feet	h. square feet	i. square feet	j. square feet

B. Findings (cont.)

Coastal Resource Area Impacts: Check all that apply below. (For Approvals Only)

	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
10. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below			
11. ☐ Land Under the Ocean	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
12. ☐ Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
13. ☐ Coastal Beaches	a. square feet	b. square feet	c. nourishment cu yd	d. nourishment cu yd
14. ☐ Coastal Dunes	a. square feet	b. square feet	c. nourishment cu yd	d. nourishment cu yd
15. ☐ Coastal Banks	a. linear feet	b. linear feet		
16. ☐ Rocky Intertidal Shores	a. square feet	b. square feet		
17. ☐ Salt Marshes	a. square feet	b. square feet	c. square feet	d. square feet
18. ☐ Land Under Salt Ponds	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
19. ☐ Land Containing Shellfish	a. square feet	b. square feet	c. square feet	d. square feet
20. ☐ Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above			
	a. c/y dredged	b. c/y dredged		
21. ☐ Land Subject to Coastal Storm Flowage	a. square feet	b. square feet		

B. Findings (cont.)

* **#22.** If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c (BVW) or B.17.c (Salt Marsh) above, please enter the additional amount here.

22. ☐ Restoration/Enhancement *:

a. square feet of BVW | b. square feet of salt marsh

23. ☐ Stream Crossing(s):

a. number of new stream crossings | b. number of replacement stream crossings

C. General Conditions Under Massachusetts Wetlands Protection Act

The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
   a. the work is a maintenance dredging project as provided for in the Act; or
   b. the time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order.
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on unless extended in writing by the Department.

ALL

7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.
8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

Owner

9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.

GC

10. A sign shall be displayed at the site not less then two square feet or more than three square feet in size bearing the words,

"Massachusetts Department of Environmental Protection" [or, "MassDEP"]

"File Number 002-1260 "

Civil

11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.

ALL

12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.

Arch / Civil

13. The work shall conform to the plans and special conditions referenced in this order.

14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.

15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.

16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.

GC
Civil to check prior to start of work.
Surveyor may need to reset prior to start of work.

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

GC

18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.

NOTICE OF STORMWATER CONTROL AND MAINTENANCE REQUIREMENTS

19. **The work associated with this Order (the "Project") is** (1) ☒ **is not** (2) ☐ **subject to the Massachusetts Stormwater Standards. If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:**

GC

a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.

b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:

GC & Civil

i. all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;

GC

ii. as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;

GC

iii. any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;

GC

iv. all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;

GC

v. any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

Civil reviews and confirms the above under 19.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

c,d,e and f
Owner

c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement) for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following: *i.*) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and *ii.*) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.

e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

g to l
Owner

g) The responsible party shall:
1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.

h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.

i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.

j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.

k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.

l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):

See Attachment to Order of Conditions

D. Findings Under Municipal Wetlands Bylaw or Ordinance

1. Is a municipal wetlands bylaw or ordinance applicable? ☒ Yes ☐ No

2. The Amesbury Conservation Commission hereby finds (check one that applies):

   a. ☐ that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw, specifically:

   _____ (1. Municipal Ordinance or Bylaw) _____ (2. Citation)

   Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.

   b. ☒ that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:

   Amesbury Wetlands Ordinance (1. Municipal Ordinance or Bylaw) AWO (2. Citation)

3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.

   The special conditions relating to municipal ordinance or bylaw are as follows (if you need more space for additional conditions, attach a text document):

   See Attachment to Order of Conditions

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
002-1260
MassDEP File #

eDEP Transaction #

Amesbury
City/Town

E. Signatures

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

3.8.2021
1. Date of Issuance

Please indicate the number of members who will sign this form.
This Order must be signed by a majority of the Conservation Commission.

4
2. Number of Signers

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

Signatures:

☒ by hand delivery on

3.8.2021
Date

☐ by certified mail, return receipt requested, on

Date

F. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request of Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

G. Recording Information

Prior to commencement of work, this Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

Amesbury
Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

Amesbury
Conservation Commission

Please be advised that the Order of Conditions for the Project at:

193 Lion's Mouth Road
Project Location

002-1260
MassDEP File Number

Has been recorded at the Registry of Deeds of:

Essex South
County

Book

Page

for: City of Amesbury
Property Owner

and has been noted in the chain of title of the affected property in:

Book

Page

In accordance with the Order of Conditions issued on:

3.8.2021
Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant

ATTACHMENT TO ORDER OF CONDITIONS

Applicant and	**Mayor Gove**
Property Owner:	**City of Amesbury** **City Hall, 62 Friend Street** **Amesbury, MA 01913**
Project:	**Amesbury Elementary School**
DEP File:	**002-1260**

Pursuant to Massachusetts Wetlands Protection Act (M.G.L. chapter 131, §40) and its implementing regulations (310 CMR, § 10.00) and the Amesbury Wetlands Protection Ordinance and its implementing regulations:

WORK AUTHORIZED: This Order authorizes, pursuant to the Massachusetts Wetlands Protection Act and the Amesbury Wetland Protection Ordinance, the construction of a new 98,195 GSF elementary school building on a ±37.8-acre parcel of land located at 193 Lions Mouth Road and a ±2.5 acre portion of the adjacent City owned Woodsom Farm property. .

The proposed project includes the construction of a new elementary school at the subject site with associated parking lots, driveways, landscaping, play areas, stormwater management facilities, utilities and related infrastructure. This project will also include the redevelopment and upgrading of portions of the existing parking lots, driveways, stormwater management facilities and related site features of the existing Cashman Elementary School. The existing Cashman Elementary School will remain as an integral part of this two-building campus.

The total area of the proposed alterations on the site for this project is 13.8 acres of the total site. The project includes work near certain wetland resource areas under the Massachusetts Wetlands Protection Act and the Amesbury Wetlands Bylaw. The area of site work within the 100-foot Buffer Zone is 1.6 acres. The proposed site work for the project includes the following:

- Construction of a new school building to the northwest of the existing school building.
- The majority of the project will be within the portions of the site that are presently developed for the existing school and facilities.
- Reconfiguration of the access roads and parking areas including a new access / egress drive through a corner of the Woodsom Farm property to Lions Mouth Road.
- Provision of new stormwater management facilities for the new portion of the site to fully meet the current Mass. Stormwater management Regulations. The new stormwater management facilities include a variety of Best Management Practices including bio-retention basins, subsurface rechargers, subsurface detention basins, a porous asphalt parking lot and permeable play surfaces. Pretreatment BMPs include

deep sump catch basins, sediment forebays and proprietary stormwater treatment systems. Stormwater management improvements have been designed to meet the requirements of the Mass Stormwater Management Regulations. The result will be more stormwater recharge on the site than under existing conditions and significant improvements to water quality while not increasing the peak rates of runoff the Wetlands Resource Areas or the City drainage system and meeting the groundwater recharge requirements.

- The stormwater management facilities for the existing school will be significantly upgraded to the extent practicable as a redevelopment. The improvements include deep sump catch basins and proprietary treatment systems to improve water quality, provision of a subsurface detention basin and improvement of an existing stormwater basin for improved detention to correct existing drain system capacity issues.
- Construction of new utilities for the new school (sewer, water, gas, electric and tele-com).
- Construction associated with grading, landscaping, walkways, and site lighting improvements.
- Construction of new outdoor play spaces.
- Installation and management of construction period erosion and sedimentation controls.

The project details are comprehensively described in the "Approved Project Documents" identified n the Appendix.

A construction sequence plan will be developed as part of the pre-construction planning process following project approval, for implementation of the project and the mitigation program. The applicant will provide a draft construction sequence plan prior to the pre-construction meeting (see Condition 20).

CURRENT CONDITIONS: The project site is a City owned property at 193 Lion's Mouth Road in Amesbury, MA containing the existing Cashman Elementary School building and associated driveways, parking areas, play areas, ball fields and utilities. The project site also includes a ±2.5-acre portion of the adjacent City owned Woodsom Farm property. The site has an access drive from Lions Mouth Road at the southern end of the site. Just over half of the property is developed for the existing school facilities and ball fields. The upland areas have a rolling terrain except where leveled for the parking areas and ball fields. The undeveloped area consists of the wooded wetlands along the Northeast side of the site and some adjacent wooded and open field areas. The property is located at the base of Whittier Hill that is northeast of the site. The main wetlands resource areas are located along the entire northeastern side of the property. These include an intermittent stream and associated Bordering Vegetated Wetlands that are in the watershed of the lower Powwow River located approximately one mile east of the site. There are also wetland resource areas on the adjacent Woodsom Farm property that consist of a pond and intermittent stream with associated BVW. Those wetlands are tributary to the main wetland described above and the 100-foot wetland buffer zones of those resource areas extend into the subject project site.

The wetland boundaries and associated 100-foot Buffer Zones under the Mass. Wetlands Protection Act are shown on the project plans. Also included are the 25 foot No Disturbance Buffer and the 50 foot No Build Buffer (under the Amesbury Wetlands Regulations).

The wetland boundaries of the main wetland were delineated by DGT Associates in July and August of 2018. The wetlands on the Woodsom Farm site were originally from the proposed Soccer Field Project that was the subject of the Notice of Intent filed in 2015 under DEP File No. 002-1116. Both the DGT Delineation and the original Woodsom Farm delineation were filed under an ANRAD filing (DEP File No. 002-1218) to formally accept the new delineation and renew the former delineation for the Soccer Field project. The Order of Resource Area Delineation was issued on October 9, 2018.

Since that time, the City has re-delineated the wetland areas on the Woodsom Farm site and submitted a new ANRAD for that site under DEP File No. 002-1249. That wetland delineation was performed by Seekamp Environmental and is presently under review by the Amesbury Conservation Commission. The results of that re-delineation show the wetlands to be closer to the school project site than the previous approved delineation, so to be conservative and to coordinate with that delineation, the current School Project plans shows this new delineation.

The site is shown on the latest FEMA National Flood Insurance Program mapping as being in a Zone X so it is not within a Land Subject to Flooding under the Mass. Wetlands Protection Act. The limits of the Zone X are included on the Existing Condition Plan and are within the BVW area. The FEMA FIRM map is included in Attachment 3

According to the latest Mass. Division of Fisheries and Wildlife - Natural Heritage Program mapping, there are no areas on or near the project site that are designated as Priority Habitat of Rare Species or Estimated Habitat of Rare Wetland Wildlife. Nor are there any Certified or Potential Vernal Pools in the vicinity of the site. Attachment 3 contains a map of the current Mass. GIS Natural Heritage data layers.

I. GENERAL CONDITIONS:

All

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order of Conditions ("Order").
2. Approval of this application does not constitute compliance with any law or regulation other than MGL Chapter 131, Section 40, Wetlands Regulations CMR 10.00 and Amesbury Wetlands Protection Ordinance ("Ordinance") and its implementing regulations ("Regulations") as promulgated by the City of Amesbury Conservation Commission (ACC).
3. This Order shall apply to any successor in interest or successor in control of the property.
4. This Order shall be **recorded by the applicant at the Registry of Deeds** promptly after the expiration of all appeal periods. No work shall be undertaken until the Final Order has been recorded in the Registry of Deeds or the Land Court for the district in

Owner

which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is to be done. **The recording information shall be submitted to the ACC** on the form at the end of this Order prior to commencement of the work. Any Order not recorded by the applicant before work commences may be recorded by the ACC at the applicant's expense.

5. The work authorized hereunder shall be completed within **five (5) years** from the date of this Order. The applicant shall appear before the ACC in one (1) year from the date of this Order to provide a status report.

6. This Order may be extended by the issuing authority for one or more periods of up to one year each upon application to the issuing authority at least **thirty (30) days** prior to the expiration date of the Order.

OPM Arch GC

7. This Order shall be made part of all construction contracts and subcontracts dealing with the work proposed and approved, and the requirements of this Order shall supersede any conflicting contract requirements. The contractor or contractors responsible for the project's completion shall understand and be notified of the requirements of this Order. Any person performing work on the activity that is the subject of this Order is individually responsible for understanding and complying with the requirements of this Order.

GC

8. Two signs shall be displayed (at 193 Lion's Mouth Road driveway entrance and at the trail access point from the adjacent Woodsom Farm/219 Lion's Mouth Road property) at the site not less than two (2) feet or more than three (3) square feet in size bearing the words,

"MA DEP File Number 002-1260"

GC to Comply

9. The Amesbury Conservation Commission (ACC) reserves the right to impose additional conditions on this project, including but not limited to additional or modified erosion control / siltation controls during construction, if it deems that site conditions warrant such measures to mitigate potential impacts.

GC

10. A copy of this Order and the plan approved in this Order shall be available on site when work within any ACC jurisdictional area is in progress.

Owner

11. If the subject parcel is sold or the development rights are transferred to any other person, the applicant shall be required to submit to the ACC a signed and notarized letter of acknowledgement from the buyer or their assignees stating that they have been provided copies of all permits associated with the proposed project, including this Order, and that they understand their responsibility associated with the construction of this project under those permits, including this Order.

Owner

12. The applicant shall be required to pay in full any outstanding invoices from the Commission's peer review consultants for this project.

13. **Applicant's Environmental Monitor:**

GC all items under 13.

a. Qualifications: The applicant shall designate an "Environmental Monitor," such as a Registered Professional Engineer, Professional Wetland Scientist or other qualified consultant who has relevant experience in wetland impact/assessment and erosion/sedimentation control measures to oversee any emergency placement of controls and regular inspection or replacement of sedimentation control devices. The qualifications of the Applicant's Environmental Monitor shall be submitted to the ACC for approval at least 30 days prior to commencement of any work on the site.

b. Authority: The name and phone number of the Environmental Monitor must be provided to the ACC in the event that this person has to be contacted, due to an emergency at this site, during any 24-hour period, including weekends. **This person shall be given the authority to stop construction should there be unlawful entry into the wetland resources areas and / or for erosion controls purposes.** The Environmental Monitor will be required to inspect all such devices and oversee cleaning and the proper disposal of waste products. Cleaning shall include removal of any entrapped silt.

c. Site Inspections: Consistent with USEPA's NPDES Construction General Permit, the Environmental Monitor shall conduct site inspections on site at least weekly and immediately after rainstorms of 0.5 inches or more during periods of active site work or construction within ACC jurisdictional areas. Less frequent inspections may be conducted to the extent permitted by the USEPA NPDES Construction General Permit and as the ACC or the ACC's Agent may approve during the course of construction based on consideration of the site conditions, the level of site activity, and other relevant factors. During inspections, the Environmental Monitor must (1) visually inspect all sedimentation / erosion control measures and ensure that they are being properly maintained and functioning as intended, and (2) visually inspect all wetland resource areas near or downgradient from site activities for siltation, turbidity, and/or other water quality impacts.

d. Reporting: During periods in which Site Inspections are required, the Environmental Monitor shall submit a written report to the ACC following each inspection (except as the ACC or the ACC's Agent may otherwise approve).

   i. The Environmental Monitor must certify that, to the best of his / her knowledge and belief based on a careful site inspection, all work is being performed in compliance with this Order of Conditions, except any incidents of noncompliance that the Environmental Monitor may identify in the report, for which mitigation and/or corrective actions shall also be identified.

   ii. The reports shall describe what work is anticipated to be complete over the next reporting period (this will update the construction sequence); current conditions of the erosion controls; description of any erosion or sedimentation repair and/or replacement; and any erosion or sedimentation problems and mitigation measures implemented.

iii. Such reports shall continue until the applicant has requested and the ACC or the ACC's Agent has approved in writing either a less frequent reporting schedule or an end of the reporting.

14. **Commission's Environmental Monitor:**

Owner
All Items
under 14

a. Environmental Monitor: At the applicant's expense, the ACC shall designate an environmental monitor to act as the "Commission's Environmental Monitor." The environmental monitor shall provide environmental monitoring expertise for wetlands issues and stormwater issues by a professional engineer and a qualified wetland scientist who have relevant experience in wetland impact / assessment and erosion / sedimentation control measures and stormwater management.

b. Inspections and Reporting: During the Construction Phase of the Project, the Commission's Environmental Monitor shall inspect the Site and report back to the Commission (with copies to the Applicant) as follows:

i. After installation of erosion controls and prior to the Applicant's commencement of site work;

ii. Bi-weekly (or at a reduced frequency if authorized by the ACC or ACC's Agent) during periods of active site work or construction activity within 100 feet of wetland resource areas. For example, inspection frequency may be reduced if the site is stable and shut down due to winter conditions.

iii. As otherwise requested by the ACC's Agent after significant rain events or at other times when active Site work is being conducted that the ACC's Agent believes presents a risk of adverse impacts to resource areas if not properly conducted or managed and warranting review by the Commission's Environmental Monitor.

c. Review of Documents: During the construction phase of the project, the Commission's Stormwater Monitor shall inspect the site and report back to the Commission (with copies to the applicant) on a schedule to be determined and agreed upon at the preconstruction meeting. The Commission's Environmental Monitor shall also review and make recommendations to the ACC or ACC's Agent (with copies to the Applicant) regarding any key project-related documents submitted to the ACC or ACC's Agent by the Applicant pursuant to this Order of Conditions if such review is determined to be warranted and is requested by the ACC or ACC's Agent.

i. The applicant, its general contractors shall notify the Conservation Commission's agent and Stormwater Monitor not less than 48 hours jprior to the construction of its stormwater system.

GC

15. There shall be no pumping of water from wetland resource areas on or adjacent to the site.

OPM
Arch
Owner
All parts of
this condition.

16. Plan Modifications: Any modification to the approved plans shall require review and approval by the ACC. Prior to consideration of any such request, the ACC may require the applicant to have the relevant wetland resource areas re-flagged or the originally approved flagging established. The applicant shall be required to submit the modification request in writing along with all the necessary forms and supporting documents in a timely manner for the ACC's consideration.

Plan modifications requested by the GC will be the responsibility of the GC unless the Owner agrees to accept the responsibility.

a. The ACC may require any significant plan modification request to be reviewed by the Commission's Environmental Monitor, in which case the applicant shall submit the necessary funds to the ACC for the consultant services.

b. The Commission shall also review the request and decide if an Amended Order of Conditions is required pursuant to the Massachusetts Wetlands Protection Act and the Amesbury Wetlands Protection Ordinance. As stated, any change that requires modification of approved plans within the jurisdictional area or changes to the erosion control plan or to the stormwater management system may require an Amended Order of Conditions unless the Commission decides otherwise at its regularly posted public meeting. If the ACC decides that a change is of sufficient magnitude to warrant imposition of additional conditions to ensure adequate protection of the resource area and / or the interests covered under the Ordinance and Regulations and an Amended Order of Conditions, a public hearing shall be required.

c. Any requests for modification or amendment of the Order shall not be considered or reviewed if the Order has expired or there is an outstanding Enforcement Order on the subject parcel – except as the ACC may otherwise explicitly allow.

II. PRE-CONSTRUCTION CONDITIONS:

GC

17. NPDES Permit and SWPPP: Prior to construction the applicant will provide the ACC a copy of the NPDES permit application, SWPPP and supporting documents. Additionally, the applicant will provide a statement from the operator/manager of the SWPPP acknowledging the responsibilities and requirements in the plans and agree to carry out said responsibilities and adhere to Best Management Practices of the plans as a perpetual responsibility and condition.

Arch/ Civil

18. Stormwater Standard 10 – Illicit Discharge Statement: Prior to the preconstruction meeting, the applicant shall provide to the ACC an updated illicit discharge statement as required by MassDEP's Stormwater Standard 10 representing acknowledgement of the final stormwater design.

Arch/ Civil

19. Pollution Prevention and Stormwater O&M Budget: Prior to the preconstruction meeting, the applicant shall provide to the ACC an updated Pollution Prevention and Stormwater Operation and Maintenance Plan that includes all catch basins and an updated estimated operation and maintenance budget.

GC, OPM, Arch.

20. Construction Sequence Plan: The contractor will provide a detailed construction sequence plan for site construction and installation of the stormwater management facilities, erosion and sediment control barriers, and other work within ACC jurisdictional areas, including location of temporary sedimentation basins and measures to ensure preservation of the infiltration surfaces during the sequencing phases, twenty-one (21) days prior to the pre-construction meeting for review and approval by the ACC and/or the ACC's Agent. Work within areas under ACC jurisdiction may not begin prior to approval by ACC or ACC's Agent of the construction sequence plan.

Owner
Arch
OPM

21. Invasive Species Control Program: The applicant will provide a final Invasive Species Control Program thirty (30) days prior to commencement of any invasive species removal activities for review and approval by the ACC; provided, however, that regardless of when such activities are scheduled to begin, the applicant will provide a final Invasive Species Control Program, including a proposed implementation schedule, for review and approval by the ACC within twelve (12) months after issuance of the OoC. The approved program will include the proposed schedule and sequence of mitigation activities and will be updated on an annual basis by March 1st of each year during construction. The updated program will also include the National Wetlands Inventory classification of replacement plants and the control methodology for each invasive plant species.

Owner

22. Erosion Control Bond: The applicant shall be required to post an erosion control bond with the ACC and the amount shall be calculated @ $0.25 per square feet of buffer zone area within the approved limit of work. Such funds shall be sufficient to repair any damages to the wetlands due to soil erosion, stabilization of all soils and the disturbed areas on the site. The applicant shall be exempt from establishing a separate erosion control bond if such a bond is established with the Planning Board approval. The ACC may periodically reduce the bond amount based on completed work and site conditions. Prior to any release of bond amount, the ACC shall require the inspection of work completed. Final release of the bond amount shall be allowed upon completion of all site work, including but not limited to, the stormwater management system, roadway binder course and final stabilization. If the erosion control bond is held by the Planning Board, the ACC shall send a letter to the Planning Board prior to final release of the bond.

Owner

23. Performance Bond: Unless required by the Amesbury Planning Board, the applicant shall post a performance bond in the amount necessary to install and complete the stormwater management system by this Order. The applicant shall submit the necessary legal and financial documents to post the bond. Upon receiving the request from the applicant, the Commission's Environmental Monitor shall review the work to be done and make its recommendation to the Commission. No building permits shall be applied for or issued until the approved performance bond has been established by the applicant. The applicant may periodically request reductions in the bond amount as portions of the work are completed. The final release from the performance bond shall be made after two growing seasons have passed and all the plants in the approved areas have survived and are healthy as confirmed by the Commission's Environmental Monitor and approved by the ACC. Any release of funds shall be made by the Commission upon verification of work by its consultant and/or its Agent.

Arch,
Civil,
Surveyor

GC for
maintenance
after initial installation.

24. Wetlands Flagging: Prior to the pre-construction meeting and commencement of any activity on this site, the boundaries of all wetland resource areas shown on the approved plan shall be identified in the field by flagging in good condition, with readable labelling, spaced at intervals not greater than 25-feet apart. Wetland flags shall be checked and replaced as necessary and maintained until a Certificate of Compliance is issued for the project or any earlier period as the ACC or the ACC's Agent may authorize.

GC

25. Erosion Controls: Prior to the pre-construction meeting and commencement of any activity on this site, all erosion control devices approved under this Order shall be properly installed as shown on the approved plan and as specified in the Construction Sequence Plan (see Condition 20). The ACC and/or its Agent and Commission's Environmental Monitor shall inspect and approve such installation at a pre-construction meeting. The erosion control devices must remain in place and functioning until the ACC or its Agent has authorized their removal. All workers must be instructed not to work beyond this limit.

GC

26. Dust Control Program: Prior to construction, a dust control program shall be developed and provided to the Conservation Agent for its approval prior to the preconstruction meeting. The dust control program shall be implemented as outlined in the ACC-approved program.

OPM
GC
ARCH
Civil and other design team as directed.

27. **Pre-Construction Meeting: Once the above-mentioned pre-construction requirements are complete, the applicant shall contact the Conservation Department prior to site preparation or construction and shall arrange an on-site PRE-CONSTRUCTION MEETING with representatives from the ACC and/or its Agent, the project supervisor, the contractor responsible for work, the engineer, the Applicant's Environmental Monitor and Stormwater Monitor, and the Commission's Environmental Monitor and Stormwater Monitor to ensure all of the Conditions of this Order are understood. Please contact the Amesbury Conservation Department office at (978) 388-8110 ext. 317 at least seventy-two (72) hours prior to any activity to arrange the pre-construction meeting.**

GC

28. Contractors/Subcontractors: All contractors and subcontractors shall be informed of the conditions and provisions of this Order. This Order shall be included in all construction contracts and subcontracts dealing with the work, and shall supersede other contract requirements. Failure to have this OoC present during a site visit shall constitute a violation of the Wetlands Protection Act and the Amesbury Wetlands Ordinance and shall be subject to enforcement action by the ACC in a public meeting.

GC

29. Project Supervisor: Prior to any work being done at the project site, the applicant shall inform the ACC and the Environmental Monitor in writing of the names, addresses, business, mobile and home telephone numbers of both the project supervisor who will be responsible for ensuring on-site compliance with this Order and his/her alternate. The notification shall occur at least 72 hours prior to commencement of work on the site. The 72 hours shall not be over weekends or holidays. The applicant shall also notify the ACC and its Environmental Monitor in writing of any changes.

Owner

30. Recorded Order: A recorded copy of the Order of Conditions shall be presented to the Agent no later that the time of the pre-construction meeting.

III. CONSTRUCTION CONDITIONS:

GC

31. A copy of the recorded Order shall be provided to the Building Inspector at the time of making application for Building Permit along with a set of approved plans.

OPM Owner

32. Prior to making application for building permits, copies of all recorded legal documents pertaining to drainage and utility easements, restrictions on the project site and other conservation restrictions shall be provided to the Commission for their records.

GC

33. Accepted engineering and Best Management Practices for construction standards shall be followed in the conduct of all work. All site improvements shall be installed as per approved plans and engineering details shown on them. Any modifications or deviations from approved plans shall only be made upon approval from the ACC (or, with respect to minor deviations, by the ACC's Agent).

GC

34. Erosion control devices shall be inspected regularly by the applicant; and immediately after 0.5 inches of precipitation. Any entrapped silt shall be removed to an area outside of the buffer zone and wetland resource areas; silt fence, compost filter tubes (or similar) and hay bales shall be replaced as necessary.

GC

35. After proper grading, all disturbed areas shall be brought to final finished grade and stabilized permanently against erosion. This shall be done in the ACC approved manner. Achievement of stabilization is considered to be when the surface shows complete vegetation cover as prescribed in the approved landscape plan. This shall be measured by at least 85% coverage by established vegetation.

GC

36. Bare ground in the Buffer Zone that cannot be permanently stabilized within thirty (30) days shall be stabilized by a temporary cover of rye or other grass should be established following U.S. Natural Resource Conservation Service (NRCS) procedures to prevent erosion and sediment transport. If the season is not appropriate for plant growth, exposed surfaces shall be stabilized by straw, jute netting or other NRCS approved Best Management Practices. Any stabilization materials such as jute netting shall be firmly anchored to prevent them from being washed from slopes by rain, snow melt, or flooding.

GC

37. Subsequent to seeding, disturbed areas will be covered with salt hay mulch, erosion control blanket or netting, or other suitable material in order to provide adequate surface protection until seen germination. Preference should be given to erosion control netting with biodegradable stitching. Netting shall be required on all slopes 4:1 or steeper unless the slope is designated on the approved plans to be covered by other material.

GC

38. Site grading and construction in the Buffer Zone shall be scheduled to avoid periods of high water. Once begun, grading and construction shall move uninterrupted to completion to avoid erosion and siltation to the wetlands.

GC

39. No alteration or activity shall occur beyond the limit or work as defined by the siltation barriers shown on the approved plan.

GC

40. All waste generated by, or associated with, the construction activity shall be contained within the construction area, and away from the resource areas. There shall be no stump dumps, burying of stumps or burying of any material onsite. The applicant shall maintain a dumpster (or other suitable means) at the site for the storage and removal of such construction material off-site. However, no trash dumpsters will be allowed within 100-feet of the Bordering Vegetated (BVW) or riparian bank.

41. Stockpiles:

GC

a. All stockpiles within the ACC jurisdictional areas shall be enclosed by erosion control consisting of hay bales and entrenched silt fence or other barriers as the ACC or the ACC's Agent may approve. For stockpiles located outside of ACC jurisdictional areas, a sediment barrier shall be installed along all downgradient perimeter areas. There shall be no stockpiling outside the approved limit of work and staging/storage and stockpiling areas shall be located further than 50 feet from wetland resource areas, including Riverfront Area, to the extent practicable. Stockpiles shall be set back at least 10 feet from the top-of-slope at any culvert (existing or being installed). Prior to storms predicted to produce 1-inch or more within a 24-hour period, stockpiles must be moved at least 50 feet away from wetland resource areas or have the side of the stockpile facing the wetland resource area(s) stabilized.

b. Stockpiles shall not drain toward wetland resource areas or drainage conveyances or catch basin inlets. If this is not possible, then the side facing such features shall be stabilized.

c. Stockpiles not in active use must be stabilized as soon as practicable, but not more than 14 days after the use of the stockpile ceases temporarily or permanently, unless:

   i. Stabilization by the 14th day is precluded by snow cover or frozen ground, in which case stabilization measures must be initiated as soon as practicable; or

   ii. Use of the stockpile will resume by the 14th day after activities ceased.

GC

42. Equipment, machinery, storage of soils, storage of materials and vehicle storage, washing, and refueling operations shall be situated in an upland area at a distance greater than 100-feet from the BVW and the applicable resource areas during construction. All machinery shall be checked daily for leaking fluids.

GC

43. Cleaning of concrete mixing equipment and/or machinery shall be restricted to upland areas at a distance greater than 100 feet to the BVW, and appropriate discharge control measures shall be implemented, including monitoring of the pH of discharge waters to ensure that the appropriate Massachusetts Surface Water Quality Discharge Standards are met.

GC

44. Unless approved by the Commission for control of invasive species, chemicals, pesticides, herbicides, hazardous materials, etc. shall not be used or stored within 100' of a wetland resource area, including Riverfront Area, with the exception of the use of herbicides as part of the approved Invasive Species Management Plan.

GC

45. Any damage caused as a direct result of this project to any wetland resource areas shall be the responsibility of the applicant to repair, restore and / or replace. Sedimentation or erosion into these areas shall be considered damage to wetland resource areas. If sediment reaches these areas, the Commission and/or its agents shall be contacted and a plan for abatement of the problem and proposed restoration / mitigation measures shall be submitted for approval and implementation. If the applicant fails to address the failure or damage as required by the Commission in a timely manner, it shall be deemed as a violation under the Regulations.

Owner
GC

46. Monitoring by the Environmental Monitor (Applicant's and ACC's), follow-up eradication of invasive species, and any necessary re-plantings as required by this Order shall be continued until a Certificate of Compliance is issued or as otherwise authorized by the ACC or ACC's Agent. The applicant shall provide sufficient funds to ensure this to avoid enforcement action.

IV. AFTER CONSTRUCTION:

Arch
Civil

47. Upon completion of the project and one full growing season has elapsed since final site stabilization has been achieved, the applicant shall submit the following to the Amesbury Conservation Commission to Request for a Certificate of Compliance (COC):

    a. WPA Form 8A- Request for a Certificate of Compliance;

    b. A letter from the applicant requesting the Certificate of Compliance with the following information included:

        i. Name and address of current landowner;

        ii. The name and address of the individual or other entity to whom the COC is to be issued;

        iii. The street address and lot number for the project; and DEP file #

        iv. "As-Built" plans prepared, sign, and stamped by a Registered Professional Civil Engineer (and / or Registered Professional Land Survey) of the Commonwealth, for public record.

GC

GC

48. At the completion of construction but prior to final site stabilization, the applicant will provide an as-built plan subject to the review of both the applicant' environmental monitor and/or the Commission's environmental monitor. The applicant will also provide a letter by the site engineer confirming the work has been completed.

Civil for "site engineer letter".

GC

49. Erosion control devices shall remain in place and functioning properly until all exposed soils have been stabilized with final vegetative cover and the ACC and/or its Agent has authorized their removal.

GC and Civil

50. The Applicant's Environmental Monitor shall also provide a full review of the as-built plans and provide comments and recommendations in support of a Request for Certificate of Compliance and the subsequent issuance of a Certificate of Compliance by the Amesbury Conservation Commission. Deviations, both authorized and unauthorized, shall be fully documented. Unauthorized deviations from the approved plan may result in additional mitigation measures imposed on the applicant by the ACC and/or enforcement action with possible fines. At the ACC's discretion, the ACC may have the Request for Certificate of Compliance reviewed by the Commission's Environmental Monitor, at the applicant's expense.

Owner

51. Prior to issue of Certificate of Compliance, the applicant shall be required to pay in full any outstanding invoices from the Commission's Environmental Monitors and Stormwater Monitors.

Arch / Civil

52. The applicant shall make request for Certificate of Compliance as provided for under Section 7.12 of the Amesbury Wetlands Regulations, as amended.

V. PERPETUAL CONDITIONS:

The following conditions are ongoing and do not expire with the issuance of the Certificate of Compliance – except as the ACC may otherwise specify in its Certificate of Compliance:

Owner

53. The management contract between the City and the site management company shall provide that the dumping of leaves, grass clippings and/or brush is prohibited in buffer zones and in wetland areas into perpetuity. In addition, semiannual reports to the ACCC on the condition of all plantings for a five-year period shall be submitted to the ACC on November 1 and May 1 of each year for a period of five years once construction is concluded. Any plantings not doing well shall be replaced by the applicant. The ACC shall select a per rview consultant to inspect the plantings and provide a written reort to the Acc on a semiannual basis, November 1 and May 1 of each year.

Owner

54. There shall be no storage of soils, material or equipment between the 100 foot buffer and the applicable resource area except within the designated loading/service area of the Amesbury Elementary School in Perpetuity. Equipment refueling shall occur outside the 100-foot buffer zone and/or on impervious surfaces.

Owner

55. The site management agreement between the City and the site manager shall provide that no chemical herbicides, pesticides, and non-organic fertilizers are to be used within ACC jurisdictional areas on the property, including both open space and developed areas, at any time now or in the future and that any contractors providing maintenance services to the site shall be advised of the requirement. The site management agreement may permit the use of chemical deicers, such as low salt/sand

mix or calcium chloride, in the areas shown on the as-built plans that are outside of the 50 foot setback jurisdictional areas.

Owner

56. Fertilizers utilized for landscaping and lawn care within ACC jurisdictional areas shall be slow release, low-nitrogen types (<5%), and shall not be used within 25-feet of a resource area. Unless approved by the Commission for control of invasive species, pesticides and herbicides shall not be used within 100-feet of a wetland resource area. This condition shall survive the Order of Conditions and shall run with the title of the property and noted in the Deed.

Owner

57. Semi-Annual Reports: The applicant and his/her/their successors in ownership shall fill written reports of the inspections, cleaning of the parking areas and stormwater management systems maintenance with the ACC on a semiannual basis, by November 1 and May 1 of each year. In addition, the ACC shall select a peer review consultant to inspect the parking areas and stormwater management systems and provide a written report to the ACC on a semiannual basis, on November 1 and May 1 of each year. These reports shall be required for five years after the completion of construction. After five years of reports have been submitted, the ACC can decide whether further reports or action is warranted.

Owner

58. It is the responsibility of the City to maintain the stormwater management systems as specified in the Operation and Maintenance Plan to ensure that they function properly. This condition shall exist in perpetuity and shall be recorded as such in the Certificate of Compliance. On the sale or change of hands of the property, the applicant shall provide the new owner with a copy of the Operation and Maintenance Plan. At each subsequent sale of the property, the then current owner shall provide a copy of the Operation and Maintenance Plan to the new owner. A copy of the new owner's acknowledgement of receipt of the Operation and Maintenance Plan shall be sent to the ACC. This condition shall exist in perpetuity and shall be recorded as such in the Certificate of Compliance.

Owner

59. The applicant shall comply with all requirements of the Operation and Maintenance Plan filed with the Order of Conditions. The applicant shall maintain and repair all components of the stormwater management system to ensure that the design capacity, the stormwater treatment and pollution abatement capacity, and structural integrity of these facilities are maintained. The applicant shall maintain all stabilized surfaces as designed including maintenance and repair of pavement and maintenance of landscaped areas maintaining a vigorous growth of all plant materials. Catch basins and stormwater treatment units shall be inspected and cleaned and roadways, driveways and sidewalks shall be swept at intervals specified in the Operation and Maintenance Plan (O&M Plan). Snow shall be plowed onto designated areas to encourage infiltration during subsequent thawing periods. Sediments shall be removed from snow storage areas by April 4 of each year. Accumulated sediments shall be removed from sumps and floatable wastes shall be removed from the surface of every catch basin at intervals specified in the operation plan. All drain pipes shall be inspected, and sediment and debris removed at intervals specified in the O&M Plan. Sediments and wastes shall be disposed of in accordance with all applicable federal, state, and local laws. The subsurface infiltration structures shall be inspected and cleaned and checked for proper infiltration at intervals specified in the O&M Plan. The

porous pavement surface shall be inspected and cleaned and checked for proper infiltration as intervals specified in the O&M Plan.

Owner

60. Annual Reports: The applicant and his/her successors in ownership shall file written reports of the inspections, cleaning and stormwater maintenance with the ACC on an annual basis, by November 1st beginning the year the stormwater management system is installed.

Appendix
Statement of Reason and Findings, Documents, and Approved Plans

STATEMENT OF REASON AND FINDINGS

This project proposes construction of the Amesbury Elementary School and associated infrastructure (parking lots, driveways, utilities, stormwater management features, play areas, and landscaping, etc.), and redevelopment of existing infrastructure. The proposed new school would be located on the same site as the existing Cashman Elementary School building and associated playing fields, parking areas, and access drive. The project site is approximately 37.8 acres in size. The existing Cashman Elementary School would remain. The proposed new school building would be built primarily in an area where grassed playing fields currently exist, although some naturally vegetated areas would be impacted. The NOI states that the proposed project site also includes approximately 2.4 acres of the adjacent city owned Woodsom Farm property, where a proposed egress driveway and associated activities are proposed.

The Amesbury Conservation Commission (Commission) engaged the following peer review consultants, who attended Zoom Virtual Workshop Meetings and produced peer review letter reports as follows:

- BSC Group, Inc. - four (4) Peer Review Reports and Attendance at two (2) Zoom Virtual Workshop Meetings:
    - Letter Report dated May 18, 2020
    - Zoom Meeting 1 on July 15, 2020
    - Letter Report dated November 13, 2020
    - Zoom Meeting 2 on November 17, 2020
    - Letter Report dated December 11, 2020
    - Letter Report dated December 17, 2020
- Stantec Consulting Services, Inc – Five (5) Peer Review Reports and Attendance at four (4) Zoom Virtual Workshop Meetings:
    - Letter Report 1 dated April 22, 2020
    - Zoom Meeting 1 on July 15, 2020
    - Letter Report 2 dated November 13, 2020
    - Zoom Meeting 2 on November 17, 2020
    - Letter Report 3 dated December 14, 2020
    - Zoom Meeting 3 on December 14, 2020
    - Letter Report 4 dated January 14, 2021
    - Zoom Meeting 4 on January 21, 2021
    - Letter Report 5 dated February 26, 2021

These documents and meetings attendance are considered the foundation for the Commission's review, findings, statement of reason, conditions and decision.

FINDINGS

1. The Commission finds that areas subject to regulation and review under the Wetlands Protection Act (WPA) and the City of Amesbury Wetland Protection Ordinance (Ch. 460) (Ordinance) and accompanying regulations exist on the

project site and include the following: Bordering Vegetated Wetlands, Inland Bank (associated with an intermittent stream), and Buffer Zones. (Shown on the site plan dated September 25, 2020). The wetland resource area delineation was peer reviewed by BSC Group, Inc. and has been approved by the Commission.

i. The site at the time of its review does not include Priority Habitats of Rare Species, Estimated Habitat of Rare Wildlife, or Potential Vernal Pools or Certified Vernal Pools as documented by the Massachusetts Natural Heritage and Endangered Species Program.

2. The Commission finds that Bordering Vegetated Wetlands and Inland Bank (associated with an intermittent stream) on the project site are significant to the following interests of the WPA and Ordinance: public and private water supplies, ground water supplies, flood control, storm damage prevention, prevention of pollution, and to the protection of fisheries and wildlife habitat.

3. The Commission finds that no impacts to BVW or Inland Banks are proposed other than the allowable maintenance removal of sediment from an existing 18-inch stormwater outfall corrugated metal pipe (CMP) at the parking lot on the southeast side of the Cashman School. Initially, the Applicant had proposed 178 square feet (s.f.) of temporary impacts at this location to remove and replace the CMP outfall, but the Applicant has eliminated these impacts.

4. The Applicant has provided a request for a Waiver (dated September 11, 2020) to the City of Amesbury Wetland Protection Ordinance (Ch. 460) (Ordinance) and accompanying regulations for the following activities:
   - Replacement of an existing 12-inch CMP with a 15-inch CMP to address existing overflow conditions. The new CMP is proposed to be located outside of the BVW and includes a new riprap spreader to prevent erosion. As mitigation for this work in the inner 25-foot Buffer Zone, the Applicant has provided a Buffer Zone mitigation plan which would restore 4,700 s.f. of existing grassy Buffer Zone to native species (trees, shrubs and herbaceous) with wildlife habitat value.
   - In addition, the Applicant proposes pulling the existing parking lot footprint in this area further away from the BVW so that it will no longer be within the 50-foot Buffer Zone.

   The Commission finds that the net effect of these activities is anticipated to improve water quality in the BVW, as well as to enhance wildlife habitat and improve carbon sequestration by vegetation.

5. The Commission finds that as proposed, other than the activities addressed in the Waiver request, the project design is in conformance with Amesbury Wetland Protection Ordinance (Ch. 460) (Ordinance) regulation sections which establish specific setbacks for development:

Section 21.3 Landscaping:

- No lawns or driveways may be constructed within 25 feet of any Resource Area…

Section 21.7 Structures:

- The Commission may at its discretion allow a proposed structure on a wall-type foundation within 100 to 50 feet of the Resource Area…
- No mitigation is sufficient to allow a structure on a wall-type foundation less than 50 feet to a Resource Area…

6. The Commission finds that the Applicant has demonstrated compliance with WPA regulatory performance standards for regulated wetland resource areas by avoiding impacts to BVW and Inland Bank, and by limiting work within the 25-foot "No-Disturb" and 50-foot "No-Build" Buffer Zones as noted above. Much of the work proposed in the outer 50-foot Buffer Zone is in areas that are currently disturbed and degraded, such as grassed playing fields. The only proposed work in BVW is removal of sediment from a stormwater outfall, which is an allowable maintenance activity, and improves conditions by removing fill from the BVW.

7. The Commission finds that Sections 20.0 and 21.0 of the Ordinance specify requirements for activities in the Buffer Zone, prohibiting disturbance within the inner 25 feet and prohibiting building within the inner 50 feet, and that the project is in compliance other than the activities that are addressed in the Ordinance Waiver request. The Commission notes, as stated above, that much of the work proposed in the outer 50-foot Buffer Zone is in areas that are currently disturbed and degraded, such as grassed playing fields.

8. The Commission finds that the proposed project is in compliance with the state and local Buffer Zone regulatory requirements, other than those for which an Ordinance Waiver has been requested.

FINDINGS RELATED TO THE WPA STORMWATER STANDARDS

1. The Commission finds that the Applicant's proposed project activities are in the areas subject to regulation and review under WPA per 310 CMR 10.05(6)(k-q) and the Ordinance and requires the Applicant to provide stormwater management practices to attenuate pollutants and provide set back from the receiving waters and wetlands in accordance with the Stormwater Management Standards.

2. The Commission finds that the Applicant has demonstrated substantial compliance to the Stormwater Management Standards with the supporting stormwater calculations and information by utilizing a combination of three (3) bioretention basins, three (3) recharge chambers systems, three (3) detention basins/chambers systems, two (2) permeable rubber playground surfaces, and one large porous/permeable pavement parking area with accompanying treatment facilities to mitigate stormwater runoff impacts from the proposed project and provide groundwater recharge. Summary calculations and tables

of the systems provided with the final project stormwater report information indicates that overall post development peak runoff rates and total runoff volumes leaving the site will be slightly reduced for all design storms and appropriate treatment of project stormwater flows are provided in accordance with the Stormwater Management Standards and provide protection of the areas subject to regulation under the WPA and Ordinance.

3. The Commission finds that the Applicant has prepared a Long Term Pollution Prevention Plan (LTPPP) for the project in compliance with the Checklist for Stormwater Report noted under Standard 4 and 9. The Commission finds that the Applicant is responsible for implementation of the project LTPPP and documenting the activities under the LTPPP. To ensure protection of the areas subject to regulation under the WPA and Ordinance and compliance with the Stormwater Management Standards, the Commission finds that the Applicant shall implement the LTPPP in perpetuity and provide copies of the maintenance activity documentation of the LTPPP to the Commission on an annual basis.

4. The Commission finds that this project includes redevelopment of a portion of the existing Cashman Elementary School site and the Applicant has demonstrated substantial compliance with Stormwater Management Standards for Redevelopment – Standard 7 - by providing treatment and recharge for the redeveloped pavement areas at the existing school to the extent practicable in accordance with the Stormwater Management Standards. The substantial compliance with Stormwater Management Standards provides additional environmental and ecological benefit to the areas subject to regulation under the WPA and Ordinance associated with the existing Cashman Elementary School site than currently exists.

5. The Commission finds that this project is large and complex. The Commission finds that the Applicant has demonstrated design intent to control construction related impacts including erosion, sedimentation and other pollutants sources during construction and land disturbance activities to prevent impacts to the adjacent resources areas consistent with the Checklist for Stormwater Report for Standard 8, but the specific details of the construction control practices such as sediment traps, construction sequencing of the various site components, etc. are needed. On the provided Checklist under Standard 8 and in the supporting application information, the Applicant indicates that a detailed Construction Period Pollution Prevention Plan (CPPPP) and SWPPP are not provided, but will be prepared by the General Contractor who will be responsible for the management of the construction site and compliance with the NPDES Construction General Permit as allowed under the Checklist for this Standard. The Applicant further notes that a Notice of Intent will be filed with the EPA for coverage under that permit. Due to the complexity of the Applicant's stormwater design and to ensure protection of the areas subject to regulation under the WPA and Ordinance is maintained in compliance with the Stormwater Management Standards, the Commission finds that the Applicant shall prepare and provide the necessary CPPPP and SWPPP documents for review, comment and acceptance by the Commission, which includes a detailed construction sequence for each stormwater system location and that the Applicant shall also obtain the associated Federal, State and Local permits prior to any pre-construction meeting.

6. The Commission finds that the Applicant has prepared a project Stormwater BMP Operation and Maintenance Plan for the numerous stormwater pretreatment and treatment BMP's as part of the LTPPP in substantial compliance to the Stormwater Management Standards under Standard 9 and that the Applicant is responsible for implementation of the Stormwater BMP Operation and Maintenance Plan. The Commission notes, that due to the numerous components and complexity of the Applicant's stormwater system design, reporting of proper maintenance and checking to ensure that each stormwater system component is working properly and effectively is crucial to ensure the stormwater management systems function as designed and protection of the areas subject to regulation under the WPA and Ordinance is maintained. To ensure compliance, the Commission finds that the Applicant shall update the Stormwater BMP Operation and Maintenance Plan to identify all stormwater components proposed for the project and implement the Stormwater BMP Operation and Maintenance Plan in perpetuity with copies of the maintenance activity documentation under the Stormwater BMP Operation and Maintenance Plan provided to the Commission on an annual basis.

7. The Commission finds that the Applicant had initially provided an illicit discharge statement for the project with the Notice of Intent Application with the Checklist for Stormwater Report under Standard 10 and finds that, for the protection of the areas subject to regulation under the WPA and Ordinance, an updated illicit discharge statement for the final project design shall be provided.

DECISION

After careful consideration of the information provided, and of current site conditions, the Commission has determined that the requested Ordinance Waiver is justified, and that sufficient mitigation has been provided for the requested non-compliant activities to result in a net ecological gain relative to existing conditions. In making this decision to grant the Wavier, the Commission notes that in addition to the proposed mitigation and resulting ecological benefits, the proposed non-compliant activities will be located in an area that is currently largely disturbed and degraded already.

The proposed Project meets all requirements of the Wetland Protection Act and its associated regulations and, with the granting of the requested Ordinance Waiver, meets all requirements of the Amesbury Ordinance and associated regulations. Therefore, the Commission votes unanimously to grant the requested Ordinance Waiver, and to approve the project subject to compliance with the Order of Conditions.

STATEMENT OF REASON AND FINDINGS

This project proposes construction of the Amesbury Elementary School and associated infrastructure (parking lots, driveways, utilities, stormwater management features, play areas, and landscaping, etc.), and redevelopment of existing infrastructure. The proposed new school would be located on the same site as the existing Cashman Elementary School building and associated playing fields, parking areas, and access drive. The project site is approximately 37.8 acres in size. The existing Cashman Elementary School would remain. The proposed new school building would be built primarily in an area where grassed playing fields currently exist, although some naturally vegetated areas would be impacted. The NOI states that the proposed project site also includes approximately 2.4 acres of the adjacent city owned Woodsom Farm property, where a proposed egress driveway and associated activities are proposed.

The Amesbury Conservation Commission (Commission) engaged the following peer review consultants, who attended Zoom Virtual Workshop Meetings and produced peer review letter reports as follows:

- BSC Group, Inc. - four (4) Peer Review Reports and Attendance at two (2) Zoom Virtual Workshop Meetings:
    - Letter Report dated May 18, 2020
    - Zoom Meeting 1 on July 15, 2020
    - Letter Report dated November 13, 2020
    - Zoom Meeting 2 on November 17, 2020
    - Letter Report dated December 11, 2020
    - Letter Report dated December 17, 2020
- Stantec Consulting Services, Inc – Five (5) Peer Review Reports and Attendance at four (4) Zoom Virtual Workshop Meetings:
    - Letter Report 1 dated April 22, 2020
    - Zoom Meeting 1 on July 15, 2020
    - Letter Report 2 dated November 13, 2020
    - Zoom Meeting 2 on November 17, 2020
    - Letter Report 3 dated December 14, 2020
    - Zoom Meeting 3 on December 14, 2020
    - Letter Report 4 dated January 14, 2021
    - Zoom Meeting 4 on January 21, 2021
    - Letter Report 5 dated February 26, 2021

These documents and meetings attendance are considered the foundation for the Commission's review, findings, statement of reason, conditions and decision.

FINDINGS

1. The Commission finds that areas subject to regulation and review under the Wetlands Protection Act (WPA) and the City of Amesbury Wetland Protection Ordinance (Ch. 460) (Ordinance) and accompanying regulations exist on the

project site and include the following: Bordering Vegetated Wetlands, Inland Bank (associated with an intermittent stream), and Buffer Zones. (Shown on the site plan dated September 25, 2020). The wetland resource area delineation was peer reviewed by BSC Group, Inc. and has been approved by the Commission.

i. The site at the time of its review does not include Priority Habitats of Rare Species, Estimated Habitat of Rare Wildlife, or Potential Vernal Pools or Certified Vernal Pools as documented by the Massachusetts Natural Heritage and Endangered Species Program.

2. The Commission finds that Bordering Vegetated Wetlands and Inland Bank (associated with an intermittent stream) on the project site are significant to the following interests of the WPA and Ordinance: public and private water supplies, ground water supplies, flood control, storm damage prevention, prevention of pollution, and to the protection of fisheries and wildlife habitat.

3. The Commission finds that no impacts to BVW or Inland Banks are proposed other than the allowable maintenance removal of sediment from an existing 18-inch stormwater outfall corrugated metal pipe (CMP) at the parking lot on the southeast side of the Cashman School. Initially, the Applicant had proposed 178 square feet (s.f.) of temporary impacts at this location to remove and replace the CMP outfall, but the Applicant has eliminated these impacts.

4. The Applicant has provided a request for a Waiver (dated September 11, 2020) to the City of Amesbury Wetland Protection Ordinance (Ch. 460) (Ordinance) and accompanying regulations for the following activities:
   - Replacement of an existing 12-inch CMP with a 15-inch CMP to address existing overflow conditions. The new CMP is proposed to be located outside of the BVW and includes a new riprap spreader to prevent erosion. As mitigation for this work in the inner 25-foot Buffer Zone, the Applicant has provided a Buffer Zone mitigation plan which would restore 4,700 s.f. of existing grassy Buffer Zone to native species (trees, shrubs and herbaceous) with wildlife habitat value.
   - In addition, the Applicant proposes pulling the existing parking lot footprint in this area further away from the BVW so that it will no longer be within the 50-foot Buffer Zone.

   The Commission finds that the net effect of these activities is anticipated to improve water quality in the BVW, as well as to enhance wildlife habitat and improve carbon sequestration by vegetation.

5. The Commission finds that as proposed, other than the activities addressed in the Waiver request, the project design is in conformance with Amesbury Wetland Protection Ordinance (Ch. 460) (Ordinance) regulation sections which establish specific setbacks for development:

Section 21.3 Landscaping:

- No lawns or driveways may be constructed within 25 feet of any Resource Area…

Section 21.7 Structures:

- The Commission may at its discretion allow a proposed structure on a wall-type foundation within 100 to 50 feet of the Resource Area…
- No mitigation is sufficient to allow a structure on a wall-type foundation less than 50 feet to a Resource Area…

6. The Commission finds that the Applicant has demonstrated compliance with WPA regulatory performance standards for regulated wetland resource areas by avoiding impacts to BVW and Inland Bank, and by limiting work within the 25-foot "No-Disturb" and 50-foot "No-Build" Buffer Zones as noted above. Much of the work proposed in the outer 50-foot Buffer Zone is in areas that are currently disturbed and degraded, such as grassed playing fields. The only proposed work in BVW is removal of sediment from a stormwater outfall, which is an allowable maintenance activity, and improves conditions by removing fill from the BVW.

7. The Commission finds that Sections 20.0 and 21.0 of the Ordinance specify requirements for activities in the Buffer Zone, prohibiting disturbance within the inner 25 feet and prohibiting building within the inner 50 feet, and that the project is in compliance other than the activities that are addressed in the Ordinance Waiver request. The Commission notes, as stated above, that much of the work proposed in the outer 50-foot Buffer Zone is in areas that are currently disturbed and degraded, such as grassed playing fields.

8. The Commission finds that the proposed project is in compliance with the state and local Buffer Zone regulatory requirements, other than those for which an Ordinance Waiver has been requested.

FINDINGS RELATED TO THE WPA STORMWATER STANDARDS

1. The Commission finds that the Applicant's proposed project activities are in the areas subject to regulation and review under WPA per 310 CMR 10.05(6)(k-q) and the Ordinance and requires the Applicant to provide stormwater management practices to attenuate pollutants and provide set back from the receiving waters and wetlands in accordance with the Stormwater Management Standards.

2. The Commission finds that the Applicant has demonstrated substantial compliance to the Stormwater Management Standards with the supporting stormwater calculations and information by utilizing a combination of three (3) bioretention basins, three (3) recharge chambers systems, three (3) detention basins/chambers systems, two (2) permeable rubber playground surfaces, and one large porous/permeable pavement parking area with accompanying treatment facilities to mitigate stormwater runoff impacts from the proposed project and provide groundwater recharge. Summary calculations and tables

of the systems provided with the final project stormwater report information indicates that overall post development peak runoff rates and total runoff volumes leaving the site will be slightly reduced for all design storms and appropriate treatment of project stormwater flows are provided in accordance with the Stormwater Management Standards and provide protection of the areas subject to regulation under the WPA and Ordinance.

3. The Commission finds that the Applicant has prepared a Long Term Pollution Prevention Plan (LTPPP) for the project in compliance with the Checklist for Stormwater Report noted under Standard 4 and 9. The Commission finds that the Applicant is responsible for implementation of the project LTPPP and documenting the activities under the LTPPP. To ensure protection of the areas subject to regulation under the WPA and Ordinance and compliance with the Stormwater Management Standards, the Commission finds that the Applicant shall implement the LTPPP in perpetuity and provide copies of the maintenance activity documentation of the LTPPP to the Commission on an annual basis.

4. The Commission finds that this project includes redevelopment of a portion of the existing Cashman Elementary School site and the Applicant has demonstrated substantial compliance with Stormwater Management Standards for Redevelopment – Standard 7 - by providing treatment and recharge for the redeveloped pavement areas at the existing school to the extent practicable in accordance with the Stormwater Management Standards. The substantial compliance with Stormwater Management Standards provides additional environmental and ecological benefit to the areas subject to regulation under the WPA and Ordinance associated with the existing Cashman Elementary School site than currently exists.

5. The Commission finds that this project is large and complex. The Commission finds that the Applicant has demonstrated design intent to control construction related impacts including erosion, sedimentation and other pollutants sources during construction and land disturbance activities to prevent impacts to the adjacent resources areas consistent with the Checklist for Stormwater Report for Standard 8, but the specific details of the construction control practices such as sediment traps, construction sequencing of the various site components, etc. are needed. On the provided Checklist under Standard 8 and in the supporting application information, the Applicant indicates that a detailed Construction Period Pollution Prevention Plan (CPPPP) and SWPPP are not provided, but will be prepared by the General Contractor who will be responsible for the management of the construction site and compliance with the NPDES Construction General Permit as allowed under the Checklist for this Standard. The Applicant further notes that a Notice of Intent will be filed with the EPA for coverage under that permit. Due to the complexity of the Applicant's stormwater design and to ensure protection of the areas subject to regulation under the WPA and Ordinance is maintained in compliance with the Stormwater Management Standards, the Commission finds that the Applicant shall prepare and provide the necessary CPPPP and SWPPP documents for review, comment and acceptance by the Commission, which includes a detailed construction sequence for each stormwater system location and that the Applicant shall also obtain the associated Federal, State and Local permits prior to any pre-construction meeting.

6. The Commission finds that the Applicant has prepared a project Stormwater BMP Operation and Maintenance Plan for the numerous stormwater pretreatment and treatment BMP's as part of the LTPPP in substantial compliance to the Stormwater Management Standards under Standard 9 and that the Applicant is responsible for implementation of the Stormwater BMP Operation and Maintenance Plan. The Commission notes, that due to the numerous components and complexity of the Applicant's stormwater system design, reporting of proper maintenance and checking to ensure that each stormwater system component is working properly and effectively is crucial to ensure the stormwater management systems function as designed and protection of the areas subject to regulation under the WPA and Ordinance is maintained. To ensure compliance, the Commission finds that the Applicant shall update the Stormwater BMP Operation and Maintenance Plan to identify all stormwater components proposed for the project and implement the Stormwater BMP Operation and Maintenance Plan in perpetuity with copies of the maintenance activity documentation under the Stormwater BMP Operation and Maintenance Plan provided to the Commission on an annual basis.

7. The Commission finds that the Applicant had initially provided an illicit discharge statement for the project with the Notice of Intent Application with the Checklist for Stormwater Report under Standard 10 and finds that, for the protection of the areas subject to regulation under the WPA and Ordinance, an updated illicit discharge statement for the final project design shall be provided.

DECISION

After careful consideration of the information provided, and of current site conditions, the Commission has determined that the requested Ordinance Waiver is justified, and that sufficient mitigation has been provided for the requested non-compliant activities to result in a net ecological gain relative to existing conditions. In making this decision to grant the Wavier, the Commission notes that in addition to the proposed mitigation and resulting ecological benefits, the proposed non-compliant activities will be located in an area that is currently largely disturbed and degraded already.

The proposed Project meets all requirements of the Wetland Protection Act and its associated regulations and, with the granting of the requested Ordinance Waiver, meets all requirements of the Amesbury Ordinance and associated regulations. Therefore, the Commission votes unanimously to grant the requested Ordinance Waiver, and to approve the project subject to compliance with the Order of Conditions.

Amesbury Elementary School
Conservation Commission - NOI Supplemental Documents List

DINISCO DESIGN
architects + planners

Documents	Submissions & Documents Included (noted by Document Date)								
	February 7, 2020 NOI Application Submission	March 5, 2020 Supplemental Material	April 8, 2020 Conservation Commission Follow Up	Sept 28, 2020 Response to Wetlands & Engineering Peer Reviews	Dec 2, 2020 Response to Wetlands & Engineering Peer Review Comments	Dec 11, 2020 Letter Update to Conservation Commission	Dec 14, 2020 Letter Response to Wetland Peer Review Comments	Jan 6, 2021 Response to Engineering Peer Review Comments	February 22, 2021 Response to Engineering Peer Review Comments
Original Notice of Intent Filing									
Stormwater Report	2/7/20								
Notice of Intent	2/7/20								
Supplemental Material									
AES Plant Book		3/5/20							
DiNisco Memo Regarding the New AES Location on CES Site			4/8/20						
Drawing Attachments:			4/7/20						
B: Site Considerations C.1: Current Design C.2: Building Shift C.3: Alt Building Location on CES Site									
Response to Stantec Review Letter #2				9/28/20					
Exhibit Plans A & B for Combined Parcels				4/17/20					
Stormwater Report (Revised)				9/25/20					
Numerical Groundwater Flow Model (Mounding Analysis by GZA)				9/28/20					
Response to BSC Group Review Letter #1				9/28/20					
Attachment 1: Original Wetland Flag Locations				5/27/20					
Invasive Species Memo (by Horsley Witten Group)				9/25/20					
Attachment A: Exhibit Plan				9/25/20					
Attachment B: Invasive Species Management Options				9/25/20					
WPA Form 3 Updated				9/29/20					
ACC Waiver Request Section 21.7 & 21.3				9/11/20					
Payground Rubber Surfacing Review				9/28/20					

Amesbury Elementary School
Conservation Commission - NOI Supplemental Documents List

	Documents	Submissions & Documents Included (noted by Document Date)								
		February 7, 2020 NOI Application Submission	March 5, 2020 Supplemental Material	April 8, 2020 Conservation Commission Follow Up	Sept 28, 2020 Response to Wetlands & Engineering Peer Reviews	Dec 2, 2020 Response to Wetlands & Engineering Peer Review Comments	Dec 11, 2020 Letter Update to Conservation Commission	Dec 14, 2020 Letter Response to Wetland Peer Review Comments	Jan 6, 2021 Response to Engineering Peer Review Comments	February 22, 2021 Response to Engineering Peer Review Comments
	Updated Plant Book				9/28/20					
	DGT Response Letter to Stantec Nov 13, 2020 Review #3 Comments & Attachments					12/1/20				
	Exhibit Plan Showing 100-Year Storm Event Flood Elevations Sheet 1.3.11					12/1/20				
	Exhibit Plan Showing 100-Year Storm Event Flood Elevations Sheet 1.3.12					12/1/20				
	Supplemental Information Report for the Stormwater Report					12/1/20				
	Response to BSC Group Review Letter #2 & Attachments:					12/1/20				
	Attachment 1: WPA Form 3 Updated					11/24/20				
	Attachment 2: Updated Plant List					12/1/20				
	DINisco Letter Update to Conservation Commission Re: Main Entry and Egress Drive w/ Figure 1						12/11/20			
	Response to BSC Group Review Letter #3 & Attachments:							12/14/20		
	SK-1 Modification to Note #20 on Plan Sheet 1.3.01							12/14/20		
	SK-2 Modification to Note #2.3 on Plan Sheets 1.3.015 & 1.3.19							12/14/20		
	DGT Response Letter to Stantec Dec 14, 2020 Review #3 Comments								1/6/21	
	Supplemental Stormwater Report				9/25/20	12/1/20			1/6/21	2/22/21
	DGT Response Letter to Stantec Jan 14, 2020 Review #4 Comments									

Amesbury Elementary School
Conservation Commission - Notice of Intent Drawing Submisison List

DINISCO DESIGN
architects + planners

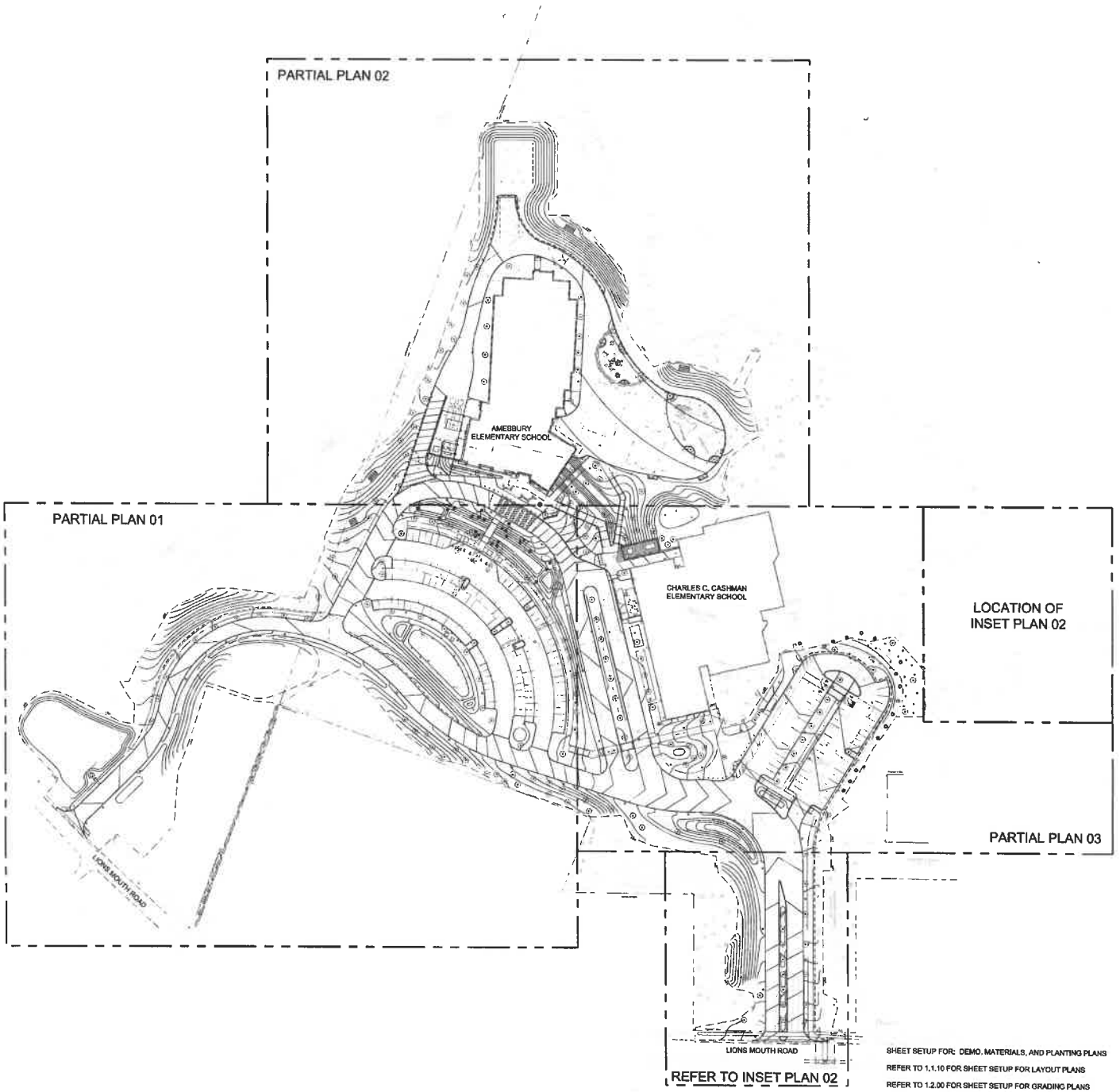
Drawing No.	Drawing Name	Submissions & Drawings Included (noted by Drawing Date)					
		Feb 7, 2020 Notice of Intent Submission + Drawing Date	September 28, 2020 Response to Peer Review		Dec 1, 2020 Response to Peer Review Comments	Jan 6, 2021 Response to Peer Review Comments	February 22, 2021 Response to Engr Peer Review Comments	
			Revised Sht No.				Revised Sht No.	
General								
G.0.01	CD Title Sheet	2/7/20		9/25/20				
Survey								
0.0.00	Existing Conditions Key Plan	1/10/20		5/15/20				
0.0.01	Existing Conditions Plan	1/10/20		5/15/20				
0.0.02	Existing Conditions Plan	1/10/20		5/15/20				
0.0.03	Existing Conditions Plan	1/10/20		5/15/20				
0.0.04	Existing Conditions Plan	1/10/20		5/15/20				
0.0.05	Existing Conditions Plan	1/10/20		5/15/20				
Landscape/Civil								
1.0.00	Overall Site Plan	2/7/20		9/25/20				
1.0.01	Partial Demo Plan - 01			9/25/20	12/1/20			2/22/21
1.0.02	Partial Demo Plan - 02			9/25/20	12/1/20			2/22/21
1.0.03	Partial Demo Plan - 03			9/25/20				2/22/21
1.1.01	Partial Materials Plan - 01	2/7/20		9/25/20	12/1/20			2/22/21
1.1.02	Partial Materials Plan - 02	2/7/20		9/25/20				2/22/21
1.1.03	Partial Materials Plan - 03	2/7/20		9/25/20	12/1/20	1/6/21		2/22/21
	Painted Playground Surfacing						1.1.21	2/22/21
1.1.21	Play Structures & Safety Surfacing			9/25/20			1.1.22	2/22/21
1.2.00	Overall Grading Plan							2/22/21
1.2.01	Partial Grading Plan - 01	2/7/20		9/25/20	12/1/20			2/22/21

Amesbury Elementary School
Conservation Commission - Notice of Intent Drawing Submisison List

		Submissions & Drawings Included (noted by Drawing Date)						
Drawing No.	**Drawing Name**	**Feb 7, 2020 Notice of Intent Submission + Drawing Date**	**September 28, 2020 Response to Peer Review**		**Dec 1, 2020 Response to Peer Review Comments**	**Jan 6, 2021 Response to Peer Review Comments**	**February 22, 2021 Response to Engr Peer Review Comments**	
			Revised Sht No.				**Revised Sht No.**	
1.2.02	Partial Grading Plan - 02	2/7/20		9/25/20	12/1/20	1/6/21		2/22/21
1.2.03	Partial Grading Plan - 03	2/7/20		9/25/20	12/1/20	1/6/21		2/22/21
1.2.04	Partial Grading Plan - Enlargement			9/25/20	12/1/20			2/22/21
1.3.01	Phase 1 Site Civil Preparation, Demolition & Erosion & Sediment Control Plan-01			9/25/20	12/1/20	1/6/21		2/22/21
1.3.02	Phase 1 Site Civil Preparation, Demolition & Erosion & Sediment Control Plan-02			9/25/20	12/1/20	1/6/21		2/22/21
1.3.03	Phase 1 Proposed Site work / Grading Plan-01			9/25/20	12/1/20	1/6/21		2/22/21
1.3.04	Phase 1 Proposed Sitework / Grading Plan-02			9/25/20	12/1/20	1/6/21		2/22/21
1.3.05	Phase 1 Erosion & Sediment Control Notes & Details and Sitework Details			9/25/20	12/1/20	1/6/21		2/22/21
1.3.06	Phase 1 Proposed Topsoil Removal Limit Plan			9/25/20	12/1/20	1/6/21		2/22/21
1.3.01	Vehicular Pavement Layout and Materials - 01	2/7/20	1.3.07	9/25/20	12/1/20	1/6/21		2/22/21
1.3.02	Vehicular Pavement Layout and Materials - 02	2/7/20	1.3.08	9/25/20	12/1/20	1/6/21		2/22/21
1.3.03	Vehicular Pavement Layout and Materials - 03	2/7/20	1.3.09	9/25/20	12/1/20	1/6/21		2/22/21
1.3.04	Stormwater Grading and Drainage Plan - 01	2/7/20	1.3.10	9/25/20	12/1/20	1/6/21		2/22/21
1.3.05	Stormwater Grading and Drainage Plan - 02	2/7/20	1.3.11	9/25/20	12/1/20	1/6/21		2/22/21
1.3.06	Stormwater Grading and Drainage Plan - 03	2/7/20	1.3.12	9/25/20	12/1/20	1/6/21		2/22/21
1.3.07	Site Utilities Plan - 01	2/7/20	1.3.13	9/25/20	12/1/20	1/6/21		2/22/21
1.3.08	Site Utilities Plan - 02	2/7/20	1.3.14	9/25/20	12/1/20	1/6/21		2/22/21
1.3.09	Site Utilities Plan - 03	2/7/20	1.3.15	9/25/20	12/1/20	1/6/21		2/22/21

Amesbury Elementary School
Conservation Commission - Notice of Intent Drawing Submisison List

		Submissions & Drawings Included (noted by Drawing Date)						
Drawing No.	Drawing Name	Feb 7, 2020 Notice of Intent Submission + Drawing Date	September 28, 2020 Response to Peer Review		Dec 1, 2020 Response to Peer Review Comments	Jan 6, 2021 Response to Peer Review Comments	February 22, 2021 Response to Engr Peer Review Comments	
			Revised Sht No.				Revised Sht No.	
1.3.10	Erosion and Sediment Control Plan - 01	2/7/20	1.3.16	9/25/20	12/1/20	1/6/21		2/22/21
1.3.11	Erosion and Sediment Control Plan - 02	2/7/20	1.3.17	9/25/20	12/1/20	1/6/21		2/22/21
1.3.12	Erosion and Sediment Control Plan - 03	2/7/20	1.3.18	9/25/20	12/1/20	1/6/21		2/22/21
1.3.13	Erosion & Sediment Control Notes & Details	2/7/20	1.3.19	9/25/20	12/1/20	1/6/21		2/22/21
1.3.14	Site Civil Details Sheet - 01	2/7/20	1.3.20	9/25/20	12/1/20	1/6/21		2/22/21
1.3.15	Site Civil Details Sheet - 02	2/7/20	1.3.21	9/25/20	12/1/20			2/22/21
1.3.16	Site Civil Details Sheet - 03	2/7/20	1.3.22	9/25/20	12/1/20	1/6/21		2/22/21
1.3.17	Site Civil Details Sheet - 04	2/7/20	1.3.23	9/25/20	12/1/20	1/6/21		2/22/21
1.3.18	Site Civil Details Sheet - 05	2/7/20	1.3.24	9/25/20	12/1/20	1/6/21		2/22/21
1.3.19	Site Civil Details Sheet - 06	2/7/20	1.3.25	9/25/20	12/1/20	1/6/21		2/22/21
1.3.20	Site Civil Details Sheet - 07	2/7/20	1.3.26	9/25/20	12/1/20	1/6/21		2/22/21
1.3.21	Site Civil Details Sheet - 08	2/7/20						
1.4.01	Partial Planting Plan - 01	2/7/20		9/25/20	12/1/20	1/6/21		2/22/21
1.4.02	Partial Planting Plan - 02	2/7/20		9/25/20	12/1/20			2/22/21
1.4.03	Partial Planting Plan - 03	2/7/20		9/25/20	12/1/20	1/6/21		2/22/21
1.4.11	Limits of Irrigation			9/25/20				
1.5.01	Site Details	2/7/20		9/25/20				2/22/21
1.5.02	Site Details	2/7/20		9/25/20				2/22/21
1.5.03	Site Details	2/7/20		9/25/20				2/22/21
1.5.04	Site Details	2/7/20		9/25/20				2/22/21
1.5.05	Site Details	2/7/20		9/25/20				2/22/21
1.5.06	Site Details							2/22/21



SHEET SETUP FOR: DEMO, MATERIALS, AND PLANTING PLANS

REFER TO 1.1.10 FOR SHEET SETUP FOR LAYOUT PLANS

REFER TO 1.2.00 FOR SHEET SETUP FOR GRADING PLANS

1 OVERALL SITE PLAN
1.0.00 SCALE: 1" = 80'-0"

AMESBURY ELEMENTARY SCHOOL

AMESBURY, MA

DINISCO DESIGN
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Brown Sardina, Inc.
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24 Roland Street
Boston, MA 02129
(617) 482-4703

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2150 Washington Street
Newton, MA 02462
(617) 527-9600

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181 West Main Street
Georgetown, MA 01833
(978) 352-8600

VAV International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 935-7226

Thompson Engineering Company, Inc.
Electrical Engineers
88 Newbury Street, Suite 103
Danvers, MA 01923
(617) 869-9006

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Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01880
(978) 266-9000

KEY PLAN

Date: 22 February 2021

Drawn By: BDB

Scale: 0 50 100

Revisions

Number	Date	Description

Overall Site Plan

1.0.00

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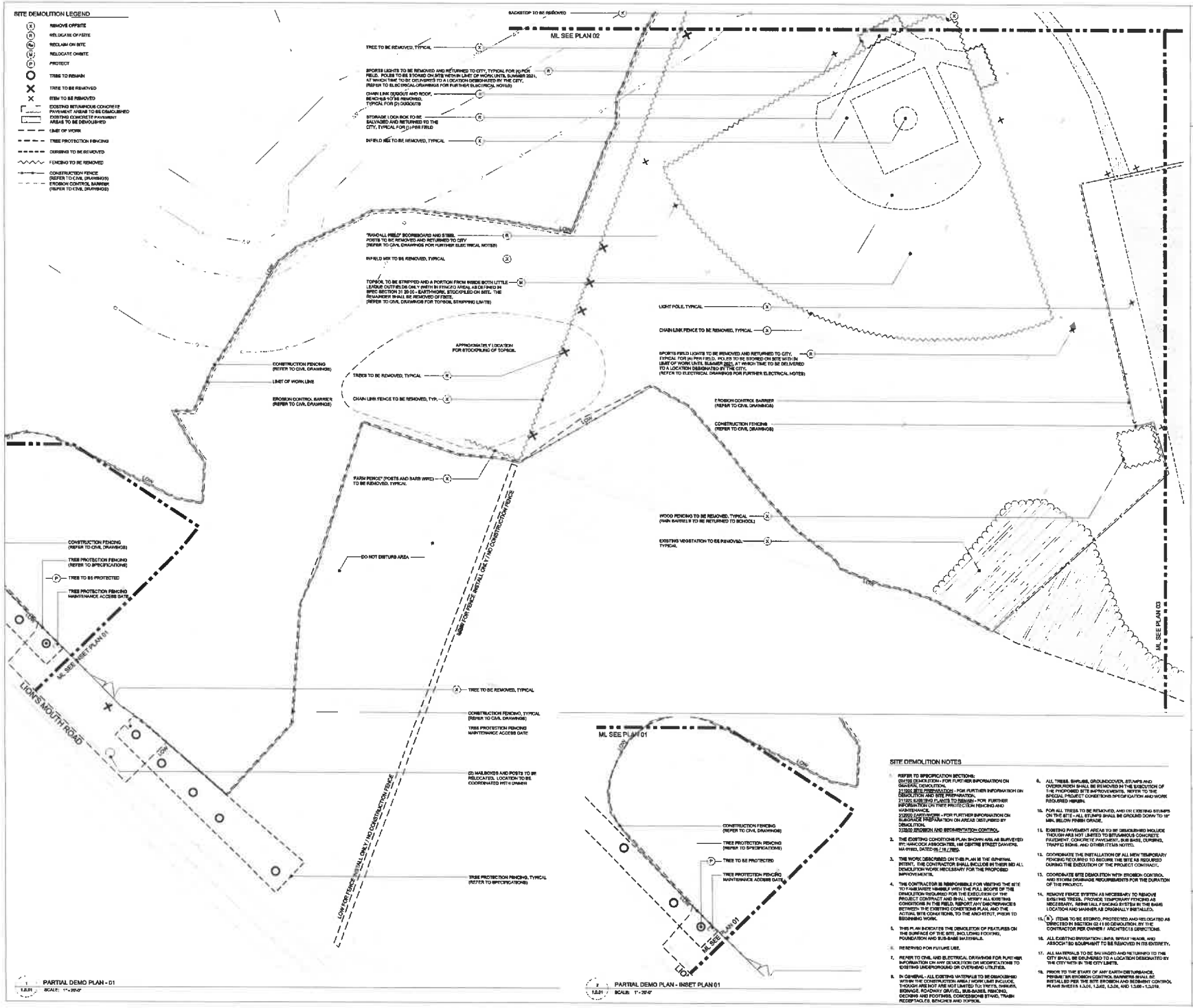

SITE DEMOLITION NOTES

1. REFER TO SPECIFICATION SECTIONS:
   024100 DEMOLITION - FOR FURTHER INFORMATION ON GENERAL DEMOLITION.
   311000 SITE PREPARATION - FOR FURTHER INFORMATION ON DEMOLITION AND SITE PREPARATION.
   311213 TREE REMOVAL PLANTING - FOR FURTHER INFORMATION ON TREE PROTECTION FENCING AND MAINTENANCE.
   312000 EARTHWORK - FOR FURTHER INFORMATION ON SUBGRADE PREPARATION ON AREAS DISTURBED BY DEMOLITION.
   312500 EROSION AND SEDIMENTATION CONTROL.
2. THE EXISTING CONDITIONS PLAN SHOWN ARE AS SURVEYED BY: HANCOCK ASSOCIATES, 185 CENTRE STREET DANVERS, MA 01923, DATED 05 / 19 / 2021.
3. THE WORK DESCRIBED ON THIS PLAN IS THE GENERAL INTENT. THE CONTRACTOR SHALL INCLUDE IN THEIR BID ALL DEMOLITION WORK NECESSARY FOR THE PROPOSED IMPROVEMENTS.
4. THE CONTRACTOR IS RESPONSIBLE FOR VISITING THE SITE TO FAMILIARIZE HIMSELF WITH THE FULL SCOPE OF THE DEMOLITION REQUIRED FOR THE EXECUTION OF THE PROJECT CONTRACT AND SHALL VERIFY ALL EXISTING CONDITIONS IN THE FIELD. REPORT ANY DISCREPANCIES BETWEEN THE EXISTING CONDITIONS PLAN, AND THE ACTUAL SITE CONDITIONS, TO THE ARCHITECT, PRIOR TO BEGINNING WORK.
5. THIS PLAN INDICATES THE DEMOLITION OF FEATURES ON THE SURFACE OF THE SITE, INCLUDING FOOTING, FOUNDATION AND SUB-BASE MATERIALS.
6. RESERVED FOR FUTURE USE.
7. REFER TO CIVIL AND ELECTRICAL DRAWINGS FOR FURTHER INFORMATION ON ANY DEMOLITION OR MODIFICATIONS TO EXISTING UNDERGROUND OR OVERHEAD UTILITIES.
8. IN GENERAL - ALL EXISTING MATERIALS TO BE DEMOLISHED WITH-IN THE CONSTRUCTION AREA / WORK LIMIT INCLUDE, THOUGH ARE NOT ARE NOT LIMITED TO: TREES, SHRUBS, SIGNAGE, ROADWAY GRAVEL, SUB-BASES, FENCING, DECKING AND FOOTINGS, CONCESSIONS STAND, TRASH RECEPTACLES, BENCHES AND TOPSOIL.
9. ALL TREES, SHRUBS, GROUNDCOVER, STUMPS AND OVERBURDEN SHALL BE REMOVED IN THE EXECUTION OF THE PROPOSED SITE IMPROVEMENTS. REFER TO THE SPECIAL PROJECT CONDITIONS SPECIFICATION AND WORK REQUIRED HEREIN.
10. FOR ALL TREES TO BE REMOVED, AND OR EXISTING STUMPS ON THE SITE - ALL STUMPS SHALL BE GROUND DOWN TO 18" MIN. BELOW FINISH GRADE.
11. EXISTING PAVEMENT AREAS TO BE DEMOLISHED INCLUDE THOUGH ARE NOT LIMITED TO BITUMINOUS CONCRETE PAVEMENT, CONCRETE PAVEMENT, SUB BASE, CURBING, TRAFFIC SIGNS, AND OTHER ITEMS NOTED.
12. COORDINATE THE INSTALLATION OF ALL NEW TEMPORARY FENCING REQUIRED TO SECURE THE SITE AS REQUIRED DURING THE EXECUTION OF THE PROJECT CONTRACT.
13. COORDINATE SITE DEMOLITION WITH EROSION CONTROL AND STORM DRAINAGE REQUIREMENTS FOR THE DURATION OF THE PROJECT.
14. REMOVE FENCE SYSTEM AS NECESSARY TO REMOVE EXISTING TREES. PROVIDE TEMPORARY FENCING AS NECESSARY. REINSTALL FENCING SYSTEM IN THE SAME LOCATION AND MANNER AS ORIGINALLY INSTALLED.
15. (R) ITEMS TO BE STORED, PROTECTED AND RELOCATED AS DIRECTED IN SECTION 02 41 00 DEMOLITION, BY THE CONTRACTOR PER OWNER / ARCHITECTS DIRECTIONS.
16. ALL EXISTING IRRIGATION LINES, SPRAY HEADS, AND ASSOCIATED EQUIPMENT TO BE REMOVED IN ITS ENTIRETY.
17. ALL MATERIALS TO BE SALVAGED AND RETURNED TO THE CITY SHALL BE DELIVERED TO A LOCATION DESIGNATED BY THE CITY WITH IN THE CITY LIMITS.
18. PRIOR TO THE START OF ANY EARTH DISTURBANCE, PERIMETER EROSION CONTROL BARRIERS SHALL BE INSTALLED PER THE SITE EROSION AND SEDIMENT CONTROL PLANS SHEETS 1.3.01, 1.3.02, 1.3.03, AND 1.3.05 - 1.3.010.

AMESBURY ELEMENTARY SCHOOL

AMESBURY, MA

DINISCO DESIGN architects - planners
99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2858

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardone, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-9600

Crabtree McGrath Assoc., Inc.
Food Service Consultants
181 West Main Street
Georgetown, MA 01833
(978) 352-6600

WAI International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 935-7226

Thompson Engineering Company, Inc.
Electrical Engineers
99 Newbury Street, Suite 103
Danvers, MA 01923
(617) 998-9099

EdVance Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01860
(978) 258-9900

KEY PLAN

NORTH ARROW

STAMP

Date: 22 February 2021

Drawn By: BDB

Scale: 0 20 40

Revisions

Number	Date	Description

Partial Demo Plan - 01

1.0.01

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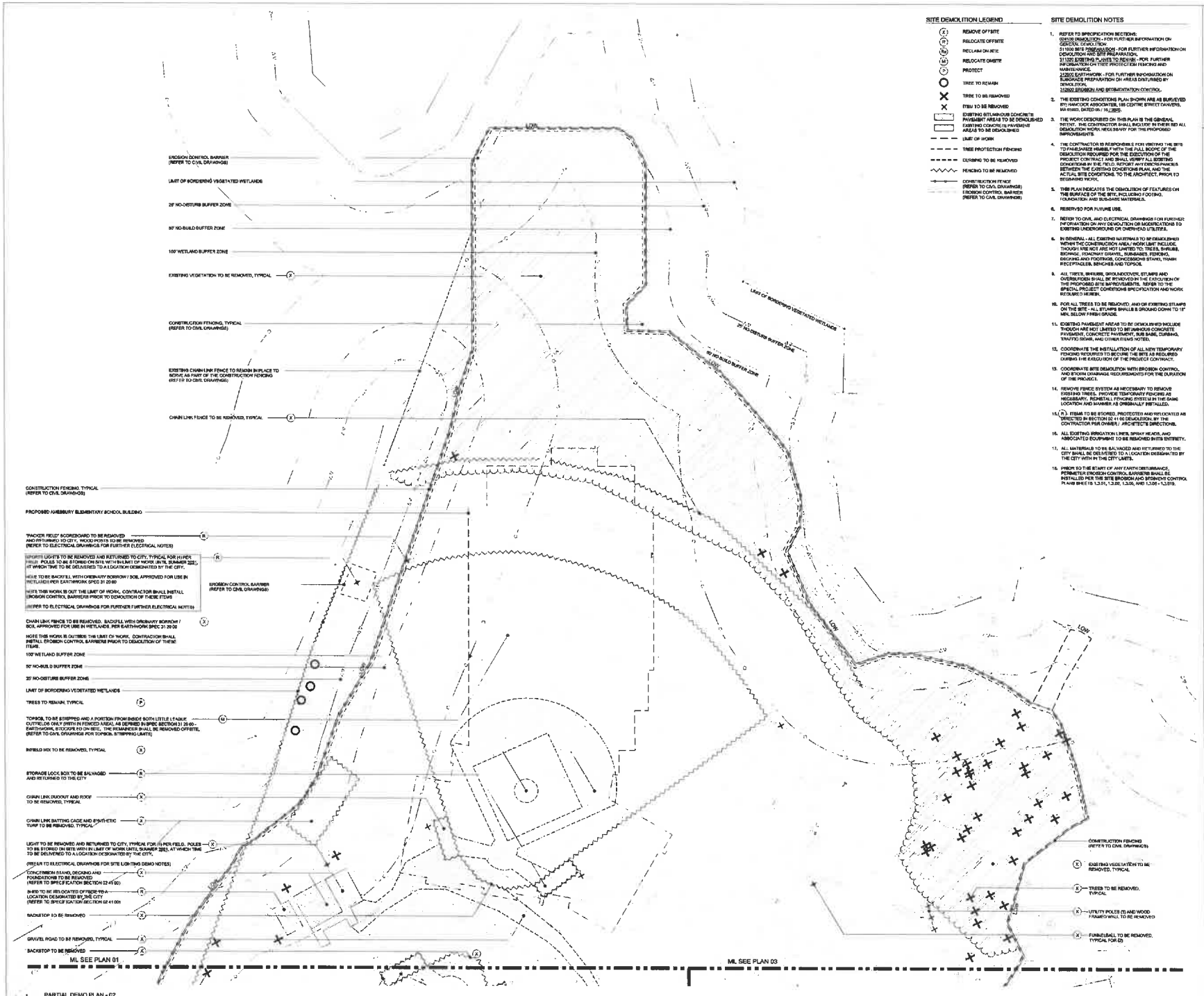

PARTIAL DEMO PLAN - 02
1.0.02 SCALE: 1" = 20'-0"

SITE DEMOLITION LEGEND

- (R) REMOVE OFFSITE
- (RL) RELOCATE OFFSITE
- (RA) RECLAIM ON SITE
- (M) RELOCATE ONSITE
- (P) PROTECT
- TREE TO REMAIN
- TREE TO BE REMOVED
- ITEM TO BE REMOVED
- EXISTING BITUMINOUS CONCRETE PAVEMENT AREAS TO BE DEMOLISHED
- EXISTING CONCRETE PAVEMENT AREAS TO BE DEMOLISHED
- LIMIT OF WORK
- TREE PROTECTION FENCING
- EXISTING TO BE REMOVED
- FENCING TO BE REMOVED
- CONSTRUCTION FENCE (REFER TO CIVIL DRAWINGS) EROSION CONTROL BARRIER (REFER TO CIVIL DRAWINGS)

SITE DEMOLITION NOTES

1. REFER TO SPECIFICATION SECTIONS:
   024100 DEMOLITION - FOR FURTHER INFORMATION ON GENERAL DEMOLITION
   311000 SITE PREPARATION - FOR FURTHER INFORMATION ON DEMOLITION AND SITE PREPARATION.
   311301 EXISTING PLANTS TO REMAIN - FOR FURTHER INFORMATION ON TREE PROTECTION FENCING AND MAINTENANCE.
   312000 EARTHWORK - FOR FURTHER INFORMATION ON SUBGRADE PREPARATION ON AREAS DISTURBED BY DEMOLITION.
   312500 EROSION AND SEDIMENTATION CONTROL.
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AMESBURY ELEMENTARY SCHOOL

AMESBURY, MA

DINISCO DESIGN
architects + planners
99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2658

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sandine, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2100 Washington Street
Newton, MA 02462
(617) 527-9800

Crabtree McGrath Assoc., Inc.
Food Service Consultants
161 West Main Street
Georgetown, MA 01833
(978) 352-8600

VAV International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 935-7226

Thompson Engineering Company, Inc.
Electrical Engineers
88 Newbury Street, Suite 103
Danvers, MA 01923
(617) 888-9006

EdVance Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01890
(978) 258-9900

KEY PLAN

NORTH ARROW | STAMP

Date: 22 February 2021
Drawn By: BDB
Scale: 0 20 40

Revisions

Number	Date	Description

Partial Demo Plan - 02

1.0.02

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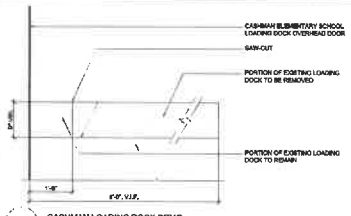

3 / 1.0.03 CASHMAN LOADING DOCK DEMO
SCALE: 1" = 1'-0"

SITE DEMOLITION LEGEND

- (X) REMOVE OFF SITE
- (R) RELOCATE OFFSITE
- (R) RELOCATE ON SITE
- (R) RELOCATE ONSITE
- (P) PROTECT
- TREE TO REMAIN
- TREE TO BE REMOVED
- ITEM TO BE REMOVED
- EXISTING BITUMINOUS CONCRETE PAVEMENT AREAS TO BE DEMOLISHED
- EXISTING CONCRETE PAVEMENT AREAS TO BE DEMOLISHED
- LIMIT OF WORK
- TREE PROTECTION FENCING
- CURBING TO BE REMOVED
- FENCING TO BE REMOVED
- CONSTRUCTION FENCE (REFER TO CIVIL DRAWINGS)
- EROSION CONTROL BARRIER (REFER TO CIVIL DRAWINGS)

SITE DEMOLITION NOTES

1. REFER TO SPECIFICATION SECTIONS:
   01150 DEMOLITION - FOR FURTHER INFORMATION ON GENERAL DEMOLITION.
   01300 SITE PREPARATION - FOR FURTHER INFORMATION ON DEMOLITION AND SITE PREPARATION.
   31132 EXISTING PLANTS TO REMAIN - FOR FURTHER INFORMATION ON TREE PROTECTION FENCING AND MAINTENANCE.
   31200 EARTHWORK - FOR FURTHER INFORMATION ON SUBGRADE PREPARATION ON AREAS DISTURBED BY DEMOLITION.
   312800 EROSION AND SEDIMENTATION CONTROL.
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15. (R) ITEMS TO BE STORED, PROTECTED AND RELOCATED AS DIRECTED IN SECTION 01 150 DEMOLITION, BY THE CONTRACTOR PER OWNER / ARCHITECTS DIRECTIONS.
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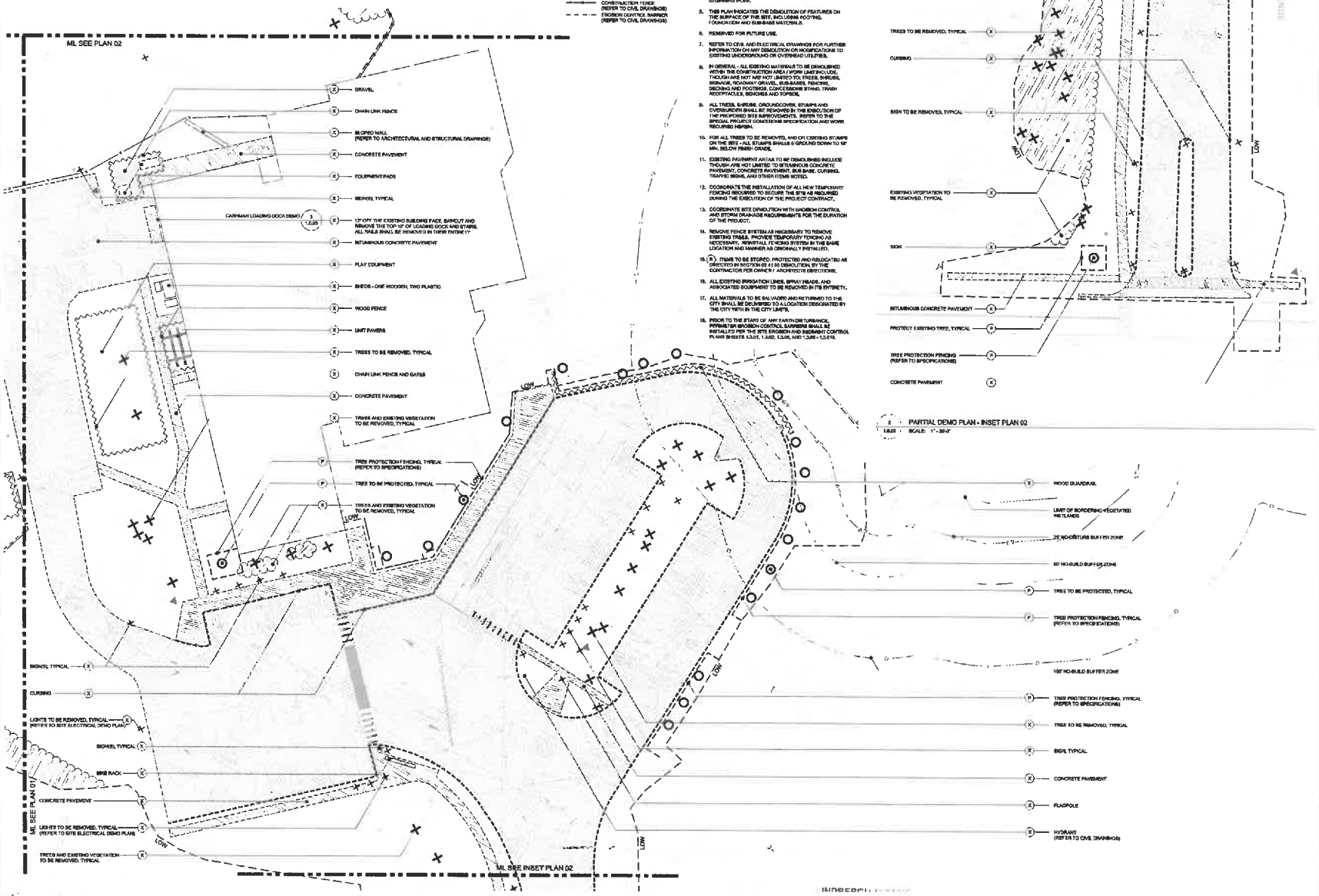

1 / 1.0.03 PARTIAL DEMO PLAN - 03
SCALE: 1" = 20'-0"

2 / 1.0.03 PARTIAL DEMO PLAN - INSET PLAN 02
SCALE: 1" = 20'-0"

AMESBURY ELEMENTARY SCHOOL

AMESBURY, MA

DINISCO DESIGN
architects + planners
99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2858

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Sasaki Sandlee, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-9600

Crabtree McGrath Assoc., Inc.
Food Service Consultants
181 West Main Street
Georgetown, MA 01833
(978) 352-6500

WAV International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 935-7228

Thompson Engineering Company, Inc.
Electrical Engineers
89 Newbury Street, Suite 103
Danvers, MA 01923
(617) 866-9066

EdVance Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01880
(978) 258-9900

KEY PLAN

NORTH ARROW

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Date: 22 February 2021

Drawn By: BDB

Scale: 0 20 40

Revisions

Number	Date	Description

Partial Demo Plan - 03

1.0.03

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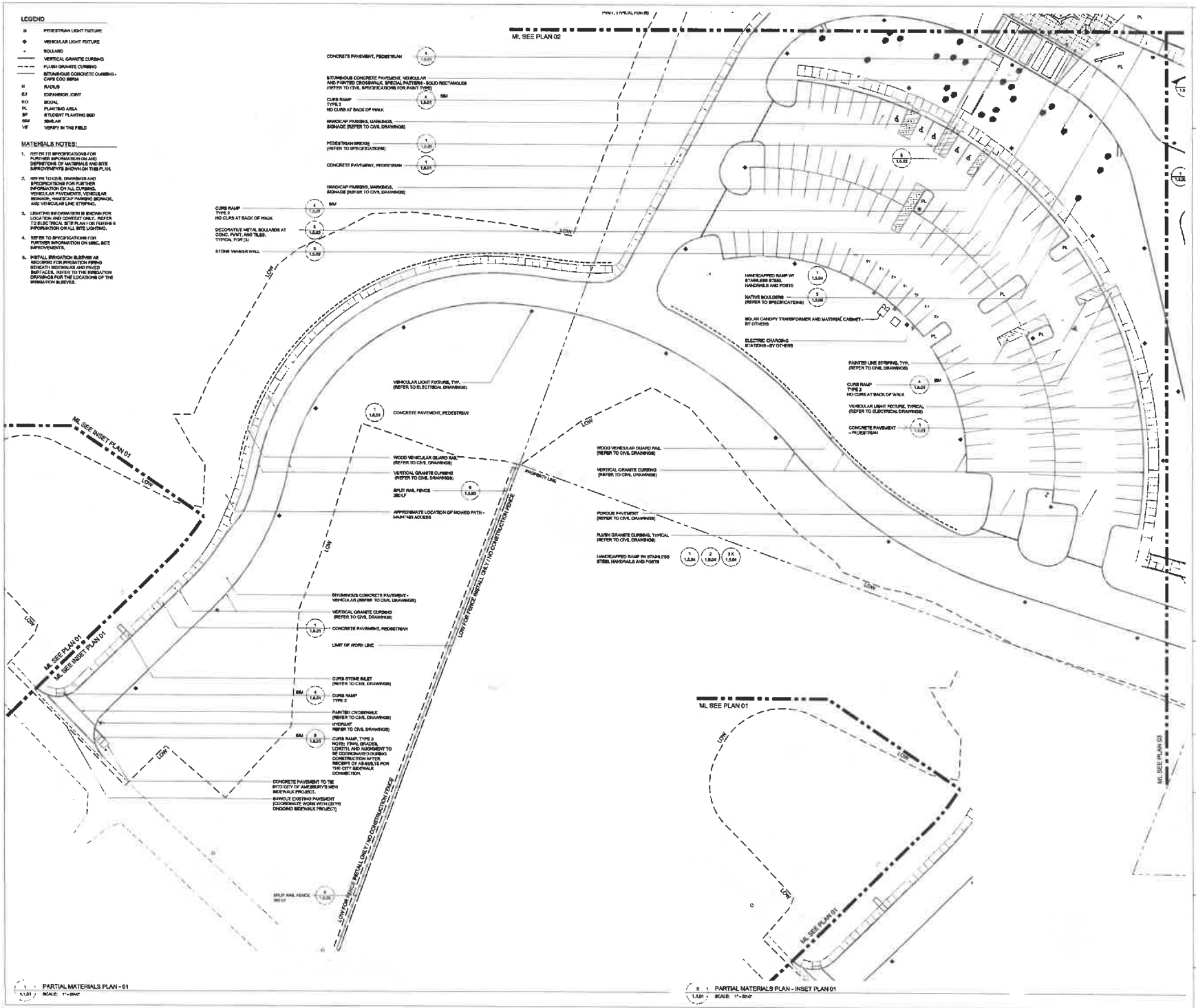

AMESBURY ELEMENTARY SCHOOL

AMESBURY, MA

DINISCO DESIGN
architects + planners
99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2555

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-9900

Crabtree McGrath Assoc., Inc.
Food Service Consultants
181 West Main Street
Georgetown, MA 01833
(978) 352-8600

VAV International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 935-7228

Thompson Engineering Company, Inc.
Electrical Engineers
80 Newbury Street, Suite 103
Danvers, MA 01923
(617) 686-9086

EdVance Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01850
(978) 258-9900

KEY PLAN

Date: 22 February 2021

Drawn By: BDB

Scale: 0 20 40

Revisions

Number	Date	Description

Partial Materials Plan - 01

1.1.01

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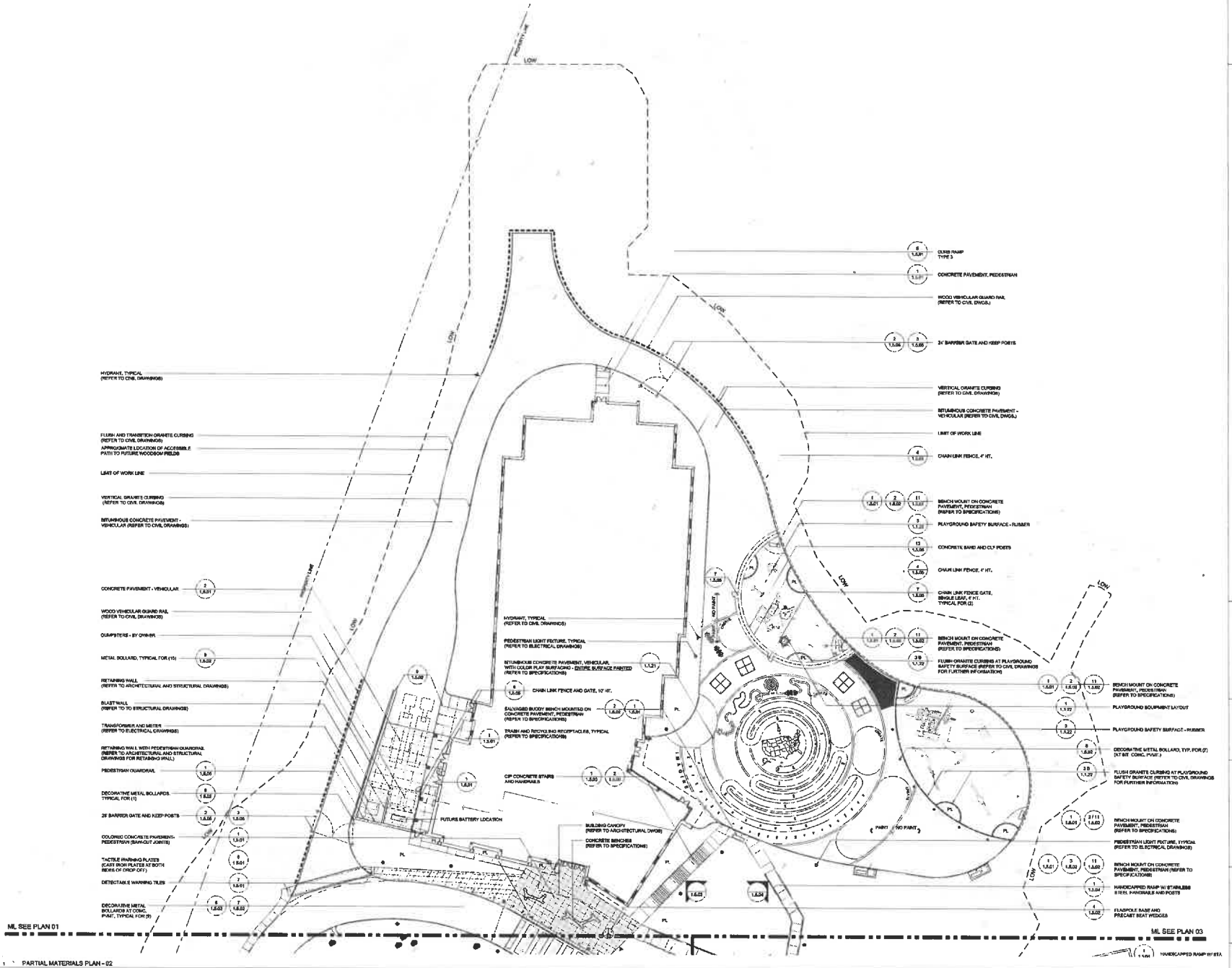

1 PARTIAL MATERIALS PLAN - 02
1.1.02 SCALE: 1" = 20'-0"

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AMESBURY, MA

DINISCO DESIGN
architects + planners

99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2626

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 462-4703

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-9600

Crabtree McGrath Assoc., Inc.
Food Service Consultants
181 West Main Street
Georgetown, MA 01833
(978) 352-9500

WAV International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 935-7228

Thompson Engineering Company, Inc.
Electrical Engineers
80 Newbury Street, Suite 103
Danvers, MA 01923
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KEY PLAN

NORTH ARROW

STAMP

Date: 22 February 2021

Drawn By: BDB

Scale: 0 20 40

Revisions

Number	Date	Description

Partial Materials Plan - 02

1.1.02

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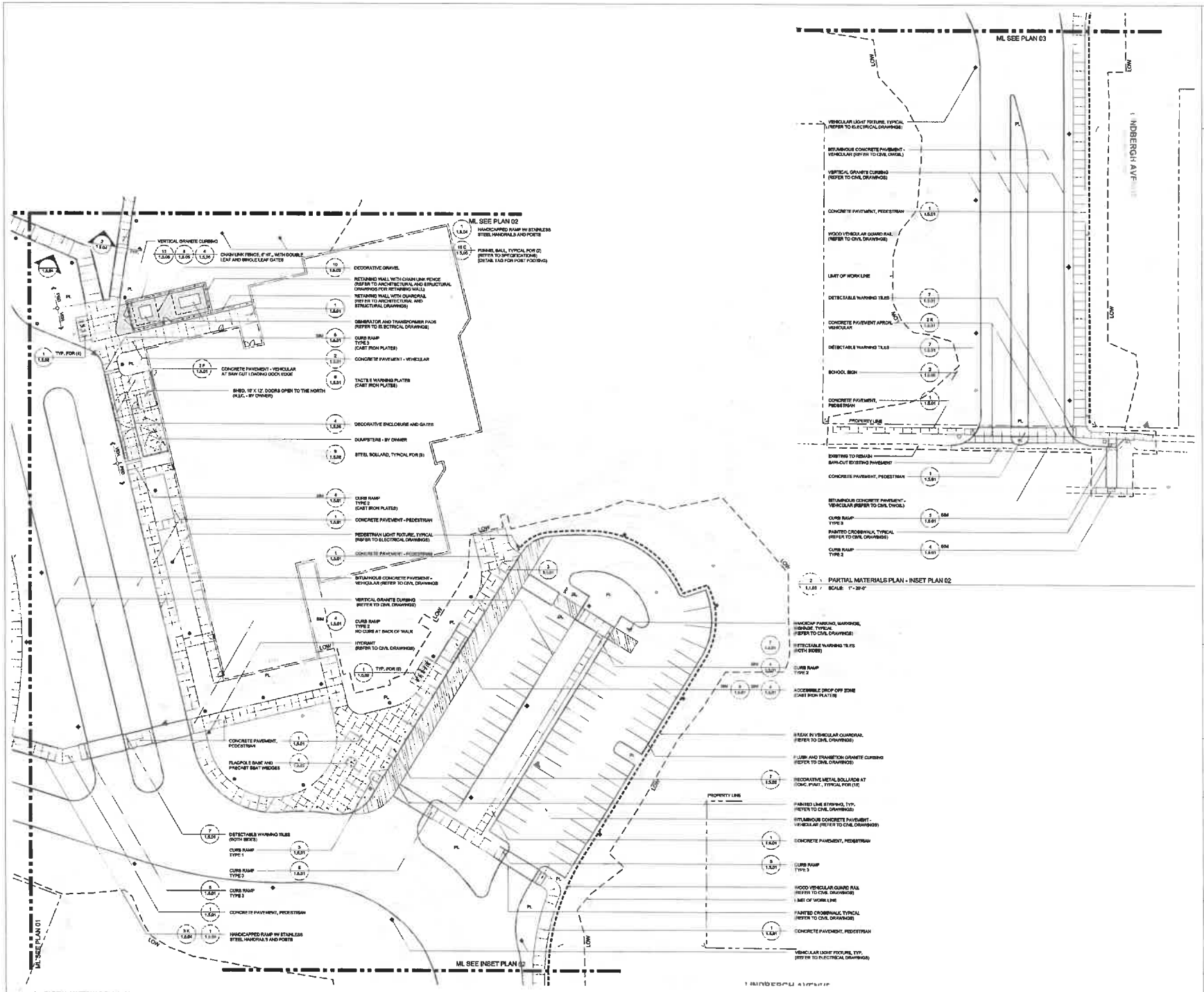

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89 Chauncy Street, Suite 901
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VAV International, Inc.
Mechanical Engineers
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Woburn, MA 01801
(781) 938-7228

Thompson Engineering Company, Inc.
Electrical Engineers
69 Newbury Street, Suite 103
Danvers, MA 01923
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NORTH ARROW

STAMP

Date: 22 February 2021

Drawn By: BDB

Scale: 0 20 40

Revisions

Number	Date	Description

Partial Materials Plan - 03

1.1.03

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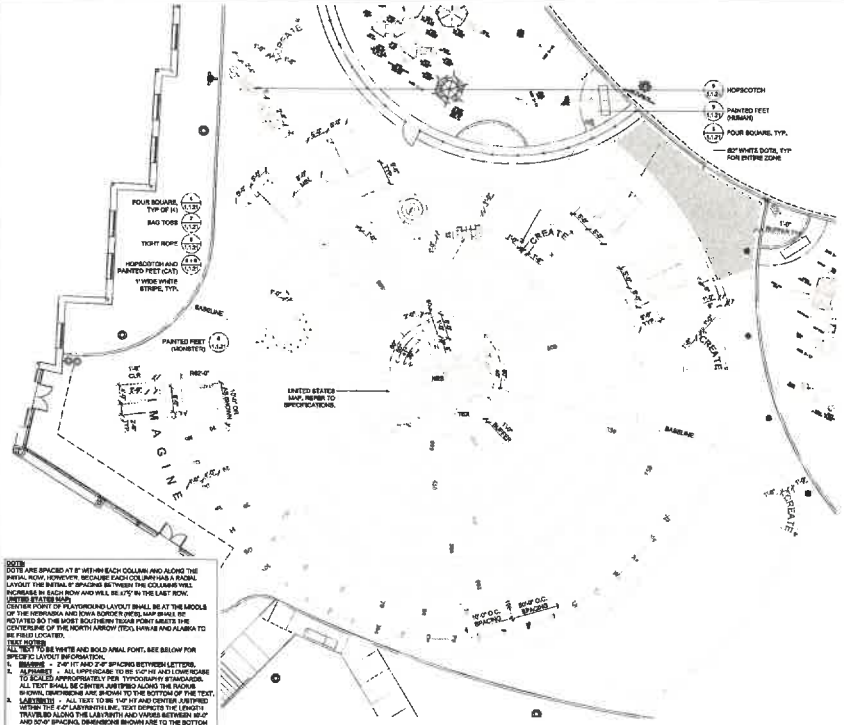


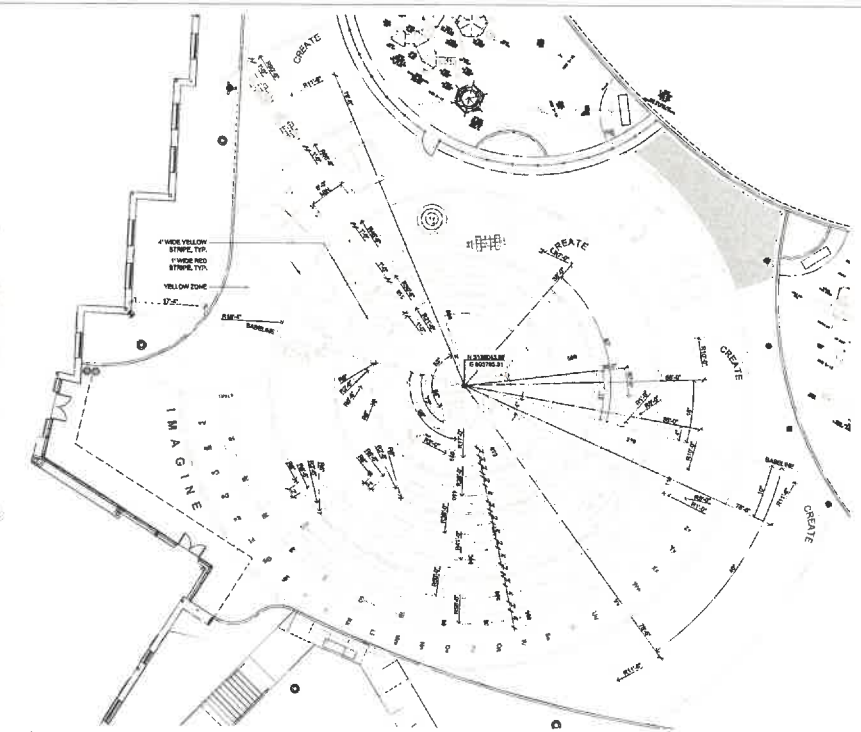
DOTS
DOTS ARE SPACED AT 8" WITHIN EACH COLUMN AND ALONG THE INITIAL ROW, HORIZ'LY. BECAUSE EACH COLUMN HAS A RADIAL LAYOUT THE INITIAL 8" SPACING BETWEEN THE COLUMNS WILL INCREASE IN EACH ROW AND WILL BE 1'-5" IN THE LAST ROW.

UNITED STATES MAP
CENTER POINT OF PLAYGROUND LAYOUT SHALL BE AT THE MIDDLE OF THE NEBRASKA AND IOWA BORDER (NEB), MAP SHALL BE ROTATED SO THE MOST SOUTHERN TEXAS POINT MEETS THE CENTERLINE OF THE NORTH ARROW (TEX), HAWAII AND ALASKA TO BE FIELD LOCATED.

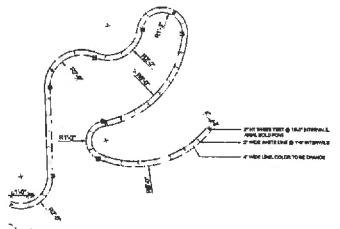
TEXT NOTES
ALL TEXT TO BE WHITE AND BOLD ARIAL FONT, SEE BELOW FOR SPECIFIC LAYOUT INFORMATION.

1. IMAGINE - 2'-0" HT AND 2'-0" SPACING BETWEEN LETTERS.
2. ALPHABET - ALL UPPERCASE TO BE 1'-0" HT AND LOWERCASE TO SCALED APPROPRIATELY PER TYPOGRAPHY STANDARDS. ALL TEXT SHALL BE CENTER JUSTIFIED ALONG THE RADIUS SHOWN, DIMENSIONS ARE SHOWN TO THE BOTTOM OF THE TEXT.
3. LABYRINTH - ALL TEXT TO BE 1'-0" HT AND CENTER JUSTIFIED WITHIN THE 4'-0" LABYRINTH LINE. TEXT DEPICTS THE LENGTH TRAVELED ALONG THE LABYRINTH AND VARIES BETWEEN 48'-0" AND 50'-0" SPACING, DIMENSIONS SHOWN ARE TO THE BOTTOM OF THE TEXT.
4. CREATE - 1'-0" HT AND RIGHT JUSTIFIED FROM THE PURITY OF THOUGHT BROWN, TEXT TO BE A CONSISTENT 1'-0" CLEAR OF THE OUTER EDGE BROWN.
5. "N" NORTH ARROW - 1'-0" HT AND CENTER JUSTIFIED, 6" CLEAR OF BASE OF NORTH ARROW.

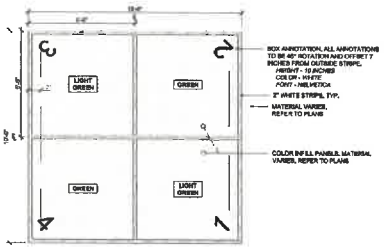
2 1.1.21 PLAYGROUND GAMES LAYOUT
SCALE: 1" = 10'-0"



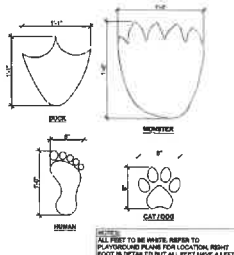
1 1.1.21 PLAYGROUND LINEWORK LAYOUT
SCALE: 1" = 10'-0"



5 1.1.21 TIGHT ROPE
SCALE: 3/8" = 1'-0"

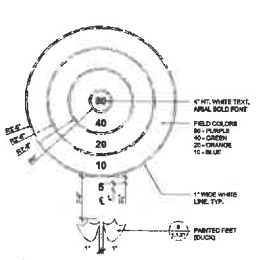


4 1.1.21 FOUR SQUARE
SCALE: 1/2" = 1'-0"

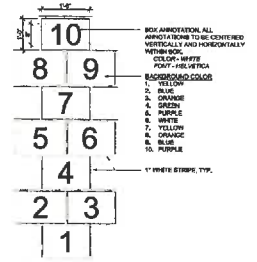


ALL FEET TO BE WHITE, REFER TO PLAYGROUND PLANS FOR LOCATION, RIGHT FOOT IS DETAILED BUT ALL FEET HAVE A LEFT (L) AND RIGHT (R) FOOT NOTED ON THE PLAN.

6 1.1.21 PAINTED FEET
SCALE: 1-1/2" = 1'-0"



7 1.1.21 BAG TOSS
SCALE: 1/2" = 1'-0"



8 1.1.21 HOPSCOTCH
SCALE: 3/8" = 1'-0"



PRELIMINARY COLOR SELECTIONS AS SHOWN IN THE DRAWAY AND NOTED BELOW, LANDSCAPE ARCHITECT WILL MAKE FINAL COLOR SELECTIONS FROM THE MANUFACTURERS FULL OF RANGE OF COLORS (STANDARD AND CUSTOM) DURING THE SUBMITTAL PHASE.

PRELIMINARY COLORS
RED, BLACK, GREY, WHITE, PURPLE, YELLOW, ORANGE, BLUE, DARK BLUE, GREEN, LIGHT GREEN

R:	RED
Bl:	BLACK
G:	GREY
Wt:	WHITE
O:	ORANGE
B:	BLUE
DB:	DARK BLUE
G:	GREEN
LG:	LIGHT GREEN
P:	PURPLE

3 1.1.21 PLAYGROUND COLOR SCHEME
SCALE: NTS

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AMESBURY, MA

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architects + planners
55 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2966

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Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
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Landscape Architects
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Boston, MA 02129
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KEY PLAN

NORTH ARROW

STAMP

Date: 22 February 2021

Drawn By: BDB

Scale: 0 10 20

Revisions

Number	Date	Description

Painted Playground Surfacing

1.1.21

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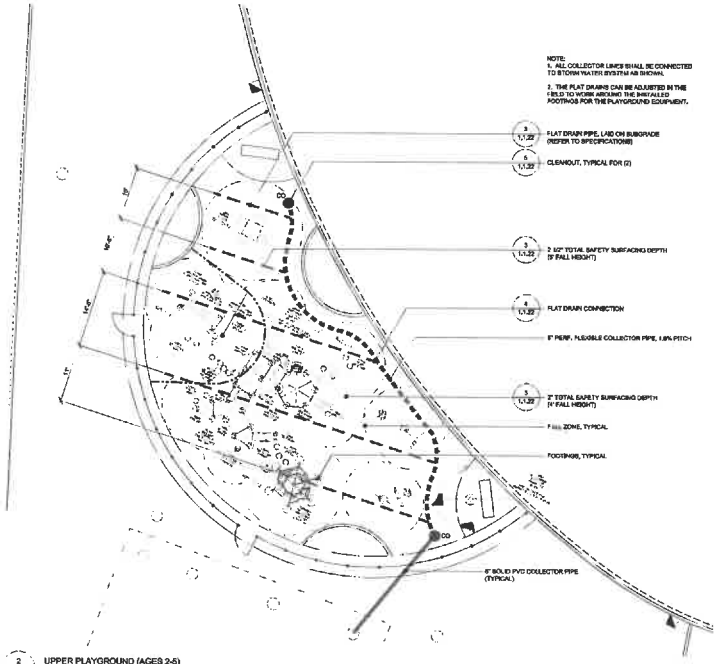
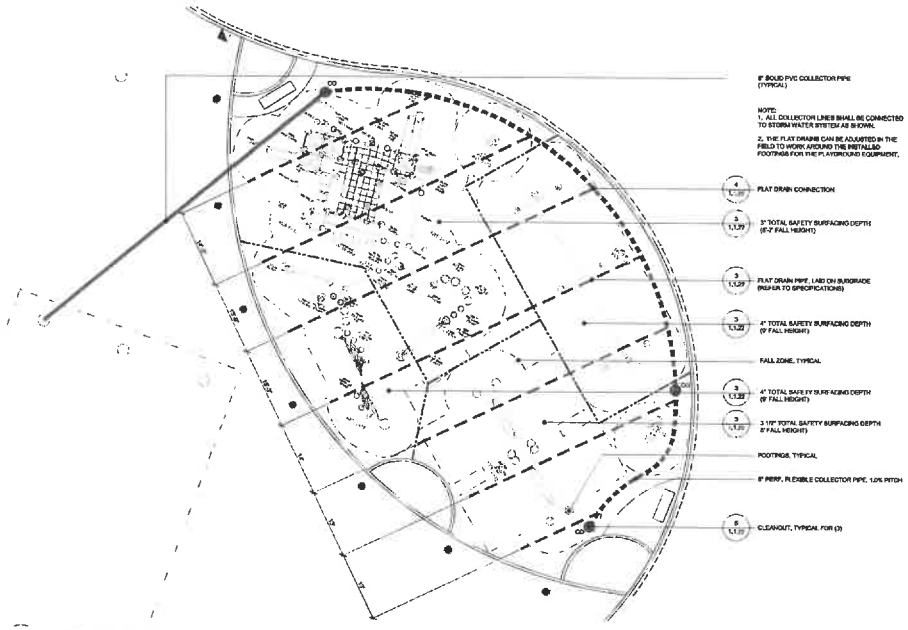
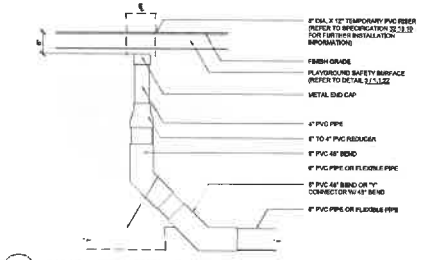


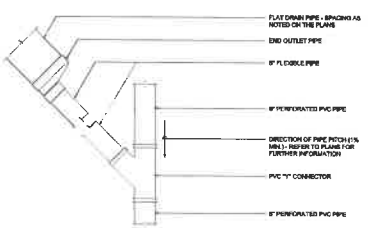
2 1.1.22 UPPER PLAYGROUND (AGES 2-5)
SCALE: 1/8" = 1'-0"



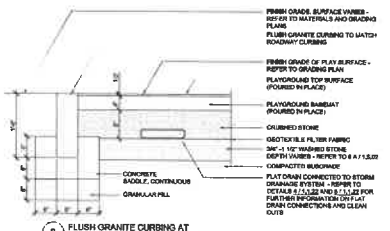
1 1.1.22 LOWER PLAYGROUND (AGES 5-12)
SCALE: 1/8" = 1'-0"



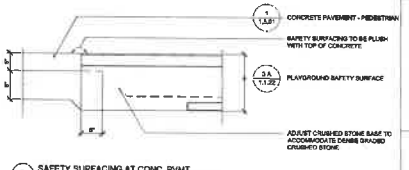
5 1.1.22 CLEANOUT AT RUBBER SURFACING
SCALE: 1" = 1'-0"



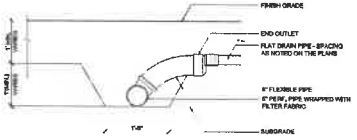
D PLAN



B FLUSH GRANITE CURBING AT PLAYGROUND SAFETY SURFACE

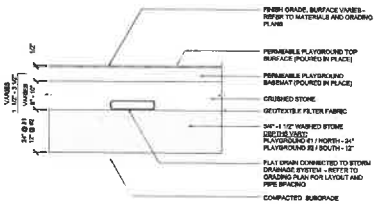


D SAFETY SURFACING AT CONC. PVMT.



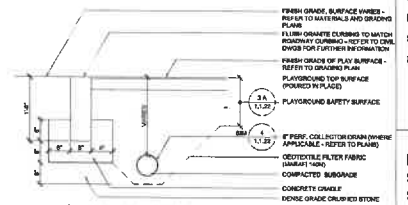
A SECTION

4 1.1.22 FLAT DRAIN CONNECTION
SCALE: 1" = 1'-0"



A PLAYGROUND SAFETY SURFACE - SECTION

3 1.1.22 PLAYGROUND SAFETY SURFACE
SCALE: 1" = 1'-0"



C COLLECTOR DRAIN PIPE

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Boston, MA 02111
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Surveying & Engineers
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Framingham, MA 01701
(508) 878-0030

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Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4765

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Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-9600

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Food Service Consultants
181 West Main Street
Georgetown, MA 01833
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Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
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Electrical Engineers
80 Hawtory Street, Suite 103
Danvers, MA 01923
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Andover, MA 01810
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NORTH ARROW

Date: 22 February 2021
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Revisions

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Play Structures, and Safety Surfacing Subsurface and Drainage

1.1.22

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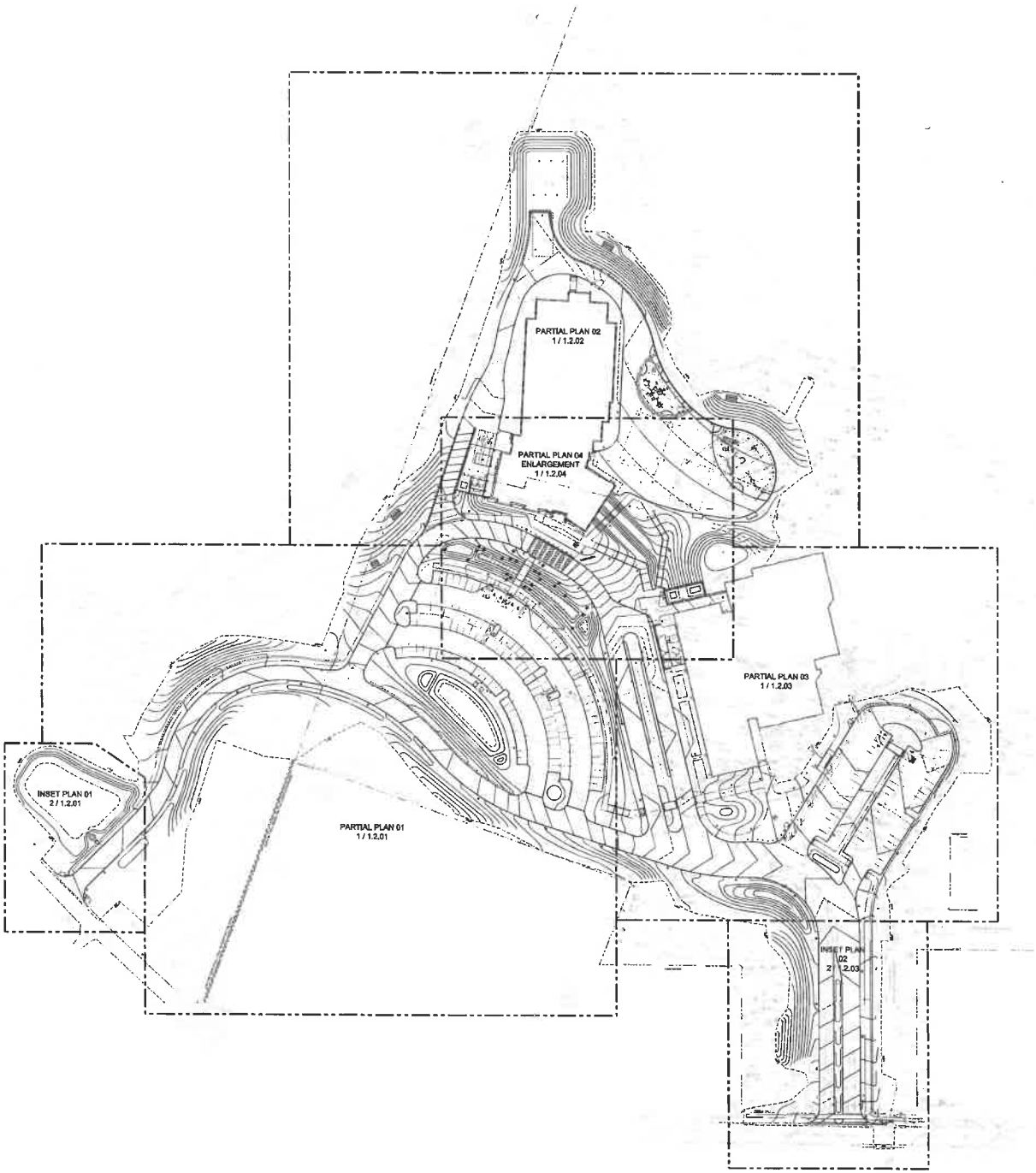

1 OVERALL GRADING PLAN
1.2.00 / SCALE: 1" = 50'-0"

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AMESBURY, MA

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architects + planners

99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 425-2656

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-9800

Cristree McGrath Assoc., Inc.
Food Service Consultants
161 West Main Street
Georgetown, MA 01833
(978) 352-8600

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Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 935-7226

Thompson Engineering Company, Inc.
Electrical Engineers
59 Newbury Street, Suite 103
Danvers, MA 01923
(617) 866-9066

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Technology Consultants
309 Brickstone Square, Suite 201
Andover, MA 01880
(978) 255-9600

KEY PLAN

NORTH ARROW

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Date: 22 February 2021

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Revisions

Number	Date	Description

Overall Grading Plan

1.2.00

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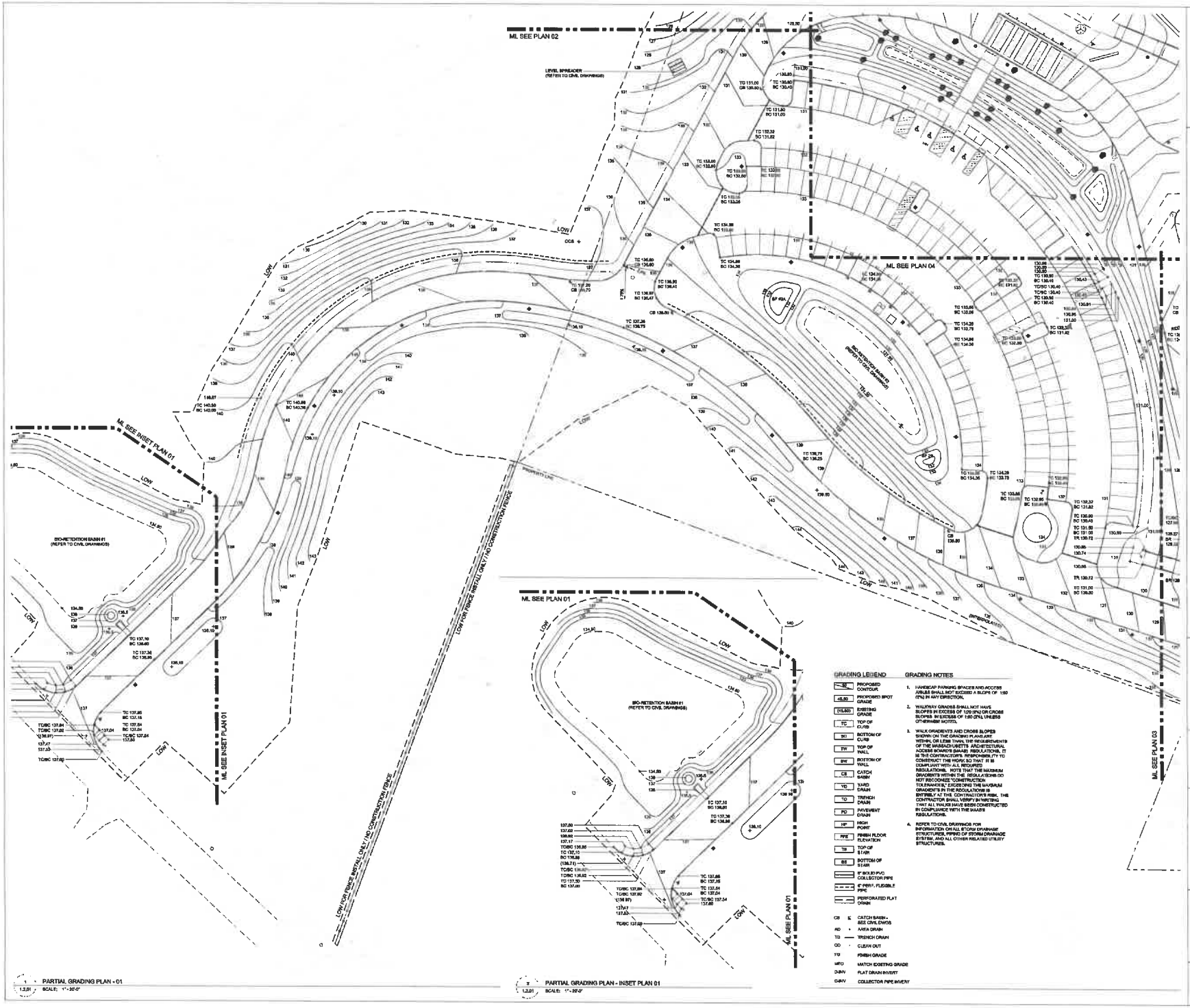

1 PARTIAL GRADING PLAN - 01
1.2.01 SCALE: 1" = 20'-0"

2 PARTIAL GRADING PLAN - INSET PLAN 01
1.2.01 SCALE: 1" = 20'-0"

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AMESBURY, MA

DINISCO DESIGN architects + planners
99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2555

DGT Associates
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Framingham, MA 01701
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Landscape Architects
24 Roland Street
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Structural Engineers
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Electrical Engineers
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(617) 888-8088

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Technology Consultants
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KEY PLAN

NORTH ARROW

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Scale: 0 20 40

Revisions

Number	Date	Description

Partial Grading Plan - 01

1.2.01

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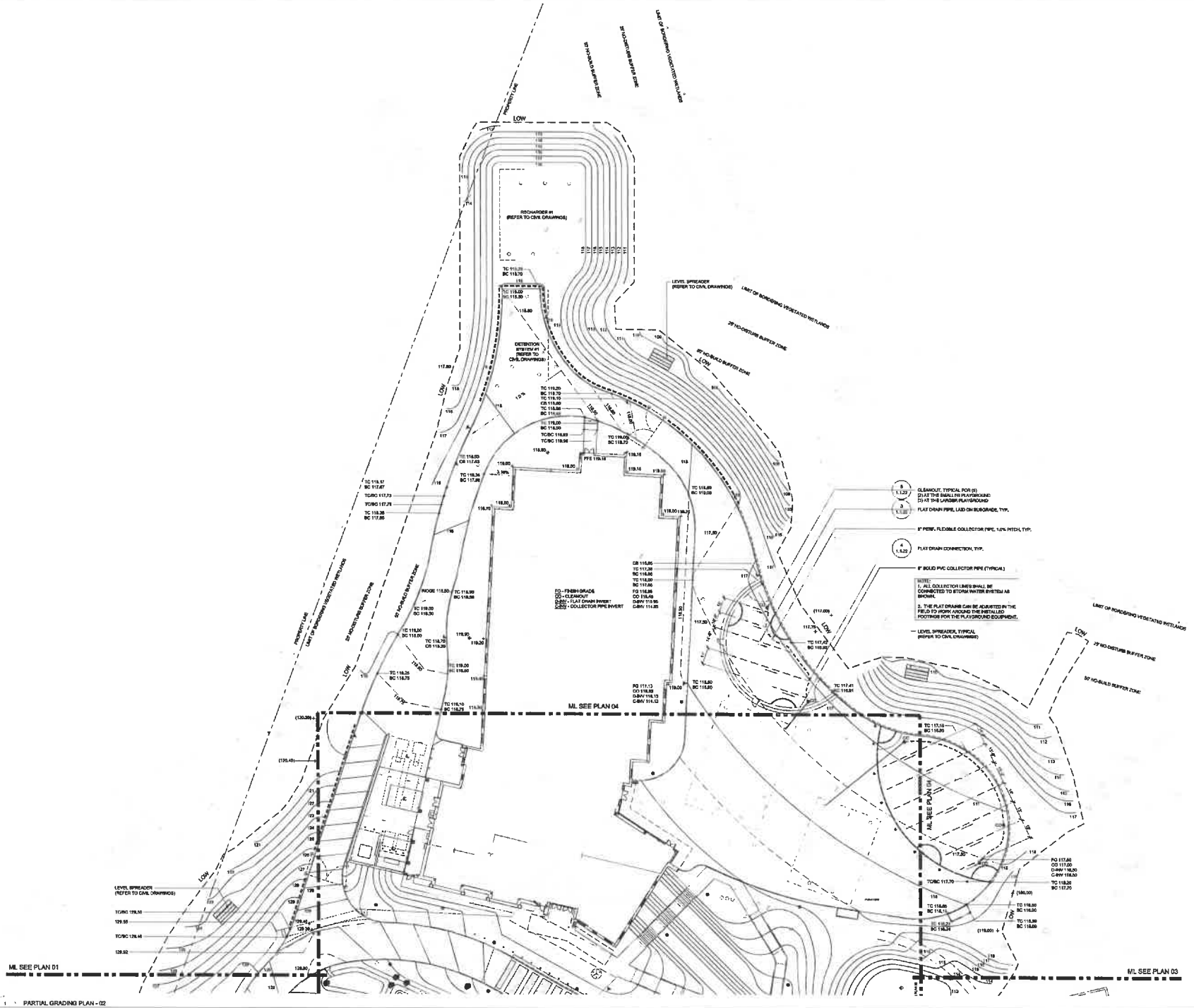

1 PARTIAL GRADING PLAN - 02
1.2.02 SCALE: 1" = 20'-0"

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KEY PLAN

Date: 22 February 2021
Drawn By: BDB
Scale: 0 20 40

Revisions

Number	Date	Description

Partial Grading Plan - 02

1.2.02

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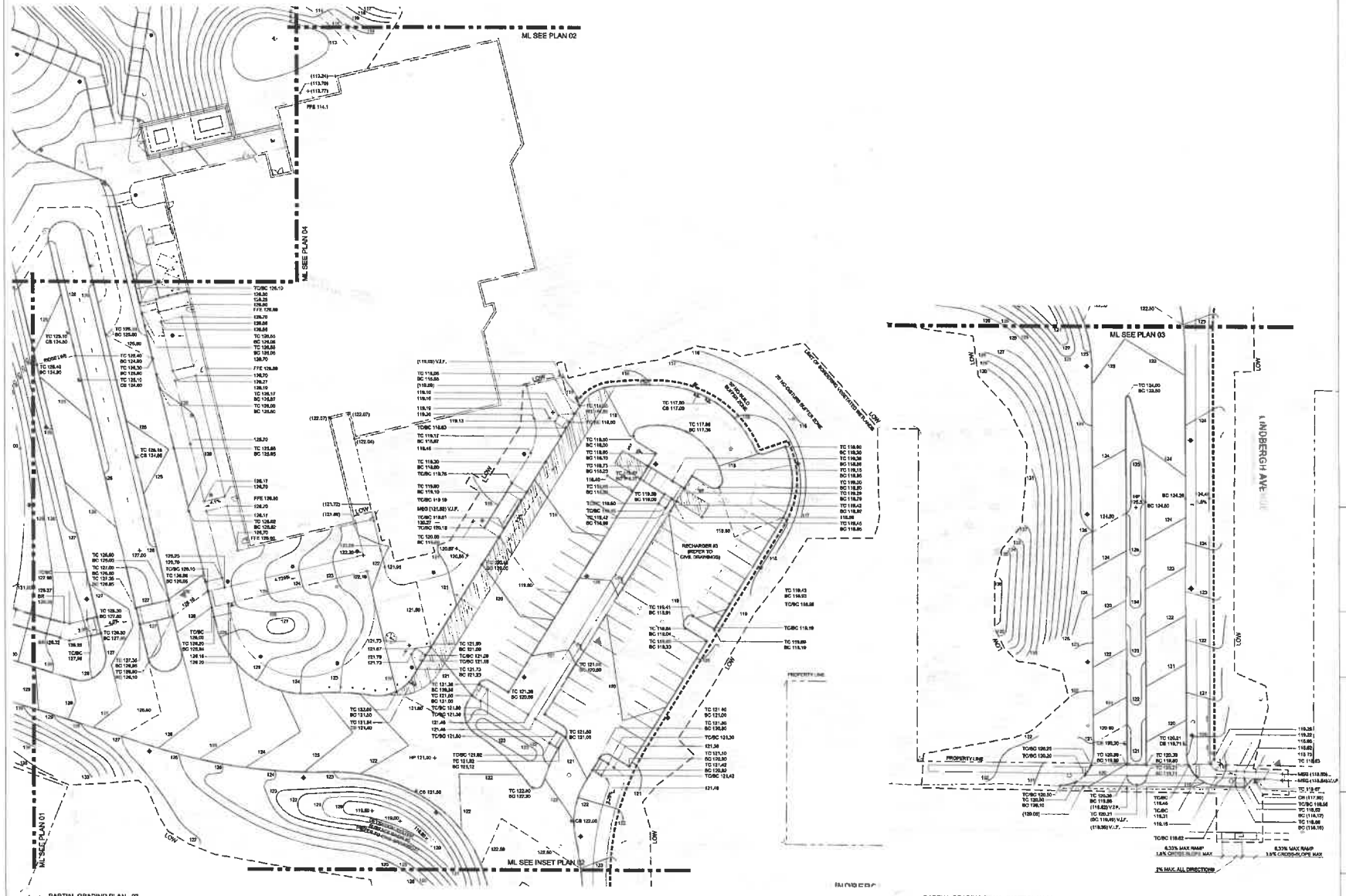

1 PARTIAL GRADING PLAN - 03
1.2.03 SCALE: 1" = 20'-0"

2 PARTIAL GRADING PLAN - INSET PLAN 02
1.2.03 SCALE: 1" = 20'-0"

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99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2606

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

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Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

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Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-9600

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Food Service Consultants
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Georgetown, MA 01833
(978) 352-8600

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Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 935-7226

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Electrical Engineers
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Danvers, MA 01923
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300 Brickstone Square, Suite 201
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KEY PLAN

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Date: 22 February 2021

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Number	Date	Description

Partial Grading Plan - 03

1.2.03

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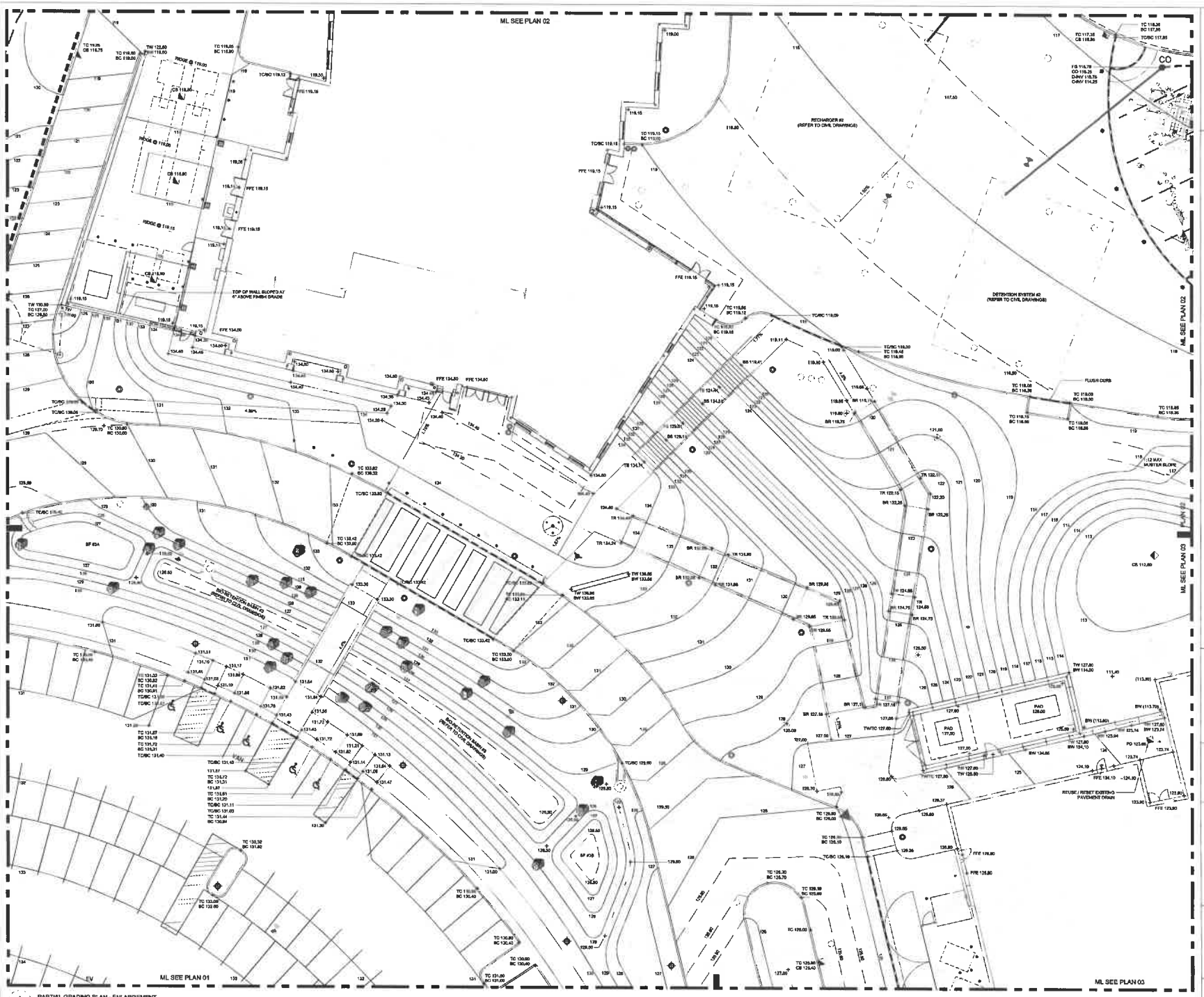

1 PARTIAL GRADING PLAN - ENLARGEMENT
SCALE: 1" = 10'-0"

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98 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2868

DGT Associates
Surveying & Engineers
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Framingham, MA 01701
(508) 879-0030

Brown Sandina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

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Structural Engineers
2150 Washington Street
Newton, MA 02462
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Food Service Consultants
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Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 935-7228

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Electrical Engineers
69 Newbury Street, Suite 103
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(617) 866-9066

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Technology Consultants
300 Brickstone Square, Suite 201
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KEY PLAN

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Date: 22 February 2021

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Scale: 0 10 20

Revisions

Number	Date	Description

Partial Grading Plan - 04 Enlargement

1.2.04

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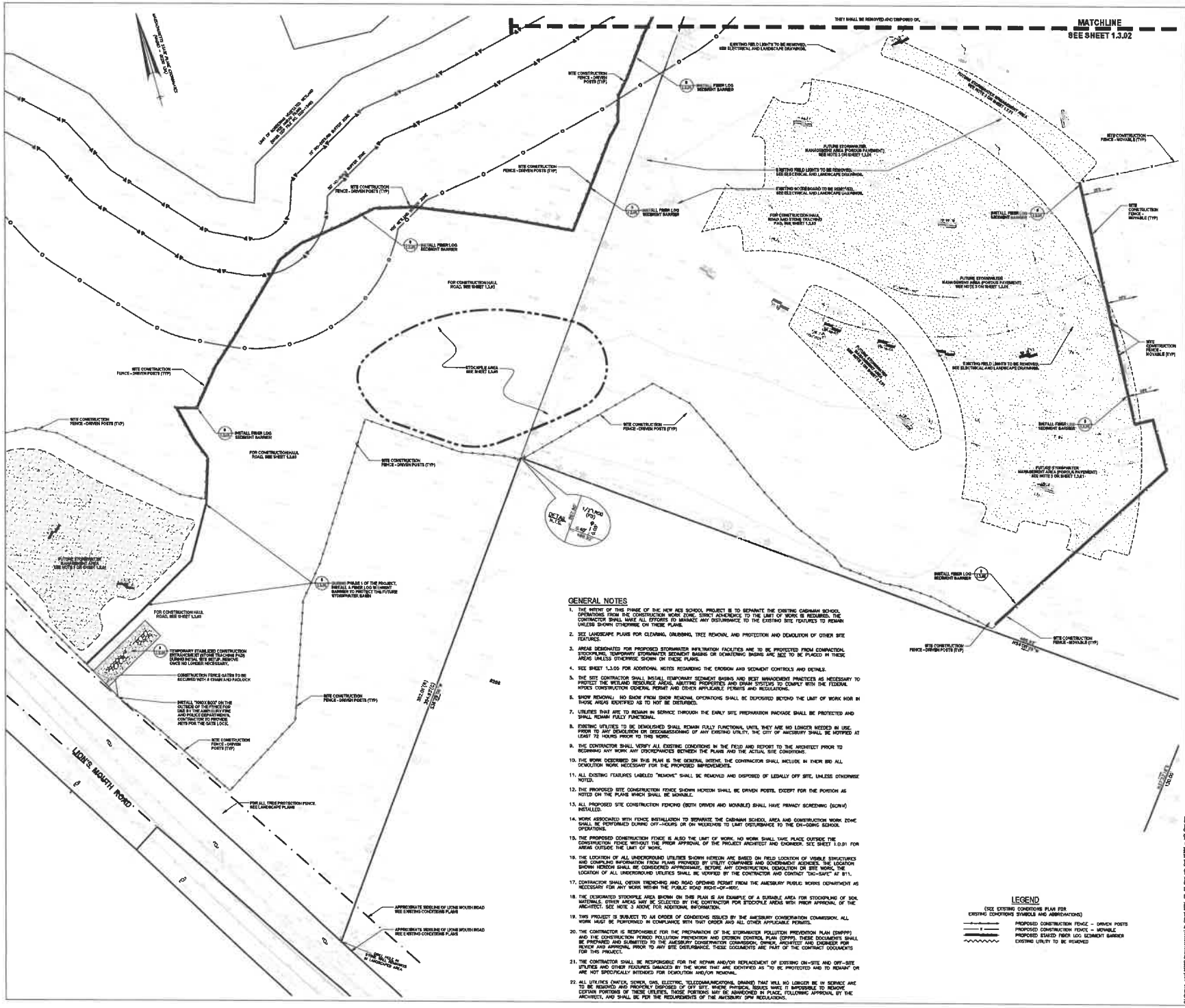

GENERAL NOTES

1. THE INTENT OF THIS PHASE OF THE NEW AES SCHOOL PROJECT IS TO SEPARATE THE EXISTING CASHMAN SCHOOL OPERATIONS FROM THE CONSTRUCTION WORK ZONE. STRICT ADHERENCE TO THE LIMIT OF WORK IS REQUIRED. THE CONTRACTOR SHALL MAKE ALL EFFORTS TO MINIMIZE ANY DISTURBANCE TO THE EXISTING SITE FEATURES TO REMAIN UNLESS SHOWN OTHERWISE ON THESE PLANS.
2. SEE LANDSCAPE PLANS FOR CLEARING, GRUBBING, TREE REMOVAL AND PROTECTION AND DEMOLITION OF OTHER SITE FEATURES.
3. AREAS DESIGNATED FOR PROPOSED STORMWATER INFILTRATION FACILITIES ARE TO BE PROTECTED FROM COMPACTION. STOCKPILING, TEMPORARY STORMWATER SEDIMENT BASINS OR DEWATERING BASINS ARE NOT TO BE PLACED IN THESE AREAS UNLESS OTHERWISE SHOWN ON THESE PLANS.
4. SEE SHEET 1.3.05 FOR ADDITIONAL NOTES REGARDING THE EROSION AND SEDIMENT CONTROLS AND DETAILS.
5. THE SITE CONTRACTOR SHALL INSTALL TEMPORARY SEDIMENT BASINS AND BEST MANAGEMENT PRACTICES AS NECESSARY TO PROTECT THE WETLAND RESOURCE AREAS, ABUTTING PROPERTIES AND DRAIN SYSTEMS TO COMPLY WITH THE FEDERAL NPDES CONSTRUCTION GENERAL PERMIT AND OTHER APPLICABLE PERMITS AND REGULATIONS.
6. SNOW REMOVAL: NO SNOW FROM SNOW REMOVAL OPERATIONS SHALL BE DEPOSITED BEYOND THE LIMIT OF WORK NOR IN THOSE AREAS IDENTIFIED AS TO NOT BE DISTURBED.
7. UTILITIES THAT ARE TO REMAIN IN SERVICE THROUGH THE EARLY SITE PREPARATION PACKAGE SHALL BE PROTECTED AND SHALL REMAIN FULLY FUNCTIONAL.
8. EXISTING UTILITIES TO BE DEMOLISHED SHALL REMAIN FULLY FUNCTIONAL UNTIL THEY ARE NO LONGER NEEDED IN USE. PRIOR TO ANY DEMOLITION OR DECOMMISSIONING OF ANY EXISTING UTILITY, THE CITY OF AMESBURY SHALL BE NOTIFIED AT LEAST 72 HOURS PRIOR TO THIS WORK.
9. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS IN THE FIELD AND REPORT TO THE ARCHITECT PRIOR TO BEGINNING ANY WORK ANY DISCREPANCIES BETWEEN THE PLANS AND THE ACTUAL SITE CONDITIONS.
10. THE WORK DESCRIBED ON THIS PLAN IS THE GENERAL INTENT. THE CONTRACTOR SHALL INCLUDE IN THEIR BID ALL DEMOLITION WORK NECESSARY FOR THE PROPOSED IMPROVEMENTS.
11. ALL EXISTING FEATURES LABELED "REMOVE" SHALL BE REMOVED AND DISPOSED OF LEGALLY OFF SITE, UNLESS OTHERWISE NOTED.
12. THE PROPOSED SITE CONSTRUCTION FENCE SHOWN HEREON SHALL BE DRIVEN POSTS, EXCEPT FOR THE PORTION AS NOTED ON THE PLANS WHICH SHALL BE MOVABLE.
13. ALL PROPOSED SITE CONSTRUCTION FENCING (BOTH DRIVEN AND MOVABLE) SHALL HAVE PRIVACY SCREENING (SCNVI) INSTALLED.
14. WORK ASSOCIATED WITH FENCE INSTALLATION TO SEPARATE THE CASHMAN SCHOOL AREA AND CONSTRUCTION WORK ZONE SHALL BE PERFORMED DURING OFF-HOURS OR ON WEEKENDS TO LIMIT DISTURBANCE TO THE ON-GOING SCHOOL OPERATIONS.
15. THE PROPOSED CONSTRUCTION FENCE IS ALSO THE LIMIT OF WORK. NO WORK SHALL TAKE PLACE OUTSIDE THE CONSTRUCTION FENCE WITHOUT THE PRIOR APPROVAL OF THE PROJECT ARCHITECT AND ENGINEER. SEE SHEET 1.0.01 FOR AREAS OUTSIDE THE LIMIT OF WORK.
16. THE LOCATION OF ALL UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON FIELD LOCATION OF VISIBLE STRUCTURES AND COMPILING INFORMATION FROM PLANS PROVIDED BY UTILITY COMPANIES AND GOVERNMENT AGENCIES. THE LOCATION SHOWN HEREON SHALL BE CONSIDERED APPROXIMATE. BEFORE ANY CONSTRUCTION, DEMOLITION OR SITE WORK, THE LOCATION OF ALL UNDERGROUND UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR AND CONTACT "DIG-SAFE" AT 811.
17. CONTRACTOR SHALL OBTAIN TRENCHING AND ROAD OPENING PERMIT FROM THE AMESBURY PUBLIC WORKS DEPARTMENT AS NECESSARY FOR ANY WORK WITHIN THE PUBLIC ROAD RIGHT-OF-WAY.
18. THE DESIGNATED STOCKPILE AREA SHOWN ON THIS PLAN IS AN EXAMPLE OF A SUITABLE AREA FOR STOCKPILING OF SOIL MATERIALS. OTHER AREAS MAY BE SELECTED BY THE CONTRACTOR FOR STOCKPILE AREAS WITH PRIOR APPROVAL OF THE ARCHITECT. SEE NOTE 3 ABOVE FOR ADDITIONAL INFORMATION.
19. THIS PROJECT IS SUBJECT TO AN ORDER OF CONDITIONS ISSUED BY THE AMESBURY CONSERVATION COMMISSION. ALL WORK MUST BE PERFORMED IN COMPLIANCE WITH THAT ORDER AND ALL OTHER APPLICABLE PERMITS.
20. THE CONTRACTOR IS RESPONSIBLE FOR THE PREPARATION OF THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AND THE CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION CONTROL PLAN (CPPP). THESE DOCUMENTS SHALL BE PREPARED AND SUBMITTED TO THE AMESBURY CONSERVATION COMMISSION, OWNER, ARCHITECT AND ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ANY SITE DISTURBANCE. THESE DOCUMENTS ARE PART OF THE CONTRACT DOCUMENTS FOR THIS PROJECT.
21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR AND/OR REPLACEMENT OF EXISTING ON-SITE AND OFF-SITE UTILITIES AND OTHER FEATURES DAMAGED BY THE WORK THAT ARE IDENTIFIED AS "TO BE PROTECTED AND TO REMAIN" OR ARE NOT SPECIFICALLY INTENDED FOR DEMOLITION AND/OR REMOVAL.
22. ALL UTILITIES (WATER, SEWER, GAS, ELECTRIC, TELECOMMUNICATIONS, DRAINS) THAT WILL NO LONGER BE IN SERVICE ARE TO BE REMOVED AND PROPERLY DISPOSED OF OFF SITE. WHERE PHYSICAL ISSUES MAKE IT IMPOSSIBLE TO REMOVE CERTAIN PORTIONS OF THESE UTILITIES, THOSE PORTIONS MAY BE ABANDONED IN PLACE, FOLLOWING APPROVAL BY THE ARCHITECT, AND SHALL BE PER THE REQUIREMENTS OF THE AMESBURY DPW REGULATIONS.

LEGEND

(SEE EXISTING CONDITIONS PLAN FOR EXISTING CONDITIONS SYMBOLS AND ABBREVIATIONS)

- PROPOSED CONSTRUCTION FENCE - DRIVEN POSTS
- PROPOSED CONSTRUCTION FENCE - MOVABLE
- PROPOSED STAKED FIBER LOG SEDIMENT BARRIER
- EXISTING UTILITY TO BE REMOVED

AMESBURY ELEMENTARY SCHOOL

AMESBURY, MA

DINISCO DESIGN architects • planners
99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2999

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Berdine, Inc.
Landscape Architects
34 Retreat Street
Boston, MA 02129
(617) 483-4706

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2180 Washington Street
Newton, MA 02462
(617) 527-9600

Crabtree Skillrath Assoc., Inc.
Food Service Consultants
161 West Main Street
Georgetown, MA 01833
(978) 352-8600

WM International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 995-7236

Thompson Engineering Company, Inc.
Electrical Engineers
99 Newbury Street, Suite 103
Danvers, MA 01923
(617) 695-9399

Sylvane Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01810
(978) 208-2600

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Revisions

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1.3.01

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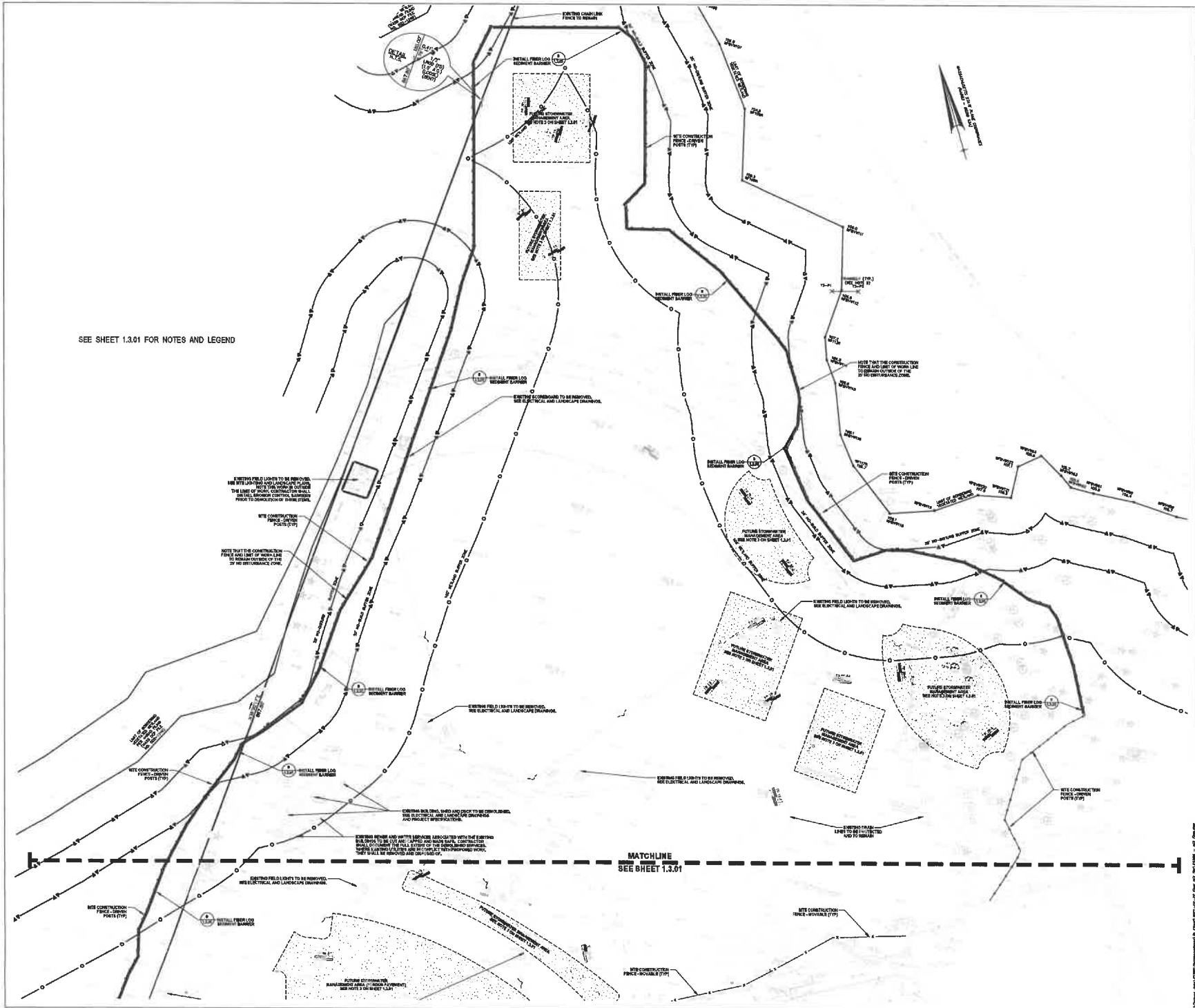

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AMESBURY, MA

DINISCO DESIGN
architects + planners

89 Chauncy Street, Suite 801
Boston, MA 02111
(617) 426-2888

DST Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4708

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2180 Washington Street
Newton, MA 02462
(617) 527-9600

Crabtree McGrath Assoc., Inc.
Food Service Consultants
161 West Main Street
Georgetown, MA 01833
(978) 352-8800

WW International, Inc.
Mechanical Engineers
400 West Cummings Park S, 4700
Woburn, MA 01801
(781) 935-7238

Thompson Engineering Company, Inc.
Electrical Engineers
89 Newbury Street, Suite 103
Danvers, MA 01923
(617) 598-8088

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Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01880
(978) 258-8800

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Revisions

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Site Civil Preparation, Demolition and Erosion and Sediment Control Plan - 02

1.3.02

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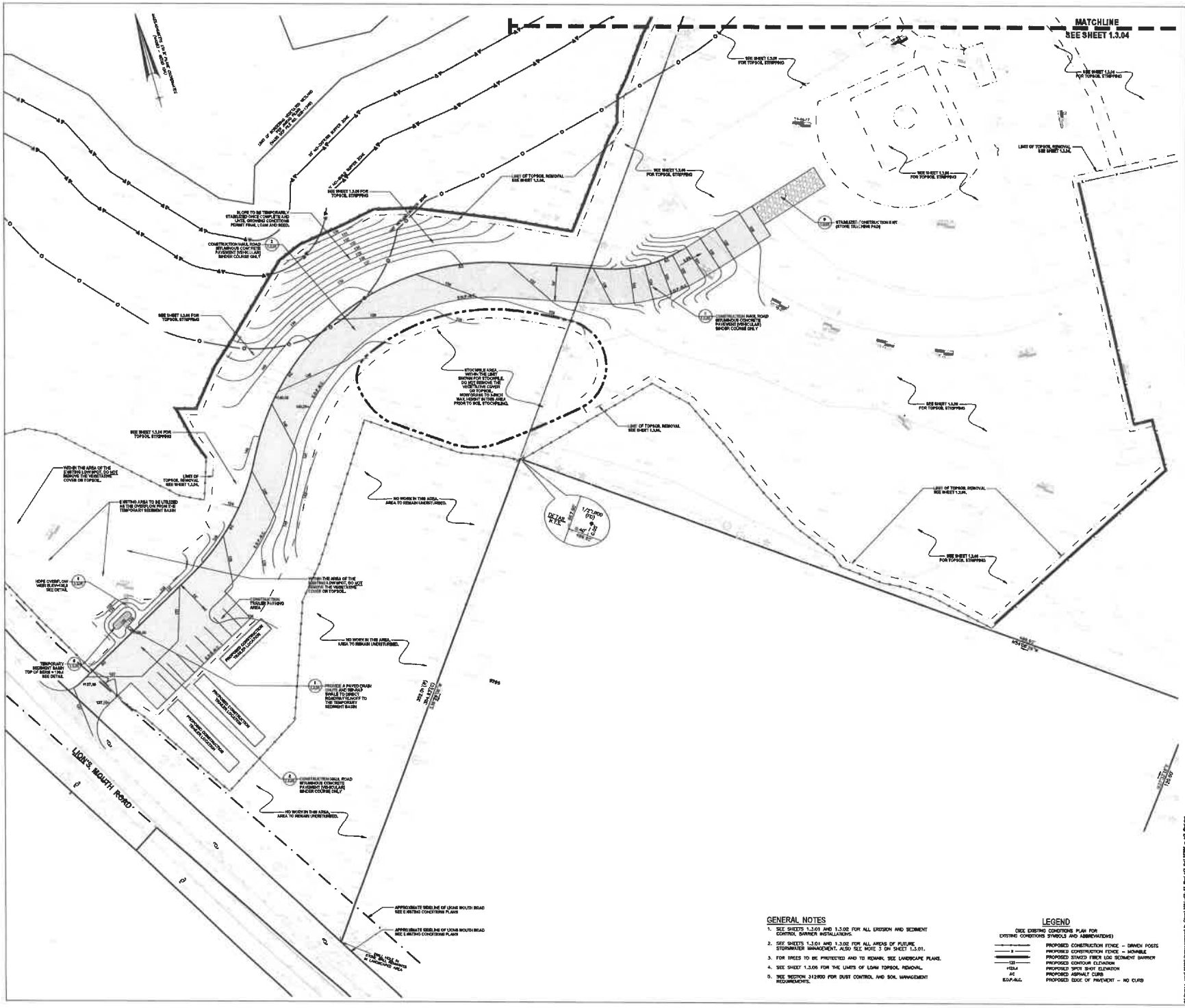

GENERAL NOTES

1. SEE SHEETS 1.3.01 AND 1.3.02 FOR ALL EROSION AND SEDIMENT CONTROL BARRIER INSTALLATIONS.
2. SEE SHEETS 1.3.01 AND 1.3.02 FOR ALL AREAS OF FUTURE STORMWATER MANAGEMENT. ALSO SEE NOTE 3 ON SHEET 1.3.01.
3. FOR TREES TO BE PROTECTED AND TO REMAIN, SEE LANDSCAPE PLANS.
4. SEE SHEET 1.3.06 FOR THE LIMITS OF LOAM TOPSOIL REMOVAL.
5. SEE SECTION 312900 FOR DUST CONTROL AND SOIL MANAGEMENT REQUIREMENTS.

LEGEND

(SEE EXISTING CONDITIONS PLAN FOR EXISTING CONDITIONS SYMBOLS AND ABBREVIATIONS)

	PROPOSED CONSTRUCTION FENCE – DRIVEN POSTS
	PROPOSED CONSTRUCTION FENCE – MOVABLE
	PROPOSED STAKED FIBER LOG SEDIMENT BARRIER
120	PROPOSED CONTOUR ELEVATION
+123.4	PROPOSED SPOT SHOT ELEVATION
AC	PROPOSED ASPHALT CURB
E.O.P.-ALC	PROPOSED EDGE OF PAVEMENT – NO CURB

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DINISCO DESIGN
architects + planners

89 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2888

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 492-4703

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Structural Engineers
2180 Washington Street
Newton, MA 02462
(617) 527-8609

Crabtree McGrath Assoc., Inc.
Food Service Consultants
161 West Main Street
Georgetown, MA 01833
(978) 363-9600

WW International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 935-7226

Thompson Engineering Company, Inc.
Electrical Engineers
89 Newbury Street, Suite 103
Danvers, MA 01923
(617) 595-8088

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Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01860
(978) 266-8800

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Site Mobilization Plan - 01

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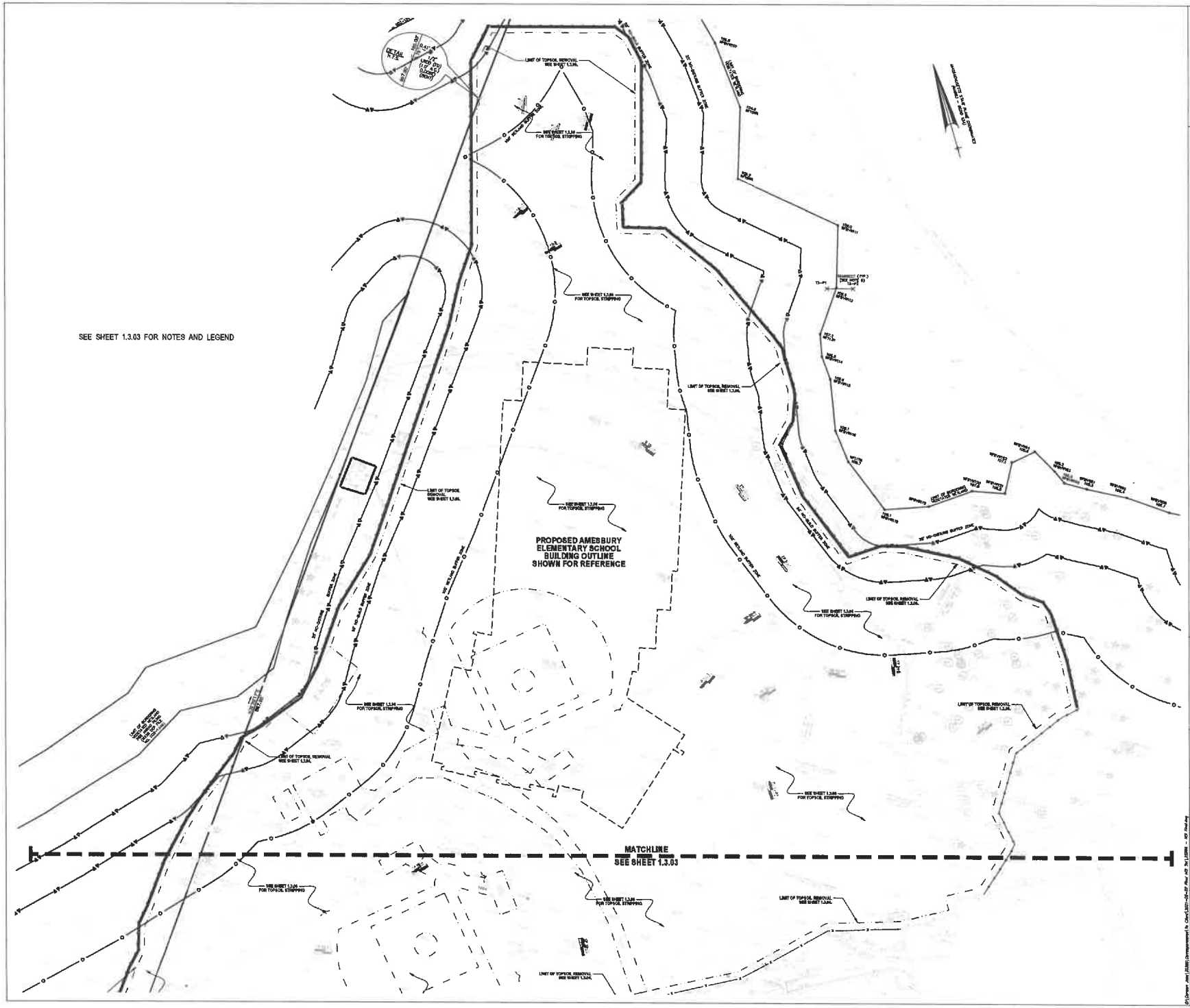

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AMESBURY, MA

DINISCO DESIGN
architects + planners

99 Chauncy Street, Suite 801
Boston, MA 02111
(617) 426-2909

DST Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 483-4709

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-8600

Crabtree Blackwell Assoc., Inc.
Food Service Consultants
161 West Main Street
Georgetown, MA 01833
(978) 352-8600

WW International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 935-7225

Thompson Engineering Company, Inc.
Electrical Engineers
60 Newbury Street, Suite 103
Danvers, MA 01923
(617) 866-8085

Software Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01860
(978) 256-8600

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Site Mobilization Plan - 02

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EROSION AND SEDIMENT CONTROL NOTES

1. **GENERAL PERFORMANCE STANDARDS:**

   1.1. THE CONTRACTOR SHALL INSTALL, ROUTINELY INSPECT AND MAINTAIN ALL SEDIMENT AND EROSION CONTROLS SUCH THAT THEY ARE IN PROPER WORKING ORDER AT ALL TIMES DURING THE CONSTRUCTION PROJECT UNTIL SUCH TIME AS ALL AREAS OF THE SITE TRIBUTARY TO THOSE EROSION CONTROLS ARE IN A PERMANENTLY STABILIZED CONDITION.

   1.2. THE PLAN VIEWS IN THIS PLAN SET SHOW ONLY THE LOCATIONS OF THE PERIMETER EROSION CONTROLS AND ARE NOT INTENDED TO SHOW ALL EROSION CONTROLS NECESSARY FOR MANAGEMENT OF THE SITE. THE CONTRACTOR SHALL MANAGE THE SITE SUCH THAT EROSION AND SEDIMENT FROM RUNOFF AND WIND BLOWN DUST ARE CONTROLLED AND MINIMIZED AT ALL TIMES. THE EROSION CONTROLS SHOWN ON THIS PLAN INCLUDE THE INITIAL SETUP OF EROSION CONTROLS AND BASIC INFORMATION. TO MEET THE REQUIREMENT OF BEST MANAGEMENT PRACTICES, THE CONTRACTOR MUST MANAGE THE SITE PROPERLY WHICH MAY INCLUDE, BUT NOT BE LIMITED TO: MINIMIZING AREAS OF EXPOSED SOILS; INSTALLING TEMPORARY COVER; MAKE NECESSARY ADJUSTMENTS TO THE EROSION CONTROL INSTALLATIONS TO IMPROVE FUNCTION; PROVIDE TEMPORARY SEDIMENT BASINS; INSTALL ADDITIONAL EROSION AND SEDIMENT CONTROL WHERE NECESSARY.

   1.3. THE EROSION CONTROL WORK IS ALSO SUBJECT TO PERMITS AND APPROVALS UNDER THE MUNICIPAL STORMWATER ORDINANCES AND ALL STATE, LOCAL AND FEDERAL REGULATIONS. THE PROJECT MAY ALSO BE SUBJECT TO OTHER STATE AND LOCAL APPROVALS. THE CONTRACTOR SHALL OBTAIN AND BE RESPONSIBLE FOR COMPLIANCE WITH THE CONDITIONS AND REQUIREMENTS OF THOSE PERMITS.

   1.4. DESIGN, INSTALLATION AND MAINTENANCE OF SEDIMENT AND EROSION CONTROLS SHALL BE IN ACCORDANCE WITH BEST MANAGEMENT PRACTICES FOLLOWING THE GUIDELINES INCLUDE IN THE FOLLOWING:
   - "STORMWATER MANAGEMENT FOR CONSTRUCTION ACTIVITIES, DEVELOPING POLLUTION PREVENTION PLANS AND BEST MANAGEMENT PRACTICES" U.S. ENVIRONMENTAL PROTECTION AGENCY, OCTOBER 1992.
   - "MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS, A GUIDE FOR PLANNERS, DESIGNERS AND MUNICIPAL OFFICIALS", MASS. EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS, MAY 2003.
   - U.S.D.A. NATURAL RESOURCES AND CONSERVATION SERVICES (NRCS) GUIDELINES.

2. **FEDERAL NPDES PHASE II COMPLIANCE:**

   2.1. THIS PROJECT IS SUBJECT TO THE FEDERAL CLEAN WATER ACT REQUIREMENTS FOR CONSTRUCTION SITES ADMINISTERED BY THE U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA). THIS PROGRAM IS THE "NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) – PHASE II FOR CONSTRUCTION SITES. FOR COMPLIANCE WITH THIS PROGRAM, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING A COMPLETE "STORMWATER POLLUTION PREVENTION PLAN" (SWPPP) IN CONFORMANCE WITH THE CURRENT CONSTRUCTION GENERAL PERMIT AND FILING A NOTICE OF INTENT WITH THE EPA UNDER THE NPDES PROGRAM. THE CONTRACTOR SHALL THEN MANAGE THE SITE IN COMPLIANCE WITH THE SWPPP AND IN COMPLIANCE WITH THE CONSTRUCTION GENERAL PERMIT. NOTE THAT THE SWPPP IS TO BE PREPARED TO BE CONSISTENT WITH THIS EROSION AND SEDIMENT CONTROL PLAN AND OTHER APPLICABLE APPROVALS. THE EROSION AND SEDIMENT CONTROL PLAN INCLUDED IN THIS PLAN SET MAY BE USED AS PART OF THE DOCUMENTATION REQUIRED FOR THE PREPARATION OF A SWPPP, BUT IS NOT TO BE CONSIDERED AS MEETING THE FULL REQUIREMENTS OF A SWPPP PREPARED FOR COMPLIANCE WITH THE NPDES PROGRAM.

   2.2. A COPY OF THE SWPPP SHALL BE FILED WITH THE MUNICIPAL ENGINEERING DEPARTMENT, CONSERVATION COMMISSION AND OTHERS AS REQUIRED BY APPLICABLE PERMITS AND APPROVALS.

   2.3. THE CONTRACTOR IS RESPONSIBLE FOR THE PREPARATION OF THE CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION CONTROL PLAN (CPPP). THIS DOCUMENT SHALL BE PREPARED AND SUBMITTED TO THE AMESBURY CONSERVATION COMMISSION, OWNER, ARCHITECT AND ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ANY SITE DISTURBANCE. THIS DOCUMENT IS TO BE CONSIDERED PART OF THE CONTRACT DOCUMENTS FOR THIS PROJECT.

3. **PERIMETER FIBER LOG / CONSTRUCTION FENCE AND LIMIT OF WORK:**

   3.1. PRIOR TO ANY DISTURBANCE OR ALTERATIONS OF ANY AREA ON THE SITE, AN EROSION CONTROL BARRIER AND CONSTRUCTION FENCE SHALL BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS AND CONTRACT DOCUMENTS. THE INSTALLED PERIMETER EROSION CONTROL BARRIERS SHALL BE INSPECTED BY THE CITY OF AMESBURY, ARCHITECT AND ENGINEER PRIOR TO THE START OF SITE WORK.

   3.2. INSTALL THE FIBER LOGS AS SHOWN. IN THOSE AREAS WHERE THE TOPOGRAPHY INDICATES THAT STORMWATER RUNOFF WILL BE CONCENTRATED (AT LOW POINTS), ADDITIONAL FIBER LOGS, AS NECESSARY, SHALL BE ADDED FOR ADDITIONAL FILTRATION AND PROTECTION. SILT FENCE FOR ADDED SUPPORT MAY BE ADDED AS NECESSARY. THE REQUIRED LOCATIONS FOR THE ADDED FIBER LOG INSTALLATION WILL BE SELECTED BY THE ENGINEER AND / OR THE AUTHORIZED INSPECTOR/ SWPPP COORDINATOR UPON COMPLETION OF THE FIBER LOG INSTALLATION (SEE DETAIL).

   3.3. ONCE INSTALLED, THE STAKED FIBER LOGS SHALL BE MAINTAINED IN PLACE UNTIL ALL AREAS UPGRADIENT FROM THE BARRIERS HAVE BEEN PERMANENTLY STABILIZED.

   3.4. ALL DISTURBED AREAS NOT OTHERWISE DEVELOPED OR WHERE SPECIAL STABILIZATION MEASURES OR LANDSCAPE PLANTINGS ARE PROPOSED SHALL BE LOAMED AND SEEDED OR SODDED. SIX INCHES OF LOAM TOPSOIL (MIN. COMPACTED DEPTH) SHALL BE APPLIED UNLESS OTHERWISE SPECIFIED. (SEE LANDSCAPE PLAN AND OTHER PLANS AS APPLICABLE).

   3.5. THE PERIMETER FIBER LOGS AND CONSTRUCTION FENCING ARE ALSO LIMITS OF WORK. ALL AREAS OUTSIDE THE LIMIT ARE TO BE LEFT UNDISTURBED. DURING THE SITE WORK, ALL PERSONS AND EQUIPMENT SHALL STAY OUT OF THESE AREAS TO PRESERVE THE EXISTING VEGETATION AND SOIL COVER.

4. **CONSTRUCTION ENTRANCE:**

   4.1. AT THE START OF SITE WORK, A STONE CONSTRUCTION ENTRANCE SHALL BE INSTALLED AT ALL ACCESS POINTS TO THE CONSTRUCTION SITE FROM THE ROADWAY TO CONTROL THE TRACKING OF MUD OFF THE SITE. THE ENTRANCE SHALL BE MAINTAINED UNTIL THE SITE IS IN A STABILIZED CONDITION WHEN THE POSSIBILITY OF VEHICLES TRACKING MUD OFF SITE HAS BEEN ELIMINATED.

   4.2. THE CONTRACTOR SHALL SWEEP THE ADJACENT ROADWAYS WHEN MUD, DUST, DIRT, DEBRIS, ETC. HAS SHOWN SIGNS OF MUD BEING TRACKED ON THE ROADWAYS EXITING THE SITE. THE CONTRACTOR SHALL PAY PARTICULAR ATTENTION TO THIS MATTER AND IMMEDIATE ATTENTION IS ALWAYS REQUIRED.

   4.3. THROUGHOUT THE CONSTRUCTION PROCESS, THE LOCATION OF THE CONSTRUCTION ENTRANCE WILL CHANGE DEPENDING ON CONSTRUCTION VEHICLE ENTRANCE AND EXIT LOCATIONS. THE CONTRACTOR SHALL DETAIL THEIR LOCATIONS IN THE STORMWATER POLLUTION PREVENTION PLAN AT EACH PHASE.

5. **DEWATERING OF EXCAVATIONS:**

   5.1. DISCHARGE FROM DEWATERING PUMPS OR TEMPORARY TRENCH OR EXCAVATION DRAINS SHALL NOT BE DISCHARGED DIRECTLY TO THE ON-SITE DRAINAGE SYSTEM, OR WETLAND RESOURCE AREAS. DISCHARGES SHALL BE DIRECTED TO A TREATMENT SYSTEM CONSISTING OF A SEDIMENT BASIN, STRAW BALE SEDIMENT BASIN, FILTER BAG SYSTEM, FRAC TANK OR OTHER APPROVED METHOD TO FILTER THE DISCHARGE WATER AND PREVENT EROSION.

   5.2. THE PUMP DISCHARGE SYSTEMS MUST BE GREATER THAN 100 FEET FROM WETLAND RESOURCES UNLESS APPROVED BY THE MUNICIPAL CONSERVATION COMMISSION AND IN ACCORDANCE WITH OTHER APPLICABLE LAWS AND REGULATIONS.

   5.3. ALL DEWATERING DRAINAGE ASSOCIATED WITH CONSTRUCTION ACTIVITIES MUST FIRST OBTAIN A DEWATERING DRAINAGE PERMIT. SUCH DISCHARGES SHALL COMPLY WITH THE MUNICIPAL REQUIREMENTS, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, MASSACHUSETTS DEP AND OTHER APPROPRIATE AGENCIES. UNDER NO CIRCUMSTANCE SHALL DEWATERING DRAINAGE BE DISCHARGED INTO A SANITARY SEWER.

6. **SOIL STOCKPILES:**

   6.1. STOCKPILES OF SOIL MATERIALS SHALL BE PLACED WITHIN AREAS THAT ARE PROTECTED BY PERIMETER EROSION CONTROLS AS SHOWN ON THIS PLAN, OR SHALL BE SURROUNDED BY PROPER SILT FENCING, FIBER LOGS, OR STAKED STRAW BALES.

   6.2. STOCKPILES THAT ARE TO BE IN PLACE FOR EXTENDED PERIODS OF TIME (MORE THAN 30 DAYS) SHALL BE COVERED OR OTHERWISE TEMPORARILY STABILIZED IN ACCORDANCE WITH BEST MANAGEMENT PRACTICES.

   6.3. SEE SECTION 312000 MANAGEMENT AND DISPOSAL OF CONTAMINATED MATERIAL OF THE PROJECT SPECIFICATIONS FOR ADDITIONAL SOIL STOCKPILE GUIDELINES.

7. **CATCH BASIN INLET PROTECTION:**

   7.1. CATCH BASINS WITHIN THE WORK AREA OR THAT WILL RECEIVE RUNOFF FROM THE WORK AREA SHALL BE PROTECTED WITH A SILT SACK AND OR OTHER APPROVED INSTALLATION TO MINIMIZE THE SEDIMENT LOAD TO THE BASIN.

8. **DUST CONTROL:**

   8.1. SEE SECTION 312000 MANAGEMENT AND DISPOSAL OF CONTAMINATED MATERIAL OF THE PROJECT SPECIFICATIONS FOR ADDITIONAL DUST CONTROL GUIDELINES.

   8.2. THE CONTRACTOR SHALL TAKE APPROPRIATE MEASURES DURING SITE WORK TO MINIMIZE WIND BLOWN DUST FROM EXPOSED SOIL SURFACES. MEASURES INCLUDE BUT ARE NOT LIMITED TO:
   - SPRINKLING WATER ON EXPOSED SURFACES
   - APPLICATION OF TEMPORARY COVER SUCH AS HYDRO MULCH AND TACKIFIER, STRAW MATTING, JUTE NETTING ETC.

9. **INFILTRATION & DETENTION SYSTEMS:**

   9.1. STORMWATER RUNOFF FROM THE DISTURBED CONSTRUCTION SITE SHALL NOT BE DISCHARGED INTO ANY EXISTING OR PROPOSED INFILTRATION SYSTEM (INCLUDING ALL UNDERGROUND RECHARGER FACILITIES AND BIORETENTION BASINS) UNTIL THE AREA BEING DRAINED IS FULLY STABILIZED AND CLEAN. UNTIL THEN, THE INFILTRATION SYSTEM SHALL REMAIN OFF-LINE AND PROTECTED. THE CONTRACTOR SHALL PROVIDE TEMPORARY BY-PASS SYSTEMS AS NECESSARY TO PREVENT CONSTRUCTION SITE RUNOFF FROM ENTERING THE INFILTRATION SYSTEMS.

   9.2. CLEAN ROOF RUNOFF MAY DISCHARGE INTO THE INFILTRATION SYSTEMS IF IT IS PIPED DIRECTLY TO THE SYSTEMS AND NOT RUN OVER DISTURBED AREAS.

10. **TEMPORARY SEDIMENT BASINS:**

   10.1. THE PLAN SHOWS A SMALL BASIN NEAR THE CONSTRUCTION HAUL ROAD TO BE UTILIZED AS A TEMPORARY SEDIMENT BASIN. THIS AREA SHALL BE GRADED AS SHOWN AND THE OVERFLOW SPILLWAY INSTALLED PER THE DETAILS.

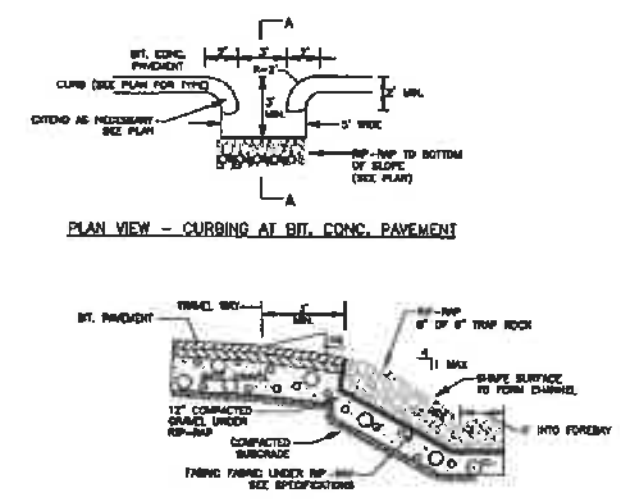
   10.2. OTHER AREAS OF THE SITE MAY REQUIRE THE INSTALLATION OF OTHER TEMPORARY SEDIMENT BASINS DURING CONSTRUCTION. CONTRACTOR SHALL BE DILIGENT IN MONITORING SITE CONDITIONS AND INSTALLING THESES SEDIMENT BASINS WHERE TOPOGRAPHY AND RUNOFF CONDITIONS REQUIRE.

11. **PROTECTION OF EXCAVATIONS FROM RUNOFF:**

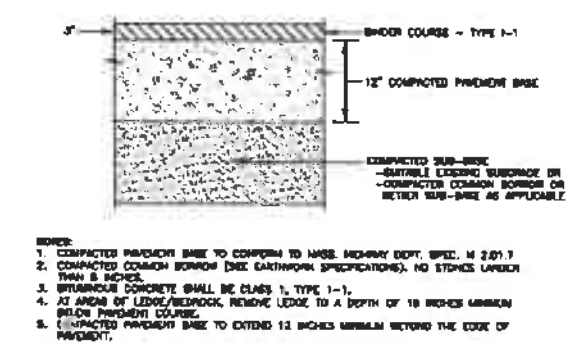
   11.1. THE CONTRACTOR SHALL PROTECT ALL EXCAVATIONS FROM RUNOFF FROM ADJACENT AREAS AND SHALL DIVERT STORMWATER TO APPROPRIATE DRAINS AND STORMWATER BEST MANAGEMENT PRACTICES. TREAT/FILTER RUNOFF AS NECESSARY TO MAINTAIN COMPLIANCE WITH THE NPDES GENERAL PERMIT.

12. **LONG-TERM POLLUTION PREVENTION PLAN:**

   12.1. THE LONG-TERM POLLUTION PREVENTION PLAN AS PREPARED BY DGT ASSOCIATES AND AS INCLUDED IN APPENDIX 2 OF THE STORMWATER MANAGEMENT REPORT AND AS REVISED THROUGH SEPTEMBER 25, 2020 SHALL BE CONSIDERED PART OF THIS PLAN SET.



1 / 1.3.05 PAVED DRAIN CHUTE (NO SCALE)



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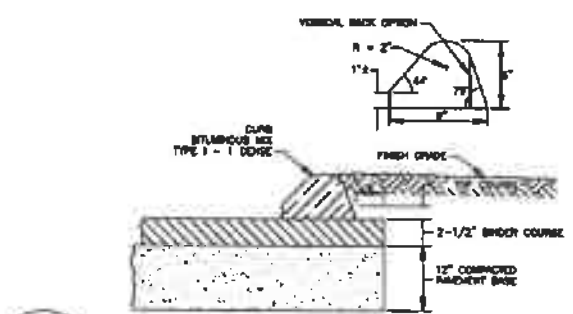
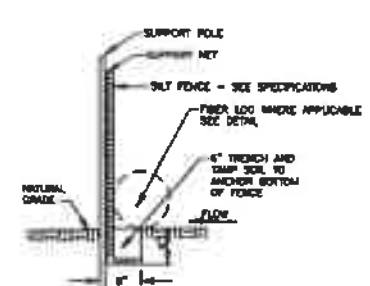
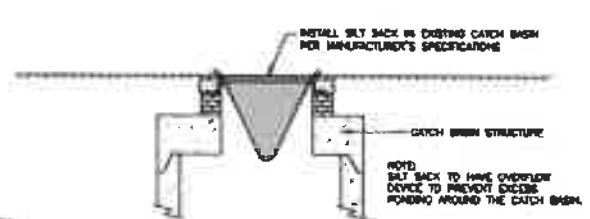


3 / 1.3.05 ASPHALT CURB (NO SCALE)



4 / 1.3.05 SILT FENCE DETAIL (NO SCALE)



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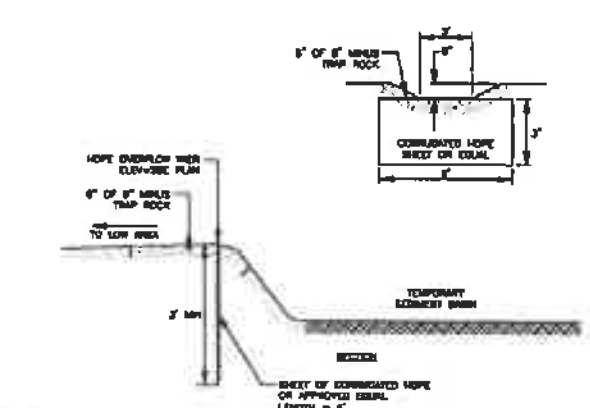
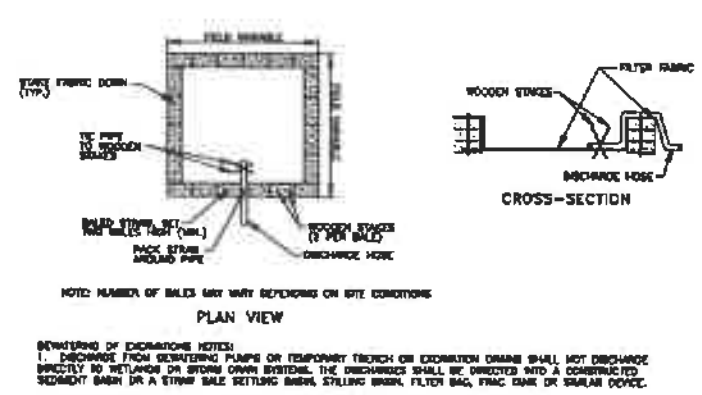
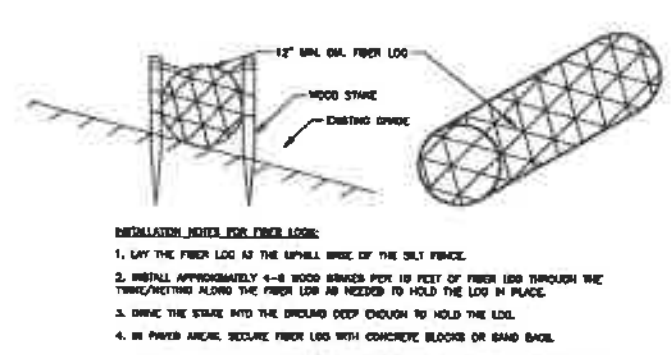


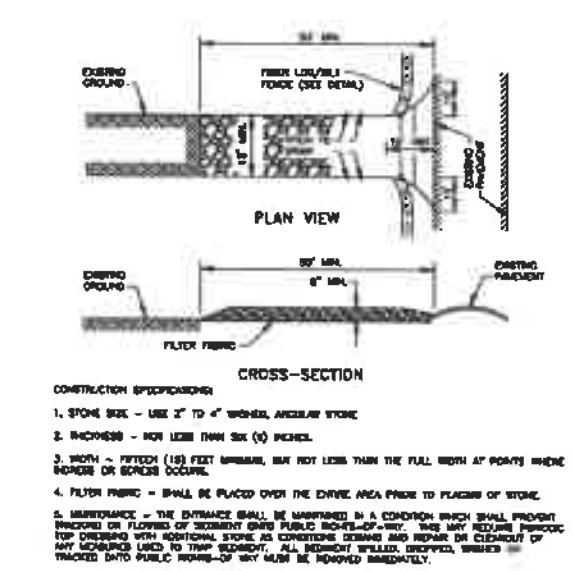
6 / 1.3.05 TEMPORARY SEDIMENT BASIN OUTLET DETAIL (NO SCALE)



7 / 1.3.05 STRAW BALE SETTLING BASIN DETAIL (NO SCALE)



8 / 1.3.05 FIBER LOG DETAIL (NO SCALE)



9 / 1.3.05 STABILIZED CONSTRUCTION ENTRANCE DETAIL (NO SCALE)

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Scale: AS NOTED
Revisions Number | Date | Description

Erosion and Sediment Control Notes and Details and Sitework Details

1.3.05

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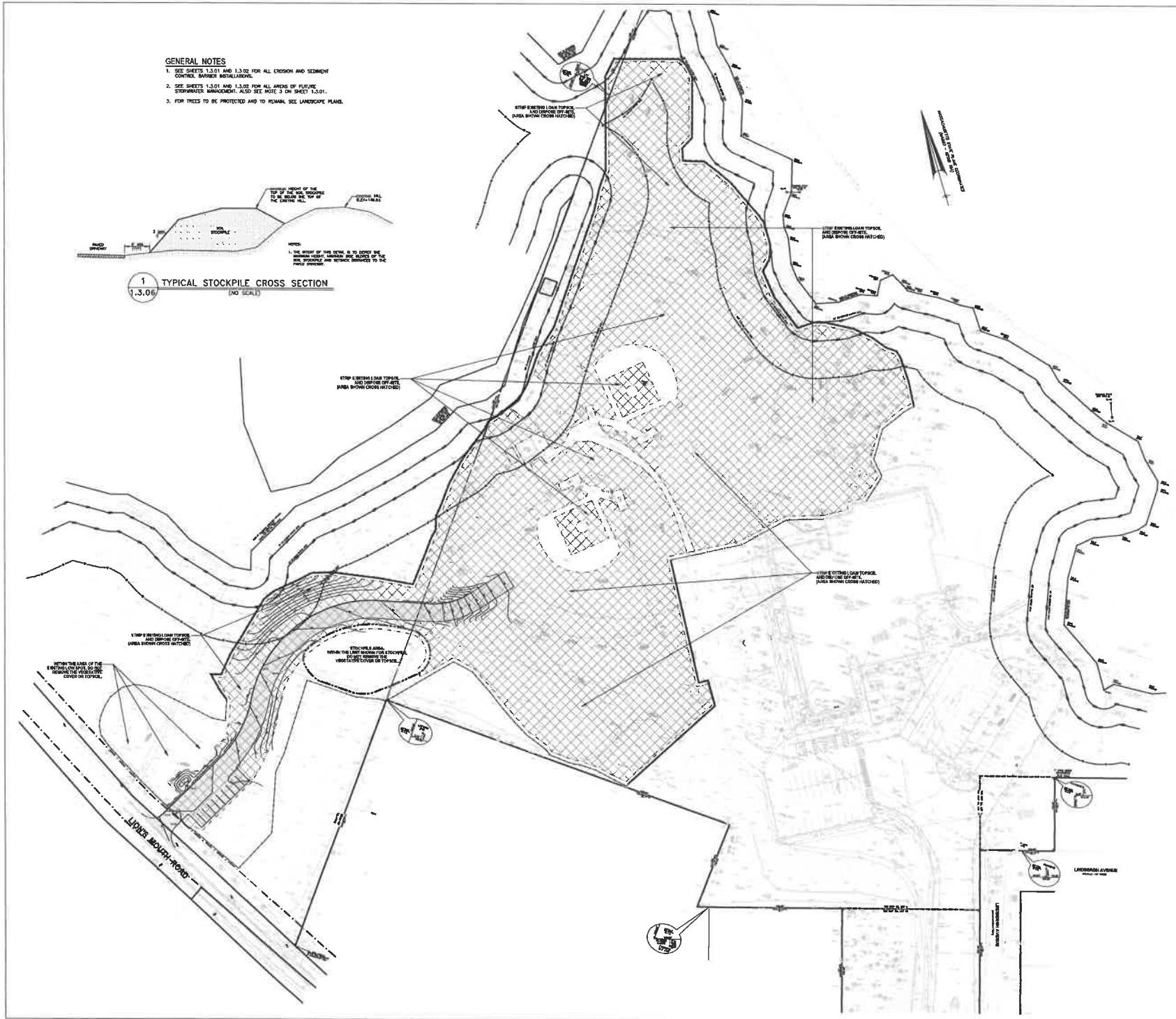

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(617) 426-2666

DGT Associates
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1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4709

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2180 Washington Street
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(617) 527-9900

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400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 999-7238

Thompson Engineering Company, Inc.
Electrical Engineers
99 Newbury Street, Suite 103
Danvers, MA 01923
(617) 999-9999

Schlosser Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01810
(978) 999-9900

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Proposed Topsoil Removal Limit Plan

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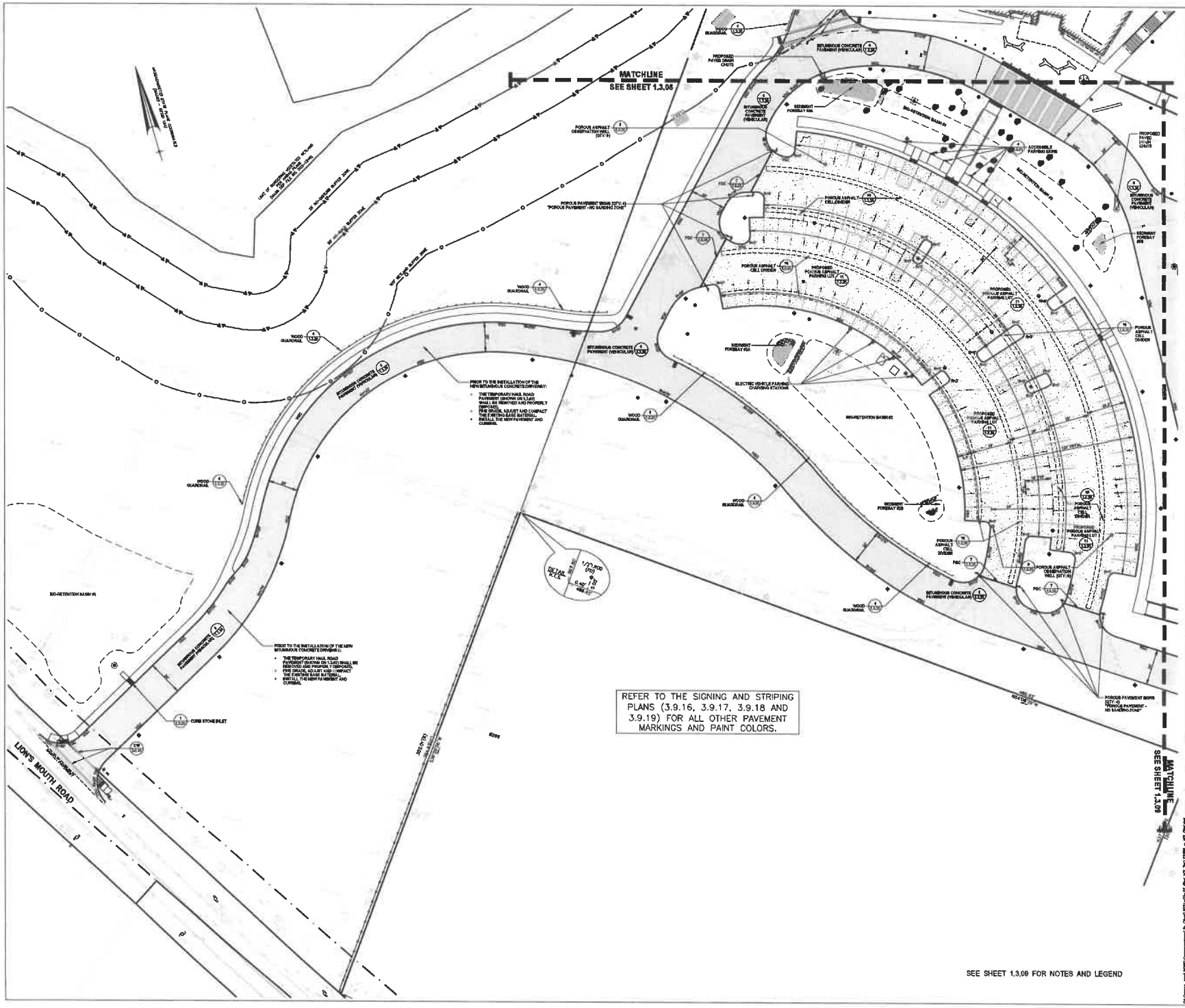

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AMESBURY, MA

DINISCO DESIGN
architects + planners

[illegible] Chauncy Street, Suite 501
Boston, MA 02111
(617) [illegible]

DST Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) [illegible]

Brown Gardner, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) [illegible]

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2180 Washington Street
Newton, MA 02462
(617) [illegible]

Crabtree Mallroth Assoc., Inc.
Food Service Consultants
181 West Main Street
Georgetown, MA 01833
(978) [illegible]

WW International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) [illegible]

Thompson Engineering Company, Inc.
Electrical Engineers
[illegible] Newbury Street, Suite 103
Danvers, MA 01923
(617) [illegible]

BrAlliance Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01880
(978) [illegible]

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Vehicular Pavement Layout and Materials Plan - 01

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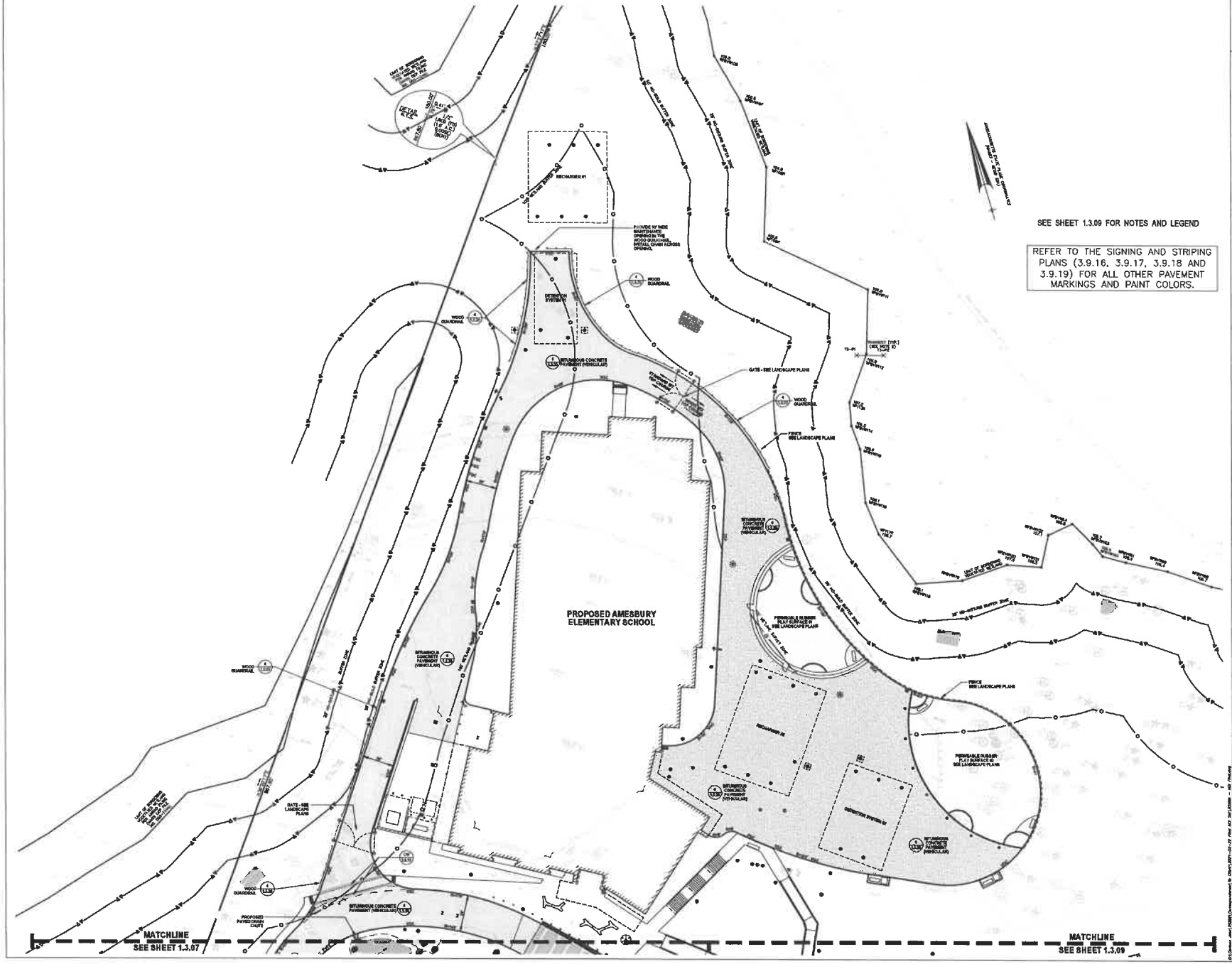

SEE SHEET 1.3.09 FOR NOTES AND LEGEND

REFER TO THE SIGNING AND STRIPING PLANS (3.9.16, 3.9.17, 3.9.18 AND 3.9.19) FOR ALL OTHER PAVEMENT MARKINGS AND PAINT COLORS.

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AMESBURY, MA

DINISCO DESIGN
architects + planners

[illegible] Chauncy Street, Suite 801
Boston, MA 02111
(617) 426-2858

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Gardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 492-4703

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-6900

Crabtree McGrath Assoc., Inc.
Food Service Consultants
191 West Main Street
Georgetown, MA 01833
(978) 363-8600

WW International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 986-7239

Thompson Engineering Company, Inc.
Electrical Engineers
89 Newbury Street, Suite 103
Danvers, MA 01923
(617) [illegible]

EdVance Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01880
(978) 359-8800

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Vehicular Pavement Layout and Materials Plan - 02

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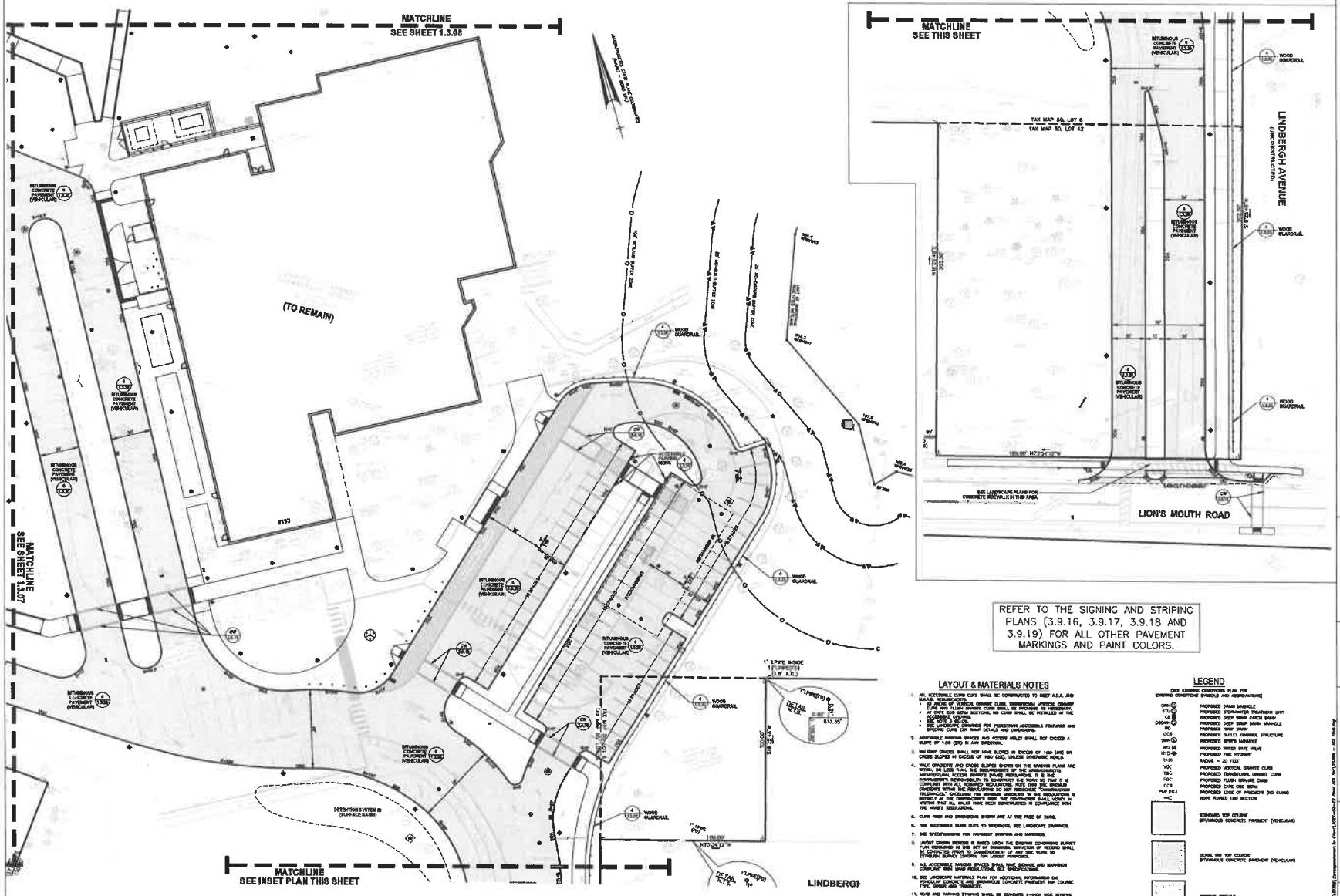

REFER TO THE SIGNING AND STRIPING PLANS (3.9.16, 3.9.17, 3.9.18 AND 3.9.19) FOR ALL OTHER PAVEMENT MARKINGS AND PAINT COLORS.

LAYOUT & MATERIALS NOTES

1. ALL ACCESSIBLE CURB CUTS SHALL BE CONFIRMATED TO MEET A.D.A. AND MAAB REQUIREMENTS.
   - SEE SHEET 1.3.10 FOR VERTICAL GRANITE CURB, TRANSITIONAL VERTICAL GRANITE CURB TO SLOPED GRANITE CURB SHALL BE PROVIDED AS NECESSARY.
   - AT CAPE COD BERM SECTIONS, NO CURB SHALL BE INSTALLED AT THE ACCESSIBLE CROSSING.
   - SEE NOTE 3 BELOW.
   - SEE SHEET 1.3.10 FOR DIMENSIONS FOR PERCEIVABLE FEATURES AND BITUMINOUS CURB OR WHAT DETAILS WERE CHANGED.
2. ACCESSIBLE PARKING SPACES AND ACCESS AISLES SHALL NOT EXCEED A SLOPE OF 1:48 (2%) IN ANY DIRECTION.
3. WALKWAY GRADES SHALL NOT HAVE SLOPES IN EXCESS OF 1:20 (5%) OR CROSS SLOPES IN EXCESS OF 1:50 (2%), UNLESS OTHERWISE NOTED.
4. WALK GRADIENTS AND CROSS SLOPES SHOWN ON THE GRADING PLANS ARE WITHIN, OR LESS THAN, THE REQUIREMENTS OF THE ARCHITECTURAL ACCESS BOARD'S (MAAB) REGULATIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONSTRUCT THE WORK SO THAT IT IS IN COMPLIANCE WITH THE REGULATIONS. NOTE THAT THE DIMENSIONS AND GRADIENTS WITHIN THE REGULATIONS ARE NOT NECESSARILY CONSTRUCTION TOLERANCES. EXCEEDING THE MAXIMUM GRADIENTS IN THE REGULATIONS IS ENTIRELY AT THE CONTRACTOR'S RISK. THE CONTRACTOR SHALL VERIFY IN WRITING THAT ALL WALKS HAVE BEEN CONSTRUCTED IN COMPLIANCE WITH THE MAAB'S REGULATIONS.
5. CURB RADII AND DIMENSIONS SHOWN ARE AT THE FACE OF CURB.
6. FOR ACCESSIBLE CURB CUTS TO VEGETATED, SEE LANDSCAPE DRAWINGS.
7. SEE SPECIFICATIONS FOR PAVEMENT STRIPING AND MARKINGS.
8. LAYOUT SHOWN HEREON IS BASED UPON THE EXISTING CONDITIONS SURVEY PLAN CONTAINED IN THIS SET OF DRAWINGS. SURVEYOR OF RECORD SHALL BE CONTACTED PRIOR TO COMMENCEMENT OF ANY SITE WORK TO ESTABLISH SURVEY CONTROL FOR LAYOUT PURPOSES.
9. ALL ACCESSIBLE PARKING SPACES SHALL HAVE SIGNAGE AND MARKINGS COMPLIANT WITH MAAB REGULATIONS. SEE SPECIFICATIONS.
10. SEE LANDSCAPE MATERIALS PLAN FOR ADDITIONAL INFORMATION ON VEHICULAR CONCRETE AND BITUMINOUS CONCRETE PAVEMENT TOP COURSE TYPE, SCORE AND TEXTURE.
11. ROAD AND PARKING STRIPING SHALL BE STANDARD 4-INCH WIDE STRIPING AND MEET MUTCD STANDARDS.

LEGEND

(SEE EXISTING CONDITIONS PLAN FOR EXISTING CONDITIONS SYMBOLS AND ABBREVIATIONS)

DMH(S)	PROPOSED DRAIN MANHOLE
STM(S)	PROPOSED STORMWATER TREATMENT UNIT
CB	PROPOSED DEEP SUMP CATCH BASIN
DSDMH(S)	PROPOSED DEEP SUMP DRAIN MANHOLE
RC	PROPOSED ROOF DRAIN
OCS	PROPOSED OUTLET CONTROL STRUCTURE
SMH(S)	PROPOSED SEWER MANHOLE
WG	PROPOSED WATER GATE VALVE
HYD	PROPOSED FIRE HYDRANT
R=30	RADIUS = 30 FEET
VGC	PROPOSED VERTICAL GRANITE CURB
TRC	PROPOSED TRANSITIONAL GRANITE CURB
FGC	PROPOSED FLUSH GRANITE CURB
CCB	PROPOSED CAPE COD BERM
EOP (EC)	PROPOSED EDGE OF PAVEMENT (NO CURB)
FES	HDPE FLARED END SECTION

STANDARD TOP COURSE BITUMINOUS CONCRETE PAVEMENT (VEHICULAR)

SCORE MIX TOP COURSE BITUMINOUS CONCRETE PAVEMENT (VEHICULAR)

POROUS ASPHALT

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AMESBURY, MA

DINISCO DESIGN architects + planners
99 Chauncy Street, Suite 601
Boston, MA 02111
(617) 439-2666

DBT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0099

Brown Rankin, Inc.
Landscape Architects
34 Rutland Street
Boston, MA 02139
(617) 482-4706

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-6900

Crabtree Skolfield Assoc., Inc.
Food Service Consultants
101 West Main Street
Georgetown, MA 01833
(978) 352-8600

WW International, Inc.
Civil Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 995-7228

Thompson Engineering Company, Inc.
Electrical Engineers
99 Newbury Street, Suite 109
Danvers, MA 01923
(617) 688-6388

BrMaher Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01860
(978) 209-6920

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Revisions

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Vehicular Pavement Layout and Materials Plan - 03

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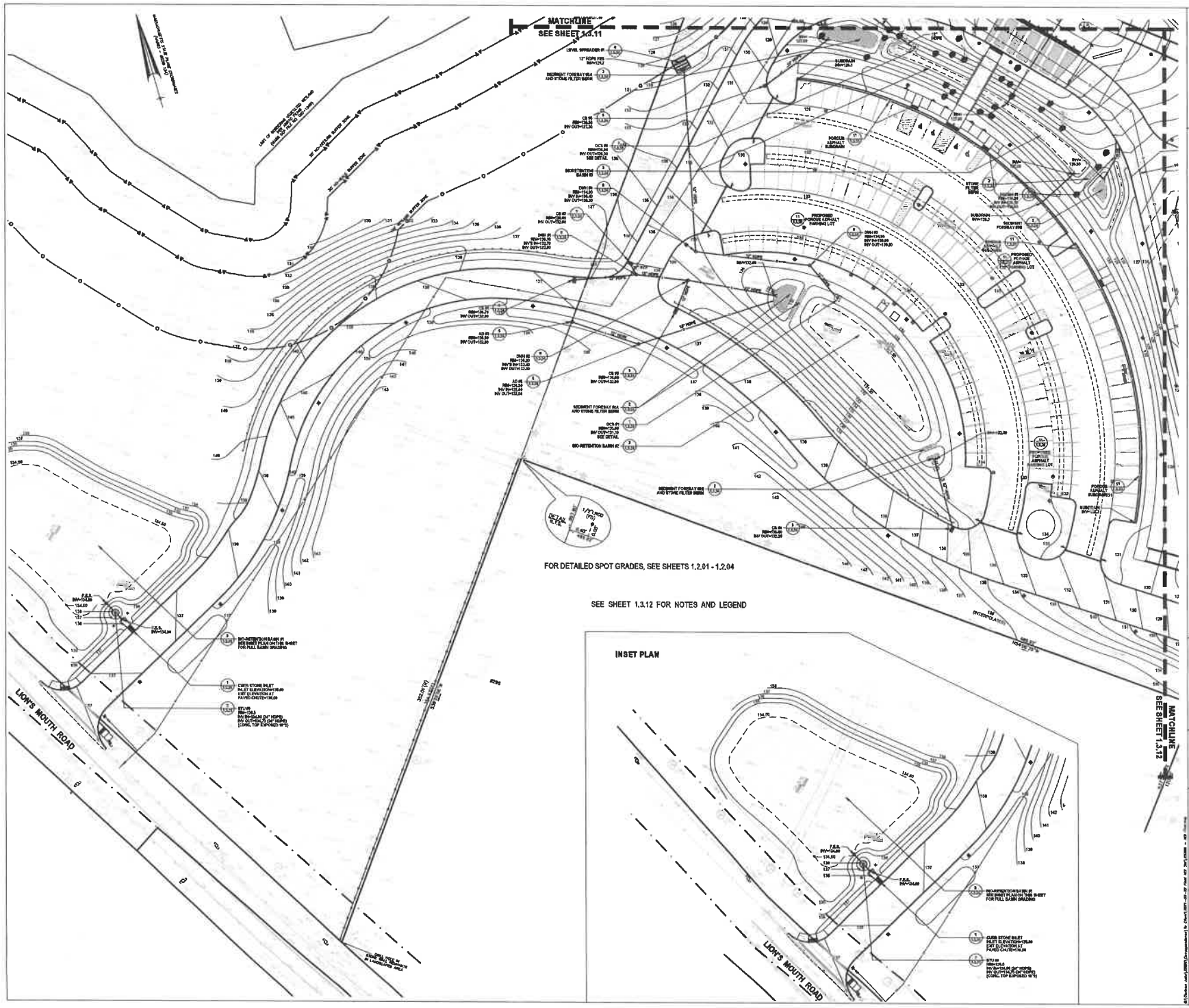

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DINISCO DESIGN
architects + planners

99 Chauncy Street, Suite 601
Boston, MA 02111
(617) 426-2888

DST Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-8800

Crabtree Mulhuth Assoc., Inc.
Food Service Consultants
101 West Main Street
Georgetown, MA 01833
(978) 352-8800

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Mechanical Engineers
409 West Cummings Park S. 4700
Woburn, MA 01801
(781) 995-7228

Thompson Engineering Company, Inc.
Electrical Engineers
99 Newbury Street, Suite 103
Danvers, MA 01923
(617) 599-8088

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Technology Consultants
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Andover, MA 01880
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Stormwater Grading and Drainage Plan - 01

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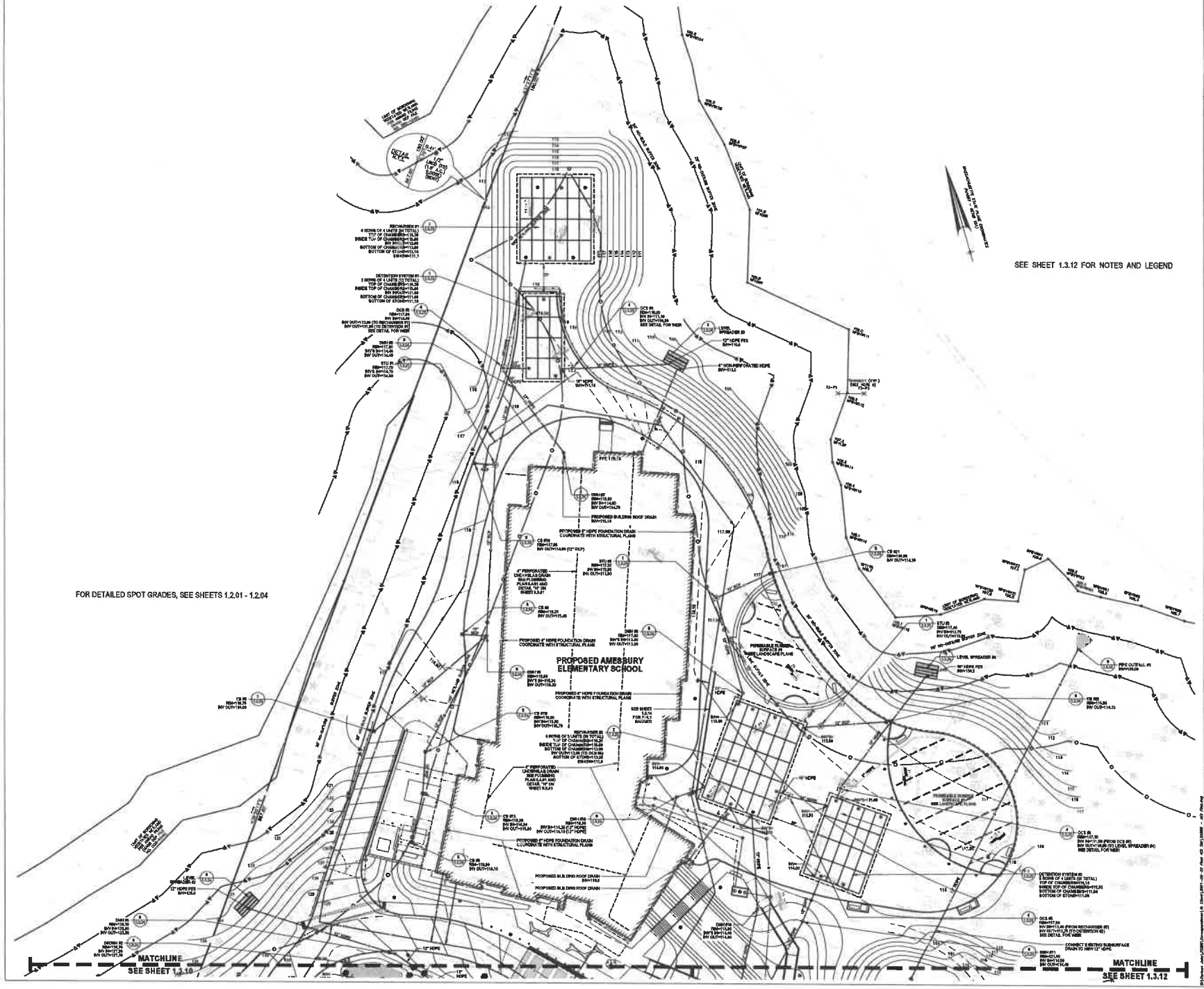

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AMESBURY, MA

DINISCO DESIGN
architects + planners

[illegible] Chauncy Street, Suite 501
Boston, MA 02111
(617) [illegible]

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0080

Brown Gardiner, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) [illegible]

Foley Hoag Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 627-0800

Crabtree McGrath Assoc., Inc.
Food Service Consultants
161 West Main Street
Georgetown, MA 01833
(978) 203-8800

WW International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 585-7228

Thompson Engineering Company, Inc.
Electrical Engineers
[illegible] Newbury Street, Suite 103
Danvers, MA 01923
(617) [illegible]

BrWhane Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01860
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Stormwater Grading and Drainage Plan - 02

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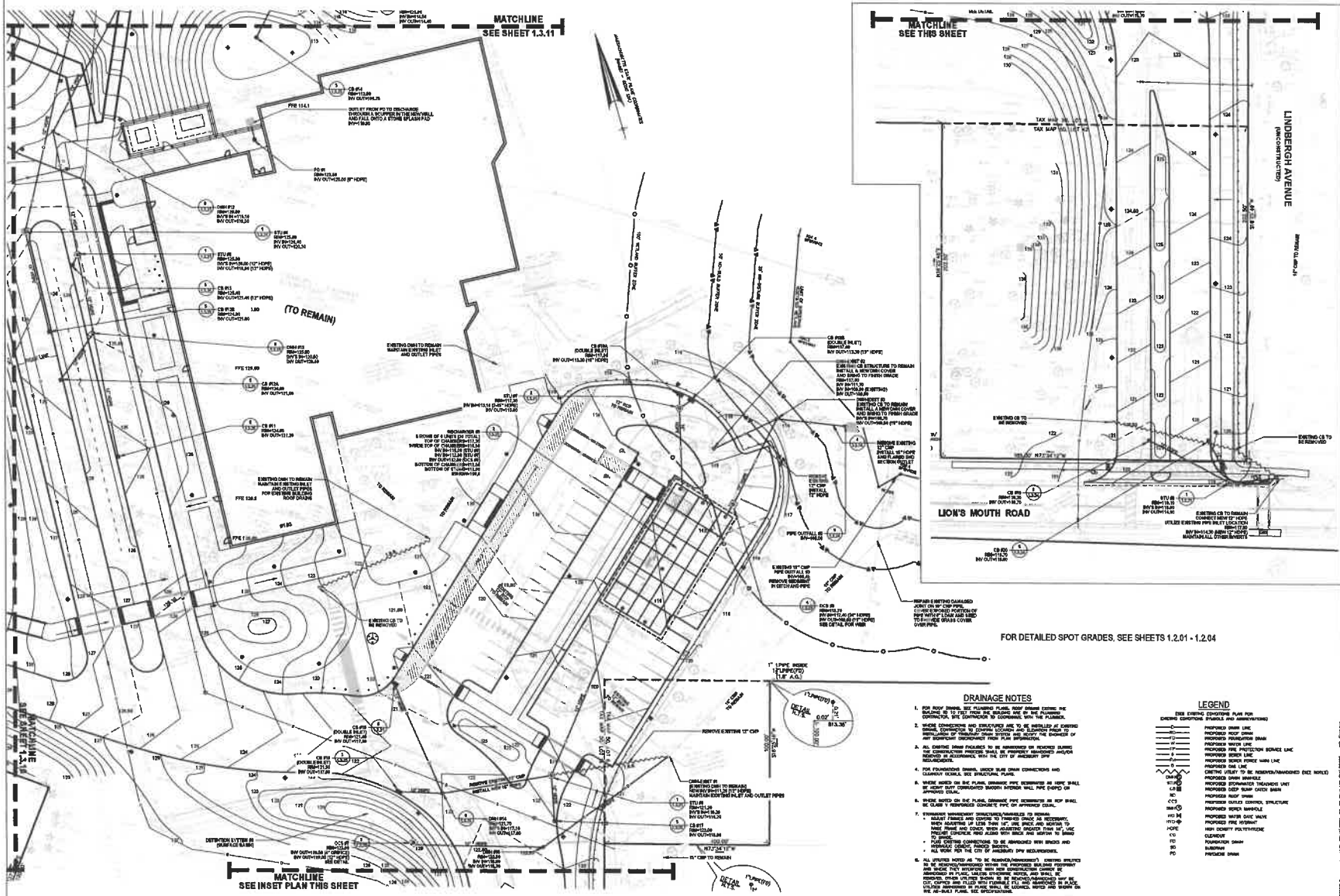

DRAINAGE NOTES

1. FOR ROOF DRAINS, SEE PLUMBING PLANS. ROOF DRAINS EXISTING PVC DRAINING TO 10 FEET FROM THE BUILDING ARE BY THE PLUMBING CONTRACTOR. SITE CONTRACTOR TO COORDINATE WITH THE PLUMBER.
2. WHERE CONNECTIONS AND STRUCTURES ARE TO BE INSTALLED AT EXISTING DRAINS, CONTRACTOR TO EXAMINE LOCATION AND ELEVATION PRIOR TO INSTALLATION OF TRIBUTARY DRAIN SYSTEM AND NOTIFY THE ENGINEER OF ANY SIGNIFICANT DISCREPANCY FROM PLAN INFORMATION.
3. ALL EXISTING DRAIN FACILITIES TO BE ABANDONED OR REMOVED DURING THE CONSTRUCTION PROCESS SHALL BE PROPERLY ABANDONED AND/OR REMOVED IN ACCORDANCE WITH THE CITY OF AMESBURY DPW REQUIREMENTS.
4. FOR FOUNDATIONS DRAINS, UNDER SLAB DRAIN CONNECTIONS AND CLEANOUT DETAILS, SEE STRUCTURAL PLANS.
5. WHERE NOTED ON SHC PLANS, DRAINAGE PIPE DESIGNATED AS HDPE SHALL BE ADS N-12 (ASTM F2306) DUAL WALL PIPE (HDPE) OR APPROVED EQUAL.
6. WHERE NOTED ON SHC PLANS, DRAINAGE PIPE DESIGNATED AS RCP SHALL BE CLASS V REINFORCED CONCRETE PIPE OR APPROVED EQUAL.
7. STORMWATER MANAGEMENT STRUCTURES/MANHOLES TO REMAIN:
   - ADJUST FRAMES AND COVERS TO FINISHED GRADE AS NECESSARY, WHEN ADJUSTING UP LESS THAN 12", USE BRICK AND MORTAR TO MAKE FRAME AND COVER. WHEN ADJUSTING HEIGHT OVER 12", USE PRECAST CONCRETE RING ALONG WITH BRICK AND MORTAR TO BRING TO GRADE.
   - PERFORM CORRECTIONS TO BE APPROVED WITH BRICKS AND PORTLAND CEMENT MORTAR MIXES.
   - ALL WORK PER THE CITY OF AMESBURY DPW RECOMMENDS.
8. ALL UTILITIES NOTED AS "TO BE REMOVED/ABANDONED": EXISTING UTILITIES TO BE REMOVED/ABANDONED WITHIN THE PROPOSED BUILDING FOOTPRINT SHALL BE REMOVED. EXISTING UTILITIES OUTSIDE THE BUILDING TO BE ABANDONED IN PLACE, UNLESS OTHERWISE NOTED, AND SHALL BE REMOVED. OTHER UTILITIES SHOWN TO BE REMOVED/ABANDONED MAY BE CUT, CAPPED AND FILLED WITH FLOWABLE FILL AND ABANDONED IN PLACE. UTILITIES ABANDONED IN PLACE SHALL BE LOCATED, NOTED AND SHOWN ON RIS AS-BUILT PLANS. SEE DEMO SHEETS.
9. CONTRACTOR TO COORDINATE ELECTRIC / TELECOM DIRECT BANK LOCATIONS AND ELEVATIONS TO AVOID CONFLICT WITH DRAIN LINES AND STRUCTURES.
10. WHERE EXISTING ENCOUNTERED MATERIAL IS TO BE USED FOR BACKFILL IN UTILITY TRENCHES, MINIMUM TAPE SHALL BE INSTALLED IN THE TRENCH OVER THE BACKFILL MATERIAL. SEE SECTION 334000.

LEGEND

(SEE EXISTING CONDITIONS PLANS FOR EXISTING CONDITIONS SYMBOLS AND ABBREVIATIONS)

- PROPOSED DRAIN LINE
- PROPOSED ROOF DRAIN
- PROPOSED FOUNDATION DRAIN
- PROPOSED WATER LINE
- PROPOSED FIRE PROTECTION SERVICE LINE
- PROPOSED SEWER LINE
- PROPOSED SEWER FORCE MAIN LINE
- PROPOSED GAS LINE
- EXISTING UTILITY TO BE REMOVED/ABANDONED (SIZE NOTED)
- PROPOSED DRAIN MANHOLE
- PROPOSED STORMWATER TREATMENT UNIT
- PROPOSED DEEP SUMP CATCH BASIN
- PROPOSED ROOF DRAIN
- PROPOSED OUTLET CONTROL STRUCTURE
- PROPOSED SEWER MANHOLE
- PROPOSED WATER GATE VALVE
- PROPOSED FIRE HYDRANT
- HIGH DENSITY POLYETHYLENE
- CLEANOUT
- FOUNDATION DRAIN
- SUBDRAIN
- PROTECTION DRAIN

AMESBURY ELEMENTARY SCHOOL

AMESBURY, MA

DINISCO DESIGN
architects + planners
60 Cherry Street, Suite 501
Boston, MA 02111
(617) 439-3995

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0259

Brown Berlina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 483-4703

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2180 Washington Street
Newton, MA 02462
(617) 527-8600

Cosentini Mehrotra Assoc., Inc.
Food Service Consultants
101 West Main Street
Chesterfield, MA 01532
(978) 303-9900

WSP International, Inc.
MEP Technical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 995-7238

Thompson Engineering Company, Inc.
Electrical Engineers
89 Newbury Street, Suite 103
Danvers, MA 01923
(617) 686-9088

BdVance Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01810
(978) 208-8800

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Stormwater Grading and Drainage Plan - 03

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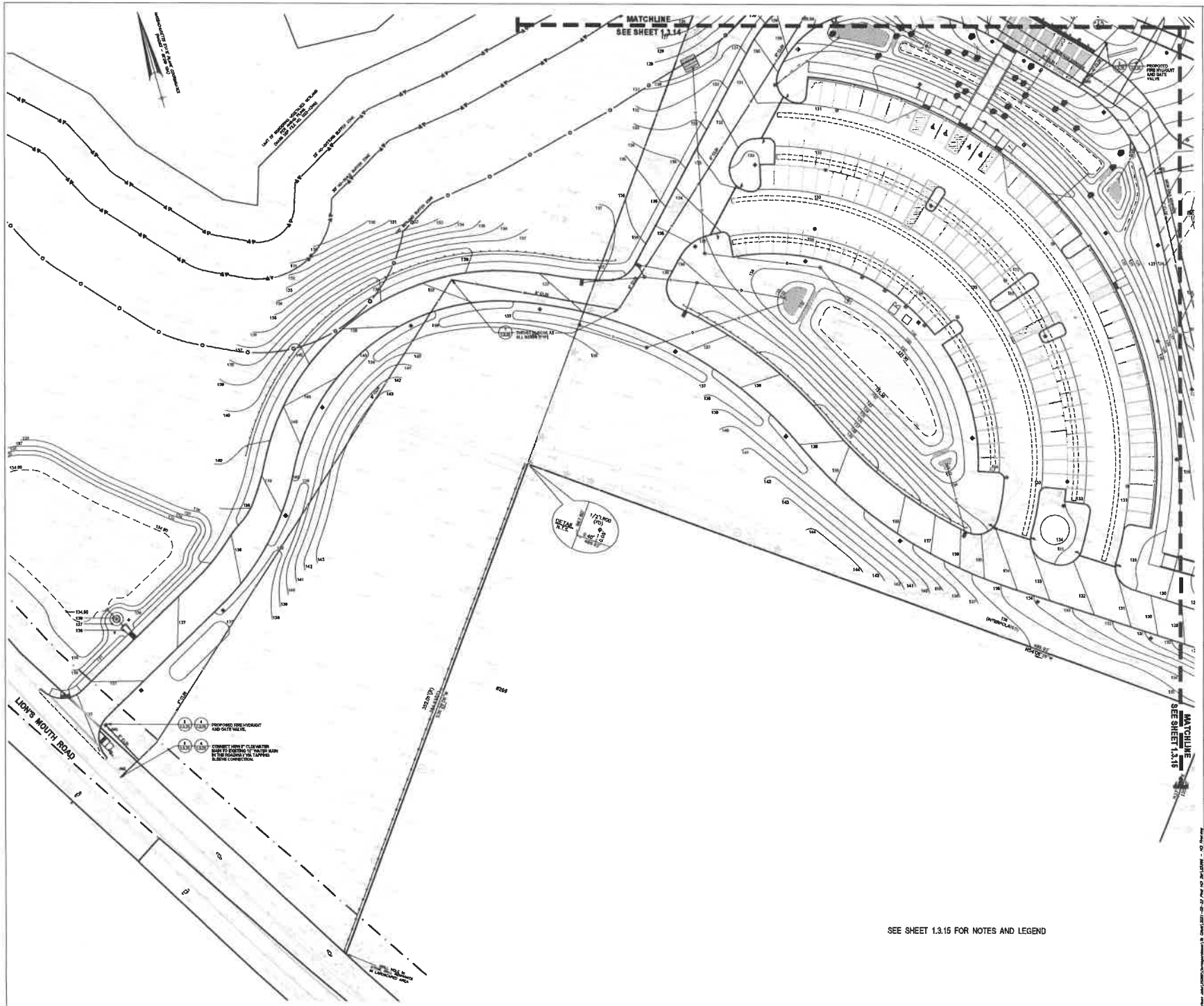

SEE SHEET 1.3.15 FOR NOTES AND LEGEND

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AMESBURY, MA

DINISCO DESIGN
architects + planners

99 Chauncy Street, Suite 801
Boston, MA 02111
(617) 426-2958

DST Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 483-4703

Foley Bald Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-6800

Cambrea McGrath Assoc., Inc.
Food Service Consultants
191 West Main Street
Georgetown, MA 01833
(978) 352-8800

VHV International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 995-7228

Thompson Engineering Company, Inc.
Electrical Engineers
50 Newbury Street, Suite 103
Danvers, MA 01923
(617) 556-5055

Erikson Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01860
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Revisions

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Site Utilities Plan - 01

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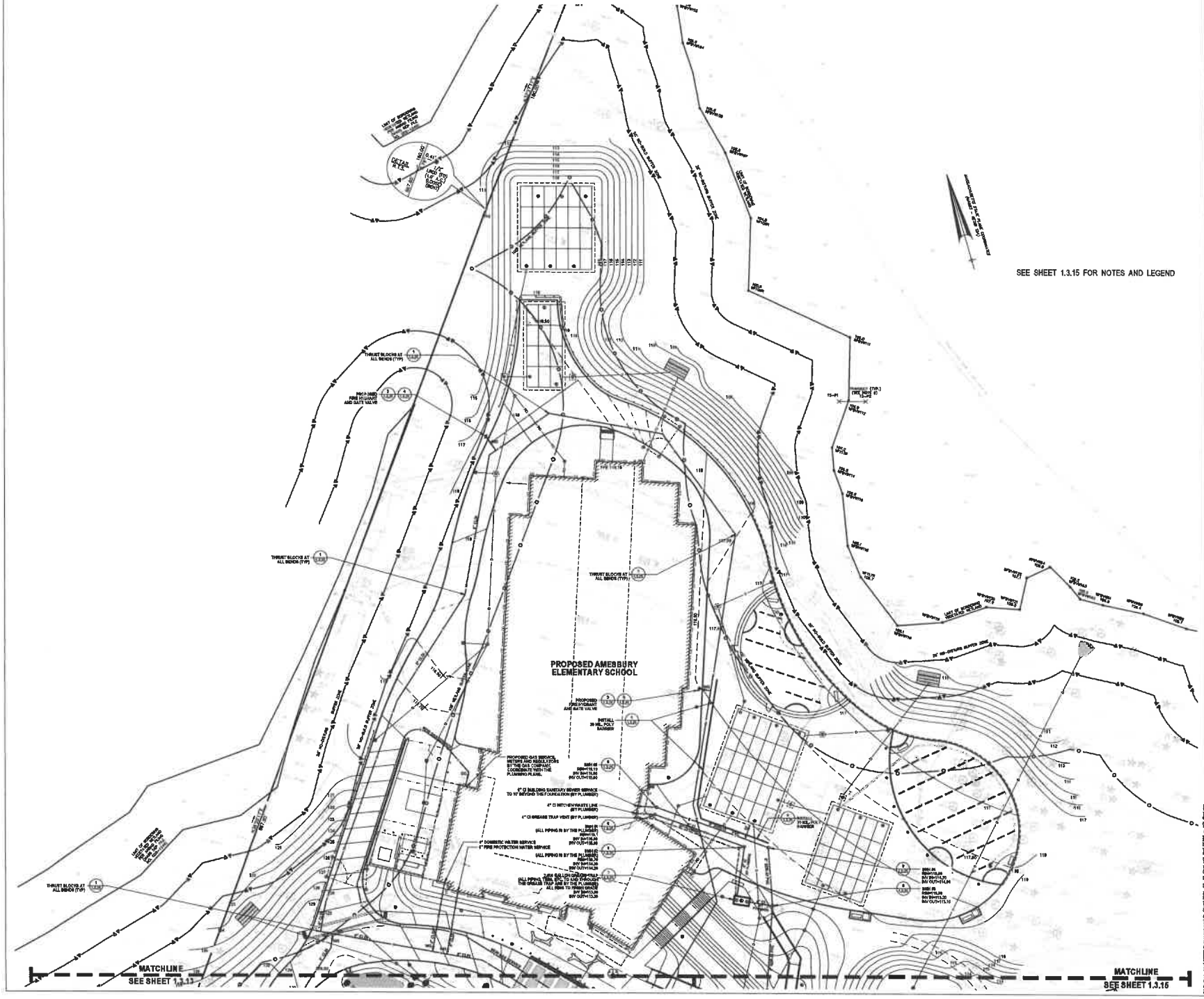

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AMESBURY, MA

DINISCO DESIGN
architects + planners

[illegible] Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2955

DST Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0080

Brown Sunline, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2100 Washington Street
Newton, MA 02462
(617) 527-6600

Cambrea McGrath Assoc., Inc.
Food Service Consultants
191 West Main Street
Georgetown, MA 01833
(978) 352-5600

WW International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 995-7239

Thompson Engineering Company, Inc.
Electrical Engineers
89 Newbury Street, Suite 103
Danvers, MA 01923
(617) 595-6000

Edvance Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01880
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Site Utilities Plan - 02

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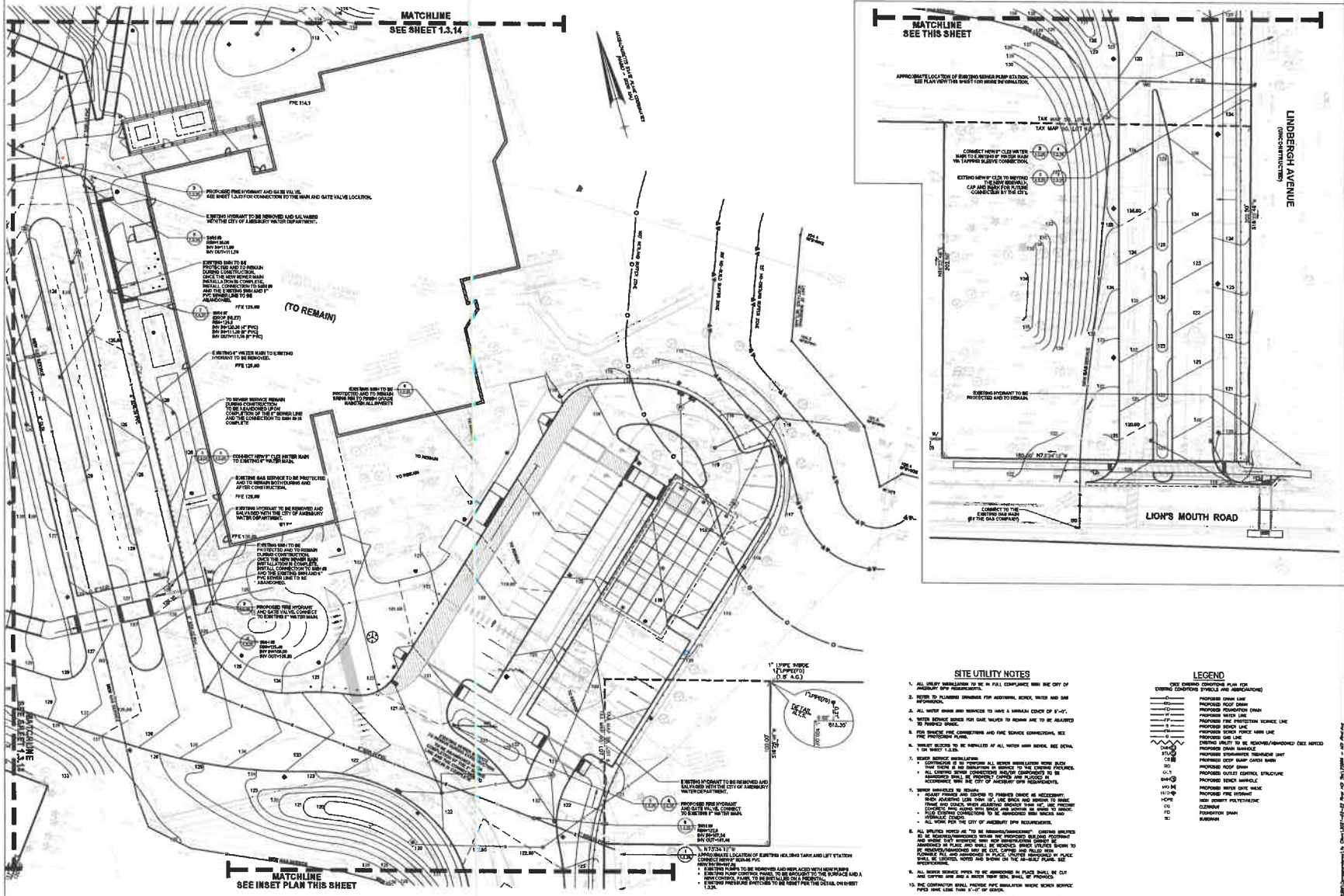

SITE UTILITY NOTES

1. ALL UTILITY INSTALLATIONS TO BE IN FULL COMPLIANCE WITH THE CITY OF AMESBURY DPW REQUIREMENTS.
2. REFER TO PLUMBING DRAWINGS FOR ADDITIONAL SEWER, WATER AND GAS INFORMATION.
3. ALL WATER MAINS AND SERVICES TO HAVE A MINIMUM COVER OF 5'-0".
4. WATER SERVICE SLEEVE FOR GATE VALVES TO REMAIN ARE TO BE ABANDONED TO FINISHED GRADE.
5. FOR SPRINKLER FIRE CONNECTIONS AND FIRE SERVICE CONNECTIONS, SEE FIRE PROTECTION PLANS.
6. THRUST BLOCKS TO BE INSTALLED AT ALL WATER MAIN BENDS. SEE DETAIL 1 ON SHEET 1.3.25.
7. SEWER SERVICE INSTALLATION:
   - CONTRACTOR IS TO PERFORM ALL SEWER INSTALLATION WORK SUCH THAT THERE IS NO DISRUPTION IN SERVICE TO THE EXISTING FIXTURES.
   - ALL EXISTING SEWER CONNECTIONS AND/OR COMPONENTS TO BE ABANDONED SHALL BE PROPERLY CAPPED AND PLUGGED IN ACCORDANCE WITH THE CITY OF AMESBURY DPW REQUIREMENTS.
8. SEWER MANHOLES TO REMAIN:
   - ADJUST FRAMES AND COVERS TO FINISHED GRADE AS NECCESSARY. WHEN ADJUSTING LESS THAN 18", USE BRICK AND MORTAR TO BRACE FRAME AND COVER. WHEN ADJUSTING GREATER THAN 18", USE PRECAST CONCRETE RISER RINGS. BRICK AND MORTAR TO BRACE. PLUG EXISTING CONNECTIONS TO BE REMOVED WITH BRICK AND HYDRAULIC CEMENT.
   - ALL WORK PER THE CITY OF AMESBURY DPW REQUIREMENTS.
9. ALL UTILITIES WORK AT TIE IN BRANCH/CONNECTION TO EXISTING UTILITIES SHALL BE COORDINATED WITHIN THE PROPERTIES BUILDING ENVELOPMENT AND WHERE THAT INTERFACE WITH NEW CONSTRUCTION CANNOT BE ABANDONED IN PLACE AND SHALL BE REMOVED. SEWER UTILITIES SHOWN TO BE REMOVED/ABANDONED MAY BE CUT, CAPPED AND PLUGGED WITH FLOWABLE FILL AND ABANDONED IN PLACE. UTILITIES ABANDONED IN PLACE SHALL BE LOCATED, NOTED AND SHOWN ON THE AS-BUILT PLANS. SEE SPECIFICATIONS.
10. ALL SEWER SERVICE PIPES TO BE ABANDONED IN PLACE SHALL BE CUT AND CAPPED AND AND A WATER TIGHT SEAL SHALL BE PROVIDED.
11. THE CONTRACTOR SHALL PROVIDE PVC INSULATION WHERE SEWER SERVICE PIPES HAVE LESS THAN 5'-0" OF COVER.
12. CONTRACTOR TO COORDINATE ELECTRIC / TELECOM/CATV RISER WORK LOCATIONS AND ELEVATIONS TO PROVE CONFLICT WITH PROPOSED SEWER, WATER AND GAS LINES AND STRUCTURES AND ALL EXISTING UTILITIES.
13. WHERE EXISTING ENCASTED MATERIAL IS TO BE USED FOR BACKFILL IN UTILITY TRENCHES, WARNING TAPE SHALL BE INSTALLED BY THE TRENCH RACK THE BACKFILL MATERIAL. SEE SECTION 331000 AND 333000.

LEGEND

(SEE EXISTING CONDITIONS PLAN FOR EXISTING CONDITIONS SYMBOLS AND ABBREVIATIONS)

D	PROPOSED DRAIN LINE
RD	PROPOSED ROOF DRAIN
F	PROPOSED FOUNDATION DRAIN
W	PROPOSED WATER LINE
FP	PROPOSED FIRE PROTECTION SERVICE LINE
S	PROPOSED SEWER LINE
FS	PROPOSED SEWER FORCE MAIN LINE
G	PROPOSED GAS LINE
DMH(S)	PROPOSED DRAIN MANHOLE
STUB	PROPOSED STORMWATER TREATMENT UNIT
CB	PROPOSED DEEP SUMP CATCH BASIN
RD	PROPOSED ROOF DRAIN
O.S.	PROPOSED OUTLET CONTROL STRUCTURE
SMH(S)	PROPOSED SEWER MANHOLE
WG	PROPOSED WATER GATE VALVE
WH	PROPOSED FIRE HYDRANT
HDPE	HIGH DENSITY POLYETHYLENE
CV	CLEANOUT
FD	FOUNDATION DRAIN
SD	SUBDRAIN

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AMESBURY, MA

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(617) 426-2626

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Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

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Landscape Architects
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(617) 483-4709

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(617) 599-9399

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Andover, MA 01810
(978) 296-9800

REVISION

Date: 22 February 2021

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Revisions

Number	Date	Description

Site Utilities Plan - 03

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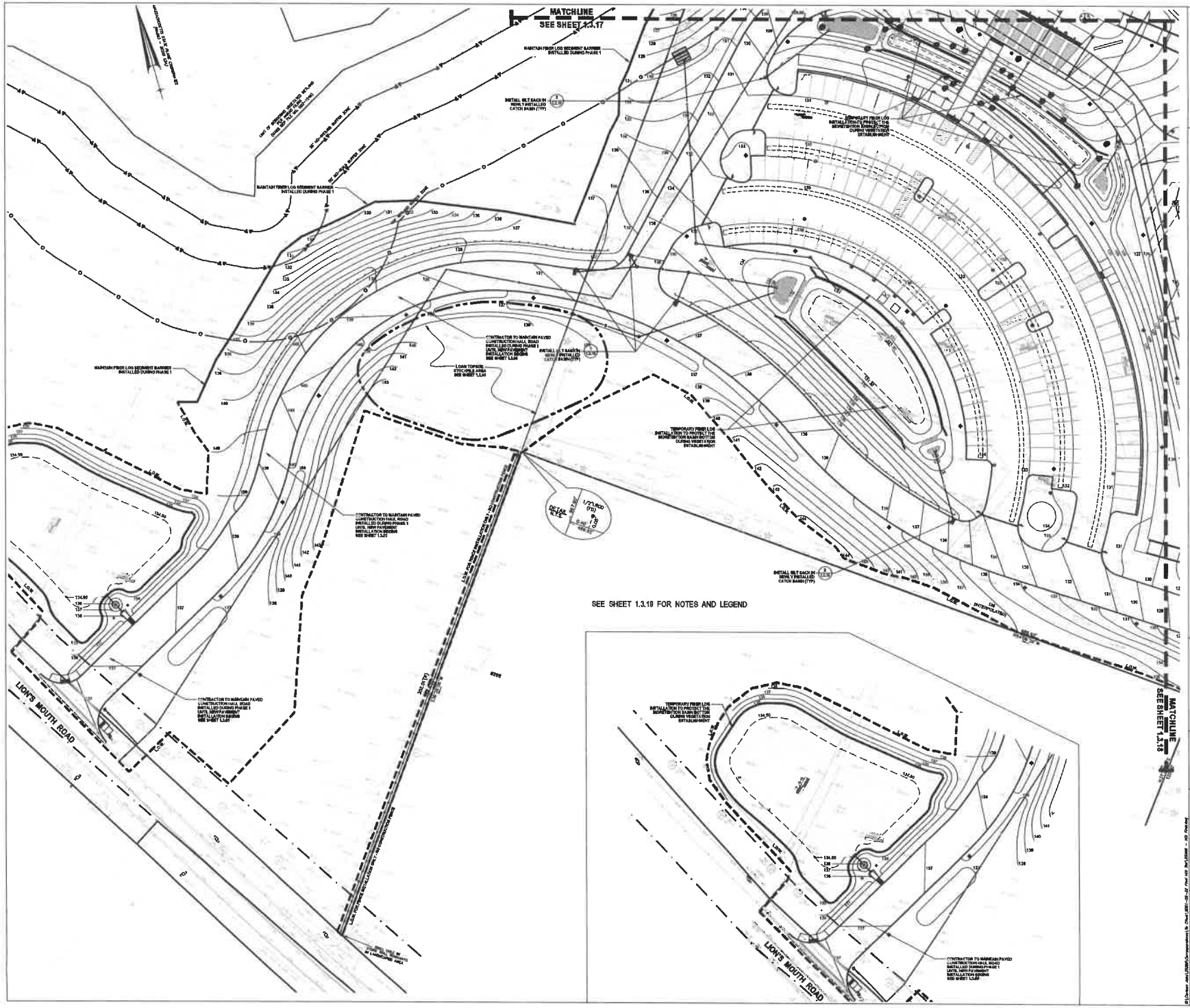

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Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

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Landscape Architects
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Andover, MA 01880
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Revisions

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Erosion and Sediment Control Plan - 01

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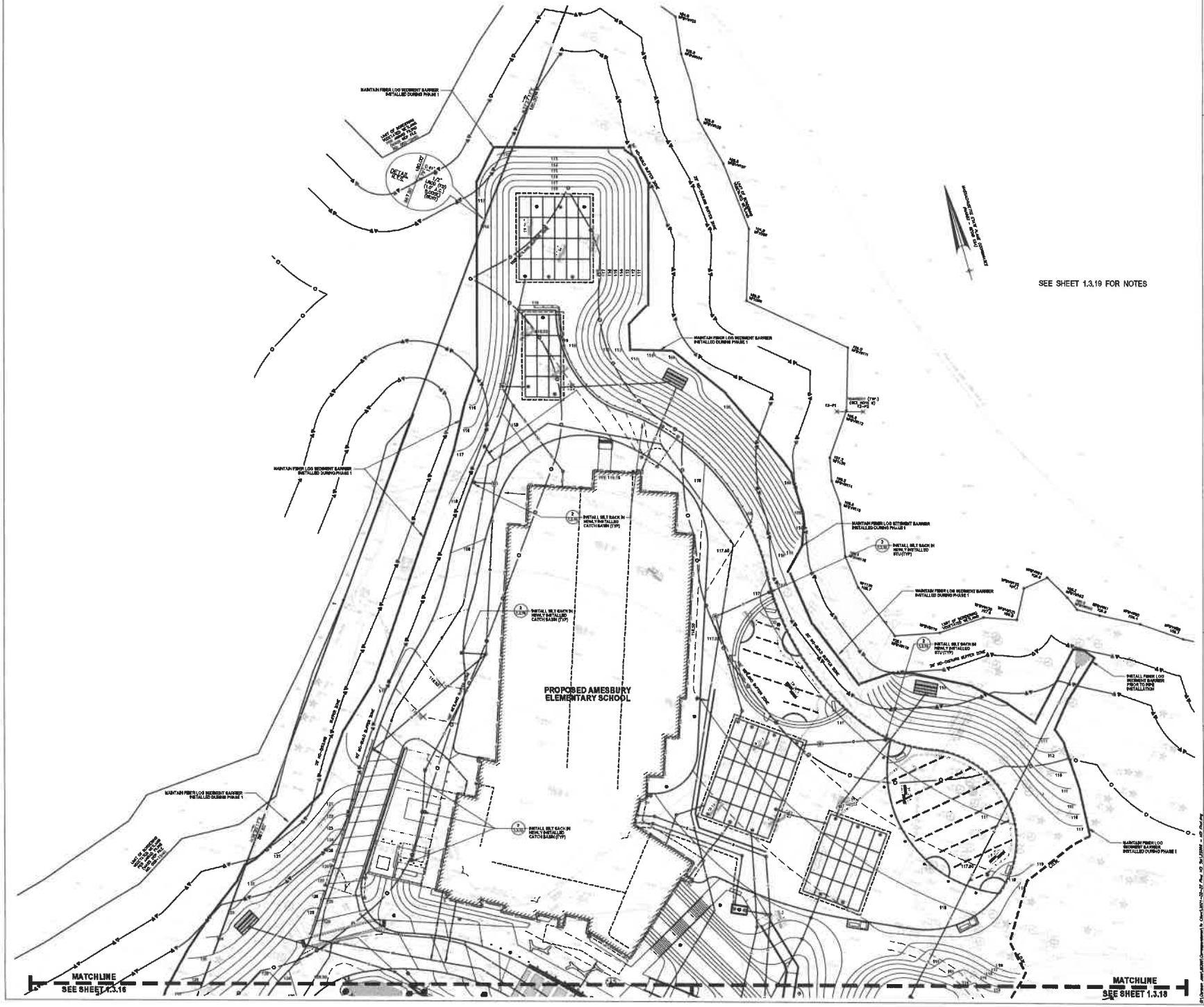

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AMESBURY, MA

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architects + planners

99 Chauncy Street, Suite 601
Boston, MA 02111
(617) 439-2655

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0089

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 483-4708

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2180 Washington Street
Newton, MA 02462
(617) 527-5900

Crabtree McGrath Assoc., Inc.
Food Service Consultants
161 West Main Street
Georgetown, MA 01833
(978) 352-8500

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Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 995-7238

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Electrical Engineers
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Technology Consultants
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Andover, MA 01860
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Revisions

Number	Date	Description

Erosion and Sediment Control Plan - 02

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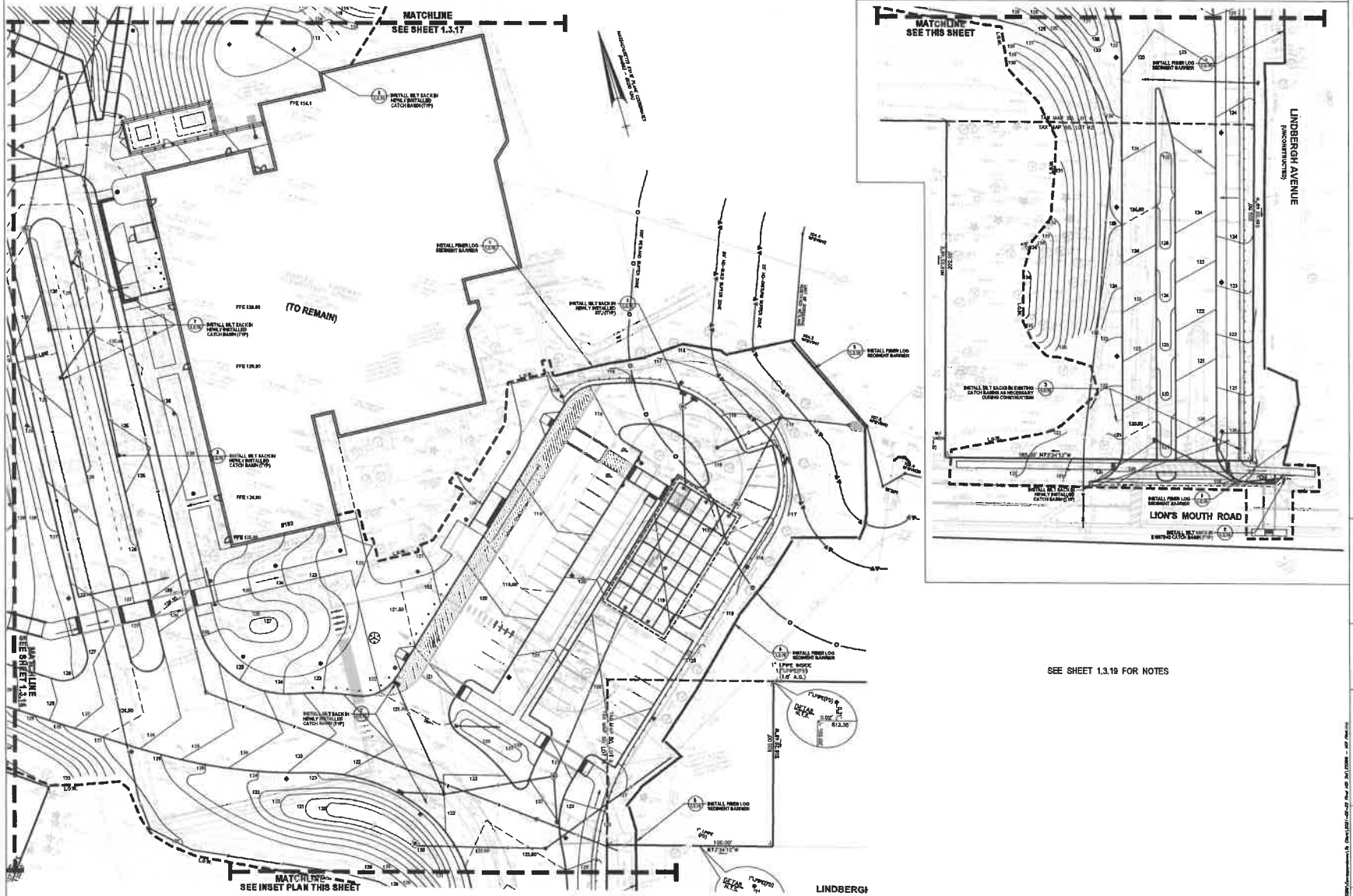

SEE SHEET 1.3.19 FOR NOTES

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Boston, MA 02111
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Framingham, MA 01701
(508) 879-0030

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Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

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Structural Engineers
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Newton, MA 02462
(617) 527-8800

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Food Service Consultants
161 West Main Street
Georgetown, MA 01833
(978) 393-8800

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Mechanical Engineers
400 West Cummings Park St. 4700
Woburn, MA 01801
(781) 995-7220

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Electrical Engineers
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Danvers, MA 01923
(617) 598-8066

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Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01880
(978) 556-8800

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Revisions

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DINISCO DESIGN architects + planners
99 Chauncy Street, Suite 801
Boston, MA 02111
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DCT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-6600

Crabtree McGrath Assoc., Inc.
Food Service Consultants
161 West Main Street
Georgetown, MA 01833
(978) 352-8600

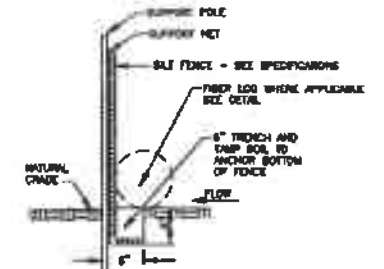
WW International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 995-7228

Thompson Engineering Company, Inc.
Electrical Engineers
86 Newbury Street, Suite 103
Danvers, MA 01923
(617) 860-6066

Edvance Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01810
(978) 208-0600

EROSION AND SEDIMENT CONTROL NOTES

1. **GENERAL PERFORMANCE STANDARDS:**
   - 1.1. THE CONTRACTOR SHALL INSTALL, ROUTINELY INSPECT AND MAINTAIN ALL SEDIMENT AND EROSION CONTROLS SUCH THAT THEY ARE IN PROPER WORKING ORDER AT ALL TIMES DURING THE CONSTRUCTION PROJECT UNTIL SUCH TIME AS ALL AREAS OF THE SITE TRIBUTARY TO THOSE EROSION CONTROLS ARE IN A PERMANENTLY STABILIZED CONDITION.
   - 1.2. THE PLAN VIEWS IN THIS PLAN SET SHOW ONLY THE LOCATIONS OF THE PERIMETER EROSION CONTROLS AND ARE NOT INTENDED TO SHOW ALL EROSION CONTROLS NECESSARY FOR MANAGEMENT OF THE SITE. THE CONTRACTOR SHALL MANAGE THE SITE SUCH THAT EROSION AND SEDIMENT FROM RUNOFF AND WIND BLOWN DUST ARE CONTROLLED AND MINIMIZED AT ALL TIMES. THE EROSION CONTROLS SHOWN ON THIS PLAN INCLUDE THE INITIAL SETUP OF EROSION CONTROLS AND BASIC INFORMATION. TO MEET THE REQUIREMENT OF BEST MANAGEMENT PRACTICES, THE CONTRACTOR MUST MANAGE THE SITE PROPERLY WHICH MAY INCLUDE, BUT NOT BE LIMITED TO: MINIMIZING AREAS OF EXPOSED SOILS; INSTALLING TEMPORARY COVER; MAKE NECESSARY ADJUSTMENTS TO THE EROSION CONTROL INSTALLATIONS TO IMPROVE FUNCTION; PROVIDE TEMPORARY SEDIMENT BASINS; INSTALL ADDITIONAL EROSION AND SEDIMENT CONTROL WHERE NECESSARY.
   - 1.3. THE EROSION CONTROL WORK IS ALSO SUBJECT TO PERMITS AND APPROVALS UNDER THE MUNICIPAL STORMWATER ORDINANCES AND ALL STATE, LOCAL AND FEDERAL REGULATIONS. THE PROJECT MAY ALSO BE SUBJECT TO OTHER STATE AND LOCAL APPROVALS. THE CONTRACTOR SHALL OBTAIN AND BE RESPONSIBLE FOR COMPLIANCE WITH THE CONDITIONS AND REQUIREMENTS OF THOSE PERMITS.
   - 1.4. DESIGN, INSTALLATION AND MAINTENANCE OF SEDIMENT AND EROSION CONTROLS SHALL BE IN ACCORDANCE WITH BEST MANAGEMENT PRACTICES FOLLOWING THE GUIDELINES INCLUDE IN THE FOLLOWING:
     - "STORMWATER MANAGEMENT FOR CONSTRUCTION ACTIVITIES, DEVELOPING POLLUTION PREVENTION PLANS AND BEST MANAGEMENT PRACTICES" U.S. ENVIRONMENTAL PROTECTION AGENCY, OCTOBER 1992.
     - "MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS, A GUIDE FOR PLANNERS, DESIGNERS AND MUNICIPAL OFFICIALS", MASS. EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS, MAY 2003.
     - U.S.D.A. NATURAL RESOURCES AND CONSERVATION SERVICES (NRCS) GUIDELINES.
2. **FEDERAL NPDES PHASE II COMPLIANCE:**
   - 2.1. THIS PROJECT IS SUBJECT TO THE FEDERAL CLEAN WATER ACT REQUIREMENTS FOR CONSTRUCTION SITES ADMINISTERED BY THE U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA). THIS PROGRAM IS THE "NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) – PHASE II FOR CONSTRUCTION SITES. FOR COMPLIANCE WITH THIS PROGRAM, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING A COMPLETE "STORMWATER POLLUTION PREVENTION PLAN" (SWPPP) IN CONFORMANCE WITH THE CURRENT CONSTRUCTION GENERAL PERMIT AND FILING A NOTICE OF INTENT WITH THE EPA UNDER THE NPDES PROGRAM. THE CONTRACTOR SHALL THEN MANAGE THE SITE IN COMPLIANCE WITH THE SWPPP AND IN COMPLIANCE WITH THE CONSTRUCTION GENERAL PERMIT. NOTE THAT THE SWPPP IS TO BE PREPARED TO BE CONSISTENT WITH THIS EROSION AND SEDIMENT CONTROL PLAN AND OTHER APPLICABLE APPROVALS. THE EROSION AND SEDIMENT CONTROL PLAN INCLUDED IN THIS PLAN SET MAY BE USED AS PART OF THE DOCUMENTATION REQUIRED FOR THE PREPARATION OF A SWPPP, BUT IS NOT TO BE CONSIDERED AS MEETING THE FULL REQUIREMENTS OF A SWPPP PREPARED FOR COMPLIANCE WITH THE NPDES PROGRAM.
   - 2.2. A COPY OF THE SWPPP SHALL BE FILED WITH THE MUNICIPAL ENGINEERING DEPARTMENT, CONSERVATION COMMISSION AND OTHERS AS REQUIRED BY APPLICABLE PERMITS AND APPROVALS.
   - 2.3. THE CONTRACTOR IS RESPONSIBLE FOR THE PREPARATION OF THE CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION CONTROL PLAN (CPPP). THIS DOCUMENT SHALL BE PREPARED AND SUBMITTED TO THE AMESBURY CONSERVATION COMMISSION, OWNER, ARCHITECT AND ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ANY SITE DISTURBANCE. THIS DOCUMENT IS TO BE CONSIDERED PART OF THE CONTRACT DOCUMENTS FOR THIS PROJECT.
3. **PERIMETER FIBER LOG / CONSTRUCTION FENCE AND LIMIT OF WORK:**
   - 3.1. PRIOR TO ANY DISTURBANCE OR ALTERATIONS OF ANY AREA ON THE SITE, AN EROSION CONTROL BARRIER AND CONSTRUCTION FENCE SHALL BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS AND CONTRACT DOCUMENTS. THE INSTALLED PERIMETER EROSION CONTROL BARRIERS SHALL BE INSPECTED BY THE CITY OF AMESBURY, ARCHITECT AND ENGINEER PRIOR TO THE START OF SITE WORK.
   - 3.2. INSTALL THE FIBER LOGS AS SHOWN, IN THOSE AREAS WHERE THE TOPOGRAPHY INDICATES THAT STORMWATER RUNOFF WILL BE CONCENTRATED (AT LOW POINTS), ADDITIONAL FIBER LOGS, AS NECESSARY, SHALL BE ADDED FOR ADDITIONAL FILTRATION AND PROTECTION. SILT FENCE FOR ADDED SUPPORT MAY BE ADDED AS NECESSARY. THE REQUIRED LOCATIONS FOR THE ADDED FIBER LOG INSTALLATION WILL BE SELECTED BY THE ENGINEER AND / OR THE AUTHORIZED INSPECTOR/ SWPPP COORDINATOR UPON COMPLETION OF THE FIBER LOG INSTALLATION (SEE DETAIL).
   - 3.3. ONCE INSTALLED, THE STAKED FIBER LOGS SHALL BE MAINTAINED IN PLACE UNTIL ALL AREAS UPGRADIENT FROM THE BARRIERS HAVE BEEN PERMANENTLY STABILIZED.
   - 3.4. ALL DISTURBED AREAS NOT OTHERWISE DEVELOPED OR WHERE SPECIAL STABILIZATION MEASURES OR LANDSCAPE PLANTINGS ARE PROPOSED SHALL BE LOAMED AND SEEDED OR SODDED. SIX INCHES OF LOAM TOPSOIL (MIN. COMPACTED DEPTH) SHALL BE APPLIED UNLESS, OTHERWISE SPECIFIED. (SEE LANDSCAPE PLAN AND OTHER PLANS AS APPLICABLE).
   - 3.5. THE PERIMETER FIBER LOGS AND CONSTRUCTION FENCING ARE ALSO LIMITS OF WORK. ALL AREAS OUTSIDE THE LIMIT ARE TO BE LEFT UNDISTURBED. DURING THE SITE WORK, ALL PERSONS AND EQUIPMENT SHALL STAY OUT OF THESE AREAS TO PRESERVE THE EXISTING VEGETATION AND SOIL COVER.
4. **CONSTRUCTION ENTRANCE:**
   - 4.1. AT THE START OF SITE WORK, A STONE CONSTRUCTION ENTRANCE SHALL BE INSTALLED AT ALL ACCESS POINTS TO THE CONSTRUCTION SITE FROM THE ROADWAY TO CONTROL THE TRACKING OF MUD OFF THE SITE. THE ENTRANCE SHALL BE MAINTAINED UNTIL THE SITE IS IN A STABILIZED CONDITION WHEN THE POSSIBILITY OF VEHICLES TRACKING MUD OFF SITE HAS BEEN ELIMINATED.
   - 4.2. THE CONTRACTOR SHALL SWEEP THE ADJACENT ROADWAYS WHEN MUD, DUST, DIRT, DEBRIS, ETC. HAS SHOWN SIGNS OF MUD BEING TRACKED ON THE ROADWAYS EXITING THE SITE. THE CONTRACTOR SHALL PAY PARTICULAR ATTENTION TO THIS MATTER AND IMMEDIATE ATTENTION IS ALWAYS REQUIRED.
   - 4.3. THROUGHOUT THE CONSTRUCTION PROCESS, THE LOCATION OF THE CONSTRUCTION ENTRANCE WILL CHANGE DEPENDING ON CONSTRUCTION VEHICLE ENTRANCE AND EXIT LOCATIONS. THE CONTRACTOR SHALL DETAIL THEIR LOCATIONS IN THE STORMWATER POLLUTION PREVENTION PLAN AT EACH PHASE.
5. **DEWATERING OF EXCAVATIONS:**
   - 5.1. DISCHARGE FROM DEWATERING PUMPS OR TEMPORARY TRENCH OR EXCAVATION DRAINS SHALL NOT BE DISCHARGED DIRECTLY TO THE ON-SITE DRAINAGE SYSTEM, OR WETLAND RESOURCE AREAS. DISCHARGES SHALL BE DIRECTED TO A TREATMENT SYSTEM CONSISTING OF A SEDIMENT BASIN, STRAW BALE SEDIMENT BASIN, FILTER BAG SYSTEM, FRAC TANK OR OTHER APPROVED METHOD TO FILTER THE DISCHARGE WATER AND PREVENT EROSION.
   - 5.2. THE PUMP DISCHARGE SYSTEMS MUST BE GREATER THAN 100 FEET FROM WETLAND RESOURCES UNLESS APPROVED BY THE MUNICIPAL CONSERVATION COMMISSION AND IN ACCORDANCE WITH OTHER APPLICABLE LAWS AND REGULATIONS.
   - 5.3. ALL DEWATERING DRAINAGE ASSOCIATED WITH CONSTRUCTION ACTIVITIES MUST FIRST OBTAIN A DEWATERING DRAINAGE PERMIT. SUCH DISCHARGES SHALL COMPLY WITH THE MUNICIPAL REQUIREMENTS, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, MASSACHUSETTS DEP AND OTHER APPROPRIATE AGENCIES. UNDER NO CIRCUMSTANCE SHALL DEWATERING DRAINAGE BE DISCHARGED INTO A SANITARY SEWER.
6. **SOIL STOCKPILES:**
   - 6.1. STOCKPILES OF SOIL MATERIALS SHALL BE PLACED WITHIN AREAS THAT ARE PROTECTED BY PERIMETER EROSION CONTROLS AS SHOWN ON THIS PLAN, OR SHALL BE SURROUNDED BY PROPER SILT FENCING, FIBER LOGS, OR STAKED STRAW BALES.
   - 6.2. STOCKPILES THAT ARE TO BE IN PLACE FOR EXTENDED PERIODS OF TIME (MORE THAN 30 DAYS) SHALL BE COVERED OR OTHERWISE TEMPORARILY STABILIZED IN ACCORDANCE WITH BEST MANAGEMENT PRACTICES.
   - 6.3. SEE SECTION 312600 MANAGEMENT AND DISPOSAL OF CONTAMINATED MATERIAL OF THE PROJECT SPECIFICATIONS FOR ADDITIONAL SOIL STOCKPILE GUIDELINES.
7. **CATCH BASIN INLET PROTECTION:**
   - 7.1. CATCH BASINS WITHIN THE WORK AREA OR THAT WILL RECEIVE RUNOFF FROM THE WORK AREA SHALL BE PROTECTED WITH A SILT SACK AND OR OTHER APPROVED INSTALLATION TO MINIMIZE THE SEDIMENT LOAD TO THE BASIN
8. **DUST CONTROL:**
   - 8.1. SEE SECTION 312600 MANAGEMENT AND DISPOSAL OF CONTAMINATED MATERIAL OF THE PROJECT SPECIFICATIONS FOR ADDITIONAL DUST CONTROL GUIDELINES.
   - 8.2. THE CONTRACTOR SHALL TAKE APPROPRIATE MEASURES DURING SITE WORK TO MINIMIZE WIND BLOWN DUST FROM EXPOSED SOIL SURFACES. MEASURES INCLUDE BUT ARE NOT LIMITED TO:
     - SPRINKLING WATER ON EXPOSED SURFACES
     - APPLICATION OF TEMPORARY COVER SUCH AS HYDRO MULCH AND TACIFIER, STRAW MATTING, JUTE NETTING ETC.
9. **INFILTRATION & DETENTION SYSTEMS:**
   - 9.1. STORMWATER RUNOFF FROM THE DISTURBED CONSTRUCTION SITE SHALL NOT BE DISCHARGED INTO ANY EXISTING OR PROPOSED INFILTRATION SYSTEM (INCLUDING ALL UNDERGROUND RECHARGER FACILITIES AND BIORETENTION BASINS) UNTIL THE AREA BEING DRAINED IS FULLY STABILIZED AND CLEAN. UNTIL THEN, THE INFILTRATION SYSTEM SHALL REMAIN OFF-LINE AND PROTECTED. THE CONTRACTOR SHALL PROVIDE TEMPORARY BY-PASS SYSTEMS AS NECESSARY TO PREVENT CONSTRUCTION SITE RUNOFF FROM ENTERING THE INFILTRATION SYSTEMS.
   - 9.2. CLEAN ROOF RUNOFF MAY DISCHARGE INTO THE INFILTRATION SYSTEMS IF IT IS PIPED DIRECTLY TO THE SYSTEMS AND NOT RUN OVER DISTURBED AREAS.
10. **LONG-TERM POLLUTION PREVENTION PLAN:**
   - 10.1. THE LONG-TERM POLLUTION PREVENTION PLAN AS PREPARED BY DCT ASSOCIATES AND AS INCLUDED IN APPENDIX 2 OF THE STORMWATER MANAGEMENT REPORT AND AS REVISED THROUGH SEPTEMBER 25, 2020 SHALL BE CONSIDERED PART OF THIS PLAN SET.



1 / 1.3.19 SILT FENCE DETAIL
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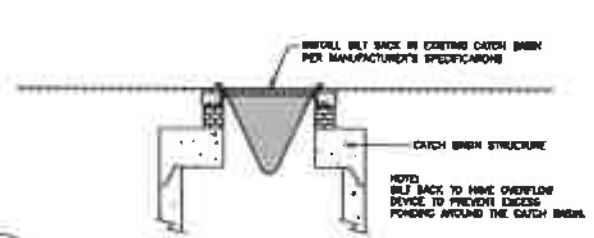
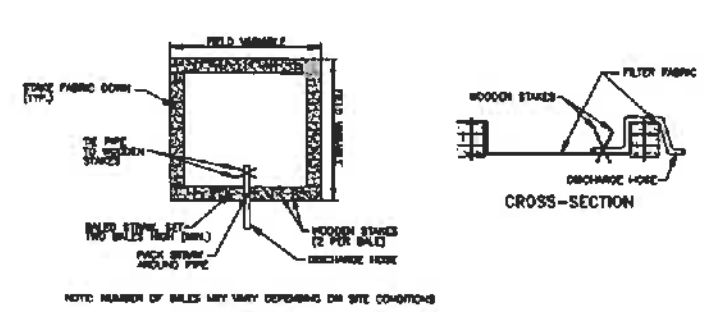


2 / 1.3.19 SILT SACK DETAIL
(NO SCALE)



NOTE: NUMBER OF BALES MAY VARY DEPENDING ON SITE CONDITIONS

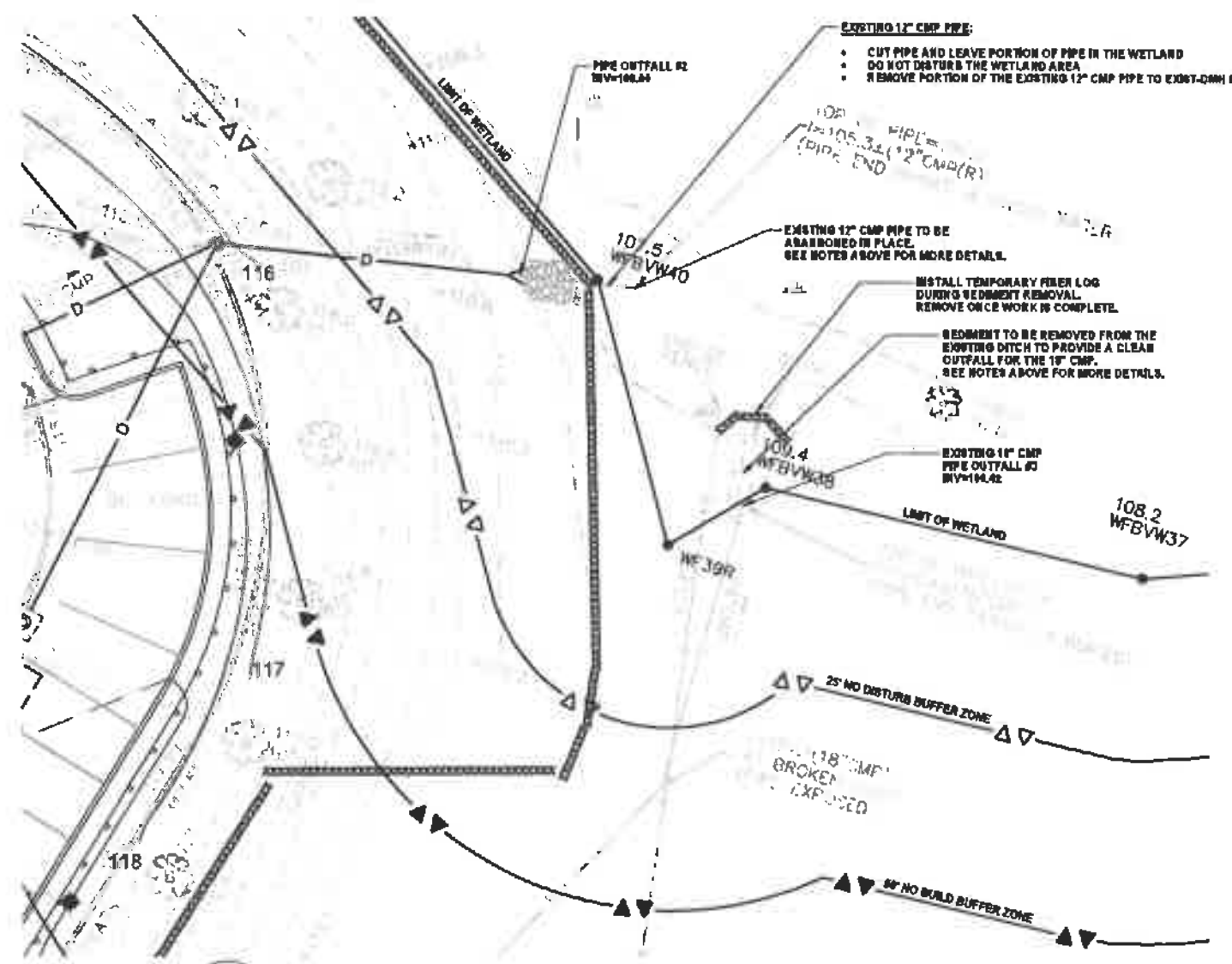
DEWATERING OF EXCAVATIONS NOTES:
1. DISCHARGE FROM DEWATERING PUMPS OR TEMPORARY TRENCH OR EXCAVATION DRAINS SHALL NOT DISCHARGE DIRECTLY TO WETLANDS OR STORM DRAIN SYSTEMS. THE DISCHARGES SHALL BE DIRECTED INTO A CONSTRUCTED SEDIMENT BASIN OR A STRAW BALE SETTLING BASIN, STILLING BASIN, FILTER BAG, FRAC TANK OR SIMILAR DEVICE.
2. SETTLING BASINS MUST BE A MINIMUM OF 100 FEET FROM THE WETLAND RESOURCE AREA.

3 / 1.3.19 STRAW BALE SETTLING BASIN DETAIL
(NO SCALE)

DRAIN OUTLET REPLACEMENT AT WETLANDS NOTES

SCHEDULE:
THE REPLACEMENT OF THE 12" CMP DRAIN OUTLET AT THE WETLANDS MUST BE PERFORMED IN THE FIRST SUMMER OF THE PROJECT SO THAT THE AREA IS AS DRY AS POSSIBLE AND THE PLANTINGS ALONG THE SLOPE CAN TAKE PLACE IN LATE SUMMER TO ESTABLISH THE VEGETATION BEFORE WINTER AND THEN MONITORED DURING THE CONSTRUCTION PERIOD.

CONSTRUCTION SEQUENCE:
1. PRIOR TO ANY WORK:
   - 1.1. THE LIMITS OF THE TREE AND SHRUB CLEARING AND PROPOSED SEDIMENT CONTROL BARRIER SHALL BE STAKED AND INSPECTED BY THE CONTRACTOR AND INSPECTED BY THE PROJECT ENGINEER.
   - 1.2. INSTALL THE SEDIMENT CONTROL BARRIER FOR INSPECTION BY THE PROJECT ENGINEER. THE ENGINEER WILL DETERMINE IF ANY PARTICULAR TREES AND SHRUBS WITHIN THE DESIGNATED LIMIT OF WORK CAN REMAIN AND BE PROTECTED.
2. CLEAR THE BRUSH AS REQUIRED.
3. TRENCH EXCAVATION AND REMOVE EXISTING 12 INCH DRAIN:
   - 3.1. EXCAVATE THE EXISTING TOPSOIL WITHIN THE TRENCH AREA AND STOCKPILE WITHIN THE UPLAND IN THE PROJECT LIMIT OF WORK FOR LATER REUSE.
   - 3.2. COMPLETE THE TRENCH EXCAVATION, CUT THE EXISTING DRAIN AT THE LOCATION SHOWN AND REMOVE THE EXISTING DRAIN. THE 12" CMP WITHIN THE WETLANDS IS TO BE ABANDONED IN PLACE. NO WORK SHALL BE DONE WITHIN THE WETLAND.
   - 3.3. INSTALL THE NEW PIPE AND FLARED END SECTION AND STONE RIP-RAP AND BACKFILL PER THE DRAIN DETAIL TO THE SUBGRADE OF THE TOPSOIL.
   - 3.4. REPLACE THE TOPSOIL IN THE TRENCH AREA TO THE ORIGINAL GRADE. TOPSOIL MUST BE FIRM BUT NOT COMPACTED. FINE GRADE BY HAND PRIOR TO PLANTING.
4. PLANTING:
   - 4.1. SEED THE DISTURBED AREAS PER THE LANDSCAPE PLANS.
   - 4.2. INSTALL STRAW MULCH AND JUTE MATTING TO PROTECT THE SEED BED.
   - 4.3. WATER AND MAINTAIN THE NEWLY SEEDED AREA AS NECESSARY UNTIL GROWTH IS FULLY ESTABLISHED AND APPROVED BY THE ENGINEER AND LANDSCAPE ARCHITECT.
   - 4.4. INSTALL PLANTINGS AND SEEDING ALONG THE SLOPE PER THE LANDSCAPE PLANS.
5. SEDIMENT REMOVAL FROM THE 18" CMP AND EXISTING DITCH:
   - 5.1. THE SEDIMENT WITHIN THE EXISTING 18" CMP OUTLET PIPE AND WITHIN THE EXISTING DITCH SHALL BE CAREFULLY REMOVED BY HAND AS TO NOT DISTURB THE VEGETATED WETLAND AREA.
   - 5.2. ALL WORK ASSOCIATED WITH SEDIMENT REMOVAL SHALL BE DONE BY HAND. ALL SEDIMENT REMOVED SHALL BE PROPERLY DISPOSED OF. NO MACHINES SHALL BE ALLOWED WITHIN THE 25' NO DISTURB BUFFER ZONE FOR THIS WORK. THE EXISTING VEGETATION WITHIN THE WETLANDS IS TO NOT BE DISTURBED.
6. REMOVAL OF THE SEDIMENT CONTROLS:
   - 6.1. UPON ACCEPTANCE BY THE ENGINEER OF THE STABILITY OF THE AREA, REMOVE THE SEDIMENT CONTROL BARRIER.



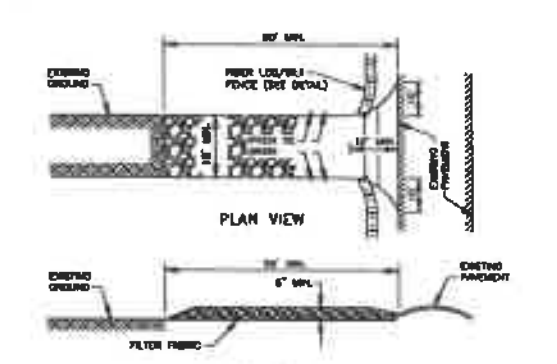
4 / 1.3.19 DRAIN OUTLET REPLACEMENT AND DITCH CLEANING AT WETLANDS

1"=10'
SCALE in FEET



INSTALLATION NOTES FOR FIBER LOGS:
1. LAY THE FIBER LOG AT THE UPHILL SIDE OF THE SILT FENCE.
2. INSTALL APPROXIMATELY 4-6 WOOD STAKES PER 10 FEET OF FIBER LOG THROUGH THE TWINE/NETTING ALONG THE FIBER LOG AS NEEDED TO HOLD THE LOG IN PLACE.
3. DRIVE THE STAKE INTO THE GROUND DEEP ENOUGH TO HOLD THE LOG.
4. IN PAVED AREAS, SECURE FIBER LOG WITH CONCRETE BLOCKS OR SAND BAGS.
5. FIBER LOG SHALL BE 12 INCHES (MIN) IN DIAMETER UNLESS OTHERWISE NOTED ON THE PLANS AND SHALL BE A COMPOST FILLED FILTER SOCK MEETING THE MUNICIPAL ENGINEERING DEPARTMENT STANDARDS.

5 / 1.3.19 FIBER LOG DETAIL
(NO SCALE)



CONSTRUCTION SPECIFICATIONS:
1. STONE SIZE – USE 2" TO 4" WASHED, ANGULAR STONE
2. THICKNESS – NOT LESS THAN SIX (6) INCHES.
3. WIDTH – FIFTEEN (15) FEET MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
4. FILTER FABRIC – SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
5. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF WAY MUST BE REMOVED IMMEDIATELY.
6. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED.

6 / 1.3.19 STABILIZED CONSTRUCTION ENTRANCE DETAIL
(NO SCALE)

KEYPLAN

Date: 22 February 2021
Drawn By: KMR
Scale: AS NOTED

Revisions Number	Date	Description

Erosion and Sediment Control Notes and Details

1.3.19

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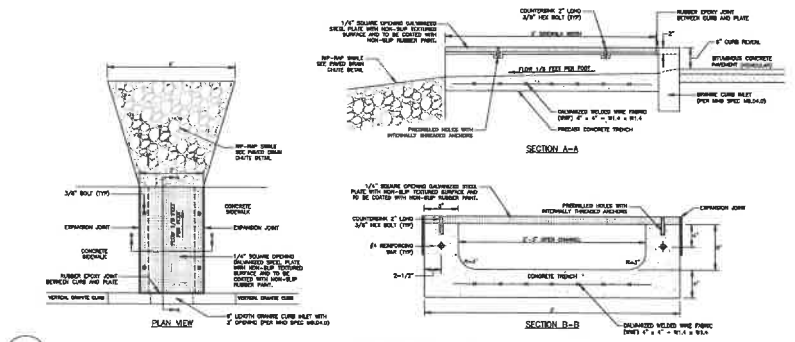
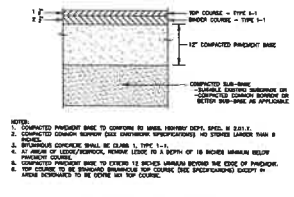
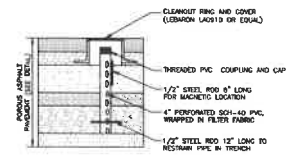
DETAIL 5/1.3.20 DELETED



1/1.3.20 CURB STONE INLET
(NO SCALE)



6/1.3.20 BITUMINOUS CONCRETE PAVEMENT (VEHICULAR)
(NO SCALE)



9/1.3.20 OBSERVATION WELL AT POROUS ASPHALT PAVEMENT
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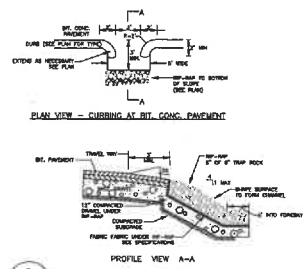

2/1.3.20 PAVED DRAIN CHUTE
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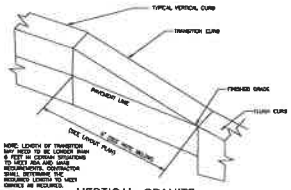

3/1.3.20 VERTICAL GRANITE TRANSITIONAL CURB
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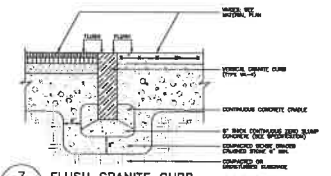

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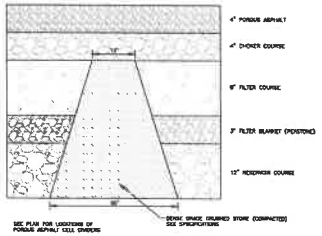
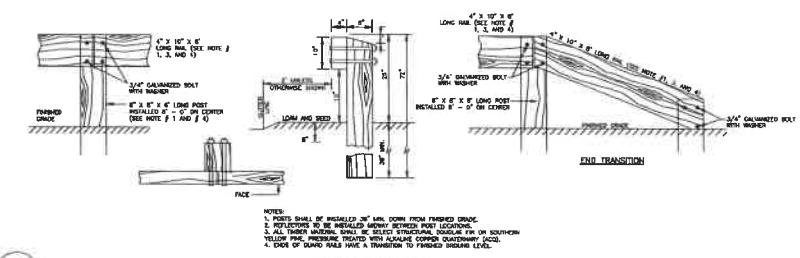


10/1.3.20 POROUS ASPHALT PAVEMENT CELL DIVIDER
(NO SCALE)



4/1.3.20 WOOD GUARD RAIL
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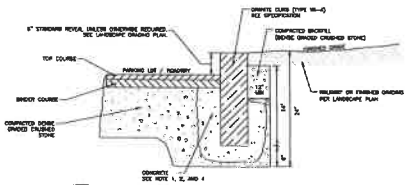

8/1.3.20 GRANITE CURB
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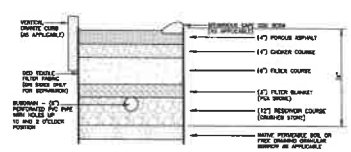

11/1.3.20 POROUS ASPHALT PAVEMENT
(NO SCALE)

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AMESBURY, MA

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architects + planners
99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2888

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4708

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Structural Engineers
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Newton, MA 02462
(617) 527-9600

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Woburn, MA 01801
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Electrical Engineers
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Danvers, MA 01923
(617) 866-8086

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Technology Consultants
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Revisions

Number	Date	Description

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Sheet - 01

1.3.20

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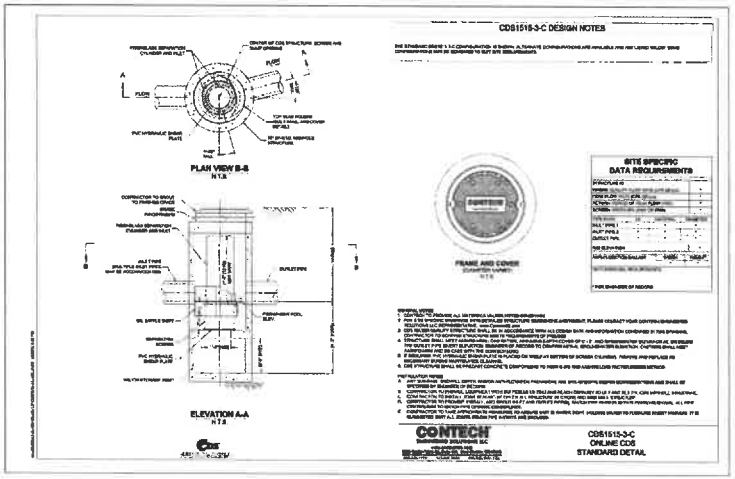
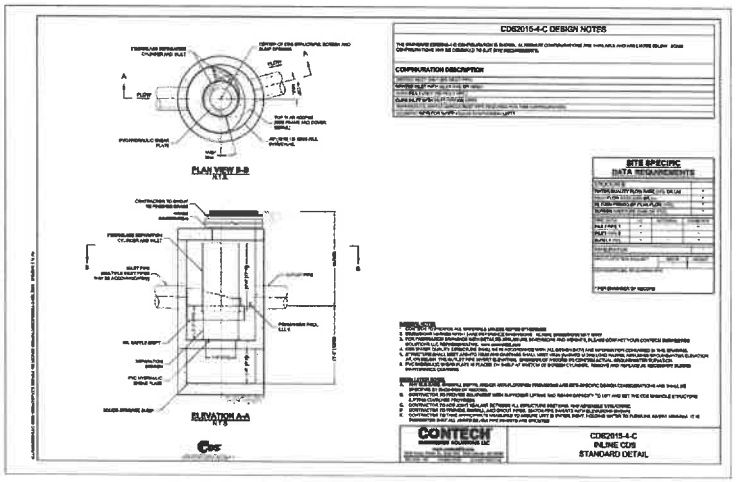


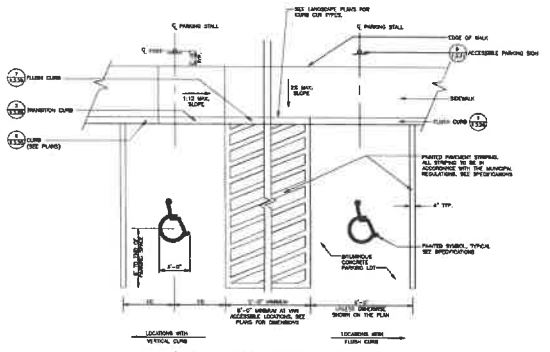
THIS DETAIL IS PROVIDED TO SHOW THE INTENT OF THE DESIGN. SEE PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION AND PROCESS FOR APPROVAL OF "EQUAL" PRODUCTS FOR THIS PURPOSE.
NOTE: SITE SPECIFIC REQUIREMENTS DETAILS SHOWN ABOVE.

1 / 1.3.21 STORMWATER TREATMENT UNIT (STU) DETAIL
(FOR STU #1, #2, #3, #4, #5, #6 AND #8)
(NO SCALE)

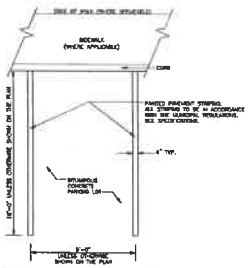


THIS DETAIL IS PROVIDED TO SHOW THE INTENT OF THE DESIGN. SEE PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION AND PROCESS FOR APPROVAL OF "EQUAL" PRODUCTS FOR THIS PURPOSE.
NOTE: SITE SPECIFIC REQUIREMENTS DETAILS SHOWN ABOVE.

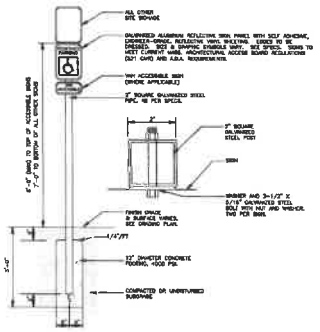
2 / 1.3.21 STORMWATER TREATMENT UNIT (STU) DETAIL
(FOR STU #7 & #9)
(NO SCALE)



3 / 1.3.21 ACCESSIBLE PARKING STALL
(NO SCALE)



4 / 1.3.21 STANDARD PARKING STALL
(NO SCALE)



5 / 1.3.21 TYPICAL SIGN
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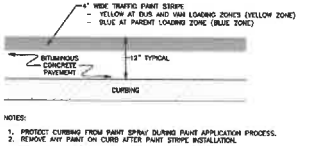

6 / 1.3.21 LOADING / UNLOADING ZONE STRIPING
(NO SCALE)

AMESBURY ELEMENTARY SCHOOL

AMESBURY, MA

DINISCO DESIGN
architects + planners
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Boston, MA 02111
(617) 439-3999

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

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Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 468-4708

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2180 Washington Street
Newton, MA 02462
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Food Service Consultants
101 West Main Street
Georgetown, MA 01833
(978) 352-8820

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Mechanical Engineers
409 West Cummings Park S. 4700
Woburn, MA 01801
(781) 895-7238

Thompson Engineering Company, Inc.
Electrical Engineers
99 Newbury Street, Suite 103
Danvers, MA 01923
(617) 888-8088

Bellwave Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01810
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Revisions

Number	Date	Description

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1.3.21

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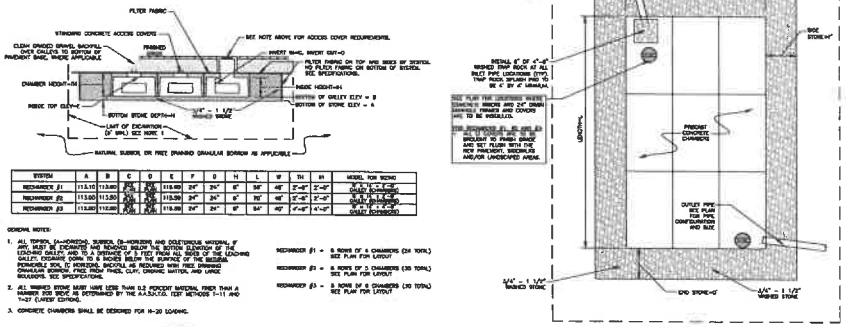
DETAIL 1 / 1.3.22 DELETED



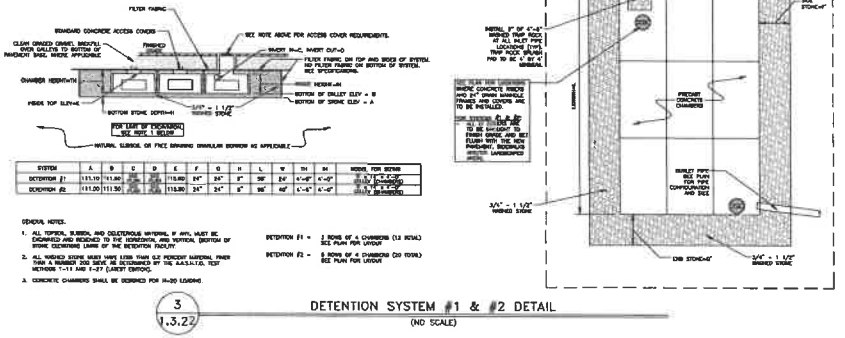
SYSTEM	A	B	C	D	E	F	G	H	L	W	TH	H1	MODEL FOR ISOTAN
RECHARGER #1	113.10	113.00	PVC	PVC	115.69	24"	24"	8"	58"	48"	2'-4"	2'-0"	ISOTAN RECHARGER
RECHARGER #2	113.00	112.80	PVC	PVC	115.59	24"	24"	8"	76"	48"	2'-4"	2'-0"	ISOTAN RECHARGER
RECHARGER #3	113.80	112.60	PVC	PVC	116.39	24"	24"	8"	94"	48"	4'-4"	4'-0"	ISOTAN RECHARGER

GENERAL NOTES:

1. ALL TOPSOIL, FILL/UNSUITABLE SUBSOIL OR HORIZONS AND DELETERIOUS MATERIAL IF ANY, MUST BE EXCAVATED AND REMOVED FROM THE SYSTEM FOOTPRINT OF THE LEACHING GALLEY. EXCAVATE DOWN TO A SUITABLE SOIL OR HORIZON. BACKFILL AS REQUIRED WITH FREE DRAINING GRANULAR SOIRROW. FREE FROM PEAT, CLAY, ORGANIC MATTER, AND LARGE BOULDERS. SEE SPECIFICATIONS.
2. ALL WASHED STONE MUST HAVE LESS THAN 0.2 PERCENT MATERIAL FINER THAN A NUMBER 200 SIEVE AS DETERMINED BY THE A.A.S.H.T.O. TEST METHODS T-11 AND T-27 (LATEST EDITION).
3. CONCRETE CHAMBERS SHALL BE DESIGNED FOR H-20 LOADING.

RECHARGER #1 = 5 ROWS OF 6 CHAMBERS (30 TOTAL) SEE PLAN FOR LAYOUT
RECHARGER #2 = 5 ROWS OF 5 CHAMBERS (25 TOTAL) SEE PLAN FOR LAYOUT
RECHARGER #3 = 5 ROWS OF 6 CHAMBERS (30 TOTAL) SEE PLAN FOR LAYOUT

2 / 1.3.22 RECHARGER #1, #2 AND #3 DETAIL
(NO SCALE)



SYSTEM	A	B	C	D	E	F	G	H	L	W	TH	H1	MODEL FOR ISOTAN
DETENTION #1	111.10	111.00	PVC	PVC	115.60	24"	24"	8"	58"	24"	4'-0"	4'-0"	ISOTAN DETENTION
DETENTION #2	111.00	111.50	PVC	PVC	113.90	24"	24"	8"	96"	48"	4'-4"	4'-0"	ISOTAN DETENTION

GENERAL NOTES:

1. ALL TOPSOIL, SUBSOIL, AND DELETERIOUS MATERIAL, IF ANY, MUST BE EXCAVATED AND REMOVED TO THE HORIZONTAL AND VERTICAL BOTTOM OF STONE CONTAINING LIMITS OF THE DETENTION FACILITY.
2. ALL WASHED STONE MUST HAVE LESS THAN 0.2 PERCENT MATERIAL FINER THAN A NUMBER 200 SIEVE AS DETERMINED BY THE A.A.S.H.T.O. TEST METHODS T-11 AND T-27 (LATEST EDITION).
3. CONCRETE CHAMBERS SHALL BE DESIGNED FOR H-20 LOADING.

DETENTION #1 = 2 ROWS OF 4 CHAMBERS (12 TOTAL) SEE PLAN FOR LAYOUT
DETENTION #2 = 5 ROWS OF 4 CHAMBERS (20 TOTAL) SEE PLAN FOR LAYOUT

3 / 1.3.22 DETENTION SYSTEM #1 & #2 DETAIL
(NO SCALE)

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AMESBURY, MA

DINISCO DESIGN
architects + planners
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Boston, MA 02111
(617) 426-2998

DBT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

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Landscape Architects
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Boston, MA 02129
(617) 483-4703

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Structural Engineers
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101 West Main Street
Georgetown, MA 01833
(978) 352-2800

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Electrical Engineers
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Danvers, MA 01923
(617) 688-8088

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Technology Consultants
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Revisions

Number	Date	Description

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1.3.22

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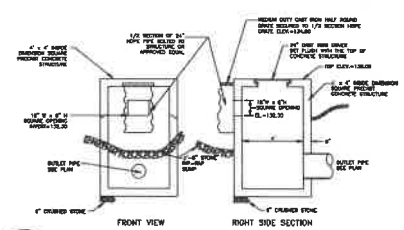
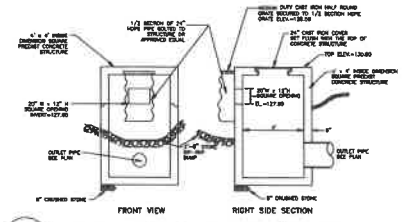
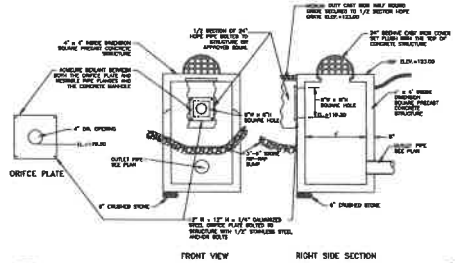


1 / 1.3.23 OUTLET CONTROL STRUCTURE #1 DETAIL
(NO SCALE)



2 / 1.3.23 OUTLET CONTROL STRUCTURE #2 DETAIL
(NO SCALE)



3 / 1.3.23 OUTLET CONTROL STRUCTURE #7 DETAIL
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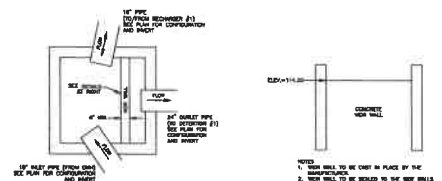
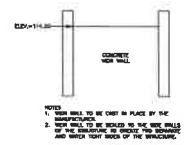
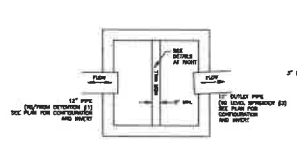


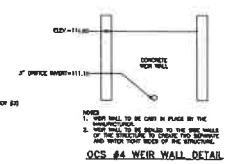
OCS #3 PLAN VIEW



OCS #3 WEIR WALL DETAIL



OCS #4 PLAN VIEW



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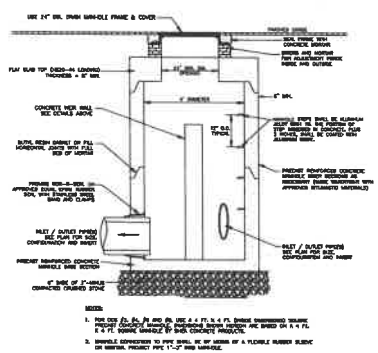
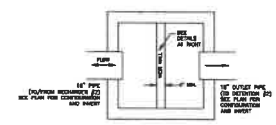
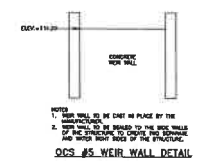


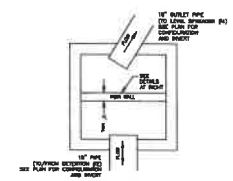
4 / 1.3.23 OUTLET CONTROL STRUCTURE #3, #4, #5, #6 and #8
(NO SCALE)



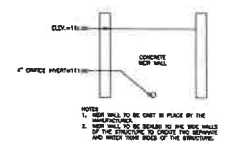
OCS #5 PLAN VIEW



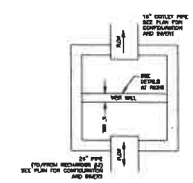
OCS #5 WEIR WALL DETAIL



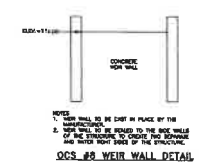
OCS #6 PLAN VIEW



OCS #6 WEIR WALL DETAIL



OCS #8 PLAN VIEW



OCS #8 WEIR WALL DETAIL

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AMESBURY, MA

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89 Chauncy Street, Suite 801
Boston, MA 02111
(617) 426-2828

DST Associates
Surveying & Engineers
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Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
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Structural Engineers
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Newton, MA 02462
(617) 527-8800

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(978) 352-8800

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Mechanical Engineers
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Watson, MA 01801
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Electrical Engineers
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Danvers, MA 01923
(617) 889-8088

EdVision Technology Design, Inc.
Technology Consultants
309 Brickstone Square, Suite 201
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(978) 355-8800

ASH PLAN

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Drawn By: KMR
Scale: AS NOTED
Revisions

Number	Date	Description

Site Civil Details
Sheet - 04

1.3.23

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MIX #1 – NEW ENGLAND WETLAND SEED MIX.

MIX #2 – NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASINS.

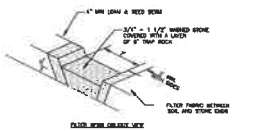
MIX #3 – NEW ENGLAND CONSERVATION/WILDLIFE MIX.

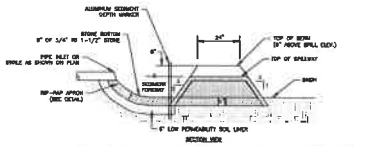
LAWN MIX

NOTE: THAT THE ABOVE SEED MIXES IDENTIFIED FOR USE ON THIS PROJECT ARE BY NEW ENGLAND NATIVE PLANTS, INC. AND INDICATE THE PLANT SPECIES MIX AND WEIGHT OF PURE/SEED COVER. SEED MIXES BY OTHER PRODUCERS MEETING THE INTENT OF THE LISTED MIXES MAY BE USED IF APPROVED AS EQUAL BY THE LANDSCAPE ARCHITECT.

SEE LANDSCAPE SPECIFICATIONS FOR SEED MIXES IDENTIFIED ON THE LANDSCAPE DRAWINGS AS "LAWN".

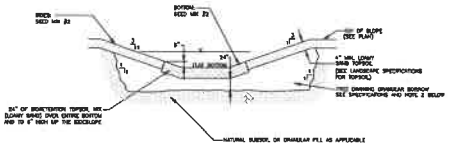
1 1.3.24 SEED MIXES FOR STORMWATER MANAGEMENT FEATURES (NO SCALE)





NOTE: BANK OF FOREBAY AND FILTER BERM BEYOND THE LIMITS OF STONE SHALL BE LOAMED AND SEEDED.

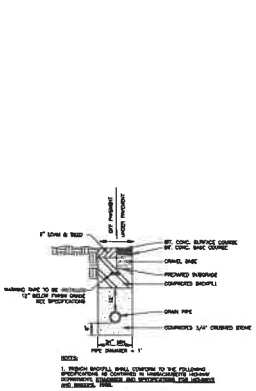
2 1.3.24 SEDIMENT FOREBAY AND FILTER BERM (NO SCALE)



NOTES:

1. REMOVE FOREIGN TOPSOIL AND SUBSOIL TO THE ELEVATION OF THE PHASED SUBGRADE BELOW THE PROPOSED TOPSOIL. IF THE NATURAL MATERIAL MEETS THE REQUIREMENTS FOR "GRADE" IN NOTE 2 BELOW, THE EXCAVATION IS NOT NECESSARY. OTHERWISE REMOVE THE UNSUITABLE SOIL TO THE DEPTHS SHOWN AND BACKFILL WITH THE MATERIAL PER NOTE 2.
2. FREE DRAINING GRANULAR BORROW SHALL CONSIST OF WELL DRAINING SOIL CONSISTING OF CLEAN SAND AND GRAVEL WITH LESS THAN 5% SILT AND CLAY WHICH MAY MORE THAN 5 PERCENT CLAY, USDA TEXTURAL CLASS: SA–SIRE SOIL MIXING THIS MAY BE USED. SEE EARTHWORK SPECIFICATIONS.
3. BIORETENTION TOPSOIL MIX SHALL BE A MIXTURE OF SAND, TOPSOIL AND COMPOST AS FOLLOWS: 40% SAND, 20% TO 35% TOPSOIL, 20% TO 40% COMPOST (BY VOLUME). SEE SPECIFICATIONS FOR RUNNER INFORMATION.
4. FOR TOPSOIL, ORGANIC CONTENT SEE LANDSCAPE SPECIFICATIONS.
5. SEE LANDSCAPE DRAWINGS FOR OTHER PLANTINGS.

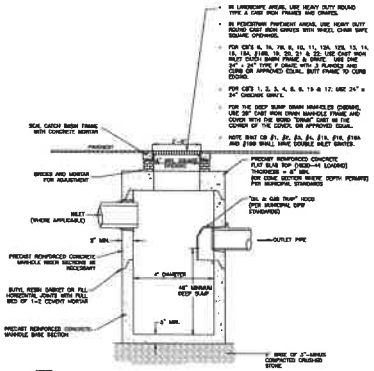
3 1.3.24 BIORETENTION BASIN DETAIL (NO SCALE)



NOTES:

1. TRENCH BACKFILL SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS AS CONTAINED IN MASSACHUSETTS HIGHWAY DEPARTMENT, STANDARD AND SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, 1988.

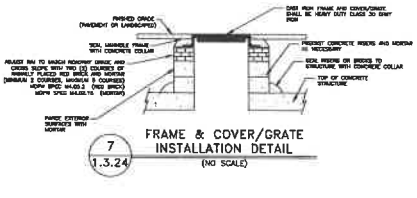
4 1.3.24 TYPICAL DRAIN PIPE BEDDING DETAIL (NO SCALE)



NOTES:

1. FOR CB #5, #6, #7A, #7B, #8, #9 AND #10, THE OPENING IN THE TOP SLAB SHALL BE OFFSET FROM THE CENTER OF THE SLAB AND SET OVER THE OUTLET PIPE TO ALLOW FOR INSTALLATION OF THE 90° & ONE TRAP HOOD.
2. USE THIS DETAIL FOR AD #1 AND AD #2 AND PROVIDE A ROUND BEEHIVE CAST IRON GRATE.

5 1.3.24 DEEP SUMP CATCH BASIN & DEEP SUMP DRAIN MANHOLE (DSDMH) (NO SCALE)



NOTES:

1. USE A 72 DIAMETER BRK MANHOLE WHERE RECOMMENDED WHICH TOTAL INSIDE DEPTH EXCEEDS 10 FT. OR WHERE PIPE ARRANGEMENT WILL DAMAGE THE INTEGRITY OF THE MANHOLE SECTIONS.
2. MANHOLE CONNECTION TO PIPE SHALL BE BY MEANS OF A FLEXIBLE RUBBER SLEEVE OR BOOT-TAL. PROJECT PIPE 1"–2" INTO MANHOLE.
3. THIS DETAIL IS ALSO BE USED FOR ALL ROOF DRAIN CLEANOUTS WHERE THE DRAIN IS 6 INCHES IN DIAMETER OR LARGER.

8 1.3.24 DRAIN MANHOLE DETAIL (NO SCALE)

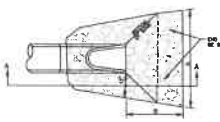


NOTE:

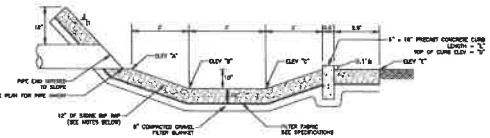
RIP-RAP SHALL CONSIST OF EVENLY GRADED 6" TO 12" ANGULAR BROKEN STONE, LARG. STONE SIZE = 6") WITH A THICKNESS OF 18 INCHES. NOT MORE THAN 15 PERCENT OF THE STONE MAY BE SMOOTHED SPALLS AND STONES LESS THAN 4" IN SIZE.

PIPE SIZE (In.)	A (MIN.)	B* (MIN.) SEE PLAN
12" OR LESS	4'	5'
18"	16'	6'

* LENGTH OF RIP-RAP TO BE PER PIPE DETAIL UNLESS OTHERWISE SHOWN ON THE PLANS.



9 1.3.24 PIPE END SECTION WITH RIP – RAP APRON DETAIL (NO SCALE)



NOTES:

1. RIP–RAP SHALL CONSIST OF EVENLY GRADED 6" TO 12" ANGULAR BROKEN STONE, LARG. STONE SIZE = 6") WITH A THICKNESS OF 18 INCHES. NOT MORE THAN 15 PERCENT OF THE STONE MAY BE SMOOTHED SPALLS AND STONES LESS THAN 4" IN SIZE.
2. SEE DETERMINATION REFERS TO MEAN SPHERICAL DIAMETER.
3. MORTAR JOINTS RESTRICTION CURB SECTIONS OF SPILLWAY.

STRUCTURE	L	ELEVATIONS A	B	D	E
LEVEL SPREADER #1	10'	139.7	139.9	139.8	139.7
LEVEL SPREADER #2	15'	125.0	124.2	124.3	125.1	123.0
LEVEL SPREADER #3	15'	116.5	116.7	116.7	116.7	115.5
LEVEL SPREADER #4	20'	116.5	108.7	109.7	110.5	110.5

6 1.3.24 LEVEL SPREADER DETAIL (NO SCALE)

AMESBURY ELEMENTARY SCHOOL

AMESBURY, MA

DINISCO DESIGN architects + planners
89 Chauncy Street, Suite 801
Boston, MA 02111
(617) 426-2999

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
34 Roland Street
Boston, MA 02129
(617) 483-4705

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
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Food Service Consultants
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Groveland, MA 01834
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Structural Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 935-7238

Thompson Engineering Company, Inc.
Structural Engineers
99 Newbury Street, Suite 103
Danvers, MA 01923
(617) 899-8008

Milliken Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01810
(978) 290-9909

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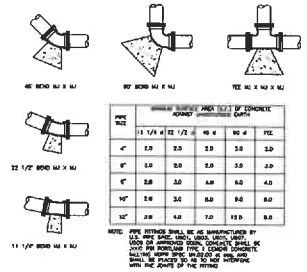
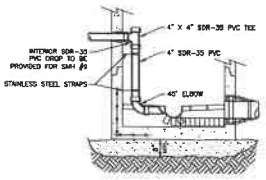


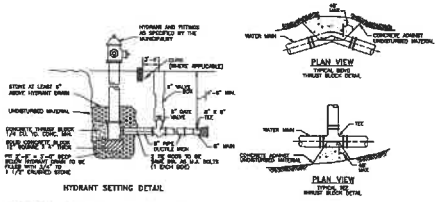
PIPE SIZE	MINIMUM BEARING AREA (sq.ft.) OF CONCRETE AGAINST UNDISTURBED EARTH				
	11 1/4 d	22 1/2 d	45 d	90 d	TEE
4"	2.0	2.0	2.0	3.0	3.0
6"	2.0	2.0	2.0	3.0	3.0
8"	2.0	3.0	4.0	6.0	6.0
10"	2.0	3.0	5.0	9.0	9.0
12"	3.0	4.0	7.0	12.0	12.0

NOTE: PIPE FITTINGS SHALL BE AS MANUFACTURED BY U.S. PIPE SIZES: U302, U303, U307, U309 OR APPROVED EQUAL. CONCRETE SHALL BE MIX NO. 3 (CONTAINING TYPE II CEMENT) CONCRETE SHALL BE PLACED SO AS TO NOT INTERFERE WITH THE JOINTS OF THE FITTING

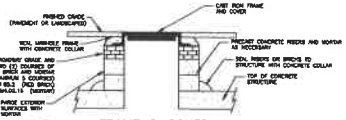
1 1.3.25 TYPICAL THRUST BLOCK (NO SCALE)



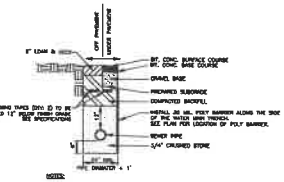
2 1.3.25 INTERIOR DROP SEWER DETAIL MANHOLE (SMH #7) (NO SCALE)



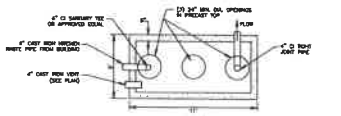
3 1.3.25 WATER MAIN INSTALLATION (NO SCALE)

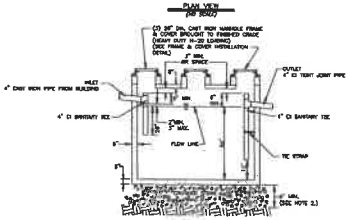


6 1.3.25 FRAME & COVER INSTALLATION DETAIL (NO SCALE)



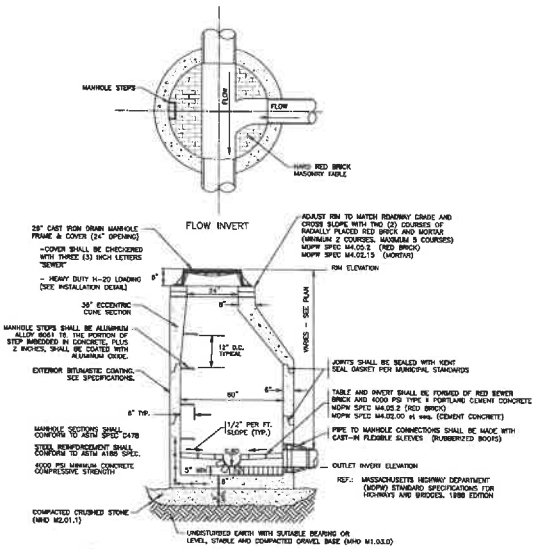
9 1.3.25 TYPICAL SEWER PIPE BEDDING (NO SCALE)



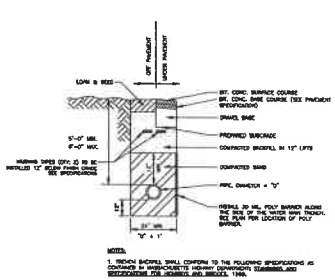


NOTES:
1. 4" SIDE INLETS OR OUTLETS ARE USED, SANITARY TEES MUST BE BROUGHT TO THE CENTERLINE OF THE TANK AND LOCATED WITHIN 12" OF THE OVERALL TIGHT SHALL BE SECURED TO TOP OF TANK WITH STAINLESS STEEL STRAPS AND 1/4" LAG BOLTS OR EQUAL. UNUSED OUTLETS TO BE PLUGGED WITH MORTAR.
2. CRUSHED STONE SHALL MEET MHD M2.01.0 AND M2.01.1.
3. DIMENSIONS SHOWN HERE ON ARE BASED ON SIMEX CONCRETE PRODUCTS ITEM NO 10-2000C.
4. ALL PIPING FROM SIDE BUILDING TO THE GREASE TRAP, INCLUDING ALL PIPING AND TEES WITHIN THE GREASE TRAP, ARE BY THE PLUMBER.

7 1.3.25 2000 GALLON PRECAST CONCRETE SINGLE-COMPARTMENT GREASE TRAP (NO SCALE)



8 1.3.25 TYPICAL SEWER MANHOLE DETAIL (NO SCALE)



4 1.3.25 WATER GATE VALVE (NO SCALE)

5 1.3.25 TYPICAL WATER PIPE BEDDING (NO SCALE)

AMESBURY ELEMENTARY SCHOOL

AMESBURY, MA

DINISCO DESIGN architects + planners
89 Church Street, Suite 501
Boston, MA 02111
(617) 426-2666

CMT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Stuart Sanitas, Inc.
Landscape Architects
34 Roland Street
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Structural Engineers
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Electrical Engineers
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(617) 888-8066

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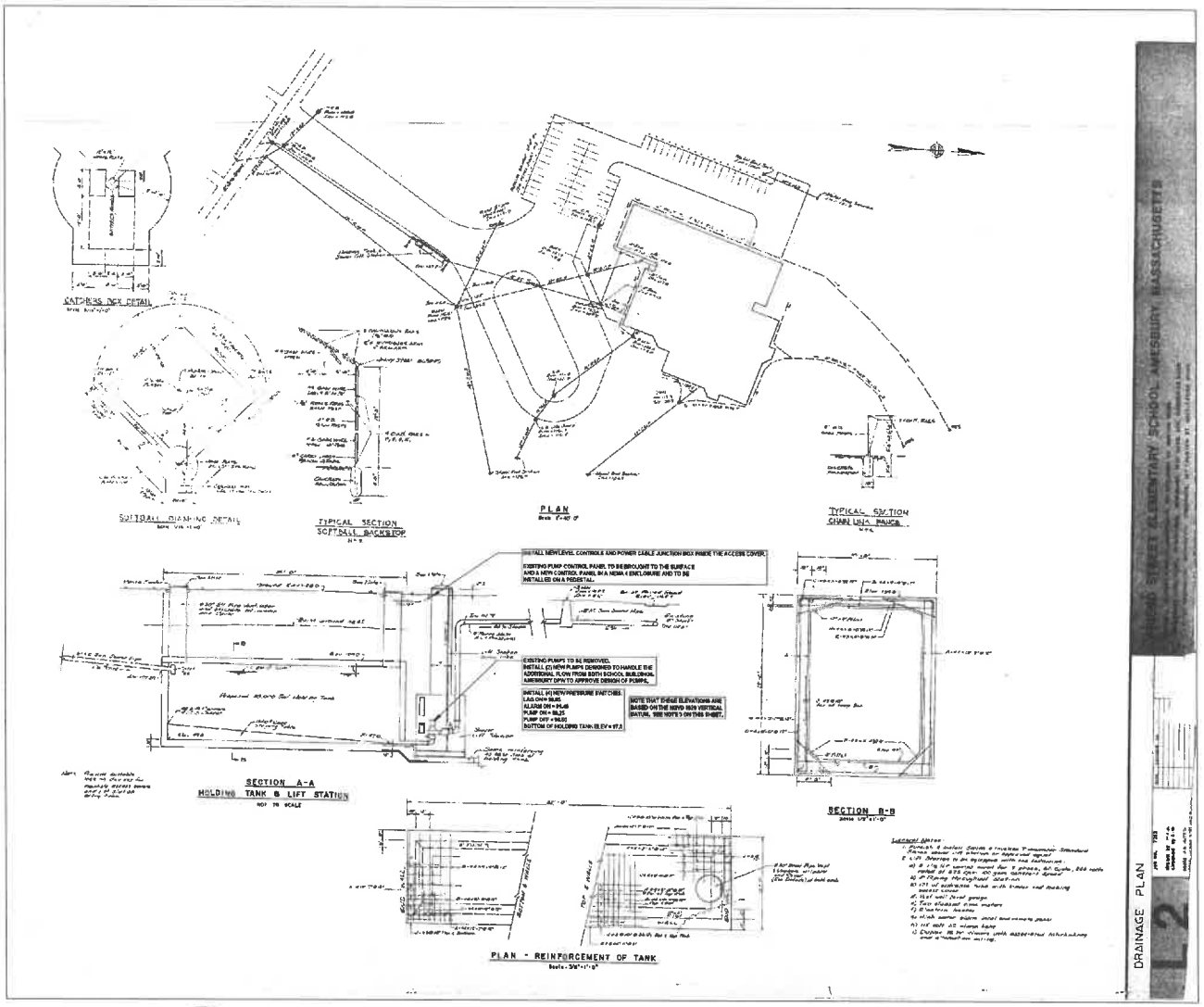

1
1.3.26

EXISTING HOLDING TANK & LIFT STATION DETAILS

SOURCE: 1973 RECORD PLANS FOR THE CASHMAN ELEMENTARY SCHOOL
(NO SCALE)

NOTE:
1. THE PLAN SHOWN ON THIS SHEET IS FROM THE 1972 PLAN SET FOR THE FRIEND STREET ELEMENTARY SCHOOL (NOW NAMED THE CASHMAN ELEMENTARY SCHOOL). THIS IS INTENDED TO SHOW THE AVAILABLE INFORMATION ON THE EXISTING SEWER PUMPING STATION. NOTE THAT THIS IS NOT AN AS-BUILT DRAWING AND ACTUAL FIELD CONDITIONS MAY DIFFER.
2. NOTES ADDED TO THIS DRAWING FOR THE NEW WORK ARE SHOWN IN BOLD TEXT.
3. THE ELEVATIONS ON THIS SHEET ARE ON THE NGVD 1929 VERTICAL DATUM. TO CONVERT TO THE APPROXIMATE CURRENT PROJECT VERTICAL DATUM (NAVD 1988), SUBTRACT 0.6 FEET. CONTRACTOR TO CONFIRM ALL ELEVATIONS PRIOR TO ANY WORK ON THIS PUMP STATION AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.

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DINISCO DESIGN
architects + planners

99 Chauncy Street, Suite 901
Boston, MA 02111
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DST Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

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Structural Engineers
2150 Washington Street
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Food Service Consultants
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Woburn, MA 01801
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Electrical Engineers
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PLANTING LEGEND

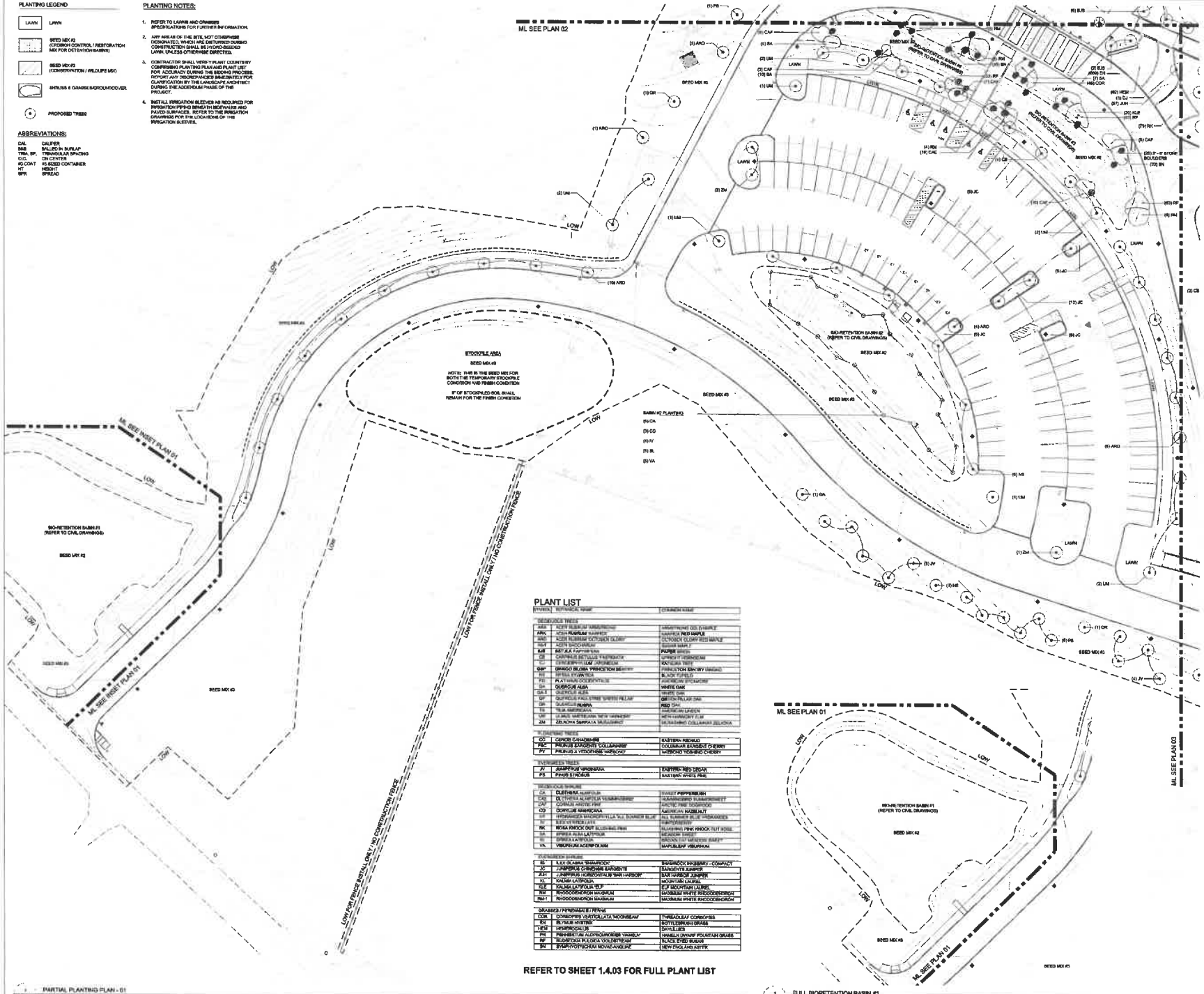
- LAWN — LAWN
- SEED MIX #2 (EROSION CONTROL / RESTORATION MIX FOR DETENTION BASINS)
- SEED MIX #3 (CONSERVATION / WILDLIFE MIX)
- SHRUBS & GRASS/GROUNDCOVER
- PROPOSED TREES

PLANTING NOTES:

1. REFER TO LAWNS AND GRASSES SPECIFICATIONS FOR FURTHER INFORMATION.
2. ANY AREAS OF THE SITE, NOT OTHERWISE DESIGNATED, WHICH ARE DISTURBED DURING CONSTRUCTION SHALL BE HYDRO-SEEDED LAWN, UNLESS OTHERWISE DIRECTED.
3. CONTRACTOR SHALL VERIFY PLANT COUNTS BY CONFIRMING PLANTING PLAN AND PLANT LIST FOR ACCURACY DURING THE BIDDING PROCESS. REPORT ANY DISCREPANCIES IMMEDIATELY FOR CLARIFICATION BY THE LANDSCAPE ARCHITECT DURING THE ADDENDUM PHASE OF THE PROJECT.
4. INSTALL IRRIGATION SLEEVES AS REQUIRED FOR IRRIGATION PIPING BENEATH BIOSWALES AND PAVED SURFACES. REFER TO THE IRRIGATION DRAWINGS FOR THE LOCATIONS OF THE IRRIGATION SLEEVES.

ABBREVIATIONS:

CAL	CALIPER
B&B	BALLED IN BURLAP
TRIA. SP.	TRIANGULAR SPACING
O.C.	ON CENTER
#3 CONT	#3 RIZED CONTAINER
HT	HEIGHT
SPR	SPREAD



PLANT LIST

KEY/QTY.	BOTANICAL NAME	COMMON NAME
DECIDUOUS TREES		
AAS	ACER SUBSP. X FREEMANII	ARMSTRONG RED MAPLE
ARK	ACER RUBRUM 'KARPICK'	KARPICK RED MAPLE
ARO	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE
AST	ACER SACCHARUM	SUGAR MAPLE
BJB	BETULA PAPYRIFERA	PAPER BIRCH
CB	CARPINUS BETULUS 'FASTIGIATA'	UPRIGHT HORNBEAM
CI	CERCIDIPHYLLUM JAPONICUM	KATSURA TREE
CBP	CRATAEGUS VIRIDIS 'PRINCETON SENTRY'	PRINCETON SENTRY HAWTHORN
GT	GLEDITSIA TRIACANTHOS	BLACK TUPELO
PD	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE
QA	QUERCUS ALBA	WHITE OAK
QA1	QUERCUS ALBA	WHITE OAK
QP	QUERCUS PALUSTRIS 'SHERATA PILLAR'	SHERATA PILLAR OAK
QR	QUERCUS RUBRA	RED OAK
TA	TILIA AMERICANA	AMERICAN LINDEN
UP	ULMUS 'PATRIOT'	PATRIOT ELM
ZS	ZELKOVA SERRATA 'MUSASHINO'	MUSASHINO COLUMNAR ZELKOVA
FLOWERING TREES		
CO	CERCIS CANADENSIS	EASTERN REDBUD
PSC	PRUNUS SARGENTII 'COLUMNARIS'	COLUMNAR SARGENT CHERRY
PV	PRUNUS X YEDOENSIS 'WIDESCAT'	WIDESCAT YOSHINO CHERRY
EVERGREEN TREES		
JV	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR
PS	PINUS STROBUS	EASTERN WHITE PINE
DECIDUOUS SHRUBS		
CA	CLETHRA ALNIFOLIA	SWEET PEPPERBUSH
CA2	CLETHRA ALNIFOLIA 'HUMMINGBIRD'	HUMMINGBIRD SUMMERSWEET
CAP	CORNUS ARGYI 'FIRE'	ARCTIC FIRE DOGWOOD
CO	CORYLUS AMERICANA	AMERICAN HAZELNUT
HP	HYDRANGEA MACROPHYLLA 'ALL SUMMER BLUE'	ALL SUMMER BLUE HYDRANGEA
IV	ILEX VERTICILLATA	WINTERBERRY
RK	ROSA KNOCK OUT 'BLUSHING PINK'	BLUSHING PINK KNOCK OUT ROSE
SA	SPIREA ALBA LATIFOLIA	MEADOW SWEET
SL	SPIREA LATIFOLIA	BROADLEAF MEADOW SWEET
VA	VIBURNUM ACERIFOLIUM	MAPLELEAF VIBURNUM
EVERGREEN SHRUBS		
IG	ILEX GLABRA 'SHAMROCK'	SHAMROCK INKBERRY - COMPACT
JC	JUNIPERUS CHINENSIS 'SARGENTII'	SARGENTII JUNIPER
JH1	JUNIPERUS HORIZONTALIS 'BAR HARBOR'	BAR HARBOR JUNIPER
KL	KALMIA LATIFOLIA	MOUNTAIN LAUREL
KLE	KALMIA LATIFOLIA 'ELF'	ELF MOUNTAIN LAUREL
RM	RHODODENDRON MAXIMUM	MAXIMUM WHITE RHODODENDRON
RM-1	RHODODENDRON MAXIMUM	MAXIMUM WHITE RHODODENDRON
GRASSES / PERENNIALS / Fern		
COR	COREOPSIS VERTICILLATA 'MOONBEAM'	THREADLEAF COREOPSIS
EH	ELYMUS HYSTRIX	BOTTLEBRUSH GRASS
HR	HEMEROCALLIS	DAYLILIES
PH	PENNISETUM ALOPECUROIDES 'HAMELN'	HAMELN DWARF FOUNTAIN GRASS
RF	RUDBECKIA FULGIDA 'GOLDSTREAM'	BLACK EYED SUSAN
SN	SYMPHYOTRICHUM NOVAE-ANGLIAE	NEW ENGLAND ASTER

REFER TO SHEET 1.4.03 FOR FULL PLANT LIST

1 PARTIAL PLANTING PLAN - 01
1.4.01 SCALE: 1" = 20'-0"

2 FULL BIORETENTION BASIN #1
1.4.01 SCALE: 1" = 20'-0"

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AMESBURY, MA

DINISCO DESIGN architects + planners
99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2858

OGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

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Landscape Architects
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(978) 352-6500

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Mechanical Engineers
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Woburn, MA 01801
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Electrical Engineers
56 Newbury Street, Suite 103
Danvers, MA 01923
(617) 668-9066

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Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01860
(978) 258-9900

KEY PLAN

Date: 22 February 2021
Drawn By: BDB
Scale: 0 20 40

Revisions

Number	Date	Description

Partial Planting Plan - 01

1.4.01

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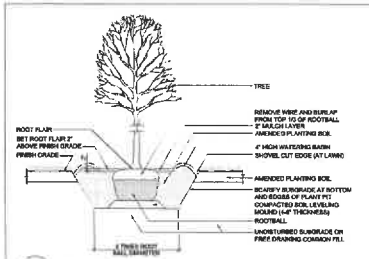
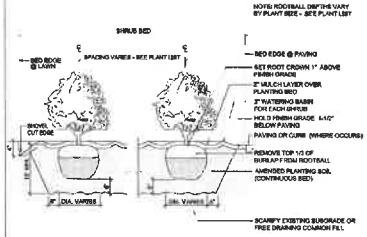
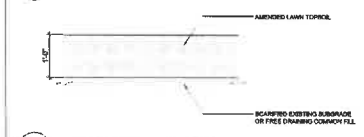


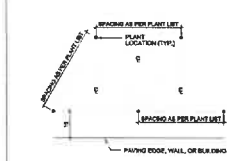
1 / 1.4.02 DECIDUOUS TREE PLANTING
SCALE: N.T.S



3 / 1.4.02 SHRUS PLANTING
SCALE: N.T.S

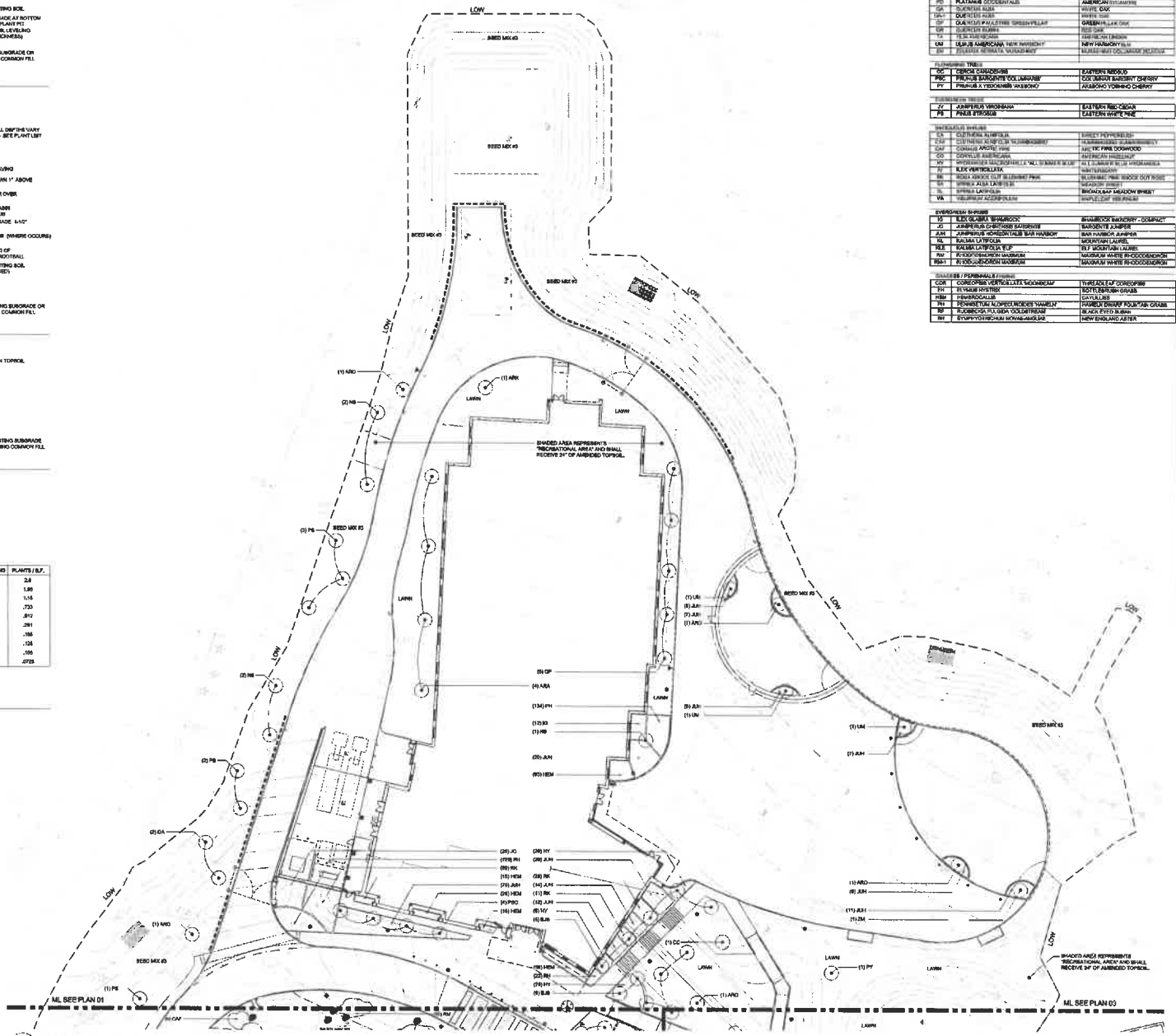


4 / 1.4.02 SOIL PREPARATION AT LAWN AREAS
SCALE: 1" = 1'-0"



PLANT SPACING	PLANTS / S.F.
6" O.C.	2.6
10" O.C.	1.86
12" O.C.	1.15
15" O.C.	.723
18" O.C.	.512
24" O.C.	.291
30" O.C.	.186
36" O.C.	.126
42" O.C.	.106
48" O.C.	.0725

5 / 1.4.02 TRIANGULAR SPACING DIAGRAM
SCALE: N.T.S



1 / 1.4.02 PARTIAL PLANTING PLAN - 02
SCALE: 1" = 20'-0"

REFER TO SHEET 1.4.03 FOR FULL PLANT LIST

PLANT LIST

SYMBOL	BOTANICAL NAME	COMMON NAME
DECIDUOUS TREES		
ARA	ACER RUBRUM 'ARMSTRONG'	ARMSTRONG GOLD MAPLE
ARR	ACER RUBRUM 'KARPICK'	KARPICK RED MAPLE
ARO	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE
AS-1	ACER SACCHARUM	SUGAR MAPLE
BJS	BETULA POPYRIFERA	PAPER BIRCH
CB	CARPINUS BETULUS 'FASTIGIATA'	UPRIGHT HORNBEAM
CJ	CERCIDIPHYLLUM JAPONICUM	KATSURA TREE
GBF	GINKGO BILOBA 'PRINCETON SENTRY' (MALE)	PRINCETON SENTRY GINKGO
NS	NYSSA SYLVATICA	BLACK TUPELO
PO	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE
QA	QUERCUS ALBA	WHITE OAK
QAT	QUERCUS ALBA	WHITE OAK
QF	QUERCUS PALUSTRIS 'GREEN PILLAR'	GREEN PILLAR OAK
QR	QUERCUS RUBRA	RED OAK
TA	TILIA AMERICANA	AMERICAN LINDEN
UM	ULMUS AMERICANA 'NEW HARMONY'	NEW HARMONY ELM
ZS	ZELKOVA SERRATA 'VILLAGE GREEN'	VILLAGE GREEN ZELKOVA
FLOWERING TREES		
CC	CERCIS CANADENSIS	EASTERN REDBUD
PSC	PRUNUS SARGENTII 'COLUMNARIS'	COLUMNAR SARGENT CHERRY
PY	PRUNUS X YEDOENSIS 'AKEBONO'	AKEBONO YOSHINO CHERRY
EVERGREEN TREES		
JV	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR
PS	PINUS STROBUS	EASTERN WHITE PINE
DECIDUOUS SHRUBS		
CN	CLETHRA ALNIFOLIA	SWEET PEPPERBUSH
CAT	CORNUS ALBA 'SIBIRICA'	REDTWIG DOGWOOD
CAF	CORNUS ALBA 'SIBIRICA VARIEGATA'	VARIEGATED REDTWIG DOGWOOD
CO	CORNUS AMERICANA	AMERICAN DOGWOOD
HY	HYDRANGEA QUERCIFOLIA 'ALL SUMMER BEAUTY'	ALL SUMMER BEAUTY HYDRANGEA
IV	ILEX VERTICILLATA	WINTERBERRY
RE	ROSA X KNOCK OUT 'RADRAZZ' PPAF	RADRAZZ KNOCK OUT ROSE
SJ	SPIREA JAPONICA 'LITTLE PRINCESS'	LITTLE PRINCESS SPIREA
SL	SPIREA LATIFOLIA	BROADLEAF MEADOW SWEET
VA	VIBURNUM ACERIFOLIUM	MAPLELEAF VIBURNUM
EVERGREEN SHRUBS		
YS	ILEX GLABRA 'SHAMROCK'	SHAMROCK INKBERRY - COMPACT
JG	JUNIPERUS CHINENSIS 'SARGENTII'	SARGENTII JUNIPER
JAH	JUNIPERUS HORIZONTALIS 'BAR HARBOR'	BAR HARBOR JUNIPER
ML	KALMIA LATIFOLIA	MOUNTAIN LAUREL
KLE	KALMIA LATIFOLIA 'ELF'	ELF MOUNTAIN LAUREL
RM	RHODODENDRON MAXIMUM	MAXIMUM WHITE RHODODENDRON
RM-1	RHODODENDRON MAXIMUM	MAXIMUM WHITE RHODODENDRON
GRASSES / PERENNIALS / FERNS		
COR	CORIOPSIS VERTICILLATA 'MOONBEAM'	THREADLEAF COREOPSIS
HH	HYSTRIX PATULA 'HYSTRIX'	BOTTLEBRUSH GRASS
HM	HEMEROCALLIS	DAYLILLIES
PH	PENNISETUM ALOPECUROIDES 'HAMELN'	FOUNTAIN DWARF FOUNTAIN GRASS
RF	RUDBECKIA FULGIDA 'GOLDSTRUM'	BLACK EYED SUSAN
SH	SYMPHYOTRICHUM NOVAE-ANGLIAE	NEW ENGLAND ASTER

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architects + planners
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(617) 426-2858

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Andover, MA 01880
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KEY PLAN

Date: 22 February 2021
Drawn By: BDB
Scale: 0 20 40

Revisions

Number	Date	Description

Partial Planting Plan - 02

1.4.02

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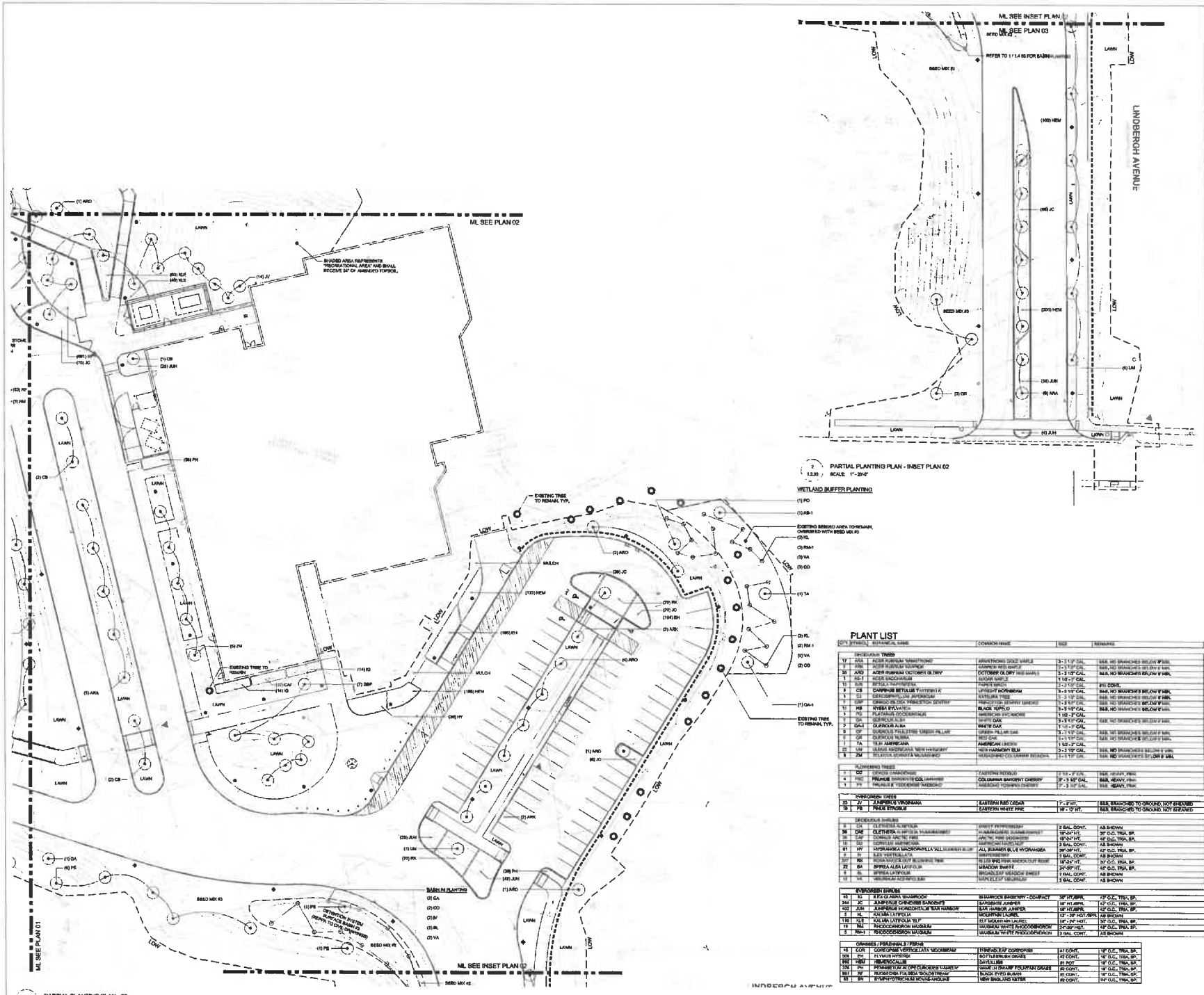

PARTIAL PLANTING PLAN - 03
1.4.03 SCALE: 1" - 20'-0"

PARTIAL PLANTING PLAN - INSET PLAN 02
1.2.03 SCALE: 1" - 20'-0"

WETLAND BUFFER PLANTING

PLANT LIST

QTY	SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
DECIDUOUS TREES					
17	ARA	ACER RUBRUM 'ARMSTRONG'	ARMSTRONG MAPLE	3 - 3 1/2" CAL.	B&B, NO BRANCHES BELOW 8' MIN.
6	ARK	ACER RUBRUM 'KARPICK'	KARPICK RED MAPLE	3 - 3 1/2" CAL.	B&B, NO BRANCHES BELOW 8' MIN.
35	ARO	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE	3 - 3 1/2" CAL.	B&B, NO BRANCHES BELOW 8' MIN.
1	AS-1	ACER SACCHARUM	SUGAR MAPLE	1 1/2 - 2" CAL.	
13	BJS	BETULA NIGRA 'HERITAGE'	HERITAGE RIVER BIRCH	3 - 3 1/2" CAL.	#10 CONT.
9	CS	CARPINUS BETULUS 'FASTIGIATA'	UPRIGHT HORNBEAM	3 - 3 1/2" CAL.	B&B, NO BRANCHES BELOW 8' MIN.
1	CJ	CERCIDIPHYLLUM JAPONICUM	KATSURA TREE	3 - 3 1/2" CAL.	B&B, NO BRANCHES BELOW 8' MIN.
17	CMP	CERCIS CANADENSIS 'PENDULA'	PENDULA WEEPING EASTERN REDBUD	3 - 3 1/2" CAL.	B&B, NO BRANCHES BELOW 8' MIN.
11	HS	HALESIA DIPTERA	SILVERBELL	3 - 3 1/2" CAL.	B&B, NO BRANCHES BELOW 8' MIN.
1	NS	NYSSA SYLVATICA	BLACK TUPELO	3 - 3 1/2" CAL.	B&B, NO BRANCHES BELOW 8' MIN.
1	PO	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	1 1/2 - 2" CAL.	
24	QA	QUERCUS ALBA	WHITE OAK	3 - 3 1/2" CAL.	B&B, NO BRANCHES BELOW 8' MIN.
2	QA-1	QUERCUS ALBA	WHITE OAK	1 1/2 - 2" CAL.	
6	QP	QUERCUS PALUSTRIS 'GREEN PILLAR'	GREEN PILLAR OAK	3 - 3 1/2" CAL.	B&B, NO BRANCHES BELOW 8' MIN.
3	QR	QUERCUS RUBRA	RED OAK	3 - 3 1/2" CAL.	B&B, NO BRANCHES BELOW 8' MIN.
1	TA	TILIA AMERICANA	AMERICAN LINDEN	1 1/2 - 2" CAL.	
23	UM	ULMUS MORTONII 'NEW HARMONY'	NEW HARMONY ELM	3 - 3 1/2" CAL.	B&B, NO BRANCHES BELOW 8' MIN.
8	ZM	ZELKOVA SERRATA 'MUSASHINO'	MUSASHINO ZELKOVA	3 - 3 1/2" CAL.	B&B, NO BRANCHES BELOW 8' MIN.
FLOWERING TREES					
7	CC	CERCIS CANADENSIS	EASTERN REDBUD	2 1/2 - 3" CAL.	B&B, HEAVY, FINE
4	PBC	PRUNUS SARGENTII 'COLUMNARIS'	COLUMNAR SARGENT CHERRY	3" - 3 1/2" CAL.	B&B, HEAVY, FINE
1	PY	PRUNUS X YEDOENSIS 'AKEBONO'	AKEBONO FLOWERING CHERRY	7 - 8 1/2" CAL.	B&B, HEAVY, FINE
EVERGREEN TREES					
23	JV	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	7' - 8' HT.	B&B, BRANCHED TO GROUND, NOT SHEARED
19	PB	PINUS STROBUS	EASTERN WHITE PINE	16' - 17' HT.	B&B, BRANCHED TO GROUND, NOT SHEARED
DECIDUOUS SHRUBS					
5	CK	CLETHERA ALNIFOLIA	SWEET PEPPERBUSH	2 GAL. CONT.	AS SHOWN
39	CAS	CLETHERA ALNIFOLIA 'HUMMINGBIRD'	HUMMINGBIRD SUMMERSWEET	18"-24" HT.	30" O.C. TRIA. SP.
36	CAF	CORNUS ALTERNIFOLIA	ARCTIC FIRE DOGWOOD	18"-24" HT.	42" O.C. TRIA. SP.
16	DJ	DEUTZIA JAPONICA	SAWTOOTH DEUTZIA	2 GAL. CONT.	AS SHOWN
61	HY	HYDRANGEA MACROPHYLLA 'ALL SUMMER BLUE'	ALL SUMMER BLUE HYDRANGEA	36"-39" HT.	42" O.C. TRIA. SP.
2	IV	ILEX VERTICILLATA	WINTERBERRY	2 GAL. CONT.	AS SHOWN
107	RX	ROSA RAMBLER 'HUT' BLUSHING PINK	BLUSHING PINK KNOCKOUT ROSE	18"-24" HT.	30" O.C. TRIA. SP.
22	SA	SPIREA ALBA LATIFOLIA	MEADOW SWEET	24"-30" HT.	42" O.C. TRIA. SP.
3	SL	SPIREA LATIFOLIA	BROADLEAF MEADOW SWEET	1 GAL. CONT.	AS SHOWN
13	VA	VERONICA AGERATIFOLIA	SAPPHIRE VERONICA	2 GAL. CONT.	AS SHOWN
EVERGREEN SHRUBS					
16	IG	ILEX GLABRA 'SHAMROCK'	SHAMROCK INKBERRY - COMPACT	36" HT./SPR.	42" O.C., TRIA. SP.
344	JC	JUNIPERUS CHINENSIS SARGENTII	SARGENTII JUNIPER	18" HT./SPR.	42" O.C., TRIA. SP.
402	JUH	JUNIPERUS HORIZONTALIS 'BAR HARBOR'	BAR HARBOR JUNIPER	18" HT./SPR.	42" O.C., TRIA. SP.
2	KL	KALMIA LATIFOLIA	MOUNTAIN LAUREL	12"-15" HOT./SPR.	AS SHOWN
116	KLS	KALMIA LATIFOLIA 'ELF'	ELF MOUNTAIN LAUREL	18" - 24" HOT.	30" O.C. TRIA. SP.
19	RM	RHODODENDRON MAXIMUM	MAXIMUM WHITE RHODODENDRON	24"-30" HOT.	48" O.C., TRIA. SP.
3	RM-1	RHODODENDRON MAXIMUM	MAXIMUM WHITE RHODODENDRON	2 GAL. CONT.	AS SHOWN
ORNAMENTAL / PERENNIALS / FERNS					
16	COR	COREOPSIS VERTICILLATA 'MOONBEAM'	THREADLEAF COREOPSIS	#1 CONT.	18" O.C., TRIA. SP.
506	EH	ELYMUS HYSTRIX	BOTTLEBRUSH GRASS	#2 CONT.	18" O.C., TRIA. SP.
592	HEM	HEMEROCALLIS	DAYLILLIES	#1 POT	18" O.C., TRIA. SP.
576	PH	PENNISETUM ALOPECUROIDES 'HAMELN'	HAMELN DWARF FOUNTAIN GRASS	#2 CONT.	18" O.C., TRIA. SP.
561	RF	RUDBECKIA FULGIDA 'GOLDSTRUM'	BLACK EYED SUSAN	#1 CONT.	18" O.C., TRIA. SP.
83	SN	SYMPHYOTRICHUM NOVAE-ANGLIAE	NEW ENGLAND ASTER	#3 CONT.	24" O.C., TRIA. SP.

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DINISCO DESIGN architects + planners
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KEY PLAN

NORTH ARROW

SEAL

Date: 22 February 2021

Drawn By: BDB

Scale: 0 20 40

Revisions

Number	Date	Description

Partial Planting Plan - 03

1.4.03

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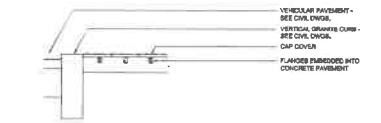
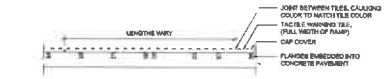


C SECTION - AT CURB



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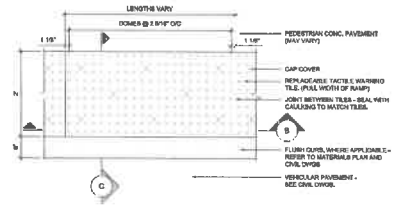

A PLAN - TYPICAL

7 / 1.5.01 DETECTABLE / TACTILE WARNING TILES - REPLACEABLE
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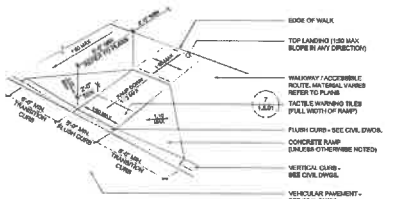
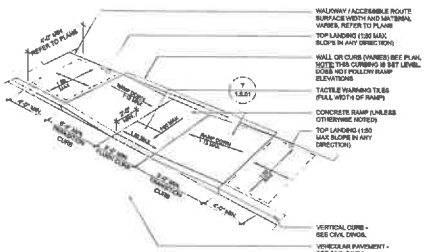


3 / 1.5.01 CURB CUT RAMP TYPE 1
SCALE: NTS



4 / 1.5.01 CURB CUT RAMP TYPE 2
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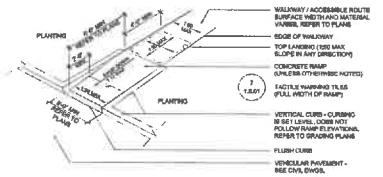

5 / 1.5.01 CURB CUT RAMP TYPE 3
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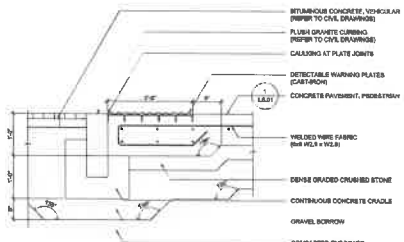

6 / 1.5.01 DETECTABLE / TACTILE WARNING TILES - CAST IRON PLATES
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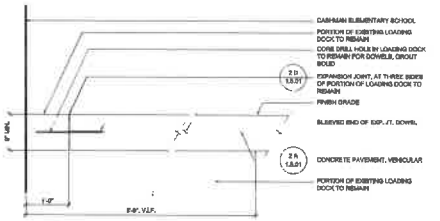
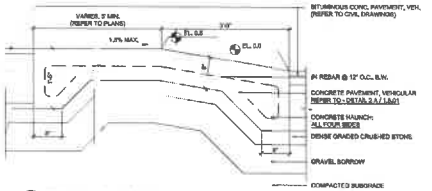
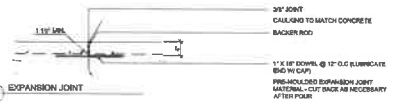


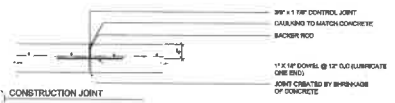
F AT CASHMAN LOADING DOCK



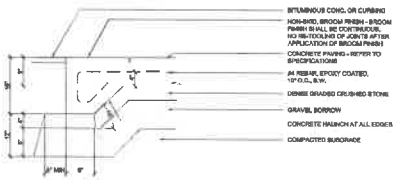
E APRONS AT ENTRY DRIVE



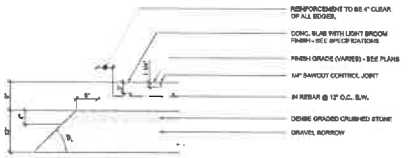
D EXPANSION JOINT



C CONSTRUCTION JOINT



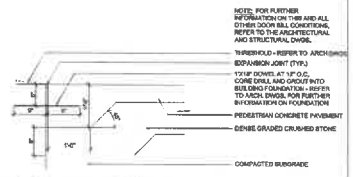
B @ ABUTTING PAVEMENT



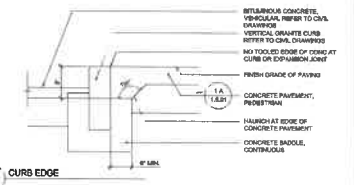
A TYPICAL SECTION

NOTES:
1. REFER TO SPECIFICATIONS FOR COLOR SELECTION AND FURTHER INFORMATION.
2. EXPANSION JOINTS 30'-0" O.C. UNLESS SHOWN OTHERWISE.
3. SAWCUT EDGES AND JOINTS, ALL PANELS.
4. WHERE SAWCUT JOINT IS REQUIRED, DEPTH TO BE 1 1/4".
5. WHERE EXPANSION JOINT ABUTS WALL OR OTHER VERTICAL SURFACE, DELETE EXPANSION SLEEVE AND DOWEL.
6. ALL TOOL MARKS ARE TO BE SMOOTHED OUT BY A LIGHT BROOM FINISH AFTER APPLICATION UNLESS SPECIAL TREATMENT IS CALLED FOR - SEE PLANS.

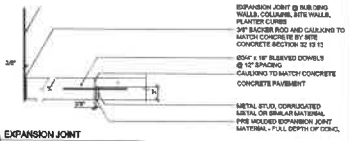
2 / 1.5.01 CONCRETE PAVEMENT - VEHICULAR
SCALE: 1" = 1'-0"



F CONC. PAVEMENT, AT DOOR THRESHOLD



E CURB EDGE



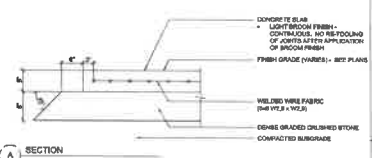
D EXPANSION JOINT



C CONSTRUCTION JOINT



B CONTROL JOINT



A SECTION

1.5.01 CONCRETE PAVEMENT - PEDESTRIAN
SCALE: 1" = 1'-0"

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REV PLAN

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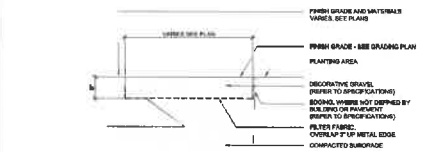

10 / 1.5.02 DECORATIVE GRAVEL
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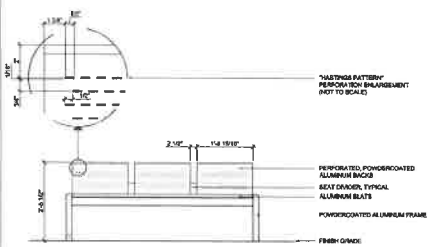

11 / 1.5.02 BENCH SYSTEM
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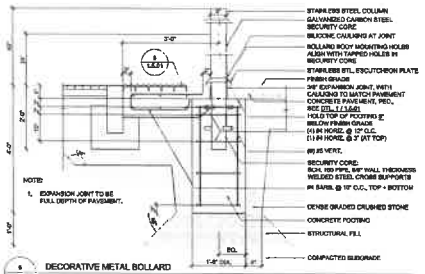
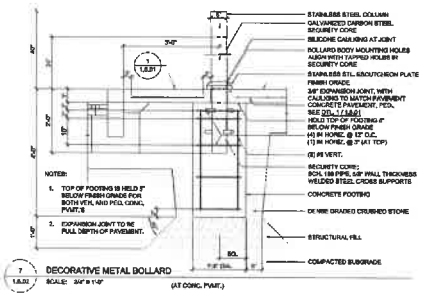
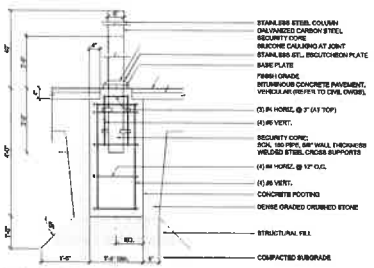


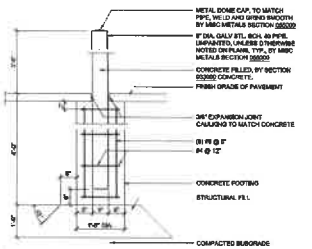
9 / 1.5.01 DECORATIVE METAL BOLLARD
SCALE: 3/4" = 1'-0"
(AT CONC. PVMT. / DET. TIL.SS)



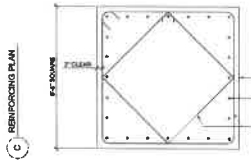
7 / 1.5.01 DECORATIVE METAL BOLLARD
SCALE: 3/4" = 1'-0"
(AT CONC. PVMT.)



8 / 1.5.02 DECORATIVE METAL BOLLARD
SCALE: 3/4" = 1'-0"
(AT BITUMINOUS CONCRETE PAVEMENT)



9 / 1.5.03 METAL BOLLARD
SCALE: 3/4" = 1'-0"



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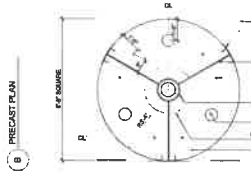

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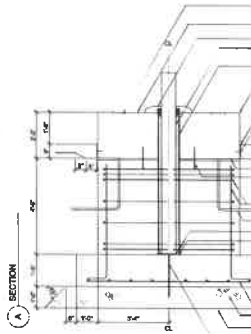

4 / 1.5.02 FLAGPOLE BASE AND PRECAST SEAT WEDGES
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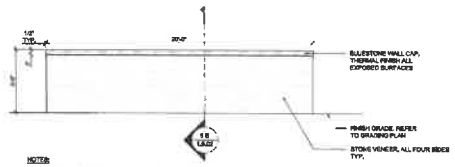
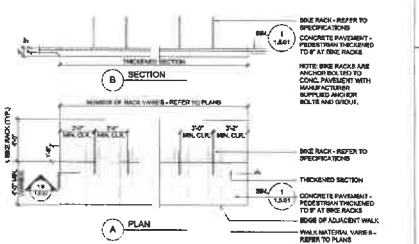
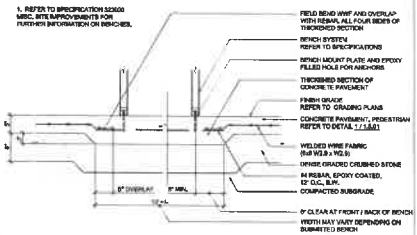


A / 6 / 1.5.03 STONE VENEER WALL
SCALE: 1/2" = 1'-0"



1 / 1.5.02 BIKE RACKS
SCALE: 1/4" = 1'-0"



2 / 1.5.02 BENCH MOUNT - ON GRADE / THICKENED SLAB
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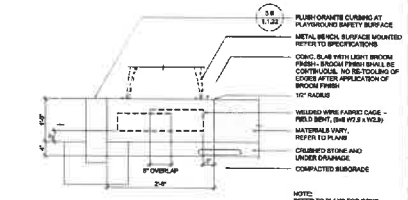
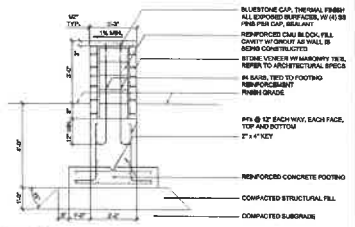


3 / 1.5.02 BENCH ON CONC. PAD
SCALE: 1" = 1'-0"



B / 5 / 1.5.03 SECTION @ STONE VENEER
SCALE: 1/2" = 1'-0"

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architects + planners
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Boston, MA 02111
(617) 426-3358

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
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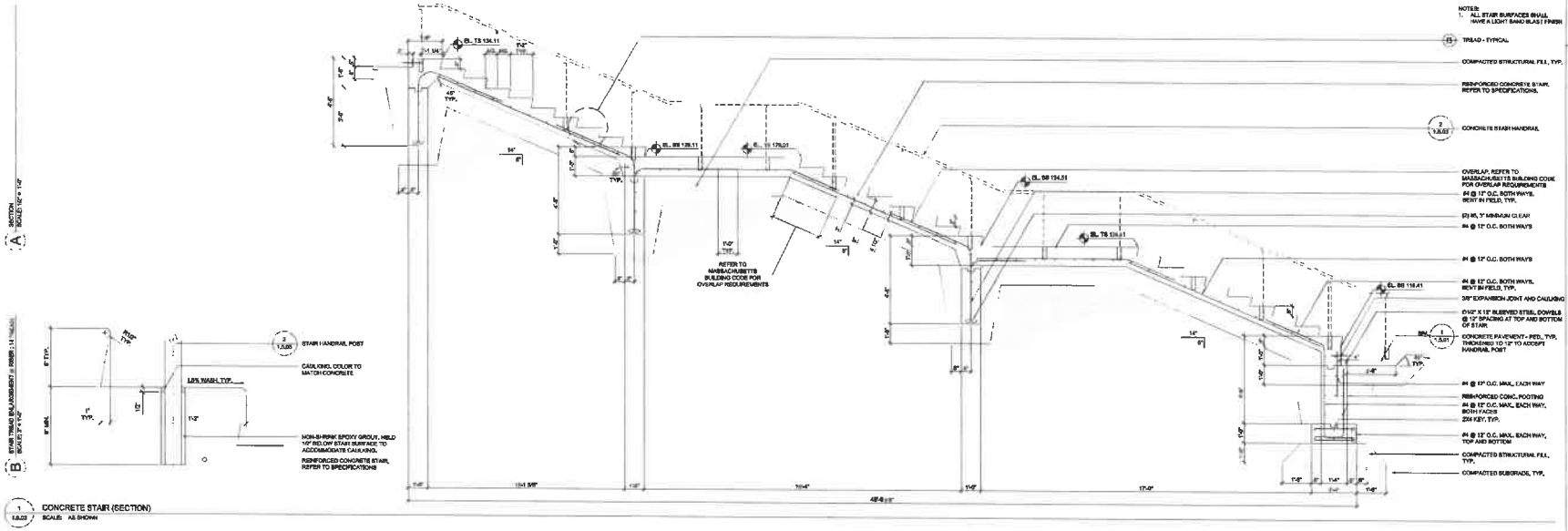

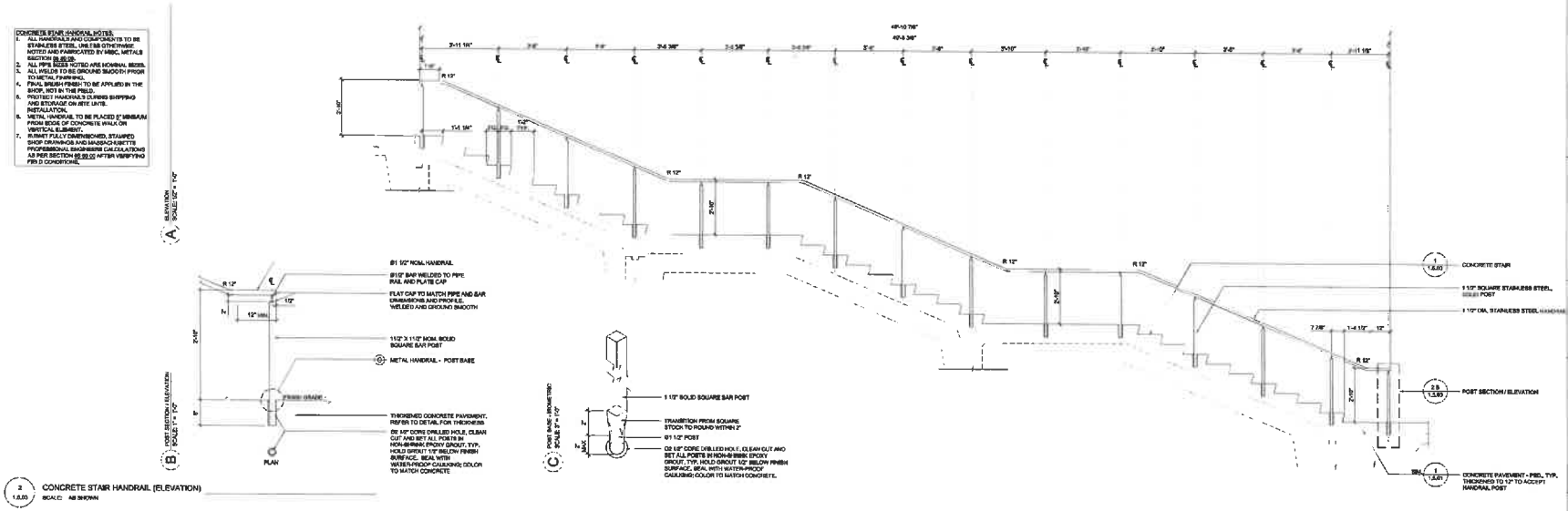

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Surveying & Engineers
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Framingham, MA 01701
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Landscape Architects
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Boston, MA 02129
(617) 482-4703

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Structural Engineers
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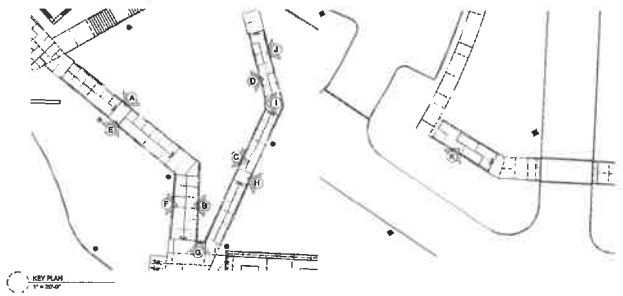
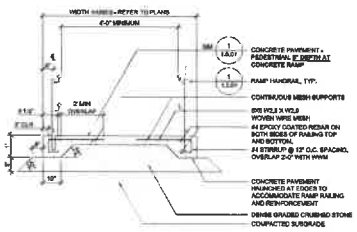
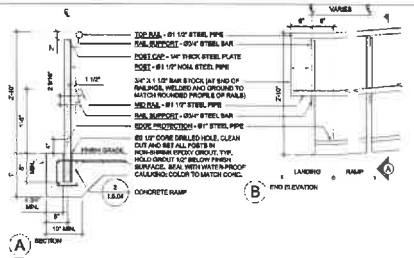


1 KEY PLAN
1" = 20'-0"



2 CONCRETE RAMP SECTION
1.5.04 SCALE: 1/2" = 1'-0"



3 CONCRETE RAMP HANDRAILS
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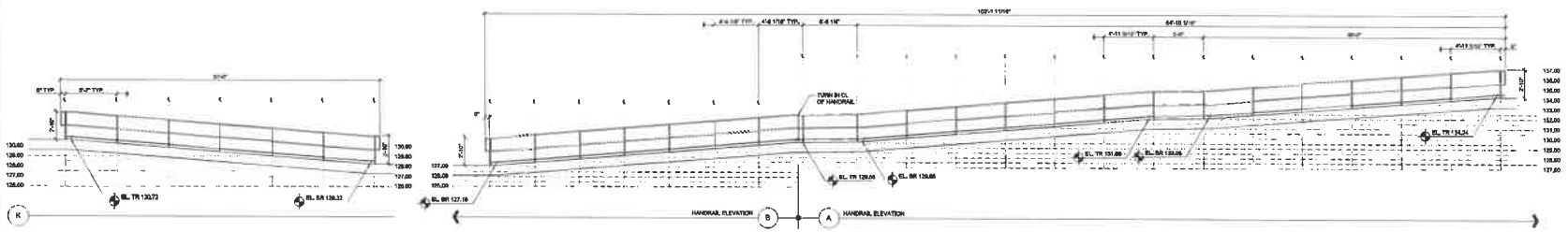
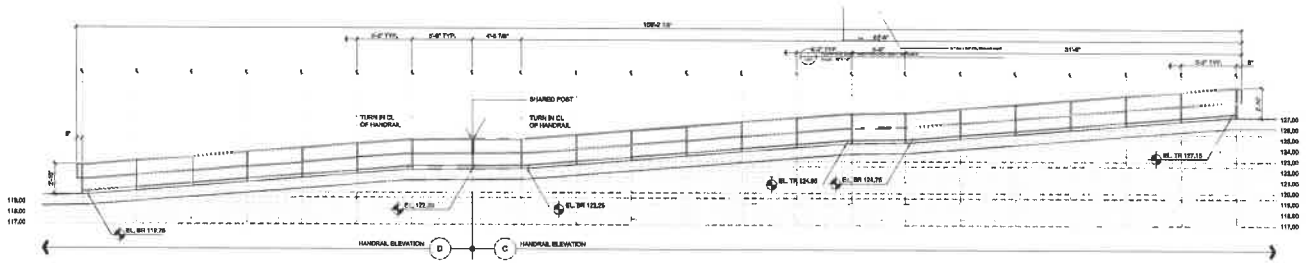
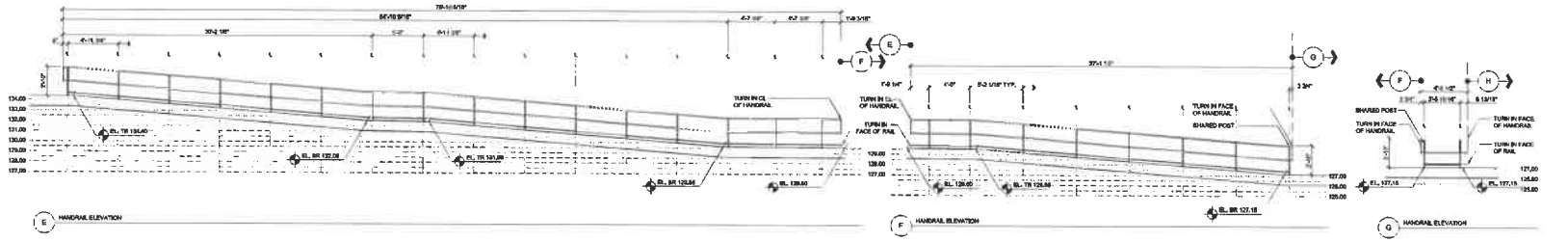


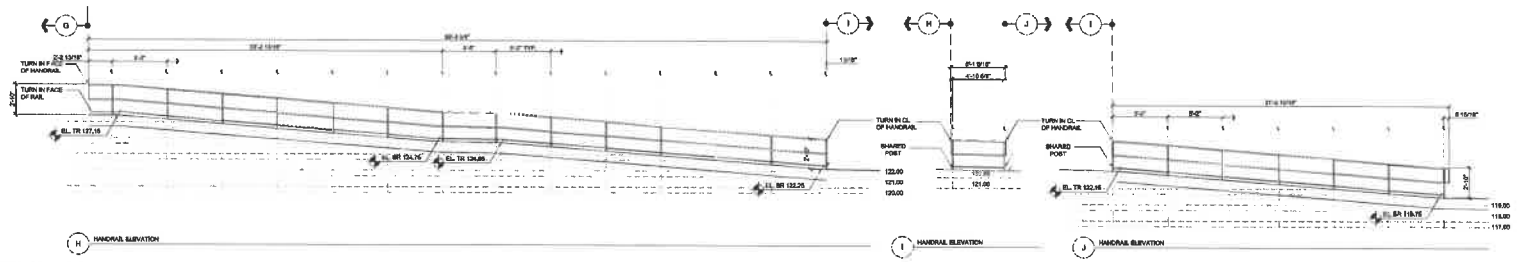
HANDRAIL ELEVATION



HANDRAIL ELEVATION



E HANDRAIL ELEVATION
F HANDRAIL ELEVATION
G HANDRAIL ELEVATION



H HANDRAIL ELEVATION
I HANDRAIL ELEVATION
J HANDRAIL ELEVATION

3 HANDICAPPED RAMP RAILING ELEVATIONS
1.5.04 SCALE: 1/4" = 1'-0"

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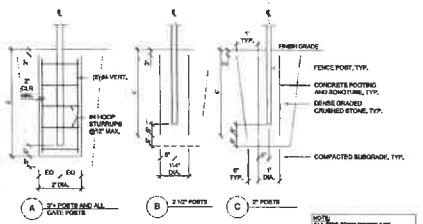
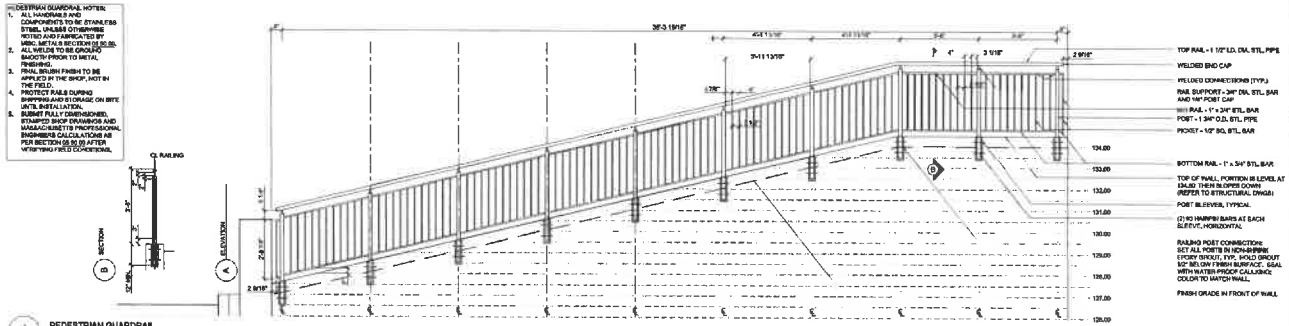
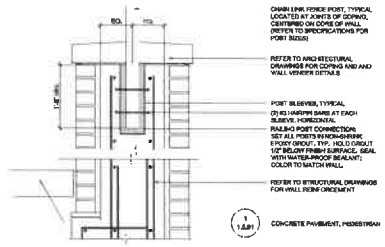


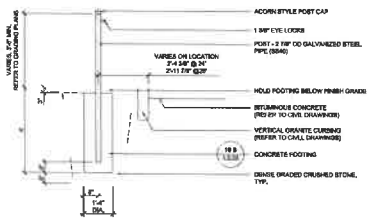
10 / 1.5.05 FENCE AND GATE POST / FOOTINGS
SCALE: 1/2" = 1'-0"



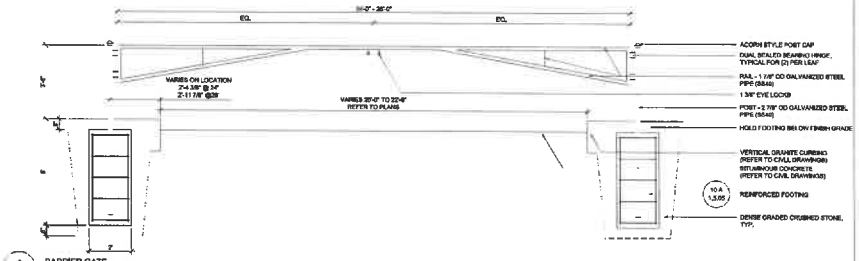
1 / 1.5.05 PEDESTRIAN GUARDRAIL
SCALE: 1/2" = 1'-0"



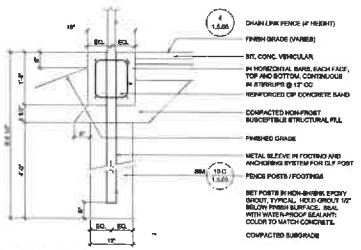
11 / 1.5.05 CLF POSTS AT CASHMAN ENCLOSURE
SCALE: 1 1/2" = 1'-0"



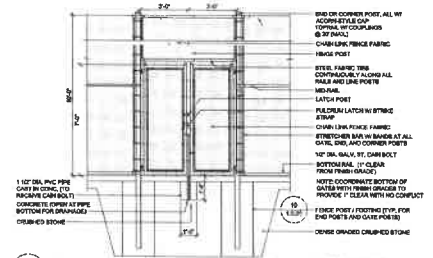
3 / 1.5.05 BARRIER GATE - KEEP POST
SCALE: 1/2" = 1'-0"



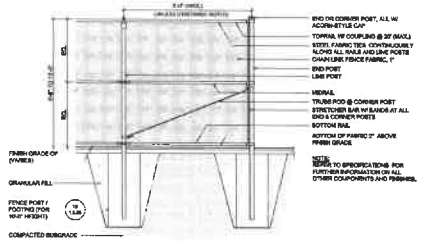
2 / 1.5.05 BARRIER GATE
SCALE: 1/2" = 1'-0"



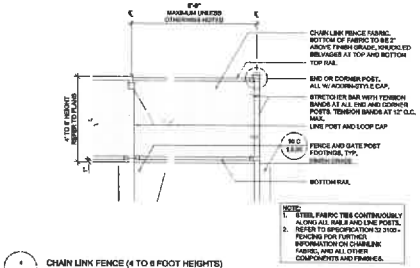
12 / 1.5.05 CLF THROUGH CONC BAND
SCALE: 3/4" = 1'-0"



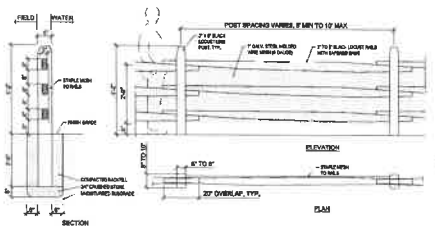
4 / 1.5.05 CHAIN LINK FENCE DOUBLE GATE - 10'-0" (STORAGE)
SCALE: 3/8"=1'-0"



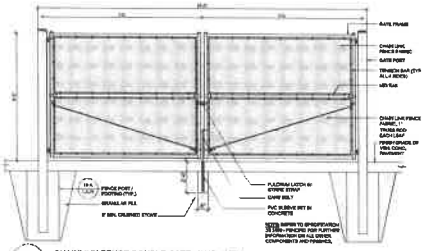
5 / 1.5.05 CHAIN LINK FENCE - 6' - 10' HEIGHTS
SCALE: 3/8"=1'-0"



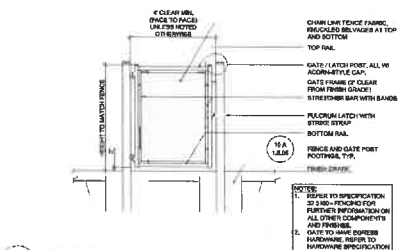
4 / 1.5.05 CHAIN LINK FENCE (4 TO 6 FOOT HEIGHTS)
SCALE: 1/2" = 1'-0"



9 / 1.5.05 SPLIT RAIL FENCE
SCALE: 1/2" = 1'-0"



8 / 1.5.05 CHAINLINK FENCE DOUBLE GATE (6' HEIGHT)
SCALE: 3/8" = 1'-0"



7 / 1.5.05 CHAINLINK FENCE SINGLE GATE
SCALE: 1/2" = 1'-0"

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architects + planners
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Mechanical Engineers
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Woburn, MA 01801
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Electrical Engineers
89 Newbury Street, Suite 103
Danvers, MA 01923
(617) 868-4066

EnNexus Technology Design, Inc.
Technology Consultants
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1.5.05

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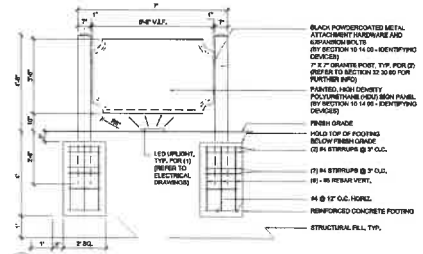
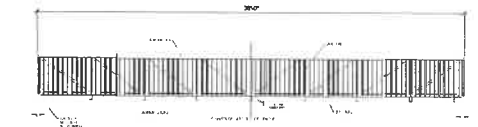
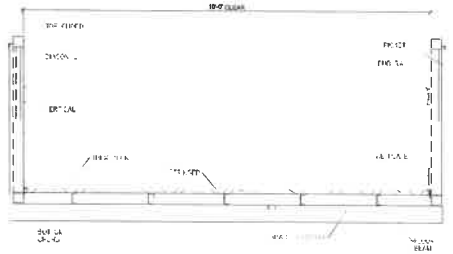


2 1.5.06 SCHOOL SIGN
SCALE: 1/2" = 1'-0"

BASIS OF DESIGN:

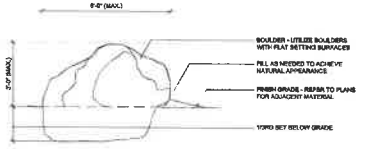


B BRIDGE ELEVATION

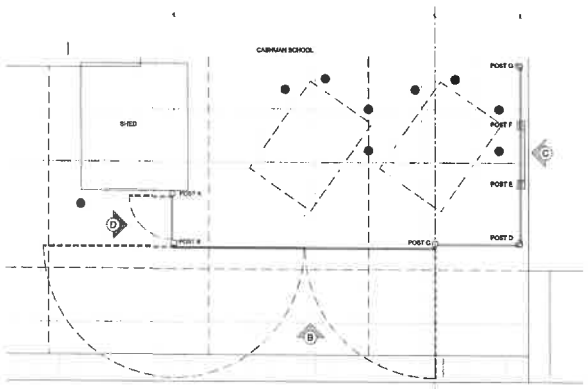


A BRIDGE SECTION

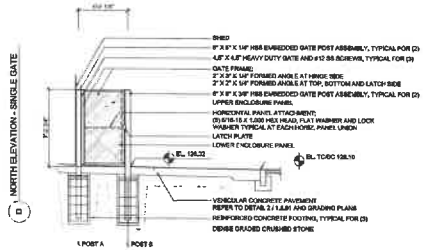
1 1.5.06 PEDESTRIAN BRIDGE
SCALE: 1/4" = 1'-0"



3 1.5.06 NATIVE BOULDER
SCALE: NO SCALE



A PLAN



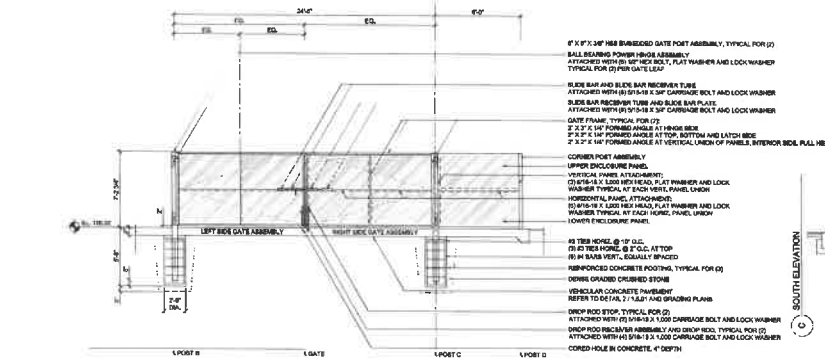
D NORTH ELEVATION - SINGLE GATE



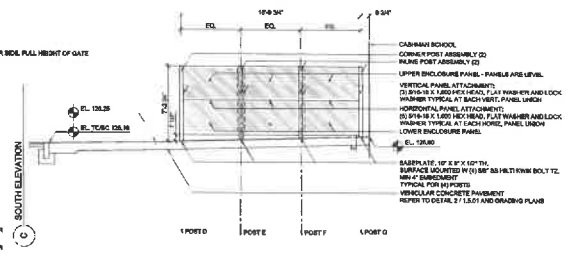
RP019 "ALPHABET SOUP" © REVAMP PANELS (R) LLC, 2021

E PANEL PATTERN BASED OF DESIGN "ALPHABET SOUP"

CONCRETE STAIR INVERTED NOTES:
1. REFER TO SPECIFICATION SECTION 32 32 00 DECORATIVE FENCING FOR FURTHER INFORMATION.
2. ALL WELDS TO BE GROUND SMOOTH PRIOR TO METAL FINISHING.
3. FINISH TO BE APPLIED IN THE SHOP, NOT IN THE FIELD.
4. PROTECT ENCLOSURE DURING SHIPPING AND STORAGE ON SITE UNTIL INSTALLATION.
5. SUBMIT FULLY DIMENSIONED, STAMPED SHOP DRAWINGS FROM THE MANUFACTURERS INTERNAL ENGINEERING DEPARTMENT AS PER SECTION 32 32 00.
6. CONTRACTOR TO VERIFY FIELD CONDITIONS PRIOR TO DEVELOPMENT OF SHOP DRAWINGS



B FRONT ELEVATION - DOUBLE LEAF GATE



C SOUTH ELEVATION

4 1.5.06 DECORATIVE ENCLOSURE AND GATES
SCALE: 1/4" = 1'-0"

AMESBURY ELEMENTARY SCHOOL

AMESBURY, MA

DINISCO DESIGN
architects + planners
99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2858

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardine, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-9600

Crabtree McGrath Assoc., Inc.
Food Service Consultants
181 West Main Street
Georgetown, MA 01833
(978) 352-9500

VAV International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 935-7228

Thompson Engineering Company, Inc.
Electrical Engineers
60 Newbury Street, Suite 103
Danvers, MA 01923
(617) 886-9065

EdVance Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01880
(978) 258-9900

KEY PLAN

NORTH ARROW

STAMP

Date: 22 February 2021

Drawn By: BDB

Scale: AS SHOWN

Revisions

Number	Date	Description

Site Details

1.5.06

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Attachment B

City of Amesbury Planning Board Decision

NEW AMESBURY ELEMENTARY SCHOOL
ORDER OF CONDITIONS
013500 - B

ANNOTATED COPY

RECEIVED
FEB 17 REC'D 21
BY: City Clerk

PLANNING BOARD DECISION

Property Ownership:	**City of Amesbury** **62 Friend Street, Amesbury MA 01913**
Applicant:	**City of Amesbury** **62 Friend Street, Amesbury MA 01913**
Application Type:	**SITE PLAN REVIEW**
Project:	**Amesbury Elementary School**
Location:	**193 Lions Mouth Road, Amesbury, MA 01913**
Date:	**February 08, 2021**

A. GENERAL

On or about January 27, 2021, the Amesbury Planning Board (the "Board") received an application for Site Plan Review requesting to construct a new Elementary School ("Project") at 193 Lions Mouth Road in Amesbury MA. The application was submitted along with a Site Plan (the "Plan") drawn on January 27, 2020 by Dinisco Design, 99 Chauncy Street Suite 901, Boston, MA 02111, and last revised on January 6, 2021 and submitted along with supporting documents by Dinisco Design on behalf of City of Amesbury (the "Applicant"). The set of plans consists of seventy-four (74) sheets and includes civil, architectural and landscaping plans.

The Board held the initial public hearing on March 9, 2020, with subsequent public hearings on November 16, 2020, December 14, 2020, January 11, 2021, and January 25, 2021. The public hearing was closed on January 25, 2021 and a decision was rendered on February 8, 2021.

This is the Final Action of the Board ("Decision") on the Site Plan application.

B. FINDINGS:

1. **Subject Property:** The Property is located at 193 Lions Mouth Road and is identified on the Assessors Database as Map 50, Lots 6, 16, 42 and Map 37, Lot 4. The parcels is zoned Open Space Conservancy (OSC). The subject property consists of 35.30 acres on the existing Cashman Elementary School (CES) site and 2.51 acres on the Woodsom Farm parcel for a total area of approximately 37.81+/- acres. The portion of Woodsom Farm being used for this project was designated for municipal purposes by the Amesbury City Council. The parcel has frontage along Lions Mouth Road;

2. **Existing Conditions:** The site is currently occupied by the 61,472 SF Cashman Elementary School (CES) and two (2) little league play fields. The existing building having a footprint of 41,455 SF is located on the eastern portion of the site and abuts wetlands to the north and northwest, a residential neighborhood to the south and the Woodsom Farm, one of the largest open space areas in the City of Amesbury and owned by the City, to the west. The site is sloped towards the wetlands to the north/northwest. The existing grades to the north and northwest create a natural area that channelizes surface runoff from the Woodsom Farm and the hills surrounding this area;

3. **Project Description and Proposed Use:** The new Amesbury Elementary School (AES) is proposed to be built on an existing City owned site shared with the existing CES located at the Project Site. The new school facility is a 98,195 square feet building with a footprint of 36,895 square feet and consists of three levels. The new elementary school is designed to be a PK, K-2 grade configuration for 425 students. The entire site abuts the Woodsom Farm on the northwest and the Essex County Greenbelt Association along the northeast boundary. The proposed work includes the new school building, paved drives and parking, children's play surfaces, stormwater management, landscaping and redevelopment of some of the previously altered buffer area. The limit of work consists of approximately 15 acres out of the total site area. The project proposal does not include rehabilitation or demolition of any existing buildings.

4. **Site Layout, Grading and Building Location:** The school is located northwest of the existing Cashman Elementary School. The area west of the existing Cashman School will be developed into additional parking for the new school. The project will require the relocation of the two existing little league fields to provide the building area for the AES. One of the major changes to the site is the vehicular circulation pattern on site. The existing drive access will continue to be used as the main access to the existing Cashman as well as the new AES. A new drive is proposed at the southeast corner of the Woodsom Farm parcel. The site plan application and supporting materials indicate that the proposed arrangement of shared parking areas and driveways along with other site improvements (including but not limited to, dedicated vehicular drop-off areas for each school, a shared bus drop-off, and new playgrounds for the AES) have been made to use the site in the most efficient and safe manner. The Preferred Schematic Report dated January 02, 2019 prepared for the Massachusetts School Building Authority documents the School District's selection and recommendation for a preferred solution for the new Amesbury Elementary School. The Board notes that it has had no input in the findings, evaluation of the alternatives or any of the recommendations stated in the above mentioned report pertaining to the potential sites considered, including the proposed location for the construction of the new AES;

5. **Environmental Resource Protection:** The Project is subject to review by the Amesbury Conservation Commission (ACC) under the local and state regulations. As the wetlands data and Notice of Intent (NOI) application have been reviewed by consultants retained by ACC, the Board did not undertake separate review of work within the ACC regulatory jurisdiction. The Board has determined that it will incorporate the Order of Conditions and terms therein by reference here to ensure that the proposed development and improvements within environmental jurisdiction areas are made with no detrimental impact to environmental resource areas or otherwise endanger public health;

6. **Stormwater Management Design:** The stormwater resulting from the proposed site development and associated improvements is proposed to be treated and/or discharged into new storm water catch basins, bio-retention basins and infiltration chamber systems as shown on the site plan. The Applicant states that the project will include Stormwater Best

Management Practices (BMPs) to comply with the various local and state stormwater laws and regulations such that there will be no increase in stormwater discharges as required by such laws and regulations. Based on the testimony of the Applicant's engineering design team and the Board's peer reviewer, the Board finds the following:

a) The proposed stormwater management system as further revised during the application review and as approved herein is in substantial compliance with the various local and state laws and regulations pertaining to stormwater management, provided the proposed system is built as described, designed and shown on the final site plan;
b) The use of the porous pavement system (PPS) in the area of the parking lot of the new school is a critical piece of the stormwater management system. The use of a traditional asphalt pavement system would be impossible given the amount of fill that would be required to elevate the parking area and new school to a level high enough to accommodate a more traditional subterranean storm water management system typically used in conjunction with a standard asphalt paving system. Therefore, the proper installation and maintenance of the PPS system is critical to ensure the stormwater system is providing the proper flooding protection not only to the buildings on the school campus but to any downstream neighbors.
c) Following the proper manufacturers / installers / peer reviewers maintenance recommendations, reporting on the completion of proper maintenance and checks to insure that the system is working effectively is crucial or there is likelihood that the stormwater management system will fail or potential negative impacts downstream on abutting properties in the neighborhood.

7. **Water and Sewer Services:** A new water main loop will run through the site to connect at the existing water main on Lions Mouth Road to add capacity for domestic and fire service to the new facility. The sewer service for the new building will be gravity fed to the existing onsite pump station. The project will upgrade the existing duplex ejector pump within the pump station, which, according the Applicant is beyond its useful life. The ejector pump will then pump the sewer up and into the City sewer main on Lions Mouth Road. The City's DPW and Water Department have indicated the proposed improvements are

acceptable and recommend approval of the proposed site plan showing these utility upgrades;

8. **Traffic and Circulation:** The Applicant presented detailed information on the changes proposed to the existing circulation pattern for the CES and the new parking and vehicular movement patterns on the AES portion of the site. Additional capacity has been created for cars to queue around the CES parking lot. During pickup and drop off, the vehicles will enter from the easterly drive and exit from the westerly drive. There are additional improvements proposed off-site. A sidewalk will be built separate from this project to connect the two drives. Other intersection and sidewalk improvements are proposed along Lions Mouth Road, Highland Street and Friend Street intersection area. Given the building location, parking and circulation needs, the Applicant indicated that additional efficiencies were created by adding additional lanes and using one-way traffic patterns. The Board has largely depended on the testimony of public safety and School Department officials, and will use its peer reviewer's comments and recommendations on traffic to determine satisfactory compliance with traffic and circulation requirements;

9. **Building Design and Space Programming:** The project includes the construction of a new 98,195 SF three level building. The new school's exterior will be traditional brick with colored masonry and painted metal panel accents that, according to the designer, evoke modern-day traditional public building architecture. The Application indicates that the square footage allowed for each space is mandated by MSBA and has been approved by MSBA, the Amesbury School Committee and the Amesbury School Building Committee. The Board has relied upon the approval of the proposed building design by the School Building Committee and City public safety officials as it pertaining to spatial arrangement, safe access and egress and other building safety requirements;

10. **Landscaping:** A landscaping plan was submitted along with the Site Plan. The Board discussed the need for additional trees along the Woodsom Farm to provide some vegetative buffer in between the natural landscape and built environment. In order to reduce the heat-sink effect, tress with large canopy were incorporated into the parking

areas. The Board also finds that the grass strips and trees in between the sidewalk and travel lanes provide additional physical safety zones for school kids and other pedestrians. The Board finds that once the landscape design changes (Exhibit #1 - #3) have been incorporated into the Final Plans, the purpose and intent of the landscape requirements would be satisfied.

Based on the findings noted above, the Board finds that the Project satisfies the Site Plan Review criteria under Section XI.C of the Amesbury Zoning Bylaw (the "Bylaw").

C. WAIVERS

By memo dated 1/6/2021, the Applicant provided the Board with an updated list of waivers sought from the specific provisions of Amesbury's Zoning Bylaw. The Board has endeavored to grant waivers from those rules and regulations, only to the extent necessary, where the waivers are consistent with the purpose and intent of the regulations and would not threaten public health, safety or welfare and to minimize harm and disruption to the locus and real property abutting the locus. In the event that further waivers are required, the Applicant shall submit a written request for such waiver(s) to the Board and the Board may grant or deny such additional waivers in accordance with applicable rules and regulations in effect at that time. The waivers listed in Table 1 are the only waivers granted to the extent necessary to construct the project as per approved site plan(s):

TABLE 1:

Section(s) of Zoning Bylaw	Requested Waiver	Decision of the Board
Section XI.C.10.n.1 – Requires pipe material be reinforced concrete and that a minimum of three (3) feet of earthen cover be provided over pipes.	To allow a) provision of less than three (3) feet of earthen cover over drainage piping as stipulated below b) the use of HDPE material for piping in lieu of the required reinforced concrete material for pipe segments provided with a minimum of 2.5 feet of cover. c) the use of Class V RCP material for piping provided with earthen cover ranging between 1.8 and 2.5 feet.	Granted to the extent necessary provided all site and building improvements are carried out as per approved plans
Section XI.C.8.a.3 – Curb cut width	To make improvements to the existing 58 feet wide curb-cut and reduce it to 56 feet including a 12 feet landscaped median as shown on the revised driveway sketch	Granted to the extent necessary provided final site plans are updated to incorporate the driveway sketch as approved

D. APPROVAL OF THE SITE PLAN AND CONDITIONS THERETO

Upon notice and after a public hearing in accordance with the statute (General Laws, Chapter 40A, section 11) and the Amesbury Zoning Bylaw, and after full consideration of the evidence presented, and upon the findings made in Section B of this Decision, the Board shall grant a conditional Site Plan Approval for the proposed Amesbury Elementary School located at 193 Lions Mouth Road in Amesbury MA as shown on the approved Plan further upon the conditions and hereinafter set forth, for the premises described in the application.

I. COMPLIANCE WITH LOCAL, STATE AND FEDERAL REQUIREMENTS:

The Project and all construction, utilities, roads, drainage, earth removal and filling and all related appurtenances with respect to the Project, shall comply with all applicable local, state and federal regulations except as waived specifically by this Decision. The Applicant shall be responsible for acquiring all other local, state and federal permits and approvals as necessary to construct the Project as approved by the Board. Final action on all other permits shall be submitted to the Board for record. The Board notes that the following are some of the permits needed for this Project prior to start of any construction activity:

1. Compliance with the Massachusetts Wetlands Protection Act and related regulations, G. L. c. 131, § 40-40A, and the Amesbury Wetlands Ordinance and Regulations;
2. Compliance with DEP Stormwater Regulations, as needed; and
3. National Pollutant Discharge Elimination System (NPDES) permit from Environmental Protection Agency.

II. GENERAL AND IN PERPETUITY CONDITONS

OWNER 1. **Allowed Uses**: This Site Plan Approval pertains only to the new AES building and site improvements shown on the approved site plan;

OWNER 2. **Landscape Buffers** –The final plan shall be submitted for review and approval prior to start of construction;

CONTRACTOR 3. **As-built Plans:** To ensure compliance with the terms and conditions of this Decision and any approval or order by any federal or state agency, the Applicant shall submit to the Board complete and detailed Progress "As-Built" Plans with its request for a Certificate of Occupancy. Prior to issuance of a Certificate of Completion by the Board, the Applicant shall have prepared and submitted Final As-Built Plans, which shall indicate the actual location of permanent monuments; inverts and location of required utilities and drainage; location of all underground utilities; and location of all permanent structures. The accuracy of such Final As-Built Plans shall be certified by a Land Surveyor or a Professional Engineer, Registered in the Commonwealth of Massachusetts, retained by the Applicant. Any damage to public roads and walkways shall be repaired and/or replaced to the satisfaction of the Director of Public Works.

OWNER 4. **Site Plan Modifications:** Prior to addition or alteration of uses not allowed by this Site Plan Approval, the Applicant shall provide detailed information and plans along with a formal written request for modification to the approved Site Plan for determination of minor or major modification and approval by the Board. Any substantial modifications to the approved Site Plan or changes that impact the criteria under Section XI.C or the Performance Standards under XI.C.8 or conditions of approval of this Decision shall be subject to review and approval of the Board. The Board shall, if it so determines, require the applicant to submit a new application for modification to the approved Site Plan and may hold a new public hearing for review of the requested modifications;

OWNER 5. **Wetland Permitting:** In order to effectively coordinate and integrate the required observation and inspection reports for this project, the Board recognizes that the Plan(s) shown under the Notice of Intent Application (as revised) and the Order of Conditions, issued by the Amesbury Conservation Commission, shall also be carried out to the satisfaction of the Commission or its agents. Also,

a. Except as waived by this Decision or a decision of the Commission, the construction of this project shall comply with the Amesbury Wetlands Bylaw and Amesbury Conservation Commission Regulations in effect at the time any building permit is sought for the project or for any jurisdiction for roadway-associated construction,

and with all rules, regulations, filing and permit requirements and certifications of the Commission with respect to natural resource protection, construction of storm water management structures within the Buffer zone and their disposal, construction of other structures including retaining walls within the Buffer Zone, and wastewater disposal;

b. Any request for alteration to the Order of Conditions made by the Applicant to the Commission (or to Massachusetts Department of Environmental Protection (Mass DEP), upon appeal) shall be simultaneously provided to the Board. The proposed work shall comply with the "Order of Conditions" issued by the Commission upon the said premises;

c. The Order of Conditions from the Commission shall be carried out to the satisfaction of the Commission. Any violation of the Order of Conditions issued by the Commission shall be deemed to be a violation of this Approval, with all remedies to the City of Amesbury as provided by law;

OWNER 6. **Stormwater Management System:** The following requirements shall be met:

a) The application of sand to the porous pavement parking area should not be allowed to avoid premature clogging of the porous pavement.

b) The Operation and Maintenance (O&M) Plan dated 2/7/2020, last revised 12/1/2020 shall be incorporated into the project requirements by reference. The budget estimate included in the O&M Plan shall be utilized by pertinent School and City Departments for initial budgeting of required maintenance and inspection of the stormwater management system.

c) Porous Pavement System (PPS) and Stormwater Maintenance: The Applicant shall provide evidence in writing along with all supporting documents to establish that the proper maintenance schedule, use of correct snow / ice mitigation materials and generally ALL of the manufacturers recommendations and requirements for maintenance, cleaning and proper products to be used on the PPS and all of the stormwater management system as a whole have been done during the prior year. This evidentiary report shall be provided to the Board for review on an annual

basis no later than November 1st every year for a minimum of 5 years from the date of issuance of Certificate of Occupancy for the new building.

d) If any failure to report on the completion of proper maintenance or there being any other evidence that the PPS system is not working effectively enough to ensure the protections to the downstream neighbors upon inspection by the Board's inspectional engineer, then the applicant shall be required to establish an escrow account that will be funded with a minimum amount equal to that of at least 1 year of annual maintenance of the entire stormwater management system in advance for the following 5 years and shall extend the monitoring and reporting requirements for an additional 5 years from the first instance of maintenance failure.

CONTRACTOR / OWNER

7. **Fill Materials:** The project requires approximately 36,000 cubic yards of imported fill. Given the quantity of material involved, the following items shall be incorporated into the project specifications:

a) Documentation and tracking records of earthen material sources.

b) Specifications to require only clean natural earthen material free of cinders, brick, concrete and other deleterious material.

c) Testing records to confirm that the material utilized on the project satisfies the desired quality requirements.

CONTRACTOR / OWNER

8. The Applicant shall provide copies of the Construction Period Pollution Prevention & Erosion Control Plan (CPPP) and the project Stormwater Pollution Prevention Plan (SWPPP) in advance of any construction activity for review and approval by the Board's engineering review consultant. The approved documents shall be incorporated into the project construction documents;

OWNER

9. The Long Term Pollution Prevention Plan (LTPPP) shall be incorporated into the project construction documents;

10. **Traffic Studies and Improvements**: The recommendations from the Board's Traffic Peer Review by VHB dated 12/14/2020 are incorporated here by reference as conditions of approval. Further, the off-site improvements related to sidewalk and intersection

reconfiguration and reconstruction as shown on and included in information package submitted on Sep 29, 2020 (Exhibit #4) shall be required to be completed no later than 12 months from the issuance of the Certificate of Occupancy for the new AES building.

OWNER 11. The sidewalk proposed to be constructed along Lions Mouth Road to connect the two drives in this project shall be constructed and built prior to the issuance of the Certificate of Occupancy for the new AES building.

OWNER 12. Peer Review Fees: Any and all outstanding invoices for peer review services shall be paid in full prior to start of any construction activity.

III. PRIOR TO START OF ANY CONSTRUCTION ACTIVITY ON SITE

The Applicant shall file with the Board and all other relevant public agencies for review and for consistency with this Decision any documents and shall have completed the following actions:

DESIGN TEAM 1. **Revisions to the Final Site Plan and Supporting Documents:** The Final Site Plan shall be revised to address the following outstanding items through the supplemental review and approval process and as part of submission of Final Plans to the Board.

a) Engineering Review Memo dated 1/21/2021: The outstanding comments under Drainage shall be addressed;

b) Site Lighting Details: The project details shall be revised to incorporate the 'Site Lighting Fixture Base Detail' provided in sketch form by Dinisco Design, dated January 6, 2021. The detail indicates a 6 inch vertical exposure on light pole bases.

DESIGN TEAM 2. **Retaining Walls:** Any retaining walls over four (4) feet shall be designed by a structural engineer and accompanied by supporting documentation indicating that the existing soils and fill are appropriate for the proposed design. Additional test pits and accompanying data shall be supplied with the retaining wall design and details, if construction drawings change or revisions are required to the approved Final Plans;

CONTRACTOR 3. **Erosion Control Barriers** - Prior to the commencement of any site work (excluding any work within the existing building), an erosion control barrier (12 inch Fiber Log and Silt

Fence as per approved erosion control plan) shall be installed to include and upto the limit of work as shown on the approved Final Plan. The erosion control barrier shall be inspected by the ACC representative prior to commencement of site work and shall be maintained until all disturbed areas have been stabilized to the satisfaction of the Board and its representatives.

IV. DURING CONSTRUCTION

The following shall apply to all construction activity as per approved Site Plan:

CONTRACTOR

1. **Stockpiles** - Earth material stockpiles shall not be allowed immediately adjacent to perimeter siltation barriers or drain inlets. Long term stockpiles over 30 days shall be shaped, stabilized and circled by 12 inch Fiber Log and Silt Fence where applicable and shall be stabilized by temporary seeding, sheeting or netting;

CONTRACTOR

2. **Repair and Cleanup:** The existing roadways shall be kept clean of all earth materials during the construction phase. Any damage to public roads and walkways shall be repaired and/or replaced to the satisfaction of the DPW Director and City Engineer;

CONTRACTOR

3. **Utility Trenches** - Utility trenches within the public Right of Way shall be saw-cut prior to excavation. Open trenches shall be backfilled with bank gravel and compacted to 95%. Trenches shall be paved with asphalt binder to a minimum depth of three (3) inches and overlaid curb to curb to a minimum depth of one and half (1.5) inches. Water service trenches shall be infrared joint paved. The Director of DPW and the City Engineer shall have the final signoff on the right of way improvements and any change to these standards or those shown on approved plans shall be subject to their review and approval;

CONTRACTOR

4. **Construction Activities** - During construction, except within the individual building envelopes, the Applicant and its agents and employees shall conform to all local, state and federal laws regarding noise, vibration, dust and use of public roads and utilities. The Applicant shall at all times use all reasonable means to minimize inconvenience to residents in the general area and maintain safe and adequate vehicular access on Lions Mouth Road.

Construction shall not commence on any day Monday through Saturday before 7:00 AM. Construction activities shall cease by 6:00 PM Monday through Friday and by Noon on Saturday. The work day may be extended to a full day on Saturdays, with prior approval of the Building Inspector. No construction or activity whatsoever (except for interior finishing) shall take place on Sunday; and

CONTRACTOR

5. **Erosion Control and Stormwater Maintenance Requirement**: The Applicant's designee or assignee shall on a quarterly basis submit interim reports and supporting documents to the Board showing that requirements for stormwater system maintenance are being adhered to according to the approved SWPPP and NPDES Permit as well as other requirements of the Stormwater Management regulations, as applicable included here by reference.

V. PRIOR TO MAKING REQUEST FOR AN OCCUPANCY PERMIT

The Applicant shall file with the Board and all other relevant public agencies for review and for consistency with this Decision any documents and shall have completed the following actions:

CONTRACTOR / DESIGN TEAM

1. **Certification of Improvements** - The Applicant shall request the Board for a Certificate of Improvements and submit it to the Building Inspector from the Board verifying that conditions of approval have been met and that construction to date is per the approved plans;

CONTRACTOR / DESIGN TEAM

2. **Landscape Installation** - All site improvements, including landscaping and street trees shall be completed and installed as per Final Plans. The Landscaped Architect for the project shall submit a certification that the trees, shrubs and screening plants have been installed as per approved Final plans. All proposed trees shall be placed in position or staked out for approval by the Board prior to digging;

DESIGN TEAM

3. **Infrastructure Improvements:** The Applicant shall provide a written certification from its project engineer that the sewer pump upgrades as approved by this Decision have been completed and signed off by the City's water and sewer department. The Applicant shall

request written confirmation from the City Engineer and DPW Director that the finished construction of all utilities and municipal structures located within the public right of way or easement areas are adjusted to appropriate finished grade, and are adequately accessible for future maintenance;

CONTRACTOR

4. **Public Way Repairs**: Any damage to public roads and walkways shall be repaired and/or replaced to the satisfaction of the DPW Director and City Engineer;

CONTRACTOR / DESIGN TEAM

5. **'As-Built' Plan:** The preparation of an 'As-Built' plan (to be incorporated into the Operation and Maintenance Plan), should be submitted for Planning Board review and approval. Furthermore, the 'As-Built' Plan should be accompanied by a report from the Engineer of Record indicating whether the overall site construction (in general) and the stormwater management and drainage construction (in specific) complies with the design intent for the project. An Interim As-built Plan may be submitted if all improvements shown on the approved Site Plan have not been completed at the time of requesting an Occupancy Certificate.

Chair, Amesbury Planning Board

EXHIBITS

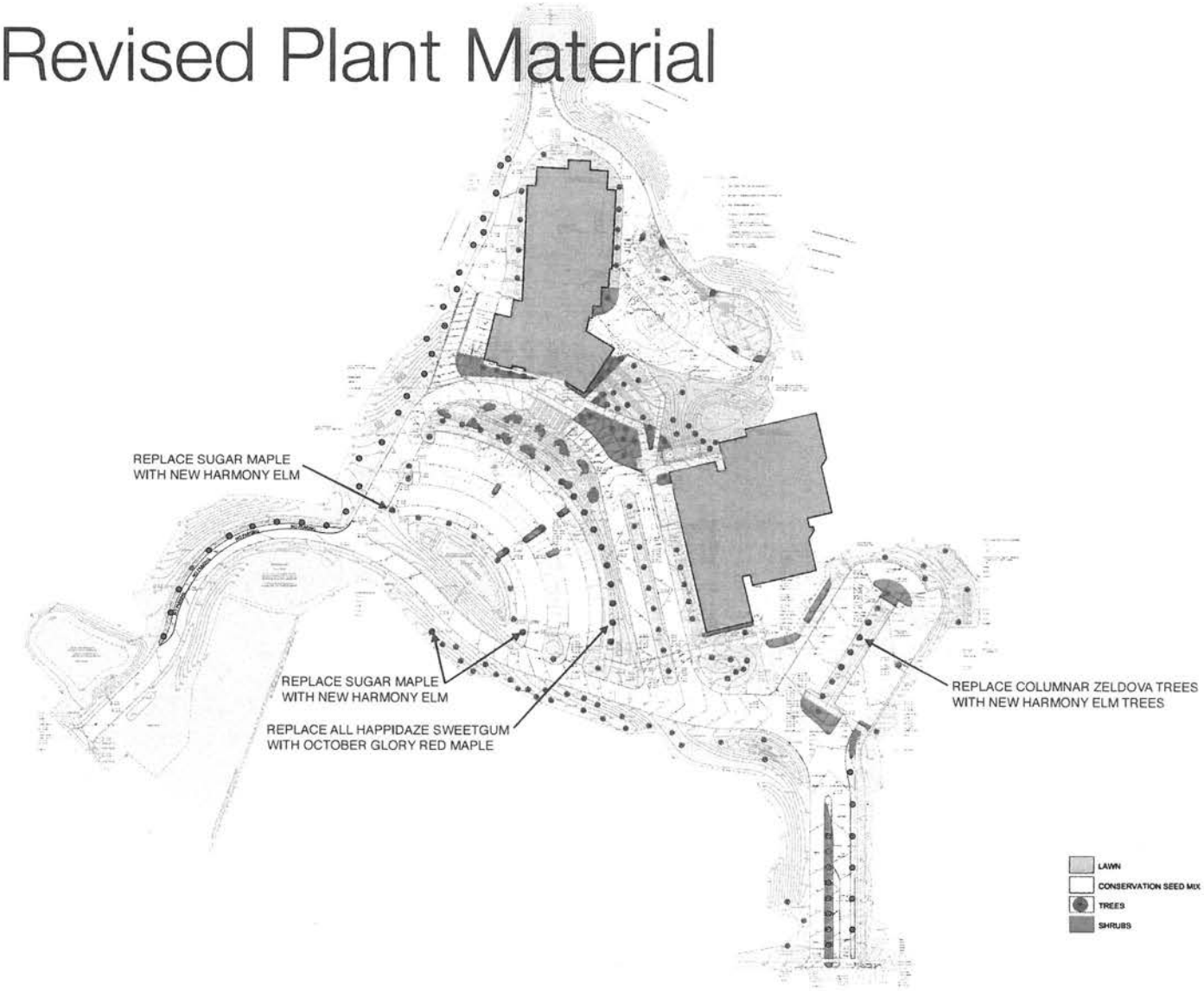
Exhibit #1:
Revised Plant Material as presented to the Board on 01/25/2021

Exhibit #2:
Eastern Driveway – Revised Design, as presented to the Board on 01/25/2021

Exhibit #3:
Western Driveway – Revised Design, as presented to the Board on 01/25/2021

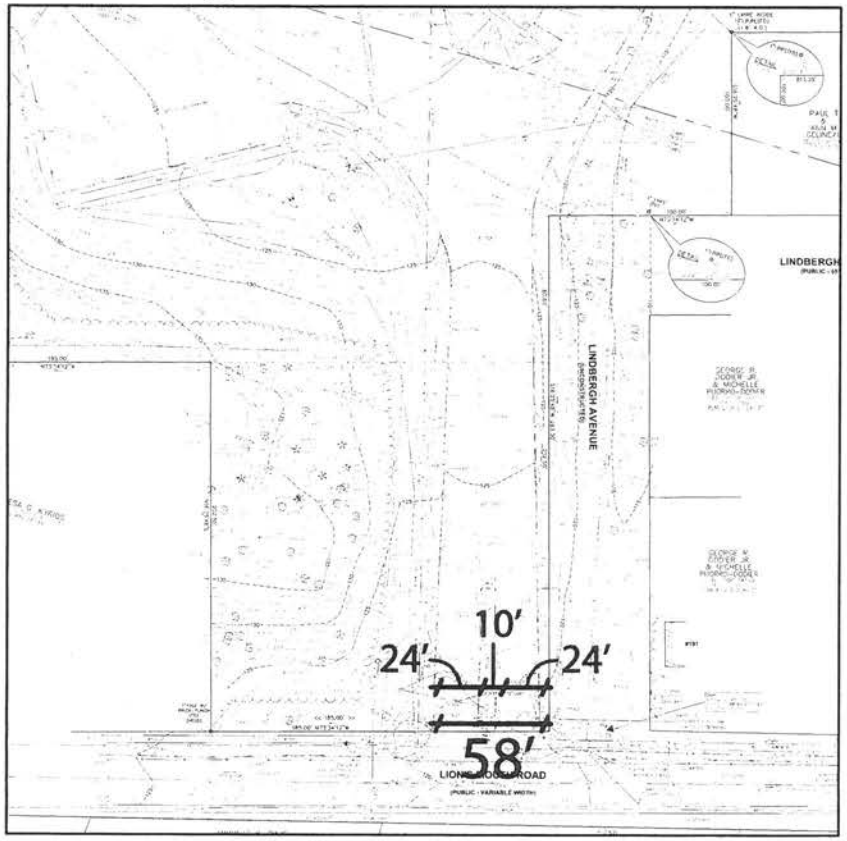
Exhibit #4:
Highland Street & Friend Street Concept Plan #8 & #9, Complete Streets Prioritization Plan

Planting | Revised Plant Material

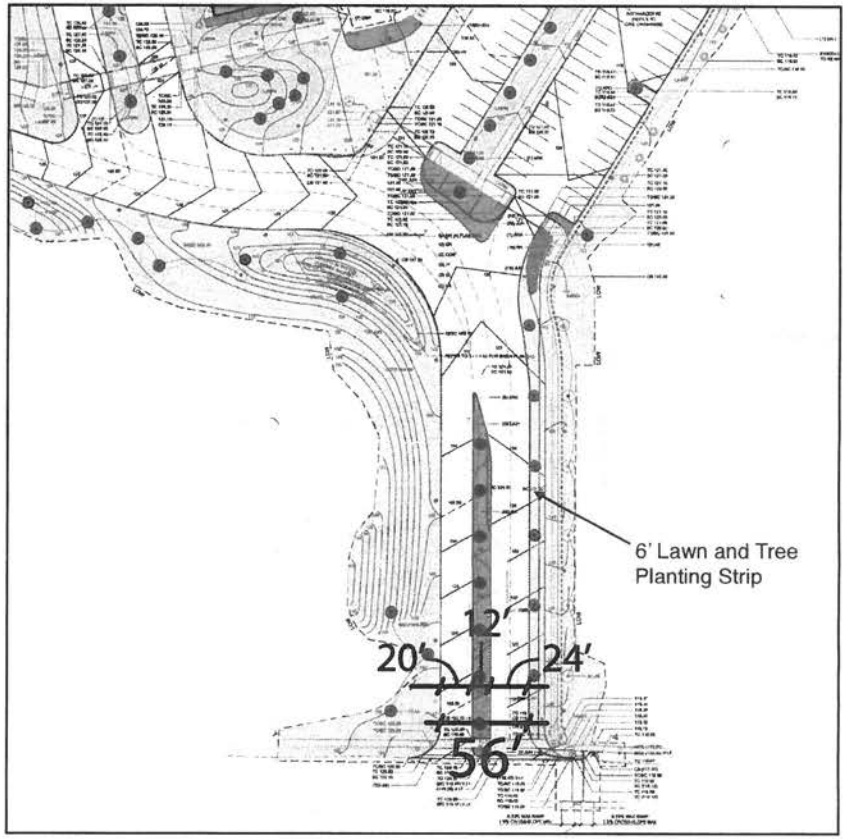


Eastern Driveway | Revised Design

Existing:

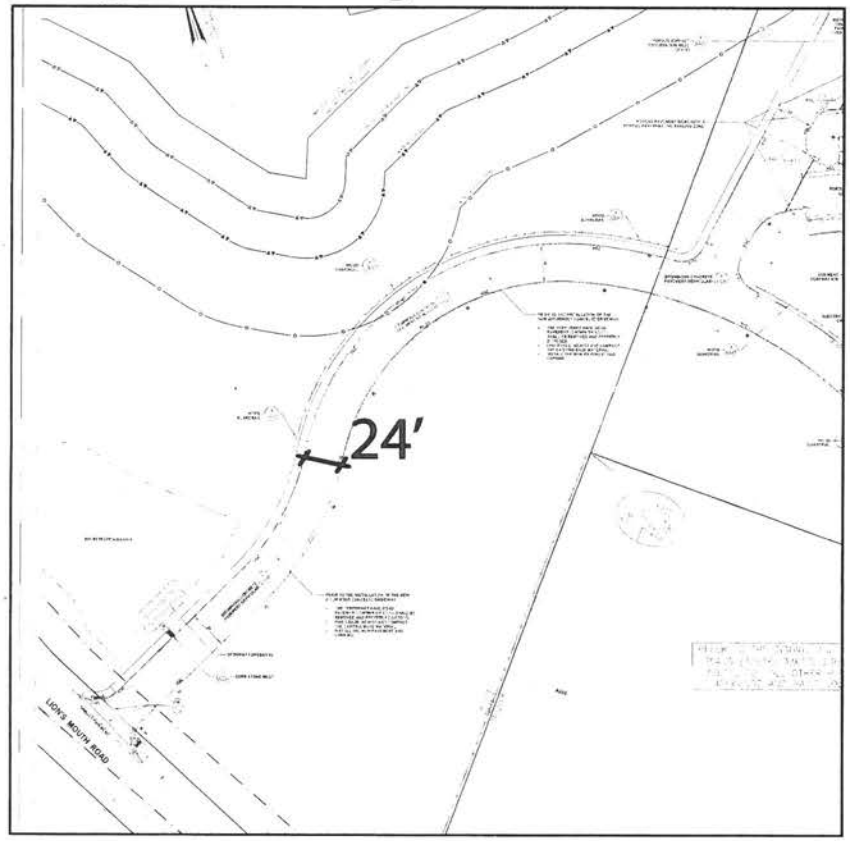


Proposed (Revised):

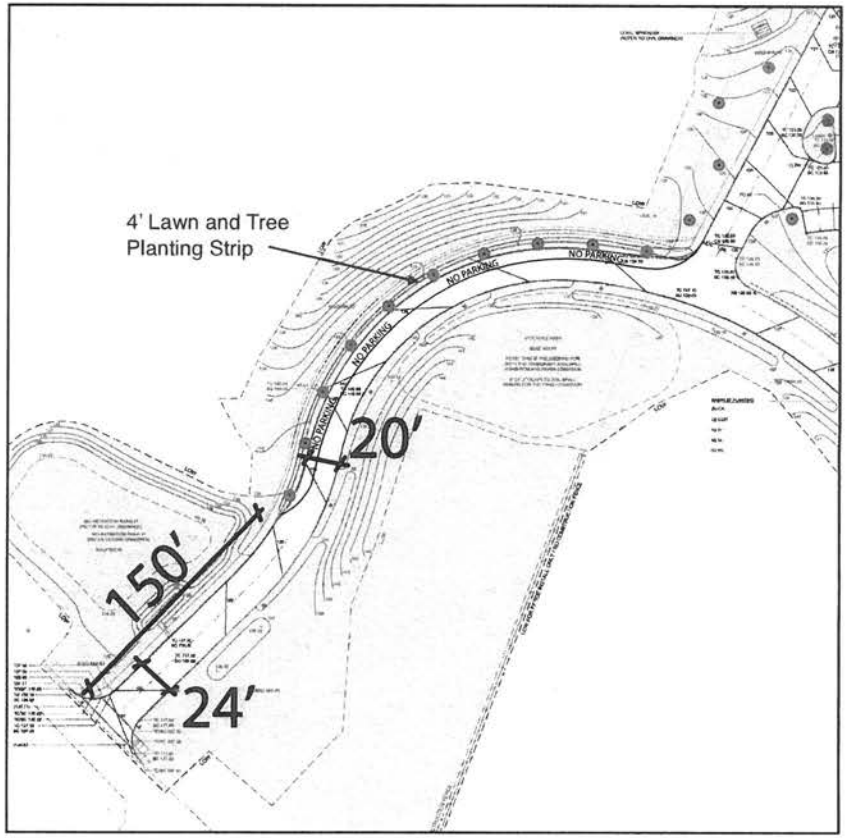


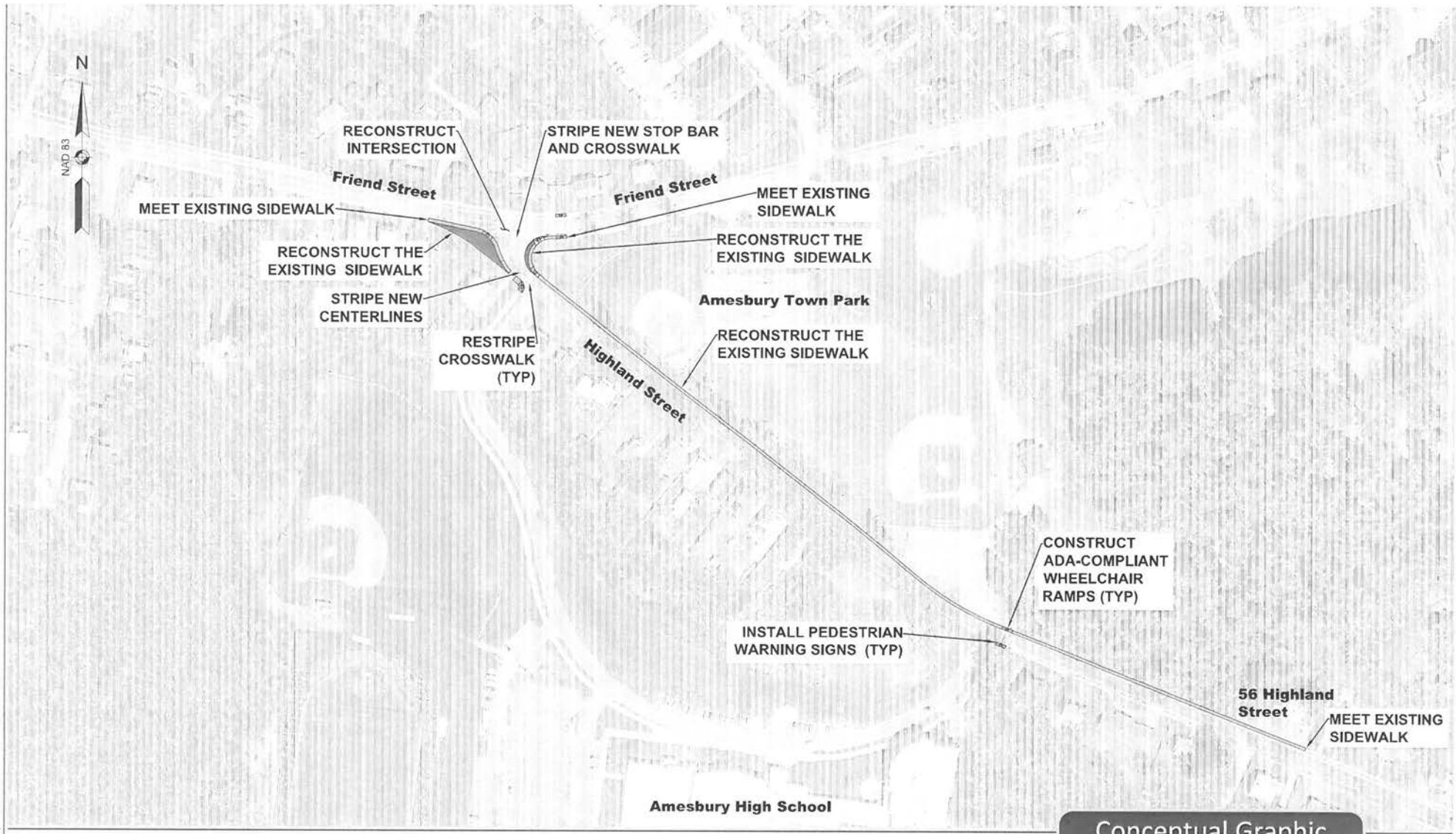
Western Driveway | Revised Design

Original Design:



Revised:





Conceptual Graphic

TEC
The Engineering Corp

TEC, Inc.
146 Dascomb Road | 169 Ocean Blvd
Andover, MA 01810 | Hampton, NH 03842

Scale: 1" = 150'

April 29, 2019

Legend

= Concrete Sidewalk
= ADA Wheelchair Ramp
= ADA Detectable Panel
= Landscaped Area

Highland Street & Friend Street Concept Plan #8 & #9
Complete Streets Prioritization Plan
Amesbury, Massachusetts

TO:
City of Amesbury
62 Friend Street
Amesbury, MA 01913

RECEIVED
FEB 17 REC'D 21
BY: City Clerk

PLANNING BOARD VOTE:

On February 8, 2021, the Amesbury Planning Board voted in favor of the approval of the Site Plan, as amended, for the proposed Amesbury Elementary School and associated site improvements at 193 Lions Mouth Road in Amesbury MA subject to the findings, waivers and conditions noted in this Decision.

Filed with the City Clerk on February 17, 2021

City Clerk

SECTION 014339

EXTERIOR MOCK-UPS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SUMMARY

A. RELATED SECTIONS AND DOCUMENTS:

This section applies to all specification sections and work of the Contract. See specifically:

1. 019113 General Commissioning
2. 033000 Cast-In-Place Concrete
3. 040001 Masonry
4. 050001 Miscellaneous and Ornamental Iron
5. 053100 Steel Decking
6. 061000 Rough Carpentry
7. 070001 Waterproofing, Dampproofing and Caulking
8. 070002 Roofing and Flashing
9. 071326 Air and Vapor Barriers
10. 072100 Insulation
11. 074213 Preformed Cladding
12. 074233 Phenolic Rainscreen System
13. 074247 Fiber Reinforced Cementitious Panel Rainscreen
14. 080001 Metal Windows
15. 092116 Gypsum Wallboard
16. Contract Drawings
17. Mock-up drawings are included in the Construction Documents.

B. After award of all subcontracts for separate components and materials of the exterior wall systems, and on basis of preliminary approval of materials and variations to proposed design of exterior wall systems, construct full-scale, fully enclosed performance mock-ups for review of construction and verification of assembly performance by means of full chamber field testing. Mock-ups shall be constructed by the same contractors and tradesmen that are awarded the various trades / work. Where requested by Architect, or as specified in individual specification sections, assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals, and finishes. Remove mock-up assemblies prior to date of Final Inspection, or as directed.

C. Mock-ups, when approved by the Architect/Engineer, will be used as datum for comparison with the remainder of the Work for the purposes of acceptance or rejection.

D. Demolish and remove from site prior to requesting inspection for certification of Substantial Completion, all Mock-ups which are not permitted to remain as part of the finished work. Coordination demolition schedule with Owner and Architect.

E. Mock-up construction shall show details and assemblies as described by the Architect. The case where no directions have been issued by the Architect, mock-up shall be 10 ft. tall and 30 ft. wide and include at least the following elements:

1. Typical exterior opaque wall, assemblies, including grade, fenestration, eave, and roof to eave conditions.
2. It shall include (1) outside and (1) inside corner.
3. It shall include each exterior cladding material including critical junctions with other cladding materials.
4. All glazing types. Each type to be detailed in the same fashion as to be on the building.
5. Representative louvers installed and detailed as to be on the building.
6. Representative corner conditions for both opaque and glazed conditions.
7. Expansion joints. Show in all conditions, including roof.
8. A 12 in. wide portion of roof including metal deck, vapor barrier, insulation and roofing.

NOTE: Performance mock-up testing to occur with exposed performance layers to help determine source of any observed leaks and deficiencies. **Mock-up shall not be clad in exterior finishes until performance tests have been passed and performance aspect of mock-up has been approved by Architect and BECx.**

All details and assemblies are to be flashed and weeps as detailed in final construction. Assemblies to be constructed such that a testing chamber can be constructed and fully sealed to the back of the mock-up, allowing testing operations to pressurize and depressurize the chamber and so allow field testing to achieve pressure differentials. Refer to exterior testing protocols described elsewhere. Wall and window flashings, colored mortar, and control/ expansion joint sealants shall be included.

F. Mock-up size and configuration as shown on the mock-up drawings included in the Construction Documents. See Section 01 33 00 SUBMITTAL for additional requirements.

G. Mock-ups shall be complete in all respects and shall represent the final complete wall assembly, including metal components, precast concrete elements, glazing, sealants and metal finishes.

H. Construct mock-ups in location and orientation at Project site approved by Architect.

I. Do not place orders for wall components or materials, and do no fabrication until mock-ups are approved.

J. Where review of mock-ups may require revisions of construction, Architect will provide such revisions in writing to the Contractor.

K. Mock-ups shall remain in place until work on Project is complete, unless otherwise directed by the Architect.

L. Design and provide structural framework assemblies necessary to support and display mock-ups.

1.03 MOCK-UP INTENT

A. Obtain Owner's and Architect's approval of appearance and tested performance **prior** to large scale ordering and production.

1. To be acceptable, work on building must match detailing and acceptable performance of approved Mock-Ups.
2. To be acceptable, work must pass reference standards for tested performance on both Mock-up and field conditions.

B. Confirm construction sequence, details, compatibility, means, methods, and techniques. Work must be representative of field conditions and performed by representative agents who will be performing work in field.

1.04 MOCK-UP GENERAL REQUIREMENTS

A. Schedule Construct Mock-Ups at the earliest possible time and **before** ordering production quantities of materials. Note: should exterior work progress on building prior to full acceptance of mock-up, work shall be at contractor's risk and will be subject for revision to achieve conforming results. **Same includes full removal of installed assemblies if determined to be necessary.**

B. Materials: Provide actual materials to be used in the Project including actual finishes and colors.

1. Do not provide visual simulations, unless preapproved by Architect.

C. Utilities, Service Fixtures, Controls:

1. Include all visible components in Mock-Up. Items are not required to be operational.

D. Locations: Locate Mock-Ups where pre-approved by Owner and Architect.

1. Solar Orientation of Exterior Mock-Ups: Comply with Architect's directions.

E. Mock-Up Construction Drawings: GC/CM to engineer and provide Mock-Up construction drawings, unless otherwise specified.

F. Protect: Protect approved Mock-Ups from damage and modification until directed by Architect.

G. Disposal: Demolish, remove, and dispose of Mock-Ups when directed by Architect.

1.05 EXTERIOR CONSTRUCTION CONFIRMATION MOCK-UPS

Use "Exterior Appearance Mock-Ups" for additional purpose of confirming construction sequence, details, compatibility, means, methods, and techniques.

A. Scope: Construct on-site in designated location a "Performance Mock-up" conforming to the drawings, descriptions, and/or depictions provided by the Architect. This Mock-up will be subject to inspection by the BECx and performance testing, defined elsewhere in Specifications, by the Owner's Testing Agent.

1. Confirm the designated location on site conforms to requirements for utilities including electric power and water at Specified current values and pressures.

2. Confirm the designated location with the constructed Mock-up meets the BECx and BETA requirements for inspection and testing access, Specified or described elsewhere.
3. Construct the Mock-up in accordance with the Contract Documents.
4. Construct and seal the Testing Chamber in accordance BETA's Specifications and requirements.

B. Components:

Include the following additional components in the Mock-Ups:

1. All concealed construction for each exterior wall assembly.
2. Supports, framings, connections, ties, and anchors for each exterior skin material.
3. Concealed flashings, air barriers, liquid water barriers, damp-proofing, waterproofing.
4. Concealed joint sealants.
5. All other exterior wall construction and components not visible.
6. Interface and intersection of all wall components and materials.
7. Components and features as described by Architect. These are to include:
    a. Simulated Subgrade foundation to above grade wall transition.
    b. Windows with opaque wall assemblies and representative transitions.
    c. Representative curtainwall and store front conditions, including head, jamb, and sill conditions. If curtainwall to roof transition occurs on building, it shall be included in Mock-up as well.
    d. Wall to roof / parapet transition including a portion of full roof assembly.
    e. Each unique cladding type and support system.

C. Coordination and Sequence

1. Coordinate inspection and testing activities with the sequence of Mock-up Construction. The following is an example. Confirm sequence requirements with Architect, BECA, and BETA:
    a. Structure; glazing units; sheathing; air and vapor barriers / membranes; damp-proofing / waterproofing; and base layer roofing as well as the testing chamber are constructed to a point of completion.

b. These assemblies are inspected for quality, constructability, and conformance with the design intent and tested for properties including adhesion, air and water tightness. Note: specified testing values are to be achieved by performance layers of assembly without exterior cladding.

c. Insulation and finishes are applied.

d. The completed assembly is inspected and tested.

e. The completed Mock-up is left on site for the duration of the construction period, or as otherwise Specified, as a reference for the project standards moving forward.

PART 2 PRODUCTS

2.01 MATERIALS

A. Materials used in the initial mock-up construction shall comply as specified in the applicable sections for the work and as approved by submittal reviews.

B. Materials may be modified upon approval from the Architect, only to the extent required or mock-up approval by the Architect.

C. Modified materials shall comply with the specified requirements but may differ in appearance characteristics, such as color and texture.

D. Materials used in the construction of approved mock-up construction shall not be re-used in the corresponding permanent construction.

PART 3 EXECUTION

3.01 GENERAL

A. Refer to mock-up drawings included in the Construction Drawings.

END OF SECTION

SECTION 015000

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

C. The General Contractor shall be responsible for providing and maintaining all temporary facilities until Substantial Completion. Removal of such prior to Substantial Completion must be with the concurrence of the Architect. The General Contractor bears full responsibility for re-providing any facility removed prior to Substantial Completion if required for the Work.

D. Removal of all temporary facilities shall be condition precedent to Substantial Completion unless directed otherwise by the Architect or specifically noted in the Specifications.

E. Conform with all requirements of LEEDv4-S with respect to Construction Activity Pollution Preventions and Construction Waste Management.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Carefully examine all of the Contract Documents for requirements that may affect the Work of this Section.

B. Nothing in this Section is intended to limit types and amounts of temporary Work required, and no omission from this Section will be recognized as an indication by the Architect that such temporary activity is not required for successful completion of the Work or compliance with requirements of the Contract Documents.

1.03 REQUIREMENTS OF REGULATORY AGENCIES

A. Provide and maintain all temporary facilities in compliance with governing rules, regulations, codes, ordinances and laws of agencies and utility companies having jurisdiction over Work involved in the project.

B. Be responsible for all temporary Work provided, and obtain any necessary permits and inspections for such Work.

C. Do not interfere with normal use of streets in vicinity of project site except as absolutely necessary to execute required Work, and then only after proper arrangement has been made with applicable authorities, including traffic control.

D. Refer to the General Conditions of the Contract for additional requirements.

1.04 TEMPORARY WATER

A. The General Contractor shall provide and maintain at his own expense an adequate supply of water for his own use and the use of all Subcontractors during construction. The General Contractor shall make all necessary arrangements with the City's Water Department and pay for any sub-metering that may be required for determining General Contractor's usage.

B. Water shall be distributed by temporary hoses or pipelines as required for all construction uses and fire protection.

C. When the permanent water distribution system has been installed, it may be used as a source of water for construction purposes, provided that the General Contractor (1) assumes full responsibility for the entire water distribution system; and (2) pays all costs for operation, maintenance and restoration of the system.

D. Any temporary pipe lines and connections from the permanent service line, either outside or within the building, necessary for the use of the General Contractor and his subcontractors shall be installed, protected and maintained at the expense of the General Contractor.

E. General Contractor shall provide an adequate supply of cool drinking water, from approved sources of acceptable quality, satisfactorily cooled, for his employees and those of his subcontractors. Individual drinking cups shall be provided for all personnel on the job.

F. At the completion of this Contract, or when use of the permanent system for construction purposes is approved by the Owner, the General Contractor shall remove all of the temporary water distribution system.

G. Use of the permanent plumbing system for construction purposes is subject to the limitations noted in SECTION 220001-PLUMBING. In no case does it constitute acceptance by the Owner or the start of the Guarantee period.

1.05 WEATHER PROTECTION

A. It is the intent of these specifications to require the General Contractor to provide temporary enclosures and heat to permit construction work to be carried on during the months of November through March in compliance with MGL 149, Section 44G (D). These specifications are not to be construed as requiring enclosures or heat for operations that are economically unfeasible to protect in the judgment of the Architect. Included in this category, without limitation, are such items as Site Work, Excavation, Pile Driving, Steel Erection, Erection of certain exterior wall panels, Roofing and similar operations.

B. "Weather Protection" shall mean the temporary protection of that work adversely affected by moisture, wind and cold, by covering, enclosing and/or heating. This protection shall provide adequate working areas during the months of November through March as determined by the Architect and consistent with the approved construction schedule to permit the continuous progress of all work necessary to maintain an orderly and efficient sequence of construction operations. The General Contractor shall furnish and install all "weather protection" material and be responsible for all costs required to maintain a minimum temperature of 40 degrees F. at the working surface. This provision does not supersede any specific requirements for methods of construction, curing of materials or the applicable general conditions set forth in the Contract Articles with added regard to performance obligations of the General Contractor.

C. Within 30 calendar days after his award contract, the General Contractor shall submit in writing to the Architect for approval three (3) copies of his proposed methods for "Weather Protection."

D. Installation of weather protection and heating devices shall comply with all safety regulations including provisions for adequate ventilation and fire protection devices. Heating devices which may cause damage to finish surface shall not be used.

E. Responsibility for Weather Protection

1. The entire responsibility for weather protection during construction until Substantial Completion, shall be assumed by the General Contractor, who shall be liable for any damage to any work caused by his failure to supply proper weather protection and proper ventilation as required.

2. Any work damaged by frost shall be removed and replaced by the General Contractor at his own expense and as directed by the Architect.

3. It is to be specifically understood that the General Contractor shall do no work at any time or under any conditions which he deems unsuited to the perfect execution of the Work. This provision shall not be interpreted as constituting any waiver, release or lessening of the General Contractor's obligation to bring the Work to Substantial Completion within the period of time set forth in the Agreement.

F. Refer to the General Conditions of the Contract for additional information.

1.06 HEATING DURING CONSTRUCTION

A. Within thirty (30) calendar days after the commencement of work under this contract, the General Contractor shall submit in writing to the Architect for approval, three copies of this method and time schedule for heating during construction which shall occur with this general program schedule.

B. Provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. ***Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.***

2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

3. Comply with applicable safety regulations, including provisions for adequate ventilation and fire protection, when installing and operating heating devices. Do not use heating devices which may cause damage to finish surfaces.

C. After the building or portion thereof is completely enclosed by either permanent construction of substantial temporary materials having comparable resistance as the specified permanent construction, the General Contractor shall provide heat therein of not less that 55 degrees F. nor more than 75 degrees F. which shall be continuously maintained in the so enclosed area until the project is accepted.

D. Permanent Heating System: The General Contractor, may, with the approval of the Architect and Owner elect to use the permanent heating system as specified for the project once it has been tested, flushed out and chemically treated and is ready to operate. The General Contractor and the Heating and/or Electrical Subcontractor shall coordinate their work so that the permanent heating system for the building will be available and ready to provide heat as soon as the building is closed in. Use of the permanent heating system and portions thereof is subject to provisions specified elsewhere in this document and the following:

1. The General Contractor shall pay the costs of all fuel and electricity required for temporary heating until Substantial completion. Where the permanent system serves both Owner and General Contractor controlled areas, costs shall be proportional as specified above.

2. The General Contractor shall furnish and pay the costs of any materials and equipment which are not part of the permanent heating system and which may be required to operate the permanent heating system on a temporary basis.

3. The Heating Subcontractor shall provide all labor required for the final restoration of the permanent heating system if used for temporary heating purposes.

4. The General Contractor shall reimburse the Heating Subcontractor to operate any portion of the permanent heating system used for temporary heating until Substantial Completion.

5. The General Contractor shall reimburse the HVAC Subcontractor for the final cleaning and for any repairs or replacements necessary to restore the permanent heating system to perfect condition at the time of Substantial Completion.

6. No parts of the air handling system shall be used until temporary filters have been installed satisfactory to the Architect. Such filter shall be kept clean and in efficient working condition, and at the time of Substantial Completion shall be replaced by the permanent filters.

7. Guarantees to the Owner for the permanent heating system begin from the time of Substantial Completion of the project, not the time that temporary use of the system begins.

E. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity and to prevent accumulation of excess moisture in building. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

1. Refer to Article "Moisture and Mold Control" in this Section for additional requirements.

2. Maintain humidity in the enclosed structure, including the existing portion of the building which remains, within limits which to prevent warping, mold growth, and damage building materials.

    a. If construction becomes damp or warped; if visible water is condensing on surfaces; or if mold growth is observed, humidity is too high. The General Contractor shall immediately effect dehumidification as necessary to reduce the humidity to acceptable levels. Replace affected materials.

3. Use permanent HVAC system to control humidity. Provide additional temporary heating and cooling systems if required to maintain acceptable ambient conditions, and to allow construction materials to dry sufficiently for subsequent Work.

   a. Provide separate temporary dehumidification systems to reduce substrate moisture levels to levels below 70% humidity levels required to allow installation or application of finishes including installation of drywall.

4. Provide ventilation required by construction activities in enclosed areas, for safely mixing, placing, curing and drying, and to vent volatile and hazardous materials.

F. Provide labor for continuous direct attendance of temporary heating and ventilating systems 24 hours per day throughout the progress of the work, for frequent inspection of the system, for emergency repairs, and for recording temperatures.

G. Operating labor shall be provided, including frequent inspection of the system, emergency repairs and keeping temperature records. The General Contractor shall pay all energy and operating costs for heating during construction. "Salamanders" shall not be used.

H. Refer to the General Conditions of the Contract for additional information.

1.07 TEMPORARY LIGHT AND POWER

A. The Electrical Subcontractor shall, at his own expense, make all arrangements for and provide all temporary light and power, except as otherwise specified. The temporary electrical service shall include but not be limited to all labor, materials, and equipment necessary to supply temporary power of adequate capacity for the project operations and testing. Transformers and meters, when required by the power company, will be furnished and installed by the appropriate power company and the Electrical Subcontractor shall pay all costs therefore. No connection shall be made to the Owner's power supply.

B. All temporary electrical work shall be performed under the direct supervision of at least one master electrician, who will be present on the project at all times when such work is being performed.

C. Temporary lighting and power shall be not less than the following:

1. Lighting - 200 watts per 100 square feet of floor area, plus 60 watts for each stair landing.

2. Receptacles - At least one 20 ampere duplex for each 1,000 square feet of floor space, and such others as will accommodate extension cords not greater than 50 feet in length to reach all work.

3. Fused switches for special construction equipment - On each floor of each building, at least one 30 ampere, 2 pole fused switch for equipment connection. Cables, and connection from switch to the special equipment, shall be provided, maintained and paid for by the trade requiring same.

4. Feeders - On each floor of each building, a feeder or feeders of sufficient capacity for the requirements of each entire floor.

D. The General Contractor shall pay the cost of electrical energy consumed by all trades until Substantial Completion for each phase is attained.

E. The Electrical Subcontractor, at his own expense, shall maintain all lamps in operating condition. Each Subcontractor shall furnish their own extension cords and all additional lamps as may be required for their work. Temporary work of a special nature, not otherwise specified thereunder, shall be provided, maintained and paid for by the trade requiring the same.

F. All lamps installed in permanent lighting fixtures and used as temporary lights during the construction period shall be removed and replaced shortly before Substantial Completion by the set of lamps required to be provided under SECTION 260001-ELECTRICAL.

G. All temporary work shall be provided in conformity with the National Electrical Code and in accordance with State laws, and requirements of the applicable power company. Particular attention is called to the Commonwealth of Massachusetts "Rules and Regulations for the Prevention of Accidents in Construction Operations", Industrial Bulletin No. 12 of Department of Labor and Industry. Division of Industrial Safety with specific reference to Section 4, Item 4.26 and Section 7 in its entirety.

H. The Electrical Subcontractor shall dismantle and completely remove from the project site all temporary electrical facilities only when the permanent electrical system has been installed and is in operation.

1.08 HOISTING EQUIPMENT AND MACHINERY

A. All hoisting equipment and machinery required for the proper and expeditious prosecution and progress of the work shall be provided by the trade requiring same.

1.09 TEMPORARY ENCLOSURES

A. The General Contractor shall provide approved temporary enclosures for all exterior openings, as soon as the building is enclosed and other wise made weathertight, or whenever necessary in order to provide suitable working conditions within the building. For this purpose, the permanent window enclosures may be utilized, except that a least one-quarter (1/4) of each window area in each space shall be provided with temporary non-flammable cloth screen to permit the exit of water vapor from the building at all times, or shall be otherwise equipped to effect the same result. The permanent door enclosures shall not be used as temporary enclosures, but temporary batten doors with proper hardware to make them self-closing shall be provided, complete with a locking device.

1.10 STAGING

A. Each subcontractor is responsible for providing, maintaining in safe condition, and removing all scaffolds, staging and planking as required for the proper execution of their Work.

B. The General Contractor shall furnish, install, maintain, and remove all temporary ramps, stairs, ladders and similar items as required for the use of all trades for proper execution of their Work.

C. Permanent stairs shall be erected as soon as possible, for which the General Contractor shall provide temporary protective treads, risers, handrails and shaft protection.

1.11 BARRIERS

A. Fences

1. The General Contractor shall be responsible for providing temporary fencing or barricades around the site and as otherwise may be necessary, to assure the safety of all persons, authorized or unauthorized. Such protective measures shall be located and constructed as required by local, state and federal ordinances, laws or regulations. Any such fencing or barricade shall be maintained in an orderly condition. Existing fencing may be utilized by the General Contractor as a portion of the construction fencing, if it meets or is modified to meet all the requirements listed below for construction fencing.

2. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day. Provide secure areas for storage of materials and equipment.

3. Unless otherwise specified, all construction fencing, both driven post and movable, shall be 6 feet high and of chain link construction with scrims for vision and dust control, erected in a substantial manner, straight, plumb and true as approved by the Architect. Refer to the Drawings for locations where fence posts are to be driven and where fencing is to be movable.

    a. Provide driven post fencing as indicated on the Drawings. Posts shall be driven into the ground if not damaging to final pavement, other site fixtures or site amenities.

    b. Provide movable fencing as indicated on the Drawings. Panels shall be secured together and to adjacent post-driven sections with fence wire or metal strapping to create an effective barrier.

4. Gates shall be built into fence at such approved locations as are necessary, well cross-braced and hung on heavy strap hinges with proper post and hook for double gates. Provide heavy hasps and padlocks for each gate. Provide keys to Owner, Architect and OPM, and to Police and Fire Departments to facilitate emergency access. Provide Knox Box at each gate. Place copies of keys in Knox Box.

5. Temporary fencing shall be installed and re-positioned in with each phase as shown on the Phasing Drawings. Upon completion of the entire project the remaining temporary fencing shall be removed as directed by the Architect. Restore the site to acceptable condition after removing fencing.

6. Refer to phasing drawings for fence location.

B. Tree and Plant Protection

1. Existing trees and shrubs which are to remain shall at all times be carefully preserved and protected against any possible injury during the process of the work.

2. The trunk and exposed roots of trees within the area of operations shall be thoroughly protected with suitable temporary guards and barriers and the branches shall not be injured by the operation of power equipment or other material devices.

3. Refer to SECTION 311320-EXISTING PLANTS TO REMAIN for additional requirements.

C. Guard Rails

1. Furnish and maintain all necessary guard rails, barriers and the like as required for safety of personnel in the building, on the site, and public.

2. All such safety barriers shall be removed upon completion of this contract. Should the work be suspended, such safety barriers shall remain in place, and become the property of the Owner.

D. Siltation Control Barriers

1. Prior to the commencement of any site work, temporary siltation control barriers shall be installed as shown on the Drawings, and specified under SECTION 311000-SITE PREPARATION and SECTION 312000-EARTHWORK.

2. Siltation control barriers must be maintained until final acceptance of sitework, at which time they shall be removed at the General Contractor's expense.

1.12 DUST CONTROL

A. Provide and maintain throughout the conduct of the Work of this Contract, the following measures necessary, as a minimum, to control and reduce emission of airborne dust, and prevent contamination of exterior surfaces at adjacent public and private properties, or otherwise creating a nuisance to the Owner or adjacent properties.

1. Sufficiently wet construction materials with a fine spray or spinkling of water during removal, cutting or other handling to reduce the emission of airborne dust.

2. Street sweeping the project site entry to maintain all areas clean and free of dirt, mud, and debris at all times.

3. The above minimum measures notwithstanding, it shall be the Construction Manager's responsibility to utilize whatever means and methods the Construction Manager deems necessary to prevent the emission of dust to comply with the above requirements. The Construction Manager shall identify the cost for dust control in a separate line item included in the Schedule of Values provided in accordance with the Contract Documents.

4. Over the course of site work activities, document implementation of dust-control measures through date-stamped photos, inspection logs or reports. See also Dust Monitoring in SECTION 312000-EARTHWORK.

B. In the case of work in or near the Cashman School, dust controls should effectively seal off existing areas that remain in use by the school during construction, to maintain a clean and healthy environment in accordance with all applicable codes and standards. All contractor-controlled areas shall be under negative pressure

1.13 ACCESS ROADS AND TRAFFIC REGULATIONS

A. Traffic and Hauling Plan: Submit a detailed hauling plan; indicate trucking routes, schedules, timing, and types of vehicles, to be received and accepted by the Town of Amesbury's municipal department. See SECTION 013100-PROJECT PROCEDURES for construction vehicle transportation routes.

B. Work in Public Ways:

1. Confine construction traffic to designated routes.

2. If it is necessary to temporarily close or obstruct traffic on a public or private street or way, obtain a permit from the local authorities in advance of such closing or obstruction; comply with local ordinances regulating such permits.

3. Whenever work is occurring in a public street or way, comply with requirements of local police department. See SECTION 011000-SUMMARY OF WORK, Article 1.23 POLICE DETAILS.

C. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.

2. Maintain access for fire-fighting equipment.

D. Traffic Signs: Provide, operate and maintain temporary signs and personnel, as required to direct and maintain an orderly flow of traffic in areas affected by General Contractor's operations, including but not limited to, haul routes, site entrances, and on-site parking areas.

1. Traffic Control Signs: Provide post signs with breakaway post assemblies conforming to applicable provisions of the Massachusetts Department of Transportation "Standard Specifications."

2. Sign Sizes / Text: Include the Contract Price a quantity of five (5) metal signs and metal posts, average size of 600 square inches with a minimum of 20 characters per sign. Where appropriate, signs may be mounted on construction fencing. Specific signage requirements will be reviewed at the Pre-Construction Meeting.

E. Parking: Provide temporary parking areas on site for construction personnel. If additional space is required, the General Contractor shall submit parking plan to City and Architect for review and approval. Parking in front of adjacent residential properties and on residential side streets is not permitted under any circumstances.

1. Designate 6 reserved parking spaces for use by the Owner's personnel and Architect. Trucks shall not queue on public streets.

1.14 SPECIAL CONTROLS

A. Water controls, such as temporary swales or sumps, should effectively protect areas during construction until such time as the permanent storm water drainage system is completed and operational. Refer to the Contract Drawings for additional information regarding storm water control.

B. By state law, smoking is not allowed on school property including those areas under construction. The General Contractor shall submit a smoking control plan for approval before the first requisition. The plan must demonstrate the enforcement activities to be taken to ensure there is no smoking on the project site.

C. Loud and/or abusive language and inappropriate contact with students and staff shall not be tolerated and shall be cause for a worker's dismissal.

D. Public streets and roadways shall be kept clean of dirt tracked by construction vehicles entering and leaving the site in accordance with the Owner/Contractor Agreement.

1.15 TRAFFIC REGULATIONS

A. The General Contractor parking and staging areas are limited to on-site areas. On-street parking shall not be allowed. Trucks shall not queue on public streets

B. Refer to SECTION 013100-PROJECT PROCEDURES for other requirements.

1.16 ROOF PROTECTION

A. During the construction period after the installation of the roofing system as specified under Roofing and Flashing, the General Contractor shall take strict precautions against unnecessary traffic on the roof surface.

B. After the satisfactory completion of all roofing and flashing work, the General Contractor shall be responsible for damages to the roof caused by work or materials of the other trades.

1.17 DISPOSAL OF DEBRIS

A. Debris shall not be permitted to accumulate and the work shall at all times be kept satisfactorily clean.

B. Remove debris from site in accordance with the time specified in SECTION 311000-SITE PREPARATION.

C. The General Contractor shall require each of his Subcontractors engaged upon the work to bear his full responsibility for cleaning up during and immediately upon completion of his work, and shall remove all rubbish, waste, tools, equipment, and appurtenances caused by and used in execution of his work; but this shall in no way be construed to relieve the General Contractor of his primary responsibility for maintaining the building and site clean and free of debris, leaving all work in a clean and proper condition satisfactory to the Architect and/or Owner. **The General Contractor shall be responsible for and pay all costs related to furnishing the required construction dumpsters at the site and legal disposal of all construction debris**.

D. The General Contractor shall provide at least one tightly built chute, serving each floor, which shall lead down to angle offset and a gate at a convenient loading point for trucks or wagons.

E. At no time shall any rubbish be thrown from the windows of the building.

F. Immediately after unpacking, all packing materials, case lumber, excelsior, wrapping, or other rubbish, flammable or otherwise, shall be collected and removed from the building and premises.

G. Coordinate all disposal of debris according to requirements of SECTION 017419-CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

1.18 TEMPORARY OFFICES

A. Provide and maintain field office on site throughout construction period. The type and placement of temporary office facilities will require Owner approval.

1. General Contractor's Office – A General Contractor's field office at which the General Contractor's authorized representatives shall be present at all times while work is in progress. Instructions, notices and other communications delivered there by the Architect or the Owner or the Owner's Project Manager shall be deemed delivered to the General Contractor. The General Contractor's trailer (or trailers) shall be a sized to accommodate meetings with a conference table and chairs sufficient to accommodate 12 persons at one time unless otherwise mutually agreed upon.

2. Owner's Project Manager's Office Trailer – Trailer shall be in close proximity to the General Contractor's field office, shall be at least 10 feet x 44 feet dimensionally, and shall be equipped with two offices, electric lights, heat, air conditioning, window screens, secure locking devices, and a toilet room with a working chemical toilet. Such office shall be equipped with at least the following new furniture and equipment: two lockable steel desks (or agreeable field constructed equivalent), two quality office chairs (fully adjustable with rolling and swivel capability), one adjustable stool, two metal plan racks, 36 inch x 96 inch sloped plan table, 72 inch x 30 inch folding table and four folding chairs, one two-drawer, 36 inch x 20 inch x 29 inch high lockable lateral filing cabinet, 12 feet of 12 inch deep wall shelving, first aid kit, electric water cooler with 5-gallon refill jugs as required, under-counter refrigerator, small microwave, Keurig coffee maker similar to K-1500 supplied with K-cup type coffee, six visitor hard hats and yellow safety vests. All Office Trailer furniture shall become the property of the Owner at the conclusion of the Work.

3. The General Contractor shall also provide the Owner's office with the following:

   a. 4 data lines

   b. Internet access for email service and a hub for multi-use.

   c. Networked plain paper color printer/copier with scan to computer capability (similar to Epson WorkForce Pro WF-7840 wireless, wide-format all-in-one printer) and all necessary replacement cartridges.

   d. Two 19.5-inch HD monitors (similar to Acer AOPEN 19.5-inch wide screen TN LED LCD), keyboard, mouse and laptop docking station.

   e. Miscellaneous tackboards, whiteboards and other typical office supplies (pens, staplers, folders, copy paper, and the like)

4. Temporary Electrical Service: Wiring, outlets and fixtures suitable to light desks and tables and to provide power to heater and air conditioning system. Electrical subcontractor shall provide temporary power hook-up and wiring, and removal of the same when no longer needed. General Contractor shall pay for electric energy consumed.

1.19 TEMPORARY TOILETS

A. The General Contractor shall provide and service an adequate number of toilet booths with chemical type toilets and handwashing stations.

B. The toilets shall be erected in location approved by the Architect and shall be maintained by the General Contractor in a clean and orderly condition in compliance with all local and state health requirements including COVID-19.

C. When the permanent sanitary system is in operating condition, the General Contractor may use portions of the system as approved by the Architect, provided that the General Contractor (1) assumes full responsibility for the so used portions of the sanitary system, and (2) pays all costs for operation, maintenance, cleaning, and restoration of the used portions.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities. Comply with COVID-19 protocols.

1. Clean, restock supplies and maintain facilities on minimum weekly basis.
2. Provide temporary toilet with padlock for exclusive use of Owner's Project Manager unless provided in the Owner's Project Manager's office trailer.
3. Toilets: Use of Owner's existing toilet facilities is not permitted.

E. Refer to the General Conditions of the Contract for additional information.

1.20 TEMPORARY TELEPHONE

A. Telephone Service for General Contractor: Provide temporary telephone service for use by construction personnel.

1. Install minimum of one telephone line in General Contractor's field office with answering machine or voice mail service.
    a. At each telephone, post a list of important telephone numbers.
        1) Police and fire departments.
        2) Ambulance service.
        3) General Contractor's home office.
        4) General Contractor's emergency after-hours telephone number.
        5) Architect's office.
        6) Engineers' offices.
        7) Owner's office.
        8) Principal subcontractors' field and home offices.
2. Provide superintendent with cellular telephone for use when away from field office. Superintendent shall carry telephone or radio at all times while on site. Maintain service until Final Completion.

B. Telephone Service for Owner's Field Office:

1. Telephone, Land Line: Provide telephone system and service in Owner's field office. Include one outside line.

a. Provide and pay for unlimited local and long distance calling services.

b. Maintain system for duration of contract.

c. Provide voice mail to each line; equipped with remote message retrieval, separate incoming and outgoing messages, time and date message stamp, pager notification of messages and call monitoring.

2. Provide training and support as required for the telephone system for the duration of Project.

C. Owner's Data Service: Provide internet access in the Owner's field office.

1. Provide dedicated high-speed (100+ Mbps) internet service, or other service with equivalent speed. Provide equipment, installation and monthly service fees for internet access without limitation on data bandwidth or usage.

2. Network: Provide local area network to connect each computer, printer, copier, scanner and other equipment. Include wiring, wireless router and, if required, switches necessary to connect each piece of equipment.

1.21 PROTECTION OF PERSONS AND PROPERTY

A. The General Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work.

B. The General Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

1. All employees on the Work and all other persons who may be affected thereby.

2. All the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the General Contractor or any of his Subcontractors or Sub-subcontractors.

3. Any other property at the site or adjacent thereto, including (but not limited to) equipment, existing construction to remain, trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of the Work. Restore to original condition or replace any property on and/or off the site which may be damaged or destroyed in the execution of the Work.

C. The General Contractor and Subcontractors shall comply with (and the General Contractor shall give all notices regarding) all applicable laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the safety of persons or property of their protection from damage, injury or loss.

D. The General Contractor shall erect and maintain, as required by existing conditions and progress of Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying Owners and users of adjacent utilities.

E. When the use of storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the General Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

F. The General Contractor shall designate a responsible member of his organization at the site, whose duty shall be the prevention of accidents. This person shall be the General Contractor's superintendent unless otherwise designated by the General Contractor in writing to the Architect.

G. The General Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.

H. In any emergency affecting the safety of persons or property, the General Contractor shall act, at his discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the General Contractor on account of emergency work shall be determined as provided in the General Conditions for Change in Contract and Methods of Preparation of Changes.

I. Water protection: Always protect excavation, trenches, buildings from damage from rain water, spring water, ground water, backing-up of drains or sewers, and other waters. Provide pumps, equipment, enclosures as required to provide this protection. Construct, maintain temporary drainage; do pumping necessary to keep excavation water free.

J. Remove snow and ice as necessary for safety and proper execution of work. Remove same when work is completed.

K. Provide constant protection against the weather as required to maintain work, materials, apparatus, fixtures, free from injury or damage. If low temperatures make it impossible to continue operations, cease work, notify Architect.

L. Shore, brace, enclose and otherwise protect, as required, existing buildings from damage during course of work.

1.22 TEMPORARY PROTECTION

A. The General Contractor shall provide weathertight enclosures for all exterior openings in buildings whenever the weather is such as to require same for protection against frost or heat, for drying out of plaster, or for suitable working conditions within the building before permanent doors and windows are installed.

B. The General Contractor shall:

1. Protect excavations, trenches, building and materials at all times from rain water, ground water, backing-up or leakage of sewers, drains or other piping and from water damage of any origin: provide all pumps, piping, coverings, and other materials and equipment as required by job conditions. (Refer also to SECTION 312000-EARTHWORK).

2. In addition to the weather protection during the months of November through March specified thereunder, provide temporary weathertight enclosures for openings in exterior walls and in roof decks when and as required to protect the Work form damage by inclement weather. Temporary enclosures shall be provided with adequate means of ventilation to prevent accumulation of moisture in the building.

3. Provide temporary wood doors for exterior entrances and elsewhere as required. Permanent door enclosures shall not be used as temporary enclosures.

4. Protect sills, jams and heads of openings through which materials are handled.

5. Protect decks and slabs to receive Work by other trades from any soiling which will prevent proper adhesion of subsequent work. Decks and slabs shall be left clean and free of all blemishes at the time other Trades begin the application of their work.

C. Roof surfaces and waterproofed surfaces shall not be subjected to traffic nor shall they be used for storage of materials. Where some activity must take place in order to carry out the work, adequate protection shall be provided.

D. After the installation of work by any Subcontractor is properly completed, the General Contractor shall be responsible for its protection and for repairing, replacing or cleaning any such work which has been damaged by other Trades or by any other cause, so that all Work is in perfect condition at the time of Substantial Completion.

E. All temporary protection and coverings shall be removed by the General Contractor at the completion of the work.

1.23 FIRE PROTECTION AND PREVENTION

A. Applicable Standards: Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations."

B. Fire Extinguishers: Provide hand-carried, portable UL-rated type A fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated type ABC dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.

1. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

C. Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

1. Prohibit smoking in construction areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

D. Comply with recommendations regarding fire protection made by the representative of the fire insurance company carrying insurance on the Work and by local fire officials.

E. Fire Watch for Welding and Cutting Operations:

1. Whenever electric arc cutting and welding equipment or oxygen-fuel gas cutting and welding systems as described in 527 CMR 39.02 are in use on the site, comply with 527 CMR 39, including, but not limited to, the following:

    a. Before beginning the work, obtain permits for welding operations and for storage of fuel gases on the site from the local fire department as required by 527 CMR 39.04, 527 CMR 6.00 and 427 CMR 14.00.

    b. Maintain and pay for a fire department fire watch to be present on the site during performance of the work and for at least 60 minutes after the welding or cutting operations have been completed, to ensure that no fire exists.

    c. Maintain records of construction operations and fire watch activities as required by 527 CMR 39.04 (4). Record locations, dates, and times where welding or cutting operations were performed, the name of the assigned fire watch or watches, and the length of time for which the fire watch standby was continued after work was completed. Describe the work, fire protection provided and special precautions taken. Make records available to fire officials.

    d. Where there is any danger of the welding or cutting operations on one side of a wall, partition, ceiling or roof igniting-materials on the other side, also maintain a fire watch on the other side of the assembly.

2. Trade subcontractors shall provide fire watch for their own operations.

F. Permanent Fire Protection: At the earliest feasible date in each area of Project, complete installation of the permanent fire protection system, and place into operation. Make sure key personnel understand how the system operates.

1. If it is necessary thereafter to disable the permanent system for short periods of time, provide temporary protection of type acceptable to Owner's insurer and to the local Fire Department while the permanent system is inoperative.

G. In construction areas, the Electrical Subcontractor shall maintain horns and strobes to the extent requested by the local authorities having jurisdiction. Smoke detectors are not required.

1.24 ACCIDENT PREVENTION

A. Comply with all recommendations and requirements for accident prevention of the Associates, General Contractors of America and the American Standards Association Standard A10.2. The Field Superintendent of the General Contractor shall conduct regular and frequent inspections of the site for compliance with safety regulations, stating in writing to the Architect each month that he has done so. The Architect specifically reserves the right to direct and enforce compliance with safety regulations if conditions on the site do not comply.

B. Neither the Owner nor the Architect shall be responsible for providing a safe working place for the General Contractor, Subcontractors or their employees or any individual responsible to them for the work.

1.25 WELDING AND CUTTING

A. Whether electric or gas welding or cutting work done above or within ten (10) feet of combustible material or above space that may be occupied by persons, interposed shield or incombustible material shall be used to protect against fire damage or injury due to sparks and hot metal.

B. Tanks supplying gases for gas welding or cutting shall be placed at no greater distance from the work than is necessary for safety, securely fastened and maintained in an upright position where practicable. Such tanks, when stored for use, shall be remote from any combustible material and free from exposure to the rays of the sun or too high temperatures.

C. Suitable fire extinguishing equipment shall be maintained near all welding and cutting operations. When operations cease for the noon hour or at the end of the day, the surroundings adjacent to welding and cutting operations shall be thoroughly wetted down.

D. A workman equipped with suitable fire extinguishing equipment shall be stationed near welding and cutting operations to see that sparks do not lodge in floor cracks or pass through floor or wall openings or lodge in any combustible material. The workman shall be kept at the source of work offering special hazards for 30 minutes after the job is completed to make sure that smoldering fires have not been started.

E. A qualified electrician shall be in charge of installing and repairing electric or arc welding equipment. No electric welding equipment shall be connected into the Owner's electrical system.

F. Refer to the General Conditions of the Contract for additional information.

1.26 TEMPORARY AND TRIAL USAGE

A. Temporary or trial usage by Owner of any mechanical device, machinery, apparatus, equipment, or any work or materials supplied under Contract, before final completion and written acceptance by the Architect shall not be construed as evidence of Architect's acceptance of same.

B. The Owner reserves the privilege of such temporary or trial usage, for such reasonable time as required to properly test such item. Claims for damage, due to injury to, or breaking of any parts of such work, when the determined cause is weakness or inaccuracy of structural parts, or by defective material or workmanship, will not be permitted.

C. If the General Contractor so elects, he may, without additional cost to the Owner, place an approved person, or persons, to instruct and assist in such trial usage. Trials shall be made under the Architect's supervision.

1.27 OVERLOADING

A. Materials and fabricated work shall not be stacked on, or be transported over, floor and roof construction that would stress any of said construction beyond the designed live loads.

1.28 SNOW AND ICE REMOVAL

A. The General Contractor shall remove all snow and ice which may impede the work, damage the finishes or materials, be detrimental to workmen, or impede trucking, delivery, or moving of materials at the job site, or prevent adequate drainage of the site or adjoining areas.

1.29 WINTER CONSTRUCTION

A. The General Contractor shall be responsible for providing protection against damage to materials and work installed in freezing weather, by providing special heat and coverings to prevent damage by the elements, in a manner approved by the Architect. The ground surfaces, under footings, under pipe lines, under masonry, under concrete, and other work subject to damage shall be protected against freezing or ice formation. If low temperature makes it impossible to continue operations safely in spite of cold weather precautions, the General Contractor shall cease work and shall so notify the Architect.

1.30 WIND PROTECTION

A. Should high wind warnings be issued by the U.S. Weather Bureau, the General Contractor shall take every precaution to minimize danger to persons, to the work, and to adjacent property.

1.31 AIR QUALITY

A. Construction activities shall be scheduled so that sufficient time is allotted for building flush-out, per SECTION 018119 – INDOOR AIR QUALITY MANAGEMENT PLAN.

1.32 NOISE AND POLLUTION CONTROL

A. All work performed under the Contract shall conform to the requirements of Chapter 11, Section 31C and Section 142D of the General Laws, and Rules and Regulations adopted thereto by the Commonwealth of Massachusetts, Department of Public Health.

B. In addition, all work shall comply with **City of Amesbury** regulations for the control of noise including activities on construction sites.

1.33 SITE DRAINAGE AND PUMPING

A. The General Contractor shall be responsible for site drainage upon entering the premises and shall maintain such drainage during the life of his Contract in a manner approved by the Architect and so as not to adversely affect the adjacent areas.

B. The General Contractor shall during the progress of the work, provide and maintain all required pumps, suction and discharge lines, and power in sufficient number and capacity to keep all excavations, pits, trenches, foundations, and the entire property areas free form accumulation of water from any source whatsoever, at all items, and under any and all circumstances and contingencies that may arise.

C. For additional requirements for excavation dewatering, refer to SECTION 312000-EARTHWORK.

1.34 TEMPORARY USE OF ELEVATORS

A. Should the General Contractor desire the use of elevator equipment prior to Substantial Completion, he shall make necessary arrangements with the Elevator Subcontractor, subject to the approval of the architect and subject to code requirements.

B. The General Contractor shall reimburse the Elevator Subcontractor for any labor or materials which are not part of the permanent installation and which are required to provide temporary elevator service including, but not limited to, temporary car enclosures, requisite guards or other protection for elevator machine room and hoistway openings, main line switch with wiring and obtaining any other special labor or equipment needed to permit temporary usage.

C. The General Contractor shall sign the elevator subcontractor's temporary acceptance form before any elevator is placed into temporary service; and pay all costs of power, operation, and maintenance and attendance of the equipment.

D. The General Contractor shall leave the complete elevator equipment in the same condition as it was at the time it was returned over to him for temporary service. If repairs or replacements are necessary to restore the apparatus to its original condition, he shall allow the Elevator Subcontractor time to make such repairs or replacements and shall pay him for making them.

1.35 MOISTURE AND MOLD CONTROL

A. General Contractor's Moisture-Protection Requirements: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

1. Protect Work from moisture in order to prevent the growth of fungus, bacteria and other biological contaminants.

B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Maintain enclosure sufficiently weather tight to prevent water from entering the building.
4. Do not permit construction operations from introducing uncontrolled water into the structure from sources such as hoses and mechanical and plumbing systems.

5. Remove standing water from decks and slabs.

6. Periodically collect and remove waste containing cellulose or other organic matter.

7. Discard or replace water-damaged material.

8. Do not install material that is wet.

9. Discard and replace stored or installed porous materials that begin to grow mold; clean non-porous materials to remove mold.

10. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

11. Provide temporary heating, cooling and dehumidification as required to maintain acceptable ambient conditions, and to allow construction materials to dry sufficiently for subsequent Work.

D. Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Provide ventilation, heating, cooling and dehumidification per "Temporary Heating and Ventilation" Article in this Section.

2. Control moisture and humidity inside building by maintaining effective dry-in conditions.

3. Comply with each product manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

4. Store construction materials in clean, dry areas. Comply with specific requirements for storage and protection of materials as specified in the Contract Documents.

E. Drying of Wet Construction and Materials: If an unanticipated event permits the entry of water into new or existing construction, take steps necessary to dry out construction within 24 hours.

1. Identify wet materials and remediate in accordance with United States Environmental Protection Agency publication "Mold Remediation in Schools and Commercial Buildings," current edition.

2. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours.

3. Use restoration drying techniques to achieve and maintain conditions that will not support biological growth. Consider the use of desiccant drying, if feasible.

4. If materials or construction cannot be adequately dried out within 24 hours, or which show evidence of biological growth, remove them from the construction area immediately, and legally dispose of them.

   a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 24 hours are considered defective.

   b. Remove materials that cannot be completely restored to their manufactured moisture level within 24 hours.

5. Remove and replace construction which shows evidence of biological growth due to presence of moisture.

6. Where construction has been in contact with contaminated water, subsequent cleaning and decontamination shall be supervised by a qualified company approved by the Owner. The cost of such supervision shall not be considered a reimbursable cost of the work.

1.36 PROJECT SIGN

A. The General Contractor shall furnish and install one (1) project sign 4 ft. x 8 ft. in dimension. Sign shall comply with CMR 963 paragraph 2.04 (1) g. Sign shall be fabricated from one-inch thick medium density overlaid exterior plywood laminated with waterproof glues. All edges of sign shall be banded with 1 in. x ½ in. pine banding. Sign shall be supported by three 4 x 4 post supports set in 12 in. diameter concrete footings to a depth of four (4) feet and so that sign is raised a minimum of three (3) feet above grade. (Note: Alternative methods of support may be required by site conditions. Alternate methods of support shall be submitted to the Architect for approval.) All nails, nuts, bolts and other connecting hardware to be galvanized. Refer to Attachment A at the end of this Section.

B. Sign shall be lettered by a professional sign painted, in accordance with a drawing prepared by the Architect.

C. The Architect will make available a high-resolution graphic of the sign layout in a compatible image file (JPG, PDF, TIFF) for the General Contractor's use. The sign text shall comply with 963 CMR Par. 2.04(1)(g) for projects funded in part by the Massachusetts School Building Authority.

D. The General Contractor shall submit a scaled drawing for the proposed sign for approval by the Architect prior to fabrication.

E. No other signs or advertisements will be allowed to be displayed without the approval of the Architect.

F. The General Contractor shall obtain approval of local authorities for erection of sign.

END OF SECTION

Attachment A

Project Sign Layout

Amesbury Elementary School



CITY OF AMESBURY
Incorporated
1668
MASSACHUSETTS

Contractor

Architect

DINISCO DESIGN
architects + planners

Owner's Project Manager

NV5

This project is funded in part by the **Massachusetts School Building Authority**

SECTION 017419

CONSTRUCTION WASTE MANAGEMENT

PART 1 GENERAL

1.01 PROVISIONS INCLUDED

A. The Conditions of the Contract and Division 1, General Requirements, apply to the work under this Section.

B. Attention of the General Contractor and this Subcontractor is directed to provisions of the Contract Documents regarding the responsibility of all bidders to visit and inspect the site, including the existing building, and to base all bids on conclusions drawn from such inspections.

1.02 SCOPE OF WORK

A. This Section specifies administrative and procedural requirements for the General Contractor's implementation of waste management controls and systems for the duration of the Work.

1. Masonry subcontractor is responsible for waste management of masonry work.
2. Roofing and flashing subcontractor is responsible for waste management of roofing and flashing work.

B. Develop and implement a waste management plan compliant with the requirements of LEED-S v4 MR prerequisite Construction and Demolition Waste Management Planning and MR credit Construction and Demolition Waste Management.

1.03 INTENT

A. Sustainable Design Intent: Comply with project requirements intended to achieve sustainable design, measured and documented according to the LEED for Schools v.4 Green Building Rating System, of the US Green Building Council. Refer to SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS for certification level and certification requirements.

B. The Owner and Architect have established that this project shall generate the least amount of waste practical and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.

C. Of the waste that is generated, as many of the waste materials as economically feasible shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized to the greatest extent practical.

D. With regard to these goals the General Contractor shall develop, for the Architect's review, a Waste Management Plan for this project.

1. Each Subcontractor, except for Sitework and Demolition, shall dispose of his own waste into dumpsters provided by the General Contractor. Sitework and Demolition Subcontractors shall dispose of surplus and waste off-site to a receiver that each of them provides.

2. The General Contractor shall be responsible for ensuring that debris will be disposed of at appropriately designated licensed solid waste disposal facilities, as defined by MGL Chapter 111, Section 150A.

1.04 SUBMITTALS

A. Waste Management Plan: Within 21 calendar days after receipt of Notice to Proceed, the General Contractor shall provide a compliant Construction Waste Management Plan including:

1. Identify a minimum of five materials target for diversion, (structural and non-structural). Determine and document the estimated percentage of the overall waste that these materials represent. Four materials streams and 75% minimum diversion rate REQUIRED.

2. Diverted materials must include at least four material streams.

3. Document if these materials will be site separated or commingled and sorted off site.

4. Describe the diversion strategies.

5. Identify the locations as to where the materials will be taken including recycling facilities, sorting facilities and landfills. Include the following:

a. Landfill Options: The name of the landfills where the non-recyclable Construction and Demolition waste will be taken to be disposed of, applicable tipping fees and the projected cost of disposing of the Project waste in landfills

b. Off-Site Sorting: The name of off-site sorting facilities to receive commingled demolition and construction debris collected in mixed materials containers on site.

c. If sorted off site, identify the sorting facilities and how the materials will be processed.

6. NOTE: Exclude all land-clearing debris and excavated soil from credit calculations. Alternative Daily Cover (ADC) does not count as diversion but must be included in total construction and demolition waste.

B. Landfill Certification: Provide a statement of verification that the landfills proposed for use are licensed for types of waste to be deposited and have sufficient capacity to receive the estimated waste from this project

C. For co-mingled materials collected in mixed containers on site and sorted off-site the following documentation must be provided:

1. For each container: A detailed breakdown of the weight of each material after sorting, including materials diverted to landfills
2. AND/OR provide the sorting facilities annual average recycling rate for EACH facility where off-site sorting takes place. Additionally, provide documentation that the facility is State regulated.
   Note: Co-mingled waste may be considered only one material stream, unless the facility can provide project specific diversion rates for each material stream.

D. Recycled, and Salvaged Materials: Provide a list of each material proposed to be recycled, salvaged or diverted from landfill during the course of the Project. Include a minimum of five of the following and any additional items:

1. Cardboard and paper
2. Clean dimensional Wood (free from nails, screws and similar foreign materials.)
3. Concrete and slurry wall materials
4. Brick/Masonry
5. Asphalt
6. Metals including framing, banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
7. Gypsum Board
8. Mechanical and Electrical equipment
9. Building components that are removed intact during demolition
10. Glass
11. Packing materials
12. Beverage Containers

E. Meetings: A description of the regular meetings to be held to address waste management.

F. Procedures for Materials Handling: Provide a description of the means by which any waste materials and/or collection containers identified above will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities.

G. Transportation: Provide a description of the means of transportation of the recyclable materials identify if materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site for off-site sorting

H. Waste Management Progress Reports to be submitted concurrent with each monthly Application for Payment. Provide a written Waste Management Progress Report and updated tracking spreadsheet

I. Waste Management Final Report: Prior to Substantial Completion, submit a written Waste Management Final Report summarizing the types and quantities of materials recycled and disposed of under the Waste Management Plan. Include the name and location of disposal facilities. Quantity may be measured by either weight or volume; be consistent in calculations. Include the following:

1. Material category.
2. Generation point of waste.
3. Total quantity of waste, by weight.
4. Quantity of waste salvaged, both estimated and actual.
5. Quantity of waste recycled, both estimated and actual.
6. Total quantity of waste recovered (salvaged plus recycled).
7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

J. Other Submittals:

1. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
2. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
3. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

4. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.05 CONTRACTORS

A. Contractor may subcontract work of this Section to a sub-contractor specializing in recycling and salvaging of construction waste.

1. Institution Recycling Network, 7 South State Street, Suite 2, Concord, NH 03301; tel. 866-229-1962
2. Waste Solutions, Inc., 965 Plain Street, Marshfield, MA 02050; tel. 781-844-1476
3. Eco-One Solutions, 18 Glenwood Street, Natick MA, 01760; tel. 978.270.8950
4. Or equal as approved by the Architect.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 RECYCLING

A. Metal, including but not limited to aluminum stairs, structural beams and sections, and reinforcing steel shall be recycled.

B. Wood that is not painted and does not contain preservatives (i.e. creosote, arsenic, and chromium-containing preservatives) shall be segregated and recycled.

C. Refer to the Massachusetts Recycling Directory available at the Massachusetts State Bookstore (617-727-2834) in the State Capitol Building for recycling operations within the State.

3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: The General Contractor shall designate an on-site person responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project

B. Distribution: The General Contractor shall distribute copies of the Waste Management Plan to the Job Site Foreman, each Subcontractor, the Owner and the Architect.

C. Instruction: The General Contractor shall provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the Project

D. Separation Facilities: The General Contractor shall lay out and label a specific area to facilitate separation of materials for recycling, salvage, reuse, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials. Location shall be acceptable to the Architect.

E. Hazardous Wastes: Any unforeseen hazardous wastes shall be separated, stored, and disposed of according to local regulations and as directed by the Owner.

END OF SECTION

ATTACHMENT A

Schedule W1 – Proposed Receiving Facilities

SCHEDULE W1 – PROPOSED RECEIVING FACILITIES
(Submit to the Consultant within 14 days after mobilization)

Project Name:		**Completed by:**	
Project location:		**Company:**	

Material Type	**Proposed Receiving Facility**		
	Name	**Material End Use**	**Phone Number**
		☐ Recycled/Reused ☐ Sent to Landfill	
		☐ Recycled/Reused ☐ Sent to Landfill	
		☐ Recycled/Reused ☐ Sent to Landfill	
		☐ Recycled/Reused ☐ Sent to Landfill	
		☐ Recycled/Reused ☐ Sent to Landfill	
		☐ Recycled/Reused ☐ Sent to Landfill	
		☐ Recycled/Reused ☐ Sent to Landfill	
		☐ Recycled/Reused ☐ Sent to Landfill	
		☐ Recycled/Reused ☐ Sent to Landfill	
		☐ Recycled/Reused ☐ Sent to Landfill	
		☐ Recycled/Reused ☐ Sent to Landfill	
		☐ Recycled/Reused ☐ Sent to Landfill	

Signature of Authorized Official Position Date

Waste Management and Disposal Form 017419-W1

ATTACHMENT B

Schedule W2 – Waste Tracking Worksheet

SCHEDULE W2 – WASTE TRACKING WORKSHEET
(Submit most recent copy to the Consultant on a monthly basis)

Project Name:		**Completed by:**	
Project location:		**Company:**	

Material Type Legend		
Land Clearing Debris	Ashpalt	Concrete/Masonry/Stone
Steel and Other Metals	Wood	Gypsum
Cardboard	Plastic	"Blue Box" Waste
Mixed Waste	Other (specify)	

#	Shipment Date	Material Type	Amount of Material by Tons		Receiving Facility Name	Waybill Number
			Reused or Recycled	Landfill		
Ex.	2006-09-12	Gypsum	4.0	0.0	Acme Recycling Inc.	05-1234

For information only. Not counted towards LEED MR Credit 2.

NOTE: This form must be a print out of an electronic excel spreadsheet created and maintained by the contractor.

Signature of Authorized Official Position Date

Waste Management and Disposal Form 017419-W2

SECTION 017700

PROJECT CLOSEOUT

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. This section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Closeout procedures for phased construction.
2. Substantial Completion procedures.
3. Procedures for list of incomplete work (punch list).
4. Above Ceiling Inspections.
5. Final completion procedures.
6. Warranties.
7. Final cleaning.
8. Repair of the Work.

1.03 RELATED SECTIONS

A. The related work shall be performed under the following Sections:

1. SECTION 013500-ORDER OF CONDITIONS for Amesbury Planning Board requirements prior to issuance of the Certificate of Occupancy.
2. SECTION 017839-PROJECT RECORD DOCUMENTS for submitting record Drawings, record Specifications, and record Product Data.
3. SECTION 017900-DEMONSTRATION AND TRAINING for requirements for instructing Owner's personnel.
4. Divisions 02 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.04 CLOSEOUT PROCEDURES FOR PHASED CONSTRUCTION

A. Preliminary activities and submittals indicated in Article 1.05, SUBSTANTIAL COMPLETION PROCEDURES apply to the completion of each phase of Work identified in the Section 011000 - SUMMARY OF WORK. Architect will issue a Certificate of Substantial Completion upon completion of Building and Site.

1.05 SUBSTANTIAL COMPLETION PROCEDURES

A. Prior to requesting the Architect's inspection to determine date of Substantial Completion, bring Work to a point where it is ready for Owner's occupancy and in accordance with the definition of "Substantial Completion" in the General Conditions.

1. Complete preliminary procedures and closeout submittals indicated in this Section. Architect will not perform inspection for Substantial Completion unless preliminary procedures and closeout submittals are completed.
2. Submit completed log of closeout activities, with dates of submittal and return entered to show that all items have been seen and, if specified, reviewed by the Architect.

B. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion of a construction phase, complete the following.

1. Complete each closeout activity and submittal required prior to requesting inspection by the Architect. Use log of closeout activities and submittals as checklist and guide to verify that prerequisites are complete.
2. Advise Owner of pending insurance changeover requirements.
3. Make final changeover of temporary construction keying to permanent and deliver keys to Owner’s Project Manager. Obtain signed receipt for delivery of keys. Advise Owner's personnel of changeover in security provisions.
4. Complete startup and testing of systems and equipment.
5. Perform preventive maintenance on equipment used prior to Substantial Completion.
6. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment and systems specified in SECTION 017900 - DEMONSTRATION AND TRAINING.
7. Advise Owner of changeover in heat and other utilities.
8. Complete final cleaning requirements.
9. Complete touch up and repair work.
10. Remove temporary facilities within the Work area of the construction phase being completed.
11. Replace chipped or broken glass and other damaged transparent materials.

12. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

13. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.

C. Preliminary Procedures for Final Construction Phase: Before requesting inspection for determining date of Substantial Completion of last construction phase for project, complete preliminary procedures required for each phase. In addition, complete the following procedures:

1. Terminate and remove remaining temporary facilities from Project site, including construction field offices, mockups, construction tools, and similar elements.

D. Inspection by Authorities Having Jurisdiction: At least 21 calendar days prior to date anticipated for Substantial Completion, obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases. For phased work, certificates may be temporary as allowed by the authorities having jurisdiction. Include the following as applicable:

1. Certificate of Occupancy.
2. Certificate of inspection for elevators
3. Certificate of inspection for mechanical work.
4. Certificate of inspection for electrical work.
5. All other permits and certificates required by law.

E. Lighting Fixture Cleaning and Lamping: The Electrical Subcontractor shall clean light fixtures, lamps, globes, lenses and reflectors. Replace burned-out bulbs and those noticeably dimmed by use.

F. HVAC Systems: The HVAC Subcontractor shall remove temporary filters install permanent filters as specified in SECTION 230001 - HVAC. The HVAC subcontractor shall submit on a separate sheet, distinct from the Operating and Maintenance data, a list of filters used on the Project, a description of each type, and appropriate location for each type.

1. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
2. Replace disposable air filters and clean permanent air filters.
3. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter upon inspection.

4. Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report upon completion of cleaning.

G. Log of Closeout Activities and Submittals: Submit log listing each activity and submittal that must be completed prior to Substantial Completion of a construction phase. Review each specification section to identify closeout activities and submittals, including certifications, start-up and testing reports, operating and maintenance data, spare parts and extra materials, and training of Owner's personnel.

1. Submit sample log listing each closeout item prior to submitting other closeout submittals.

2. Arrange log in tabular format in form acceptable to Architect. Order entries by specification section number and include the following information for each:

   a. Specification section number, name, and paragraph reference.
   b. Type of activity or submittal (such as "test report" or "manual").
   c. Description of the activity or submittal.
   d. Date submitted by the General Contractor.
   e. Date returned by the Architect, if Architect's approval is required.
   f. Date transmitted to the Owner or Project Manager.
   g. Remarks.

3. Completed Log: Submit completed log with request for inspection for Substantial Completion.

H. Closeout Submittals: Before requesting inspection for determining date of Substantial Completion of a construction phase, submit closeout submittals specified in this Section and in other Sections; and as listed in the log of closeout activities and submittals prepared by the General Contractor. Required closeout submittals include the following:

1. List of items to be completed and corrected (punch list).
2. Tools, spare parts, extra materials, keys for equipment, and similar items to location designated by Owner. Package carefully and label with manufacturer's name and model number where applicable. Obtain receipt upon delivery.
3. Testing, adjusting and balancing reports, and other reports, specified in SECTION 230001-HVAC.
4. Sustainable design submittals required by SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
5. Copies of inspection certificates from authorities having jurisdiction.

6. Certifications related to installed work and similar information substantiating that project conforms to the requirements of the Contract Documents and is fully operational.

7. Operation and Maintenance Manuals, as specified in this SECTION.

8. Special warranties specified in individual specification Sections, in form reasonably acceptable to the Architect.

9. Project Record Documents, as specified in SECTION 017839-PROJECT RECORD DOCUMENTS.

10. Records of training sessions specified in SECTION 017900-DEMONSTRATION AND TRAINING to document completion of training.

I. Closeout Submittals for Final Construction Phase: Before requesting inspection for determining date of Substantial Completion of last construction phase for project, submit closeout submittals specified in this Section and in other Sections indicated to be submitted for each phase. In addition, submit the following:

1. Turnover information related to Owner's occupancy, use, operation and maintenance, including final meter readings, if applicable.

2. Consent of surety to payment at the time of Substantial Completion.

3. The General Contractor's and Subcontractors' project warranty required by General Conditions and individual Sections.

4. All documentation required for incentives as required by the utility companies.

1.06 PROCEDURES FOR LIST OF INCOMPLETE WORK (PUNCH LIST)

A. General Contractor's List of Incomplete Work (Punch List): Prepare a comprehensive, detailed punch list of incomplete work, including each trade and each part of the project. Prepare list in form acceptable to the Architect; incomplete punch lists will be returned to the General Contractor without action.

1. Prepare list using spreadsheet software such as Microsoft Excel, in version compatible with Architect's computer software.

2. Submit 2 hard copies and 1 copy in electronic format on CD-ROM.

3. Format: Tabular format, with work listed room by room. Include columns for the following information:

a. Room number.

b. Room name.

c. Description of the item of work.

d. Trade responsible for item of work.

e. Signature and date of the supervisor or responsible party for each trade, who shall initial punch list to indicate item has been completed.

f. Remarks.

g. Cost to complete item.

4. Organization:

a. Include the following information at the top of each page:

1) Project name.

2) Date.

3) Name of Architect.

4) Name of the General Contractor.

5) Page number.

b. Organize punch list into separate pages for work related to building interior, building exterior and roof, and the project site.

c. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.

d. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

B. The failure to include any items on such list does not alter responsibility of the General Contractor to complete all work in accordance with the Contract Documents. Refer to the General Conditions.

C. Request for Inspection: Submit a **written request** for inspection to determine Substantial Completion to the Architect a minimum of ten (10) calendar days prior to the date the work will be completed and ready for final inspection and tests. After submitting request, continue to diligently pursue completion of items on punch list. Include the following with request:

1. Three copies of the General Contractor's list of incomplete Work.

2. Certification letter that final cleaning is complete, preliminary activities and closeout submittals are complete, and that work is ready for inspection.

D. On receipt of request for inspection, Architect will either proceed with inspection or notify the General Contractor of unfulfilled requirements.

1. When the "punch list" has been prepared, the Architect will arrange a meeting with the General Contractor and Subcontractor(s) to identify and explain all "punch list" items and answer questions on the work which must be done before final acceptance.

2. If the General Contractor gives notice that Subcontractor has completed his "punch list" items, the Architect will inspect that portion of the work and, if the items are found to be satisfactorily completed, advise the General Contractor accordingly.

3. If the Architect begins the inspection and finds items that are incomplete and not minor in nature, the Architect will notify the General Contractor and suspend the inspection until the General Contractor completes or corrects such work.

4. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

5. The Architect and his Consultants will perform up to three (3) back punch inspections. If additional back punch inspections are required as a result of the failure of the applicable subcontractors and/or the General Contractor to confirm complete, costs incurred by the Architect and his Consultants associated with additional back punching will be at the General Contractor's expense.

E. Architect's Inspection: Architect will complete inspection of completed Work, and may add additional items to the punch list prepared by the General Contractor. Architect will transmit the revised punch list to the General Contractor.

1. Preparation of the Architect's punch list is not a Certificate of Substantial Completion, nor an affirmation that the Work is substantially complete, nor is the date of the list to be construed as the Date of Substantial Completion.

F. The General Contractor shall correct all "punch list" items or shall cause the correction of the "punch list" items listed with the Certificate of Substantial Completion within 60 calendar days of the date of Substantial Completion. Should the "punch list" not be completed within the specified time frame, the Owner may invoke the rights given under the General Conditions.

G. Prepare copies of the punch list applicable to each room or space and post in each room in conspicuous place. Require each tradesperson performing work to sign and date the posted list in space provided beside each item when the item completed. Monitor progress of completion, and verify that trades are signing punch list upon completion of items.

H. Certificate of Substantial Completion: Architect will prepare the Certificate of Substantial Completion after inspection and upon the General Contractor's completion of closeout activities and closeout submittals. Issuance of the Certificate of Substantial Completion and determination of the date of Substantial Completion are at the sole discretion of the Architect.

I. Monetization of Punch List: Prior to Final Completion, cooperate with the Architect in preparation of a monetized punch list, indicating the cost to complete each incomplete item, with total.

1.07 ABOVE CEILING INSPECTIONS

A. Schedule: Above ceiling inspections shall be clearly listed in the Construction Schedule and updated as appropriate. The Architect and his applicable consultants shall be provided a minimum of one week to visit the site and perform their inspections. Above ceiling inspections shall be scheduled by floor unless mutually agreed to separate a portion of a building or addition(s). In no case shall a floor be divided up into more than two areas.

B. Request for Inspection: The General Contractor shall submit to the Architect a **written request** for an above ceiling inspection a minimum of seven (7) calendar days prior to the scheduled start date shown in the updated Construction Schedule. Prior to performing above ceiling inspections, the Architect will require sign-offs from all applicable trades **and** confirmation by the General Contractor that **all** above ceiling work is complete for designated floor and ready for inspection.

1. If the Architect begins the inspection and finds items that are incomplete and not minor in nature, the Architect will notify the General Contractor and suspend the inspection until the General Contractor completes or corrects such work.

2. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

C. Architect's Inspection: Architect and applicable consultants will complete inspection of Work and provide a list of delinquent or incomplete items.

1.08 FINAL COMPLETION PROCEDURES

A. The General Contractor shall supervise and direct the work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and for coordinating all portions of the work under the Contract.

B. The General Contractor shall carefully check his own work and that of Subcontractors as the work is being performed. Unsatisfactory work shall be corrected immediately.

C. During the finishing stages of the project, the General Contractor shall make frequent inspections with Subcontractors and the Architect so as to progressively check for and correct faulty work.

D. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment in accordance with the General Conditions.

2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

E. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify the General Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify the General Contractor of construction that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

F. Final Closeout Submittals: Prepare remaining closeout submittals and submit to the Architect prior to Final Completion, allowing sufficient time for review, at least 15 working days.

1. Final construction photographs.
2. Certificate of insurance for products and completed operations.
3. Consent of Surety to Final Payment.
4. An affidavit certifying that bills and indebtedness connected with the Work have been paid.
5. Proof that taxes, fees and similar obligations have been paid.
6. Additional turnover information which may be required by Owner's lender and Owner's property insurer.

G. Signed and Dated "Punch Lists": Complete items which are listed as incomplete on the General Contractor list of incomplete work and those listed on the Architect's list of incomplete work attached to the Certificate of Substantial Completion; or, if acceptable to the Owner's Project Manager, furnish assurance that Work not complete and accepted will be completed without delay.

1. As evidence of completion of this work, submit to the Architect the originals of the lists which were posted on site and which have been signed and dated item-by-item to indicate completion of all the work listed.

H. Remove remaining construction facilities, temporary controls, and tools.

I. Re-clean to standards specified for cleaning. Remove surplus materials and rubbish. Notify the Architect in writing that this cleaning has been completed.

J. Submit Final Application for Payment.

1.09 GUARANTEES

A. The work under this Contract, except as expressly excluded, and all subcontractors, severally and collectively, whether herein stipulated in each case or not, shall be guaranteed against faulty workmanship and/or material for a term of one year from date of Substantial Completion of the entire project. The provisions of the guarantee and/or guarantees shall be incumbent on all parties of the work, including the General Contractor, each Subcontractor, all material suppliers and all manufacturers whose products and/or equipment are incorporated into the project.

1.10 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. For work listed as "incomplete" at time of Substantial Completion, warranties required by the Contract Documents shall commence when such work is accepted as complete by the Architect, unless an exception is specifically made in the Certificate of Substantial Completion.

C. Submit properly executed warranties within 15 days of completion of the Work.

D. Assemble two executed copies of each warranty, bond, and service and maintenance contract applicable to the project. Include General Contractor's Project Warranty required by the General Conditions, and manufacturer's standard warranties and special warranties specified in individual specification Sections.

E. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of applicable Contractor.
3. Inside Title Page: Repeat information on the cover and identify applicable Owner's, name of responsible principal, address and telephone number.
4. Provide table of contents for each volume, arranged in systematic order, neatly typewritten.
5. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

6. Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide table of contents at beginning of document.

F. Provide additional copies of each warranty to include in operation and maintenance manuals.

G. Submittal: Acceptance by the Architect is a prerequisite to Substantial Completion.

1. Submit one review copy of fully compiled warranties in final form. The Architect will review the copy and return it with comments.
2. Upon review and acceptance by the Architect, resubmit two corrected bound copies.

H. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.11 OPERATIONS AND MAINTENANCE DATA

A. At least two (2) months prior to the time of turning over this contract to the Owner for use and occupancy or substantial completion, the General Contractor shall secure and deliver to the Owner via the Architect three (3) complete indexed files containing approved operating and maintenance manuals, shop drawings, training for the Owner personnel and other data as follows:

1. Operating manuals and operating instruction for the various systems.
2. Catalog data sheets for each item of mechanical or electrical equipment actually installed including performance curves, rating data and parts list.
3. Catalog sheets, maintenance manuals, and approved shop drawings of all mechanical or electrical equipment controls and fixtures with all details clearly indicated, including size of lamps.
4. Names, addresses and telephone numbers of repair and service companies for each of the major systems installed under this contract.
5. Refer to the respective SECTIONS for additional requirements.

B. Non-availability of operating and maintenance manuals or inaccuracies therein may be ground for cancellation and postponement of any scheduled final inspection by the Architect until such time as the discrepancy has been corrected and/or retainage of sufficient moneys to prepare same.

PART 2 PRODUCTS

2.01 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that meet Green Seal GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 EXECUTION

3.01 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project. This includes cleaning of the work of all finished trades where needed whether or not cleaning for such trades is included in their respective SECTIONS.

   a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances and legally dispose of them.

   b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

   c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

   d. Remove tools, construction equipment, machinery, and surplus material from Project site.

   e. Remove snow and ice to provide safe access to building.

   f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

   g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

   h. Sweep concrete floors broom clean in unoccupied spaces.

   i. Vacuum carpet and similar soft surfaces with HEPA-filtered vacuum, removing debris and excess nap; shampoo if visible soil or stains remain. Refer to SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS for requirements for meeting applicable sustainable design credits.

j. Clean transparent materials, including mirrors and glass in both sides of doors, windows, storefront, and curtain wall. Re-clean windows, storefront, and curtain wall initially cleaned under the Work of Division 08 Sections. Polish mirrors and glass, taking care not to scratch surfaces. Remove glazing compounds and other noticeable, vision-obscuring materials.

k. Remove labels that are not permanent.

l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

n. Clean exposed surfaces of diffusers, registers, and grills.

o. Leave Project clean and ready for occupancy.

2. The Subcontractors for mechanical and electrical work, including Plumbing, Ventilating, Fire Protection, and Electrical Work shall respectively clean all materials and equipment installed by them, leaving all in a finished and clean state.

C. Construction Waste Disposal: Comply with waste disposal requirements in SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

3.02 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.

2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

3.03 WARRANTY INSPECTION

A. The General Contractor shall schedule a warranty inspection meeting at the project site no less than eight months and no more than (9) months after the Substantial Completion date(s) and shall provide an appropriate warranty retainage or warranty bond to ensure compliance for any deficient work.

END OF SECTION

SECTION 017823

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and other DIVISION 01 Specification Sections, apply to this Section.

1.03 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Operation manuals for systems, subsystems, and equipment,
3. Product maintenance manuals.
4. Systems and equipment maintenance manuals.

B. Related Sections:

1. SECTION 013300 - SUBMITTALS for submitting copies of submittals for operation and maintenance manuals.
2. SECTION 019113 – BUILDING COMMISSIONING REQUIREMENTS for verification and compilation of data into operation and maintenance manuals.
3. DIVISIONS 02 through 33 SECTIONS for specific operation and maintenance manual requirements for the Work in those Sections.

1.04 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.05 CLOSEOUT SUBMITTALS

A. The General Contractor shall secure and deliver to the operating agency via the Architect three (3) complete indexed files containing approved operating and maintenance manuals, shop drawings, training for the Owner personnel and other data.

B. Manual Content: Operations and maintenance manual content is specified in individual specification sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized by this Section.

1. Where applicable, clarify and update reviewed manual content to correspond to modifications and field conditions.

C. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file. Assemble each manual into a composite electronically-indexed file. Submit on digital media acceptable to Architect. All PDF files shall be native format and searchable.

a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically-linked operation and maintenance directory.

b. Enable inserted reviewer comments on draft submittals.

2. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves.

D. Initial Manual Submittal: Submit one draft copy of each manual at least 30 days before commencing demonstration and training. Architect and Commissioning Agent will comment on whether general scope and content of manual are acceptable.

E. Final Manual Submittal: Submit three copies of each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect and Commissioning Agent will return copy with comments.

1. Correct or modify each manual to comply with Architect's and Commissioning Agent's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's and Commissioning Agent's comments and prior to commencing demonstration and training.

1.06 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Prepare a single, comprehensive directory of operation and maintenance data and materials, listing items and their location to facilitate ready access to desired information.

B. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

C. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

D. List of Subcontractors and Suppliers: List major subcontractors and suppliers with addresses and telephone numbers. Organize alphabetically by systems and subsystems, and alphabetically by name of entity.

E. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

F. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

G. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.07 REQUIREMENTS FOR OPERATION AND MAINTENANCE MANUALS

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for the General Contractor.
6. Name and contact information for Project manager.
7. Name and contact information for Architect
8. Name and contact information for Commissioning Agent.
9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
10. Names and contact information for responsible subcontractors.
11. Name and contact information for relevant manufacturer’s representative.

12. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Require each manufacturer to prepare or provide information on its own products and systems. Where equipment or systems are job-assembled by a Subcontractor, then require that Subcontractor to prepare maintenance instructions.

E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.

2. File Names and Bookmarks: Enable bookmarking of individual documents based upon file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel upon opening file.

F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.

G. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-II-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

1. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.

2. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

3. Information for complex systems, such as elevators, may be separately bound. Include tabbed divider for system in primary binder and insert page directing user to separate volume; or include a clear cross reference in the table of contents.

4. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.

5. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.

6. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.

7. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

8. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.

9. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual_ at appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.08 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.

2. Performance and design criteria if the General Contractor is delegated design responsibility.

3. Operating standards.

4. Operating procedures.

5. Operating logs.

6. Wiring diagrams.

7. Control diagrams.

8. Piped system diagrams.

9. Precautions against improper use.

10. License requirements including inspection and renewal dates.

11. Equipment start up reports, balancing reports, field testing performance reports.

B. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed and identify color-coding where required for identification.

1.09 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning. Include recommendations for sustainable cleaning products complying with LEEDv4-S.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

1.10 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, includes source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference. Specification Section number and title in Project. Manual and drawing or schedule designation or identifier where applicable.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

1.11 ADDITIONAL DOCUMENTS REQUIRED BY SECTION 017839-PROJECT PROCEDURES

A. Documents to be included in O&M electronic PDF files:

1. Record Drawings
2. Record Submittals

1.12 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.

2. Comply with requirements of newly prepared record Drawings in SECTION 017839 - PROJECT RECORD DOCUMENTS.

G. Comply with SECTION 017700 - PROJECT CLOSEOUT for schedule for submitting operation and maintenance documentation.

END OF SECTION

SECTION 017839

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. SECTION 013500-ORDER OF CONDITIONS for Amesbury Planning Board As-Built Drawing requirements for monuments, inverts, utilities and stormwater systems.
2. SECTION 017700-PROJECT CLOSEOUT for general closeout procedures.
3. SECTION 017823-OPERATION AND MAINTENANCE DATA for operation and maintenance manual requirements.
4. Divisions 02 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

1.04 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of record Drawings as follows:
   a. Initial Submittal: Submit one paper copy set of marked-up record prints and one set of corrected record digital CAD files. Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal: Make changes requested by the Architect on the initial submittal. Submit three paper copy sets printed from record CAD files, and one set of record digital CAD files. Plot each Drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit three paper copies and one annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one paper copy of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Reports: Submit written report monthly indicating items incorporated in Project record documents concurrent with progress of the Work, including modifications, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 PRODUCTS

2.01 RECORD DOCUMENTS, GENERAL

A. Record Documents: Maintain two sets of record drawings, specifications and product data at the project site as Record Documents. Use one set exclusively for accurately and promptly recording as the work progresses actual installations wherever the work was installed other than as shown on the Contract Drawings or described in the specifications. The second set shall be used to indicate the profess of the work installed by coloring in the various pipe lines, ducts, and apparatus as needed. Maintain separate sets of drawings, specifications and product data for day-to-day use in constructing the Work.

B. Require Filed-Sub Bidders to maintain Record Drawings of Work done under their trade.

2.02 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    b. Accurately record information in an acceptable drawing technique.
    c. Record data as soon as possible after obtaining it.
    d. Record and check the markup before enclosing concealed installations.
    e. Cross-reference record prints to corresponding archive photographic documentation.
2. Content: Types of items requiring marking include, but are not limited to, the following:
    a. Dimensional changes to Drawings.
    b. Revisions to details shown on Drawings.
    c. Depths of foundations below first floor.
    d. Locations and depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Duct size and routing.

i. Locations of concealed internal utilities.

j. Changes made by Change Order or Construction Change Directive.

k. Changes made following Architect's written orders, including Architect's Supplemental Instructions.

l. Revisions, supplemental information, and responses to Requests for Information.

m. Details not on the original Contract Drawings.

n. Field records for variable and concealed conditions.

o. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.

4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.

5. Mark important additional information that was either shown schematically or omitted from original Drawings.

6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, RFI numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare full sets of corrected digital data files of the Contract Drawings, as follows:

1. Formats

a. The General Contractor shall obtain one set of all Project Drawings of this Section on flash drives in DWG format. The CAD files shall be in the most current version of AutoCAD and Windows operating systems or other mutually agreeable formats. CAD Drawings shall maintain the established layering, color and pen thickness scheme. Make all modifications on the CAD Drawing files indicated on the marked up set of Record Drawings. Remove all superseded data to show the completed installation. These CAD files shall become the property of the Owner.

b. The record drawings required to be furnished under the terms of this Contract are shown in the List of Drawings at the front of the Project Manual **except** for the following Drawings: G.0.02; G.0.04-G.0.08, inclusive; 0.0.00-0.0.05, inclusive; 1.0.01-1.0.03, inclusive; and 5.9.01-5.9.03, inclusive.

2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.

3. Employ experienced CADD drafters to record information. Use same symbols and notations as used on original Contract Drawings. Delineate clearly, neatly, and accurately Work as it is installed.

4. Refer instances of uncertainty to Architect for resolution.

5. Architect will furnish General Contractor one set of digital data files of the Contract Drawings for use in recording information.

   a. Refer to SECTION 013300-SUBMITTALS for requirements related to use of Architect's digital data files.

   b. Architect will provide data file layer information. Record markups in separate layers.

6. Provide digital files to each Filed-Sub Bidder and require each to record their work in the Record Drawings.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.

2. Format: Annotated PDF electronic file with comment function enabled.

3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.

4. Identification: As follows:

   a. Project name.

   b. Date.

   c. Designation "PROJECT RECORD DRAWINGS."

   d. Name of Architect.

   e. Name of General Contractor.

D. Site utility drawings shall meet the City of Amesbury’s DPW requirements.

2.03 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.

3. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.

4. Note related Change Orders, record Product Data, and record Drawings where applicable.

5. Revisions, supplemental information, and responses to Requests for Information.

B. Format: Submit record Specifications as annotated PDF electronic file or scanned PDF electronic file(s) of marked up paper copy of Specifications.

2.04 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.

3. Note related Change Orders, record Specifications, and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file or scanned PDF electronic file(s) of marked up paper copy of Specifications.

1. Include record. Product Data directory organized by specification section number and title, electronically linked to each item of record Product Data.

PART 3 EXECUTION

3.01 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

C. Keep marked-up sets for each trade up to date. Record new information within 48 hours of receipt, or of Work being installed.

1. Review Record Documents weekly, and certify to Owner that the Record Documents are current with each monthly Application for Payment.
2. The Owner shall have the right to retain that portion of the progress payment applicable to the unrecorded Work should if Record Documents are not current.

END OF SECTION

SECTION 017900

DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. This Section includes administrative and procedural requirements for instructing Owner's personnel for all applicable subcontractors, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. ***Demonstration and training video*** recording for the following SECTIONS of work:
    a. SECTION 090005 – RESILIENT FLOORING
    b. SECTION 096566 – WOOD AND ATHLETIC FLOORING
    c. SECTION 096816 – CARPETING
    d. SECTION 114000 – FOODSERVICE EQUIPMENT
    e. SECTION 115213 – PROJECTION SCREENS
    f. SECTION 116143 – STAGE DRAPERY
    g. SECTION 116600 – ATHLETIC AND SPORTS EQUIPMENT
    h. SECTION 140001 – ELEVATORS
    i. SECTION 210001 – FIRE PROTECTION
    j. SECTION 220001 – PLUMBING
    k. SECTION 230001 – HVAC
    l. SECTION 250001 – BUILDING AUTOMATION SYSTEM
    m. SECTION 260001 – ELECTRICAL
    n. SECTION 265561 – EMERGENCY RADIO COMMUNICATIONS
    o. SECTION 270100 – STRUCTURED CABLING SYSTEMS
    p. SECTION 274000 - AUDIO-VIDEO COMMUNICATIONS SYSTEM

q. SECTION 275000 – DISTRIBUTED COMMUNICATIONS SYSTEM

r. SECTION 281000 – INTEGRATED SECURITY SYSTEMS

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. SECTION 013100-PROJECT PROCEDURES for requirements for pre-instruction conferences.

2. DIVISIONS 02 through 33 Sections for specific requirements for demonstration and training for products in those Sections.

1.04 SUBMITTALS

A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. At completion of training, submit 3 complete training manuals for Owner's use.

B. Qualification Data: For facilitator and instructor.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

E. Report: Submit report of training. Include project name, name and address of General Contractor and subcontractor providing training, brief description of item or system which was the subject of the training, dates and times of training, and names and job description or title of Owner's personnel in attendance. Report briefly on activities occurring during training, including problems or questions (if any) and how these were resolved.

F. Demonstration and Training Video Recordings: Submit three copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.

b. Name and address of photographer.

c. Name of Architect.

d. Name of Contractor.

e. Date video was recorded.

f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

2. Transcript: Prepared on 8-1/2-by-11-inch paper, punched and bound in heavy-duty, 3-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video. Include name of Project and date of video on each page.

1.05 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, experienced in operation and maintenance procedures and training.

C. Photographer Qualifications: A professional photographer who is experienced photographing construction projects.

D. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in SECTION 013100-PROJECT PROCEDURES. Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.

2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.

3. Review required content of instruction.

4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.06 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect

PART 2 PRODUCTS

2.01 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, by individual Specification Sections, including but not limited to the following:

1. Motorized doors, including overhead coiling doors.
2. Equipment, including gymnasium equipment, projection screens, food-service equipment, and residential appliances.
3. Fire-protection systems, including fire alarm, and fire-suppression systems.
4. Conveying systems, including elevators.
5. Domestic water distribution system, including pumps, filtration system and hot water system.
6. Sewage system and equipment.
7. Heat generation, including boilers, pumps, and water distribution piping.
8. Refrigeration systems, including chillers, condensers, pumps, and distribution piping.
9. HVAC systems, including air-handling equipment, air distribution systems, and terminal equipment and devices.
10. HVAC instrumentation and controls.
11. Electrical service and distribution, including transformers, switchboards, panelboards, and motor controls.
12. Packaged engine generators, including transfer switches.
13. Lighting equipment and controls.
14. Stage curtain, lighting and A/V equipment.
15. Communication systems, including intercommunication, public address, clocks and programming, voice and data, and CATV equipment.
16. Intrusion detection, surveillance and access control systems.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
   a. System, subsystem, and equipment descriptions.
   b. Performance and design criteria if Contractor is delegated design responsibility.
   c. Operating standards.
   d. Regulatory requirements.

e. Equipment function.
f. Operating characteristics.
g. Limiting conditions.
h. Performance curves.

2. Documentation: Review the following items in detail:
   a. Operations manuals.
   b. Maintenance manuals.
   c. Project Record Documents.
   d. Identification systems.
   e. Warranties and bonds.
   f. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:
   a. Instructions on meaning of warnings, trouble indications, and error messages.
   b. Instructions on stopping.
   c. Shutdown instructions for each type of emergency.
   d. Operating instructions for conditions outside of normal operating limits.
   e. Sequences for electric or electronic systems.
   f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:
   a. Startup procedures.
   b. Equipment or system break-in procedures.
   c. Routine and normal operating instructions.
   d. Regulation and control procedures.
   e. Control sequences.
   f. Safety procedures.
   g. Instructions on stopping.
   h. Normal shutdown instructions.
   i. Operating procedures for emergencies.
   j. Operating procedures for system, subsystem, or equipment failure.
   k. Seasonal and weekend operating instructions.
   l. Required sequences for electric or electronic systems.
   m. Special operating instructions and procedures.

5. Adjustments: Include the following:
   a. Alignments.
   b. Checking adjustments.
   c. Noise and vibration adjustments.
   d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:
    a. Diagnostic instructions.
    b. Test and inspection procedures.
7. Maintenance: Include the following:
    a. Inspection procedures.
    b. Types of cleaning agents to be used and methods of cleaning.
    c. List of cleaning agents and methods of cleaning detrimental to product.
    d. Procedures for routine cleaning
    e. Procedures for preventive maintenance.
    f. Procedures for routine maintenance.
    g. Instruction on use of special tools.
8. Repairs: Include the following:
    a. Diagnosis instructions.
    b. Repair instructions.
    c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
    d. Instructions for identifying parts and components.
    e. Review of spare parts needed for operation and maintenance.

PART 3 EXECUTION

3.01 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.

B. Set up instructional equipment at instruction location.

3.02 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between the General Contractor, Contractor, OPM and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Owner will furnish the General Contractor with names and positions of participants.
2. Presenter must be willing to be videotaped.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner, through Owner’s Project Manager, with at least 14 days' advance notice.

D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral performance-based test.

E. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

F. General for All Applicable Subcontractors: Engage a qualified commercial videographer/photographer to record demonstration and training video. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective

G. Video Format: Provide high-quality DVD and electronic format: AVE, WMV, MOV or MP4 as chosen by the Owner. Video must be professional in nature with clear sound and images.

H. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.

END OF SECTION

SECTION 018113

SUSTAINABLE DESIGN REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes general requirements and procedures for compliance with certain prerequisites and credits needed for Project to obtain "LEED Version 4 for Building Design and Construction: Schools" (LEED v4 BD+C: Schools) **Silver** certification based on USGBC's LEED v4 BD+C: Schools.

1. Specific requirements for LEED are also included in other Sections.
2. Some LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.
3. A copy of the LEED Project checklist is attached at the end of this Section for information only.
    a. Some LEED prerequisites and credits needed to obtain the indicated LEED certification depend on aspects of Project that are not part of the Work of the Contract.
4. A copy of the LEED Materials Reporting Form is included at the end of this section.
5. Definitions included in the "LEED Version 4 for Building Design and Construction" (LEED v4 BD+C) Reference Guide and online amendments apply to this Section.

B. Related Requirements:

1. Section 01 33 00, Submittals
2. Section 01 50 00, Temporary Facilities and Controls
3. Section 01 74 19, Construction Waste Management.
4. Section 01 78 23, Operations and Maintenance Data
5. Section 01 81 19, Indoor Air Quality Requirements.
6. Section 01 91 13 General Commissioning Requirements

7. Divisions 2 through 33 for LEED requirements specific to the work of each of these sections. Requirements may or may not include reference to LEED.

1.03 DEFINITIONS

A. Bio-Based Materials: Materials that meet the Sustainable Agriculture Network's Sustainable Agriculture Standard. Bio-based raw materials shall be tested using ASTM D 6866 and be legally harvested, as defined by the exporting and receiving country.

B. CDPH Standard Method v1.1: California Department of Public Health (CDPH) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, v. 1.1–2010, for the emissions testing and requirements of products and materials.

C. Chain-of-Custody (COC): A procedure that tracks a product form the point of harvest or extraction to its end use, including all successive stage of processing, transformation, manufacturing, a distribution.

D. Chain-of-Custody Certificates: Certificates signed by manufacturers and fabricators certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001.

E. Composite Wood and Agrifiber: Products made of wood particles and/or plant material pressed and bonded with adhesive or resin such as particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates, and door cores.

F. Corporate Sustainability Report: A third-party verified report that outlines the environmental impacts of extraction operations and activities associated with the manufacturer’s product and the product’s supply chain.

G. Environmental Product Declaration (EPD): An independently verified report based on life-cycle assessment studies that have been conducted according to a set of common rules for each product category and peer-reviewed.

1. Product-Specific Declaration: A product with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that has at least a cradle to gate scope.

2. Industry-Wide (Generic) EPD: Provide products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator. EPD must conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.

3. Product-Specific Type III EPD: A product with a third-party certification, including external verification, in which the manufacturer is explicated recognized by the program operator. EPD must conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.

H. Extended Producer Responsibility (EPR): Measures undertaken by the maker of a product to accept its own and sometimes other manufacturers' products as postconsumer waste at the end of the products' useful life.

I. Health Product Declaration Open Standard (HPD): A standard format for reporting product content and associated health information for building products and materials.

J. Indoor Air Quality (IAQ) Management Plan: Plan developed by the Contractor to provide a healthy indoor environment for workers and building occupants during construction. Plan must meet or exceed the recommendations of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) "IAQ Guidelines for Occupied Buildings Under Construction."

K. Leadership Extraction Practices: Products that meet at least one of the responsible extraction criteria, which include: extended producer responsibility; bio-based materials; FSC wood products; materials reuse; recycled content; and other USGBC approved programs.

L. Material Cost: The dollar value of materials being provided to the site, after Contractor mark-ups, including transportation costs, taxes, fees, and shop labor, but excluding field equipment and field labor costs.

M. Materials Reuse: Reuse includes salvaged, refurbished, or reused products.

N. Multi-Attribute Optimization: Third party certified products that demonstrate impact reduction below industry average in at least three of the following six categories: global warming potential; stratospheric ozone depletion; acidification; eutrophication; tropospheric ozone creation; nonrenewable resource depletion.

O. Recycled Content: Recycled content is the sum of postconsumer recycled content plus one-half the preconsumer recycled content, based on cost.

1. "Postconsumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.

2. "Preconsumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials, such as rework, regrind, or scrap, generated in a process and capable of being reclaimed within the same process that generated it.

P. Regional Materials: Materials that are extracted, harvested, recovered, and manufactured within a radius of 100 miles from the Project site.

Q. Volatile Organic Compounds (VOC) Emissions Test: Refer to CDPH Standard Method v1.1 definition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Work of this project includes completed building and application for LEED certification. Work is not complete until Owner has accepted USGBC's final review of LEED certification.

1. Provide documentation required by LEED and LEED review.

B. Provide materials and procedures necessary to obtain LEED prerequisites and credits required in this Section. Other Sections may specify requirements that contribute to LEED prerequisites and credits. Refer to other sections for additional materials and procedures necessary to obtain LEED prerequisites and credits.

C. Respond to questions and requests for additional information from Architect and the USGBC regarding LEED credits until the USGBC has made its determination on the project's LEED certification application.

D. LEED Online Submittals: Upload LEED documentation submittal data directly to USGBC project "LEED Online" website. Complete online forms at least monthly and as necessary to document LEED credits for submittals required in this Section.

E. LEED Conference: Schedule and conduct a conference at a time convenient to Owner and Architect within 21 days prior to commencement of the work. Advise Architect, Owner's Commissioning Authority**,** and Owner's Project Manager of scheduled meeting dates.

1. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Owner's Project Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: LEED goals for the project, Contractor's action plans, and discussion of targeted LEED Prerequisites and Credits.
3. Minutes: Record and distribute minutes to attendees and other entities with responsibilities for obtaining LEED Credits.

1.05 ACTION SUBMITTALS

A. General: Submit additional LEED submittals required by other Specification Sections.

1. Submit each LEED submittal simultaneously with applicable product submittal.

2. Where LEED credits require photographic documentation, take necessary photographs and include them with the submittal.

B. LEED Documentation Submittals:

1. General, LEED Materials Reporting Form: Project submittals must be accompanied by a completed LEED Materials Reporting Form. Submittal packages must also include highlighted documentation supporting the sustainability claims made on the LEED Materials Reporting Form.

2. SSc5, Heat Island Reduction: Product data for roof and non-roof hardscape products indicating compliance with solar reflectance index (SRI) and solar reflectance (SR) requirements.

3. EAp3, Building-Level Energy Metering: Product data for meters, sensors, and data collection system used to provide continuous metering of building energy-consumption performance.

4. EAc3, Advanced Energy Metering: Product data for meters, sensors, and data collection system used to provide continuous metering of individual energy-consumption performance of any individual energy end uses that represent 10% or more of the total annual consumption of the building.

5. MRp2/MRc5, Construction and Demolition Waste Management: Comply with submittal requirements of Section 017419 "Construction Waste Management and Disposal."

6. MRc2, Building Product Disclosure and Optimization: Environmental Product Declarations complying with LEED requirements.

a. Documentation should confirm EPD conforms with ISO 14205, 14040, 14044 and EN 15804 or ISO 21930.

b. EPD shall have at least Cradle to Gate scope.

c. Complete “LEED Materials Documentation Sheet” with MRc2 information for each product having an EPD.

7. MRc3, Building Product Disclosure and Optimization, Sourcing of Raw Materials: Option 2, Leadership Extraction Practices.

a. Extended Producer Responsibility: Product data and certification letter from product manufacturers, indicating participation in an extended producer responsibility program and statement of costs.

b. Bio-Based Materials: Product data and certification for bio-based materials, indicating that they comply with requirements. Include statement of costs.

c. Certified Wood: Product data and chain-of-custody certificates for products containing certified wood. Include statement indicating cost for each certified wood product.

d. Materials Reuse: Receipts for salvaged and refurbished materials used for Project, indicating sources and costs.

e. Recycled Content: Product data and certification letter from product manufacturers, indicating percentages by weight of postconsumer and preconsumer recycled content for products having recycled content. Include statement of costs.

f. Regional Content: Product data and certification letter from product manufacturers, indicating extraction, harvest, recovery, and manufacturer location and distance (miles) from the Project site.

8. MRc4, Building Product Disclosure and Optimization, Material Ingredients: Option 1, Material Ingredient Reporting.

   a. Material ingredient reports for products that comply with LEED requirements for material ingredient reporting, including but not limited to the following:

      1) Manufacturer Inventory.

      2) Health Product Declaration.

      3) Cradle to Cradle certifications.

      4) Declare product labels.

9. EQp2/EQc3/EQc4, Indoor Air Quality: Comply with submittal requirements of SECTION 018119-INDOOR AIR QUALITY REQUIREMENTS.

Product Category	VOC Content	Volume Used	General Emissions Compliance	Category Evaluation Compliance
a. Paints and coatings	X	X	X	
b. Adhesives and sealants	X	X	X	
Adhesives and sealants applicable to products in categories c, d, and f below.				
c. Flooring			X	
d. Products containing composite wood or agrifiber products or wood glues				X (ULEF, NAF)

e. Ceilings, walls, thermal, and acoustic insulation			X	X (Batt Insulation)
f. Exterior applied materials. (Healthcare and Schools projects only)	X	X		

1.06 INFORMATIONAL SUBMITTALS

A. Qualification Data: For LEED coordinator.

B. Project Materials Cost Data: Provide statement indicating total cost for materials used for Project. Costs exclude labor, overhead, and profit. Include breakout of costs for the following categories of items:

1. Mechanical.
2. Electrical.
3. Plumbing.
4. Wood construction materials.
5. Furniture.
6. Specialty items such as elevators and equipment.
7. Earthwork and exterior improvements, hard costs.

C. LEED Action Plan Components: Provide preliminary submittals within fourteen days of date established the Notice to Proceed indicating how the following requirements will be met:

1. MRp2/MRc5, Waste management plan, complying with SECTION 017419-CONSTRUCTION WASTE MANAGEMENT.
2. EQp2/EQ3/EQ4, Indoor air quality plan, complying with SECTION 018119-INDOOR AIR QUALITY REQUIREMENTS.

D. LEED Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with LEED action plans for the following:

1. MRp2/MRc5, Waste reduction progress reports complying with SECTION 017419-CONSTRUCTION WASTE MANAGEMENT.
2. MRc2, Building product disclosure and optimization – environmental product declarations.
    a. LEEDv4 MR BPDO Calculator or equivalent MR Tracking Sheet monitoring the project's progress towards targeted LEED MR Credits. To be presented at construction meetings.

3. MRc3, Building product disclosure and optimization – sourcing of raw materials.

   a. Option 2:

      1) Extended producer responsibility.

      2) Bio-based materials.

      3) Certified wood products.

      4) Materials reuse.

      5) Recycled content.

         AND additionally for any product meeting at least one of attributes 1-5 above:

      6) Regional content.

   b. LEEDv4 MR BPDO Calculator or equivalent MR Tracking Sheet monitoring the project's progress towards targeted LEED MR Credits. To be presented at construction meetings.

4. MRc4, Building product disclosure and optimization – material ingredients.

   a. LEEDv4 MR BPDO Calculator or equivalent MR Tracking Sheet monitoring the project's progress towards targeted LEED MR Credits. To be presented at construction meetings.

5. EQc2, Low emitting materials.

   a. LEEDv4 Low Emitting Materials Calculator or equivalent Low Emitting Materials Tracking Sheet monitoring the project's progress towards targeted LEED Indoor Environmental Quality Credits. To be presented at construction meetings.

6. EQc3, Indoor air quality, during construction, complying with SECTION 018119-INDOOR AIR QUALITY REQUIREMENTS.

7. EQc4, Indoor air quality assessment, complying with SECTION 018119-INDOOR AIR QUALITY REQUIREMENTS.

1.07 QUALITY ASSURANCE

A. LEED Coordinator: Engage an experienced LEED-Accredited Professional to coordinate LEED requirements. LEED coordinator may also serve as waste management coordinator.

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

A. Provide products and procedures necessary to obtain LEED credits required in this Section. Although other Sections may specify some requirements that contribute to LEED credits, the Contractor shall determine additional materials and procedures necessary to obtain LEED credits indicated. Contractor to determine a combination of credit options best suited for achieving credits required.

1. Exclusions: Special equipment, such as elevators, escalators, process equipment, and fire suppression systems, is excluded from the credit calculations. Also excluded are products purchased for temporary use on the project, like formwork for concrete.

B. Unauthorized Products: Materials and products required for work of this section shall not contain asbestos, lead, mercury, polychlorinated biphenyls (PCBs), or other hazardous materials identified by the Owner.

2.02 BUILDING PRODUCT DISCLOSURE AND OPTIMIZATION

A. MRc2, Building Product Disclosure and Optimization, Environmental Product Declarations (EPD): Option 1. Provide at least 20 permanently installed products (sourced from at least 5 different manufacturers) which meet one of the disclosure criteria:

1. Product-Specific Declaration: Valued as one quarter (1/4) of a product.
2. Industry-Wide (Generic) EPD: Valued as one half (1/2) of a product.
3. Product-Specific Type III EPD: Valued as one whole product.

B. MRc3, Building Product Disclosure and Optimization, Sourcing of Raw Materials: Option 2, Leadership Extraction Practices. Provide products that meet at least one of the responsible extraction criteria below for at least 25%, by cost, of the total value of permanently installed building products in the project:

1. Extended producer responsibility program.
2. Bio-based materials.
3. Certified Wood: Wood-based materials include, but are not limited to, the following materials when made from wood, engineered wood products, or wood-based panel products:
    a. Rough carpentry.
    b. Miscellaneous carpentry.
    c. Heavy timber construction.
    d. Wood decking.

e. Metal-plate-connected wood trusses.

f. Structural glued-laminated timber.

g. Finish carpentry.

h. Architectural woodwork.

i. Wood paneling.

j. Wood veneer wall covering.

k. Wood flooring.

l. Wood lockers.

m. Wood cabinets.

4. Recycled content.

a. Exceptions: Do not include fire protection, operational plumbing, operational mechanical, and operational electrical components, and specialty items, such as elevators and equipment, in the calculation.

5. AND Regional content, only for a product that meets at least one of the attributes 1-5 listed above.

6. Note: Structure and enclosure materials may not constitute more than 30% of the value of MRc3 compliant building products.

C. MRc4, Building Product Disclosure and Optimization, Material Ingredients: Option 1, Material Ingredient Reporting.

1. Use at least 20 different permanently installed products from at least five different manufacturers that use any of the following programs to demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm), which meet one of the following disclosure criteria:

a. Manufacturer Inventory.

b. Health Product Declarations (HPDs).

c. Cradle to Cradle (C2C) certifications.

d. Declare product labels.

2.03 LOW-EMITTING MATERIALS

A. EQc2, Low-Emitting Materials, General Emissions Requirements: Products must demonstrate they have been tested and determined compliant in accordance with California Department of Public Health, (CDHP), Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's documentation demonstrating compliance must state the range of total VOCs (tVOC) after 14 days measured as specified in the CDPH Standard Method v1.1 as follows:

1. 0.5mg/m3 or less,
2. between 0.5 and 5.0 mg/m3 or,
3. 0.50 mg/m3 or more.

B. EQc2, Low-Emitting Materials, Paints and Coatings, VOC content: For field applications that are inside the weatherproofing system, 100 percent of paints and coatings shall comply with the limits for VOC content when calculated according to the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, **OR** the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011.

Product Type:	Allowable VOC Content (g/L):
Bond Breaker	350
Clear wood finishes - Varnish	275
Clear wood finishes – Sanding Sealer	275
Clear wood finishes - Lacquer	275
Colorant – Architectural Coatings, excluding IM coatings	50
Colorant – Solvent Based IM	600
Colorant - Waterborne IM	50
Concrete – Curing compounds	100
Concrete – Curing compounds for roadways & bridges	350
Concrete surface retarder	50
Driveway Sealer	50
Dry-fog coatings	50
Faux finishing coatings - Clear topcoat	100
Faux finishing coatings – Decorative Coatings	350
Faux finishing coatings - Glazes	350
Faux finishing coatings - Japan	350
Faux finishing coatings – Trowel applied coatings	50
Fire-proof coatings	150
Flats	50
Floor coatings	50
Form release compounds	100
Graphic arts (sign) coatings	150
Industrial maintenance coatings	100
Industrial maintenance coatings – High temperature IM coatings	420
Industrial maintenance coatings – Non-sacrificial anti-graffiti coatings	100
Industrial maintenance coatings – Zinc rich IM primers	100
Magnesite cement coatings	450
Mastic coatings	100

Metallic pigmented coatings	150
Multi-color coatings	250
Non-flat coatings	50
Pre-treatment wash primers	420
Primers, sealers and undercoaters	100
Reactive penetrating sealers	350
Recycled coatings	250
Roof coatings	50
Roof coatings, aluminum	100
Roof primers, bituminous	350
Rust preventative coatings	100
Stone consolidant	450
Sacrificial anti-graffiti coatings	50
Shellac- Clear	730
Shellac – Pigmented	550
Specialty primers	100
Stains	100
Stains, interior	250
Swimming pool coatings – repair	340
Swimming pool coatings – other	340
Traffic Coatings	100
Waterproofing sealers	100
Waterproofing concrete/masonry sealers	100
Wood preservatives	350
Low solids coatings	120

C. EQc2, Low-Emitting Materials, Paints and Coatings, General Emissions Requirement: For field applications that are inside the weatherproofing system, at least 90 percent of paints and coatings, measured by volume, shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

1. To comply with the General Emissions Requirement, products shall meet one of the following:
    a. UL Greenguard Gold Certified
    b. SCS Indoor Advantage Gold Certified
    c. MAS Certified Green
    d. Documentation that product meets the California Department of Public Health (CDHP), Standard Method v1.1-2010, using the applicable exposure scenario.

D. EQc2, Low-Emitting Materials, Adhesives and Sealants, VOC content: For field applications that are inside the weatherproofing system, 100 percent of adhesives and sealants shall comply with the limits for VOC content when calculated according to South Coast Air Quality Management District (SCAQMD) Rule #1168, requirements in effect on July 1, 2005, and rule amendment date January 7, 2005:

Architectural Applications:	Allowable VOC Content (g/L):
Indoor carpet adhesives	50
Carpet pad adhesives	50
Outdoor carpet adhesives	150
Wood flooring adhesives	100
Rubber floor adhesives	60
Subfloor adhesives	50
Ceramic tile adhesives	65
VCT and asphalt tile adhesives	50
Dry wall and panel adhesives	50
Cove base adhesives	50
Multipurpose construction adhesives	70
Structural glazing adhesives	100
Single ply roof membrane adhesives	250
Specialty Applications:	
PVC welding	510
CPVC welding	490
ABS welding	325
Plastic cement welding	250
Adhesive primer for plastic	550
Computer diskette manufacturing	350
Contact adhesive	80
Special purpose contact adhesive	250
Tire retread	100
Adhesive primer for traffic marking tape	150
Structural wood member adhesive	140
Sheet applied rubber lining operations specialty	850
Top and Trim adhesive	250
Substrate Specific Applications:	
Metal to metal substrate specific adhesives	30
Plastic foam substrate specific adhesives	50
Porous material (except wood) substrate specific adhesives	50
Wood substrate specific adhesives	30
Fiberglass substrate specific adhesives	80
Sealants:	
Architectural sealant	250
Marine deck sealant	760

Nonmember roof sealant	300
Roadway sealant	250
Single-ply roof membrane sealant	450
Other sealant	420
Sealant Primers:	
Architectural non-porous sealant primer	250
Architectural porous sealant primer	775
Modified bituminous sealant primer	500
Marine deck sealant primer	760
Other sealant primer	750
Other	
Other adhesives, adhesive bonding primers, adhesive primers or any other primers	250

1. Exception: The provisions of SCAQMD Rule 1168 do not apply to adhesives and sealants subject to state or federal consumer product VOC regulations.

E. EQc2, Low-Emitting Materials, Adhesives and Sealants, General Emissions Requirement: For field applications that are inside the weatherproofing system, at least 90 percent of adhesives and sealants, measured by volume, shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

F. EQc2, Low-Emitting Materials, Flooring, General Emissions Requirement: 100 percent of flooring shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

1. To comply with the General Emissions Requirement, products shall meet one of the following:
    a. FloorScore Certified (hard surface flooring and flooring adhesives)
    b. Green Label Plus certified (carpet, adhesive, and cushion)
    c. NSF/ANSI 332 certified (resilient flooring)
    d. Documentation that product meets the California Department of Public Health (CDHP), Standard Method v1.1-2010, using the applicable exposure scenario.

G. EQc2, Low-Emitting Materials, Composite Wood: 100 percent of composite wood, agrifiber products, and adhesives shall be made using ultra-low-emitting formaldehyde (ULEF) resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde (NAF).

H. EQc2, Low-Emitting Materials, Exterior Applied Materials, VOC content: For field applications that are exterior applied, at least 90 percent of adhesives, sealants, coatings, roofing, and waterproofing, measured by volume, shall comply with the limits for VOC content when calculated according to the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, **AND** the South Coast Air Quality Management District (SCAQMD) Rule 1168, effective June 3, 2011 for adhesives and sealants.

1. Refer to Table under 2.03, B. above for allowable VOC content. Refer to CARB 2007 SCM and SCAQMD Rule 1168 for any products not listed.
2. The following materials are prohibited and do not count toward total percentage compliance:
    a. Hot-mopped asphalt for roofing.
    b. Coal tar sealants for parking lots and other paved surfaces.

I. Additional Low-Emitting Requirements:

1. If the applicable regulation requires subtraction of exempt compounds, any content of intentionally added exempt compounds larger than 1% weight by mass (total exempt compounds) must be disclosed.
2. If a product cannot reasonably be tested as specified above, testing of VOC content must comply with ASTM D2369-10; ISO 11890, part 1; ASTM D6886-03; or ISO 11890-2.
3. Methylene chloride and perchloroethylene may not be intentionally added in paints, coatings, adhesives, or sealants.

2.04 INDOOR WATER USE REDUCTION

A. WEp2, Indoor Water Use Reduction, Appliances: Provide ENERGY STAR or performance equivalent appliances.

B. WEp2/WEc2, Indoor Water Use Reduction, Plumbing Fixtures: Do not exceed water flow requirements indicated in Division 22 - PLUMBING. All newly installed toilets, urinals, private lavatory faucets, and showerheads that are eligible for labeling must be WaterSense labeled.

PART 3 EXECUTION

3.01 NONSMOKING BUILDING

A. EQp2, Environmental Tobacco Smoke Control: Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.

4. Refer to SECTION 018119-INDOOR AIR QUALITY REQUIREMENTS.

3.02 CONSTRUCTION WASTE MANAGEMENT

A. MRp2 MRc5, Construction and Demolition Waste Management: Comply with SECTION 017419-CONSTRUCTION WASTE MANAGEMENT.

3.03 CONSTRUCTION INDOOR-AIR-QUALITY MANAGEMENT

A. EQc3/EQc4, Construction Indoor Air Quality Management Plan: Comply with SECTION 018119-INDOOR AIR QUALITY REQUIREMENTS.

END OF SECTION

ATTACHMENT A

LEEDv4-S Scorecard

LEED for Schools v4
Project Scorecard - 90% Construction Documents

Project Name: Amesbury Elementary School
Project Address: 193 Lion's Mouth Road, Amesbury, MA 01913
Date Updated: 09/17/2020

Phase	Yes	+	-	No			
	Project Totals						
	51	11	11	37			
	0	0	1	0		**Integrative Process**	1
D			1		Credit 1	**Integrative Process**	1
	2	0	0	13		**Location & Transportation**	15
D	x	x	x	N/A	Credit 1	**LEED for Neighborhood Development Location**	15
D	1				Credit 2	**Sensitive Land Protection**	1
D				2	Credit 3	**High Priority Site**	2
D				5	Credit 4	**Surrounding Density and Diverse Uses**	1-5
D				4	Credit 5	**Access to Quality Transit**	1-4
D				1	Credit 6	**Bicycle Facilities**	1
D				1	Credit 7	**Reduced Parking Footprint**	1
D	1				Credit 8	**Green Vehicles** (LEEDv4.1)	1
	8	0	3	1		**Sustainable Sites**	12
C	Y				Prereq 1	**Construction Activity Pollution Prevention**	Req'd
D	Y				Prereq 2	**Environmental Site Assessment**	Req'd
D	1				Credit 1	**Site Assessment**	1
D	2				Credit 2	**Site Development - Protect or Restore Habitat** (LEEDv4.1)	2
D	1				Credit 3	**Open Space**	1
D			3		Credit 4	**Rainwater Management** (LEEDv4.1)	2-3
D	2				Credit 5	**Heat Island Reduction**	1-2
D	1				Credit 6	**Light Pollution Reduction**	1
D				1	Credit 7	**Site Master Plan**	1
D	1				Credit 8	**Joint Use of Facilities**	1
	4	0	0	8		**Water Efficiency**	12
D	Y				Prereq 1	**Outdoor Water Use Reduction**	Req'd
D	Y				Prereq 2	**Indoor Water Use Reduction**	Req'd
D	Y				Prereq 3	**Building-level Water Metering**	Req'd
D	1			1	Credit 1	**Outdoor Water Use Reduction**	2
D	2			5	Credit 2	**Indoor Water Use Reduction**	1-7
D				2	Credit 3	**Cooling Tower Water Use**	1-2
D	1				Credit 4	**Water Metering**	1
	19	6	3	3		**Energy & Atmosphere**	31
C	Y				Prereq 1	**Fundamental Commissioning and Verification**	Req'd
D	Y				Prereq 2	**Minimum Energy Performance**	Req'd

D	Y				Prereq 3	**Building-level Energy Metering**	Req'd
D	Y				Prereq 4	**Fundamental Refrigerant Management**	Req'd
C	5			1	Credit 1	**Enhanced Commissioning**	2-6
D	13	3			Credit 2	**Optimize Energy Performance**	1-16
D	1				Credit 3	**Advanced Energy Metering**	1
C				2	Credit 4	**Demand Response**	1-2
D		3			Credit 5	**Renewable Energy Production** (1%/5%/10%)	1-3
D			1		Credit 6	**Enhanced Refrigerant Management**	1
C			2		Credit 7	**Green Power and Carbon Offsets** (50%/100%)	1-2
	Yes	+	-	No			
	4	1	3	5		**Materials & Resources**	13
D	Y				Prereq 1	**Storage & Collection of Recyclables**	Req'd
C	Y				Prereq 2	**Construction and Demolition Waste Management Plan**	Req'd
C			3	2	Credit 1	**Building Life-Cycle Impact Reduction**	2-5
C	1			1	Credit 2	**Building Product Disclosure & Optimization**-EPD's (LEEDv4.1)	1-2
C		1		1	Credit 3	**Building Product Disclosure & Optimization**-Raw Materials (LEEDv4.1)	1-2
C	1			1	Credit 4	**Building Product Disclosure & Optimization**-Material Ingredients (LEEDv4.1)	1-2
C	2				Credit 5	**Construction and Demolition Waste Management**	1-2
	Yes	+	-	No			
	7	3	0	6		**Indoor Environmental Quality**	16
D	Y				Prereq 1	**Minimum IAQ Performance**	Req'd
D	Y				Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	Req'd
D	Y				Prereq 3	**Minimum Acoustical Performance**	Req'd
D	2				Credit 1	**Enhanced IAQ Strategies**	1-2
C	1	2			Credit 2	**Low-Emitting Materials** (3/5/6)	1-3
C	1				Credit 3	**Construction IAQ Management Plan**	1
C	1			1	Credit 4	**IAQ Assessment**	1-2
D	1				Credit 5	**Thermal Comfort**	1
D	1			1	Credit 6	**Interior Lighting**	1-2
D				3	Credit 7	**Daylight**	1-3
D		1			Credit 8	**Quality Views**	1
D				1	Credit 9	**Acoustic Performance**	1
	Yes	+	-	No			
	6	0	0	0		**Innovation**	6
D	1				Credit 1	**Innovation: OM Starter Kit (Green Cleaning & IPM Plan)**	1
D	1				Credit 2	**Innovation: Purchasing Lamps (Low Mercury Lighting)**	1
D	1				Credit 3	**Innovation: Occupant Comfort Survey**	1
D	1				Credit 4	**Innovation: Design for Active Occupants**	1
D	1				Credit 5	**Pilot: Integrative Analysis of Building Materials**	1
C	1				Credit 6	**LEED Accredited Professional**	1
	Yes	+	-	No			
	1	1	1	1		**Regional Priority Credits**	4
						Zip code 01913:	
				1	Credit 1	**High Priority Site**	1
	1				Credit 2	**Optimize Energy Performance** 8pt threshold	1
		1			Credit 3	**Renewable Energy Production (5%)**	1
			1		Credit 4	**Building Life Cycle Impact Reduction.** 2pt threshold	1
	Yes	+	-	No			
	51	11	11	37		**Project Totals (Certification Estimates)**	110

Certified: 40-49 points, **Silver:** 50-59 points, **Gold:** 60-79 points, **Platinum:** 80+ points

ATTACHMENT B

LEEDv4 Materials Reporting Form

New Amesbury Elementary School
193 Lions Mouth Road, Amesbury, MA

LEED® V4 MATERIALS REPORTING FORM

MATERIAL OR PRODUCT:
MATERIAL COST (LESS LABOR AND EQUIPMENT):

Contractor/Installer:	Manufacturer:
Address:	Manufacturer Address:
Contact:	

Signed by:_____ Date:_____

Company:_____

***Instructions to Contractor/Installer**:* Please complete the following information in all appropriate categories. Use one documentation sheet for each product or material (e.g. tile and grout each get their own sheet). Attach any supporting information to this sheet (including, but not limited to, cut sheets and letters from manufacturers to demonstrate compliance).

LEED MR Credit 2 – BPDO: Environmental Product Declarations
(For Division 3-10 & 31.60.00, 32.10.00, 32.30.00, 32.90.00 products and materials)

*Does the product have a manufacturer's **Environmental Product Declaration (EPD)**[1]?*

Product Manufacturer:	Product Name:	EPD Provided? (Y/N)

*Does the product contain **regionally**[2] **extracted, harvested, or recovered**[3] **materials**?*

Raw Materials:	Miles to Project

*Was the material/product **manufactured**[4] **and purchased regionally**?*

Location of Manufacturer (City/State):	
Distance from Manufacturer to Project Site (Miles)	
Location of Distributor (City/State)	
Distance from Distributor to Project Site (Miles)	

1. Environmental Product Declaration (EPD): a statement that the item meets the environmental requirements of ISO 14021-1999, ISO 14025-2006 and EN 15804, or ISO 21930-2007.
2. Regional: within 100 miles of project site as-the-crow-flies.
3. Extraction, harvest, or recovery location: Location of origin for virgin or recycled resources from which the building product's components are made. (i.e. before processing or manufacturing.)
4. Manufactured Location: Final assembly of components into the building product that is furnished or installed.

LEED MR Credit 3 – BPDO: Sourcing of Raw Materials
(For Division 3-10 & 31.60.00, 32.10.00, 32.30.00, 32.90.00 products and materials)

*Does the manufacturer participate in an **extended producer responsibility[5] program**?*

Product Manufacturer:	Product Name:	Extended Producer Responsibility Program? (Y/N)

*Is the product **bio-based[6]**? If so, does it meet the Sustainable Agriculture Network's (SAN) Sustainable Agriculture Standard?*

Product Manufacturer:	Product Name:	Meets SAN Sustainable Agriculture Standard? (Y/N)

*Does the material/product contain **FSC Certified wood**?*

Component:	Vendor Chain-of-Custody #	% Wood of Materials	% FSC Wood of Materials	Vendor invoice provided? (Y/N)

*Is the material/product **reused, salvaged or refurbished**?*

Component:	Reused, Salvaged or Refurbished Product? (Y/N)	Actual Cost Paid or Replacement Value (whichever is higher):

*Does the material/product contain **post-consumer[7] and/or pre-consumer[8] recycled content**?*

Percentage of post-consumer content:	
Percentage of pre-consumer content:	

*If only part of **the assembly contains recycled content**, fill in the chart below:*

Assembly Components:	Weight:	% Post-Con	% Pre-Con
Totals by weight (should equal 100% of assembly)			

*Does the product contain **regionally[2] extracted, harvested, or recovered[3] materials**?*

Raw Materials:	Miles to Project

*Was the material/product **manufactured[4] and purchased regionally[2]**?*

Location of Manufacturer (City/State):	
Distance from Manufacturer to Project Site (Miles)	
Location of Distributor (City/State)	
Distance from Distributor to Project Site (Miles)	

5. Extended producer responsibility: measures undertaken by the maker of a product to accept its own and sometimes other manufacturer's products as postconsumer waste at the end of the product's useful life.
6. Bio-based Material: commercial or industrial products that are composed in whole, or in significant part, of biological products, renewable agricultural materials (including plant, animal, and marine materials), or forestry materials. Bio-based raw materials must be tested using ATSM Test Method D6866 and be legally harvested, as defined by the exporting and receiving country. Leather and other animal hides are excluded.
7. Post-Consumer Recycled Content: Portion of material or product which derives from discarded consumer waste that has been recovered for use as a raw material (e.g. plastic water bottles, newspaper)
8. Pre-Consumer Recycled Content: Portion of material or product which derives from recovered industrial materials that are diverted from municipal solid waste for use in a different mfg. process, prior to use by a consumer

LEED MR Credit 4 – BPDO: Material Ingredients
(For Division 3-10 & 31.60.00, 32.10.00, 32.30.00, 32.90.00 products and materials)

*Does the product have a manufacturer's **Health Product Declaration (HPD)**[9]?*

Product Manufacturer:	Product Name:	HPD Provided? (Y/N)

*Does the product contain **regionally**[2] **extracted, harvested, or recovered**[3] **materials**?*

Raw Materials:	Miles to Project

*Was the material/product **manufactured**[4] **and purchased regionally**?*

Location of Manufacturer (City/State):	
Distance from Manufacturer to Project Site (Miles)	
Location of Distributor (City/State)	
Distance from Distributor to Project Site (Miles)	

LEED EQ Credit 2 – Low-Emitting Materials (Where applicable, regardless of Division)

*Does the material/product comply with all applicable standards for **VOC content and emissions**?*

Product Manufacturer:	Product Name:	TVOC Emissions[10] Range	VOC Content (g/l)	Source Provided? (Y/N)

*Is the materials/product **wet-applied**[11]?*

Product Manufacturer:	Product Name:	VOC Content (g/l)	Volume Used (L)	Source Provided? (Y/N)

*Is the material/product **interior applied** (inside the weatherproofing) **or exterior applied**? (Schools only)*

Product Manufacturer:	Product Name:	Interior	Exterior

*Is the **composite wood material/product ULEF or NAF**[12]?*

Product Manufacturer:	Product Name:	ULEF or NAF?	Source Provided? (Y/N)

*Does **batt insulation contain no added formaldehyde**, including no urea formaldehyde, phenol formaldehyde, and urea-extended phenol formaldehyde? (Schools only)*

Product Manufacturer:	Product Name:	No added formaldehyde? (Y/N)	Source Provided? (Y/N)

9. Health Product Declaration (HPD): a report of the materials or ingredients content of a building product and the associated health effects. Defining the content of this report is the Health Product Declaration Open Standard™
10. TVOC Emissions for Building products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.1-2010.
11. All paints and coatings wet-applied on site must meet applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011. All adhesives and sealants wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications, as analyzed by the methods specified in Rule 1168.
12. Composite Wood Evaluation as defined by the California Air Resources Board (CARB), Airborne Toxic Measure to Reduce Formaldehyde Emissions from Composite Wood Products Regulation, must be documented to have low formaldehyde emissions that meet the CARB ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde (NAF) resins.

SECTION 018119

INDOOR AIR QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. All of the Contract Documents, including General Conditions and Division 1 General Requirements, apply to the work of this section.

1.02 SUMMARY

A. Requirements for minimum indoor air quality (IAQ) performance standards during the period of construction.

B. The General Contractor shall develop, for Owner and Architect review, a Construction Indoor Air Quality Management Plan for this Project.

C. Sustainable Design Intent: Comply with project requirements intended to achieve sustainable design, measured and documented according to the LEED for Schools v.4 Green Building Rating System, of the US Green Building Council.

1.03 RELATED REQUIREMENTS

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. Section 01 33 00, Submittals.
2. Section 01 50 00, Temporary Facilities and Controls.
3. Section 01 74 19, Construction Waste Management.
4. Section 01 81 13, Sustainable Design Requirements
5. Section 01 91 13, General Commissioning.
6. Division 22, 23 and 26
7. Divisions 3 through 14 Specification Sections; Specific requirements relating to indoor air quality for each Section.

1.04 PERFORMANCE REQUIREMENTS

A. Comply with minimum requirements of Sections 4 through 7 of ASHRAE 62.1-2010, Ventilation for Acceptable Indoor Air Quality and approved Addenda.

1. Coordinate with requirements of Section 01 91 13, General Commissioning, and Division 23 - HVAC.

B. Prevent exposure of building systems to environmental tobacco smoke during construction. At a minimum, take the following measures:

1. Do not allow smoking inside the project building.
2. Locate exterior designated smoking areas at least 25 feet away from entries, outdoor air intakes and operable windows during construction.

C. During construction meet or exceed the minimum requirements of the recommended Control Measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008-2008, Chapter 3.

D. Protect occupied portions of the building from transfer of dust and particulate matter, noise and odor emissions generated during construction in compliance with the minimum requirements of the recommended Control Measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition 2007, ANSI/SMACNA 008-2008, Chapter 3.

E. Protect absorptive materials from moisture damage when stored on-site and after installation.

F. Use materials and products in compliance with the VOC content limits as established in LEED credit IEQ Low Emitting Materials.

G. During construction, comply with the following requirements, per LEED IEQ Construction Indoor Air Quality Management Plan:

1. Develop and implement a moisture control plan to ensure dry conditions will be maintained to protect absorptive materials stored on site. Include criteria for protecting the building from moisture intrusion and occupant exposure to mold spores.
2. If permanently installed air handlers are used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 shall be used at each return air grille, as determined by ASHRAE 52.2-2007. Protect active outdoor air intakes and return air grilles with applicable filtration media. Periodically inspect temporary media and replace as necessary. Replace filtration media immediately prior to occupancy.
3. Develop and implement a plan to reduce noise and emissions on the construction site; address the following:

a. Surrounding community noise and vibration impacts. Determine which areas on and adjacent to the site will require special protection from noise.

b. Construction Worker training and protective equipment. Determine construction activities that may require the use of protective gear or specialty equipment and properly train workers in their use and/or operation.

c. Source Reduction. Develop and implement policies to limit truck and equipment idling on site and to limit vibration and noise from demolition and construction activities

1.05 SUBMITTALS

A. Construction Indoor Air Quality (IAQ) Management Plan: the General Contractor shall submit a preliminary Construction IAQ Management Plan for review.

1. Within 21 calendar days after receipt of Notice to Proceed, the General Contractor shall submit to the Owner a finalized Construction IAQ Management Plan.

2. The proposed Plan shall comply with Division 23 – MECHANICAL requirements.

3. The proposed Plan shall include, but not be limited to, the following:

a. Protection of ventilation system components during construction.

b. Cleaning and replacing contaminated ventilation system components after construction, including filtration media.

c. Temporary ventilation.

d. Protection of absorptive materials from moisture damage when stored on-site and after installation.

g. Sequence of finish installation plan.

h. Selection of cleaning products and procedures to be used during construction and final cleaning.

i. Other items required by SMACNA IAQ Guidelines for Occupied Buildings under Construction, 2nd edition 2007, ANSI/SMACNA 008-2008 Chapter 3.

4. Coordinate Construction IAQ Management Plan with Owner's current IAQ management plans and procedures.

5. Comply with the requirements of LEED IEQ Construction Indoor Air Quality Management Plan

B. Material Safety Data Sheets (MSDS): Submit for materials with date clearly identified. MSDS must contain specific chemical content data identifying the percent of the total product mass represented by each listed chemical.

C. Product Data: Submit for each type of filtration media used during construction and installed immediately prior to occupancy, include and highlight MERV values the documentation provided.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Take special care to prevent accumulation of moisture on materials and within packaging during delivery, storage, and handling to prevent development of mold and mildew inside packaging and on products.

B. Immediately remove from site and properly dispose of materials showing signs of mold and mildew, including materials with moisture stains.

C. When not in use, store products in original sealed containers, in a designated location

PART 2 PRODUCTS

2.01 FILTRATION MEDIA

A. Filtration Media: Comply with ASHRAE 52.2-2007 and provide filtration media with compliant MERV ratings.

PART 3 EXECUTION

3.01 CONSTRUCTION IAQ MANAGEMENT PLAN IMPLEMENTATION

A. IAQ Manager: The General Contractor shall designate an on-site person responsible for instructing workers and overseeing and documenting results of the Construction IAQ Management Plan for the Project.

B. Distribution: The General Contractor shall distribute copies of the Construction IAQ Management Plan to the Job Site Foreman, each subcontractor, the Owner, and the Architect.

C. Instruction: The General Contractor shall provide on-site instruction of appropriate procedures and methods to be used by all parties at the appropriate stages of the Project.

D. Preconditioning: Allow products, which have odors and significant VOC emissions, to off-gas in specified dry, well-ventilated space for sufficient period to dissipate odors and emissions prior to delivery to Project.

1. Remove containers and packaging from materials prior to conditioning to maximize off-gassing of VOCs.
2. Condition products in ventilated warehouse or other building.

E. Coordinate Construction IAQ Management Plan with final cleaning as indicated in SECTION 017700-PROJECT CLOSEOUT.

END OF SECTION

SECTION 018300

MINIMUM WAGE RATES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. The listing of CLASSIFICATIONS AND MINIMUM WAGE RATES as determined by the Commissioner of Labor and Industries under the provisions of Sections 27 and 27A, Chapter 149 of the General Laws as amended, are attached herewith and are hereby made a part of the Contract Documents.

B. The General Contractor and all Subcontractors shall comply with the requirements of Chapter 149 of the General Laws, Commonwealth of Massachusetts, Section 26 and 27D, inclusive, as amended.

C. It is the obligation of the Contractor to assure that the Contractor and all of its subcontractors comply with the requirements of the Massachusetts Prevailing Wage Law, MGL c.149 SS26-27H. The Contractor shall be responsible for all loss, cost and damage suffered or incurred by the Owner as a result of any stop work order or other enforcement action taken by the Attorney General under the authority of MGL c.149 S27, and shall release, indemnify, hold harmless and defend the Owner, the Architect, their officers, employees and consultants, from and against all claims, actions, suits, fines, or administrative proceedings arising out of or related to the violation by the Contractor or any subcontractor of the said Prevailing Wage Law (or, in the case of the Contractor's defense obligation, the claimed violation thereof).

D. It is the obligation of the Contractor to assure that the Contractor and all of its subcontractors comply with the requirements of the Davis-Bacon Act issued by the U.S. Department of Labor under the Davis-Bacon and Related Acts. The Contractor shall be responsible for all loss, cost and damage suffered or incurred by the Owner as a result of any stop work order or other enforcement action taken by the DOL's OFCCP, and shall release, indemnify, hold harmless and defend the Owner, the Architect, their officers, employees and consultants, from and against all claims, actions, suits, fines, or administrative proceedings arising out of or related to the violation by the Contractor or any subcontractor of the said Prevailing Wage Law (or, in the case of the Contractor's defense obligation, the claimed violation thereof).

E. When there is a conflict between the prevailing wage rate under the Prevailing Wage Rates determined by the Department of Labor Standards and to Federal (Davis-Bacon) Minimum Wage Rates, the worker will be paid at the higher wage rate.

END OF SECTION

ATTACHMENT A

Massachusetts Prevailing Wage Rates

NEW AMESBURY ELEMENTARY SCHOOL
MINIMUM WAGE RATES
018300 - A

CHARLES D. BAKER
Governor

KARYN E. POLITO
Lt. Governor

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS

Prevailing Wage Rates

As determined by the Director under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

ROSALIN ACOSTA
Secretary
MICHAEL FLANAGAN
Director

Awarding Authority: City of Amesbury

Contract Number:

City/Town: AMESBURY

Description of Work: New Amesbury Elementary School Project consists of new construction of a 98,196 SF elementary school and related site work.

Job Location: 193 Lion's Mouth Road, Amesbury, MA

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule from the Department of Labor Standards ("DLS") if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- All apprentices working on the project are required to be registered with the Massachusetts Department of Labor Standards, Division of Apprentice Standards (DLS/DAS). Apprentice must keep his/her apprentice identification card on his/her person during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DLS/DAS regardless of whether or not they are registered with any other federal, state, local, or private agency must be paid the journeyworker's rate for the trade.**
- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule. Awarding authorities are required to request these updates no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. Contractors are required to obtain the wage schedules from awarding authorities, and to pay no less than these rates to covered workers. The annual update requirement is not applicable to 27F "rental of equipment" contracts.
- Every contractor or subcontractor which performs construction work on the project is required to submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. A sample of a payroll reporting form may be obtained at http://www.mass.gov/dols/pw.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may report the violation to the Fair Labor Division of the office of the Attorney General at (617) 727-3465.
- Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2020	$35.15	$12.91	$14.82	$0.00	$62.88
	06/01/2021	$35.95	$12.91	$14.82	$0.00	$63.68
	08/01/2021	$35.95	$13.41	$14.82	$0.00	$64.18
	12/01/2021	$35.95	$13.41	$16.01	$0.00	$65.37
(3 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2020	$35.22	$12.91	$14.82	$0.00	$62.95
	06/01/2021	$36.02	$12.91	$14.82	$0.00	$63.75
	08/01/2021	$36.02	$13.41	$14.82	$0.00	$64.25
	12/01/2021	$36.02	$13.41	$16.01	$0.00	$65.44
(4 & 5 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2020	$35.34	$12.91	$14.82	$0.00	$63.07
	06/01/2021	$36.14	$12.91	$14.82	$0.00	$63.87
	08/01/2021	$36.14	$13.41	$14.82	$0.00	$64.37
	12/01/2021	$36.14	$13.41	$16.01	$0.00	$65.56
ADS/SUBMERSIBLE PILOT *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$103.05	$9.40	$23.12	$0.00	$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR *LABORERS - ZONE 2*	12/01/2020	$35.41	$8.60	$16.06	$0.00	$60.07
	06/01/2021	$36.33	$8.60	$16.06	$0.00	$60.99
	12/01/2021	$37.24	$8.60	$16.06	$0.00	$61.90
	06/01/2022	$38.14	$8.60	$16.06	$0.00	$62.80
	12/01/2022	$38.99	$8.60	$16.06	$0.00	$63.65
	06/01/2023	$39.89	$8.60	$16.06	$0.00	$64.55
	12/01/2023	$40.79	$8.60	$16.06	$0.00	$65.45
For apprentice rates see "Apprentice- LABORER"						
AIR TRACK OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2020	$35.41	$8.60	$16.06	$0.00	$60.07
	06/01/2021	$36.33	$8.60	$16.06	$0.00	$60.99
	12/01/2021	$37.24	$8.60	$16.06	$0.00	$61.90
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	12/01/2020	$38.10	$12.80	$9.45	$0.00	$60.35
ASPHALT RAKER *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
ASPHALT RAKER (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.98	$13.50	$15.70	$0.00	$79.18
	06/01/2021	$51.08	$13.50	$15.70	$0.00	$80.28
	12/01/2021	$52.23	$13.50	$15.70	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
BACKHOE/FRONT-END LOADER *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.98	$13.50	$15.70	$0.00	$79.18
	06/01/2021	$51.08	$13.50	$15.70	$0.00	$80.28
	12/01/2021	$52.23	$13.50	$15.70	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER *LABORERS - ZONE 2*	12/01/2020	$35.41	$8.60	$16.06	$0.00	$60.07
	06/01/2021	$36.33	$8.60	$16.06	$0.00	$60.99
	12/01/2021	$37.24	$8.60	$16.06	$0.00	$61.90
	06/01/2022	$38.14	$8.60	$16.06	$0.00	$62.80
	12/01/2022	$38.99	$8.60	$16.06	$0.00	$63.65
	06/01/2023	$39.89	$8.60	$16.06	$0.00	$64.55
	12/01/2023	$40.79	$8.60	$16.06	$0.00	$65.45
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2020	$35.41	$8.60	$16.06	$0.00	$60.07
	06/01/2021	$36.33	$8.60	$16.06	$0.00	$60.99
	12/01/2021	$37.24	$8.60	$16.06	$0.00	$61.90
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
BOILER MAKER *BOILERMAKERS LOCAL 29*	01/01/2020	$46.10	$7.07	$17.98	$0.00	$71.15

Apprentice - *BOILERMAKER - Local 29*

Effective Date - 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	$29.97	$7.07	$11.69	$0.00	$48.73
2	65	$29.97	$7.07	$11.69	$0.00	$48.73
3	70	$32.27	$7.07	$12.59	$0.00	$51.93
4	75	$34.58	$7.07	$13.49	$0.00	$55.14
5	80	$36.88	$7.07	$14.38	$0.00	$58.33
6	85	$39.19	$7.07	$15.29	$0.00	$61.55
7	90	$41.49	$7.07	$16.18	$0.00	$64.74
8	95	$43.80	$7.07	$17.09	$0.00	$67.96

Notes:

Apprentice to Journeyworker Ratio:1:4

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) *BRICKLAYERS LOCAL 3 (LYNN)*	02/01/2021	$55.75	$11.39	$22.09	$0.00	$89.23
	08/01/2021	$57.15	$11.39	$22.25	$0.00	$90.79
	02/01/2022	$57.74	$11.39	$22.25	$0.00	$91.38

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *BRICK/PLASTER/CEMENT MASON - Local 3 Lynn*

Effective Date - 02/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.88	$11.39	$22.09	$0.00	$61.36
2	60	$33.45	$11.39	$22.09	$0.00	$66.93
3	70	$39.03	$11.39	$22.09	$0.00	$72.51
4	80	$44.60	$11.39	$22.09	$0.00	$78.08
5	90	$50.18	$11.39	$22.09	$0.00	$83.66

Effective Date - 08/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.58	$11.39	$22.25	$0.00	$62.22
2	60	$34.29	$11.39	$22.25	$0.00	$67.93
3	70	$40.01	$11.39	$22.25	$0.00	$73.65
4	80	$45.72	$11.39	$22.25	$0.00	$79.36
5	90	$51.44	$11.39	$22.25	$0.00	$85.08

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/GRADER/SCRAPER *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN *LABORERS - FOUNDATION AND MARINE*	12/01/2020	$41.05	$8.60	$17.47	$0.00	$67.12
	06/01/2021	$42.07	$8.60	$17.47	$0.00	$68.14
	12/01/2021	$43.08	$8.60	$17.47	$0.00	$69.15
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER *LABORERS - FOUNDATION AND MARINE*	12/01/2020	$39.90	$8.60	$17.47	$0.00	$65.97
	06/01/2021	$40.92	$8.60	$17.47	$0.00	$66.99
	12/01/2021	$41.93	$8.60	$17.47	$0.00	$68.00
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING TOP MAN *LABORERS - FOUNDATION AND MARINE*	12/01/2020	$39.90	$8.60	$17.47	$0.00	$65.97
	06/01/2021	$40.92	$8.60	$17.47	$0.00	$66.99
	12/01/2021	$41.93	$8.60	$17.47	$0.00	$68.00
For apprentice rates see "Apprentice- LABORER"						
CARBIDE CORE DRILL OPERATOR *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CARPENTER *CARPENTERS -ZONE 2 (Eastern Massachusetts)*	03/01/2021	$43.54	$9.40	$18.95	$0.00	$71.89
	09/01/2021	$44.19	$9.40	$18.95	$0.00	$72.54
	03/01/2022	$44.79	$9.40	$18.95	$0.00	$73.14
	09/01/2022	$45.44	$9.40	$18.95	$0.00	$73.79
	03/01/2023	$46.04	$9.40	$18.95	$0.00	$74.39

Apprentice - *CARPENTER - Zone 2 Eastern MA*

Effective Date - 03/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.77	$9.40	$1.73	$0.00	$32.90
2	60	$26.12	$9.40	$1.73	$0.00	$37.25
3	70	$30.48	$9.40	$13.76	$0.00	$53.64
4	75	$32.66	$9.40	$13.76	$0.00	$55.82
5	80	$34.83	$9.40	$15.49	$0.00	$59.72
6	80	$34.83	$9.40	$15.49	$0.00	$59.72
7	90	$39.19	$9.40	$17.22	$0.00	$65.81
8	90	$39.19	$9.40	$17.22	$0.00	$65.81

Effective Date - 09/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.10	$9.40	$1.73	$0.00	$33.23
2	60	$26.51	$9.40	$1.73	$0.00	$37.64
3	70	$30.93	$9.40	$13.76	$0.00	$54.09
4	75	$33.14	$9.40	$13.76	$0.00	$56.30
5	80	$35.35	$9.40	$15.49	$0.00	$60.24
6	80	$35.35	$9.40	$15.49	$0.00	$60.24
7	90	$39.77	$9.40	$17.22	$0.00	$66.39
8	90	$39.77	$9.40	$17.22	$0.00	$66.39

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 $30.72/ 3&4 $36.75/ 5&6 $55.37/ 7&8 $61.45

Apprentice to Journeyworker Ratio:1:5

CARPENTER WOOD FRAME *CARPENTERS-ZONE 3 (Wood Frame)*	04/01/2020	$22.66	$7.21	$4.80	$0.00	$34.67
	04/01/2021	$23.16	$7.21	$4.80	$0.00	$35.17
	04/01/2022	$23.66	$7.21	$4.80	$0.00	$35.67
	04/01/2023	$24.16	$7.21	$4.80	$0.00	$36.17

All Aspects of New Wood Frame Work

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *CARPENTER (Wood Frame) - Zone 3*

Effective Date - 04/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$13.60	$7.21	$0.00	$0.00	$20.81
2	60	$13.60	$7.21	$0.00	$0.00	$20.81
3	65	$14.73	$7.21	$0.00	$0.00	$21.94
4	70	$15.86	$7.21	$0.00	$0.00	$23.07
5	75	$17.00	$7.21	$3.80	$0.00	$28.01
6	80	$18.13	$7.21	$3.80	$0.00	$29.14
7	85	$19.26	$7.21	$3.80	$0.00	$30.27
8	90	$20.39	$7.21	$3.80	$0.00	$31.40

Effective Date - 04/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$13.90	$7.21	$0.00	$0.00	$21.11
2	60	$13.90	$7.21	$0.00	$0.00	$21.11
3	65	$15.05	$7.21	$0.00	$0.00	$22.26
4	70	$16.21	$7.21	$0.00	$0.00	$23.42
5	75	$17.37	$7.21	$3.80	$0.00	$28.38
6	80	$18.53	$7.21	$3.80	$0.00	$29.54
7	85	$19.69	$7.21	$3.80	$0.00	$30.70
8	90	$20.84	$7.21	$3.80	$0.00	$31.85

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 $17.41/ 3&4 $19.67/ 5&6 $26.87/ 7&8 $29.14

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING *BRICKLAYERS LOCAL 3 (LYNN)*	01/01/2020	$49.07	$12.75	$22.41	$0.62	$84.85

Apprentice - *CEMENT MASONRY/PLASTERING - Eastern Mass (Lynn)*

Effective Date - 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.54	$12.75	$15.41	$0.00	$52.70
2	60	$29.44	$12.75	$17.41	$0.62	$60.22
3	65	$31.90	$12.75	$18.41	$0.62	$63.68
4	70	$34.35	$12.75	$19.41	$0.62	$67.13
5	75	$36.80	$12.75	$20.41	$0.62	$70.58
6	80	$39.26	$12.75	$21.41	$0.62	$74.04
7	90	$44.16	$12.75	$22.41	$0.62	$79.94

Notes:

Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

Apprentice to Journeyworker Ratio:1:3

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CHAIN SAW OPERATOR *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$50.98	$13.50	$15.70	$0.00	$80.18
	06/01/2021	$52.08	$13.50	$15.70	$0.00	$81.28
	12/01/2021	$53.23	$13.50	$15.70	$0.00	$82.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$33.00	$13.50	$15.70	$0.00	$62.20
	06/01/2021	$33.75	$13.50	$15.70	$0.00	$62.95
	12/01/2021	$34.54	$13.50	$15.70	$0.00	$63.74
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2021	$52.06	$8.25	$22.75	$0.00	$83.06

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.03	$8.25	$0.00	$0.00	$34.28
2	55	$28.63	$8.25	$6.16	$0.00	$43.04
3	60	$31.24	$8.25	$6.72	$0.00	$46.21
4	65	$33.84	$8.25	$7.28	$0.00	$49.37
5	70	$36.44	$8.25	$19.39	$0.00	$64.08
6	75	$39.05	$8.25	$19.95	$0.00	$67.25
7	80	$41.65	$8.25	$20.51	$0.00	$70.41
8	90	$46.85	$8.25	$21.63	$0.00	$76.73

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN *LABORERS - ZONE 2*	12/01/2020	$40.05	$8.60	$17.32	$0.00	$65.97
	06/01/2021	$41.07	$8.60	$17.32	$0.00	$66.99
	12/01/2021	$42.08	$8.60	$17.32	$0.00	$68.00
	06/01/2022	$43.08	$8.60	$17.32	$0.00	$69.00
	12/01/2022	$44.08	$8.60	$17.32	$0.00	$70.00
	06/01/2023	$45.08	$8.60	$17.32	$0.00	$71.00
	12/01/2023	$46.33	$8.60	$17.32	$0.00	$72.25
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DEMO: BACKHOE/LOADER/HAMMER OPERATOR *LABORERS - ZONE 2*	12/01/2020	$41.05	$8.60	$17.32	$0.00	$66.97
	06/01/2021	$42.07	$8.60	$17.32	$0.00	$67.99
	12/01/2021	$43.08	$8.60	$17.32	$0.00	$69.00
	06/01/2022	$44.08	$8.60	$17.32	$0.00	$70.00
	12/01/2022	$45.08	$8.60	$17.32	$0.00	$71.00
	06/01/2023	$46.08	$8.60	$17.32	$0.00	$72.00
	12/01/2023	$47.33	$8.60	$17.32	$0.00	$73.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: BURNERS *LABORERS - ZONE 2*	12/01/2020	$40.80	$8.60	$17.32	$0.00	$66.72
	06/01/2021	$41.82	$8.60	$17.32	$0.00	$67.74
	12/01/2021	$42.83	$8.60	$17.32	$0.00	$68.75
	06/01/2022	$43.83	$8.60	$17.32	$0.00	$69.75
	12/01/2022	$44.83	$8.60	$17.32	$0.00	$70.75
	06/01/2023	$45.83	$8.60	$17.32	$0.00	$71.75
	12/01/2023	$47.08	$8.60	$17.32	$0.00	$73.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER *LABORERS - ZONE 2*	12/01/2020	$41.05	$8.60	$17.32	$0.00	$66.97
	06/01/2021	$42.07	$8.60	$17.32	$0.00	$67.99
	12/01/2021	$43.08	$8.60	$17.32	$0.00	$69.00
	06/01/2022	$44.08	$8.60	$17.32	$0.00	$70.00
	12/01/2022	$45.08	$8.60	$17.32	$0.00	$71.00
	06/01/2023	$46.08	$8.60	$17.32	$0.00	$72.00
	12/01/2023	$47.33	$8.60	$17.32	$0.00	$73.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR *LABORERS - ZONE 2*	12/01/2020	$40.80	$8.60	$17.32	$0.00	$66.72
	06/01/2021	$41.82	$8.60	$17.32	$0.00	$67.74
	12/01/2021	$42.83	$8.60	$17.32	$0.00	$68.75
	06/01/2022	$43.83	$8.60	$17.32	$0.00	$69.75
	12/01/2022	$44.83	$8.60	$17.32	$0.00	$70.75
	06/01/2023	$45.83	$8.60	$17.32	$0.00	$71.75
	12/01/2023	$47.08	$8.60	$17.32	$0.00	$73.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER *LABORERS - ZONE 2*	12/01/2020	$40.05	$8.60	$17.32	$0.00	$65.97
	06/01/2021	$41.07	$8.60	$17.32	$0.00	$66.99
	12/01/2021	$42.08	$8.60	$17.32	$0.00	$68.00
	06/01/2022	$43.08	$8.60	$17.32	$0.00	$69.00
	12/01/2022	$44.08	$8.60	$17.32	$0.00	$70.00
	06/01/2023	$45.08	$8.60	$17.32	$0.00	$71.00
	12/01/2023	$46.33	$8.60	$17.32	$0.00	$72.25
For apprentice rates see "Apprentice- LABORER"						
DIRECTIONAL DRILL MACHINE OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$68.70	$9.40	$23.12	$0.00	$101.22
For apprentice rates see "Apprentice- PILE DRIVER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DIVER TENDER *PILE DRIVER LOCAL 56 (ZONE 1)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2020	$49.07	$9.40	$23.12	$0.00	$81.59
DIVER TENDER (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2020	$73.60	$9.40	$23.12	$0.00	$106.12
DIVER/SLURRY (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2020	$103.05	$9.40	$23.12	$0.00	$135.57
DRAWBRIDGE OPERATOR (Construction) *DRAWBRIDGE - SEIU LOCAL 888*	07/01/2020	$26.77	$6.67	$3.93	$0.16	$37.53
ELECTRICIAN *ELECTRICIANS LOCAL 103*	03/01/2021	$55.41	$13.00	$20.01	$0.00	$88.42
	09/01/2021	$56.84	$13.00	$20.06	$0.00	$89.90
	03/01/2022	$58.04	$13.00	$20.09	$0.00	$91.13
	09/01/2022	$59.48	$13.00	$20.13	$0.00	$92.61
	03/01/2023	$60.67	$13.00	$20.17	$0.00	$93.84

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELECTRICIAN - Local 103*

Effective Date - 03/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$22.16	$13.00	$0.66	$0.00	$35.82
2	40	$22.16	$13.00	$0.66	$0.00	$35.82
3	45	$24.93	$13.00	$15.13	$0.00	$53.06
4	45	$24.93	$13.00	$15.13	$0.00	$53.06
5	50	$27.71	$13.00	$15.57	$0.00	$56.28
6	55	$30.48	$13.00	$16.01	$0.00	$59.49
7	60	$33.25	$13.00	$16.46	$0.00	$62.71
8	65	$36.02	$13.00	$16.90	$0.00	$65.92
9	70	$38.79	$13.00	$17.34	$0.00	$69.13
10	75	$41.56	$13.00	$17.80	$0.00	$72.36

Effective Date - 09/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$22.74	$13.00	$0.68	$0.00	$36.42
2	40	$22.74	$13.00	$0.68	$0.00	$36.42
3	45	$25.58	$13.00	$15.15	$0.00	$53.73
4	45	$25.58	$13.00	$15.15	$0.00	$53.73
5	50	$28.42	$13.00	$15.59	$0.00	$57.01
6	55	$31.26	$13.00	$16.04	$0.00	$60.30
7	60	$34.10	$13.00	$16.48	$0.00	$63.58
8	65	$36.95	$13.00	$16.93	$0.00	$66.88
9	70	$39.79	$13.00	$17.37	$0.00	$70.16
10	75	$42.63	$13.00	$17.83	$0.00	$73.46

Notes: :

App Prior 1/1/03; 30/35/40/45/50/55/65/70/75/80

Apprentice to Journeyworker Ratio:2:3***

ELEVATOR CONSTRUCTOR *ELEVATOR CONSTRUCTORS LOCAL 4*	01/01/2021	$63.47	$15.88	$19.31	$0.00	$98.66
	01/01/2022	$65.62	$16.03	$20.21	$0.00	$101.86

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELEVATOR CONSTRUCTOR - Local 4*

Effective Date - 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$31.74	$15.88	$0.00	$0.00	$47.62
2	55	$34.91	$15.88	$19.31	$0.00	$70.10
3	65	$41.26	$15.88	$19.31	$0.00	$76.45
4	70	$44.43	$15.88	$19.31	$0.00	$79.62
5	80	$50.78	$15.88	$19.31	$0.00	$85.97

Effective Date - 01/01/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$32.81	$16.03	$0.00	$0.00	$48.84
2	55	$36.09	$16.03	$20.21	$0.00	$72.33
3	65	$42.65	$16.03	$20.21	$0.00	$78.89
4	70	$45.93	$16.03	$20.21	$0.00	$82.17
5	80	$52.50	$16.03	$20.21	$0.00	$88.74

Notes:
Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER *ELEVATOR CONSTRUCTORS LOCAL 4*	01/01/2021	$44.43	$15.88	$19.31	$0.00	$79.62
	01/01/2022	$45.93	$16.03	$20.21	$0.00	$82.17
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"						
FENCE & GUARD RAIL ERECTOR *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2020	$45.23	$13.00	$15.70	$0.00	$73.93
	05/01/2021	$46.38	$13.00	$15.70	$0.00	$75.08
	11/01/2021	$47.38	$13.00	$15.70	$0.00	$76.08
	05/01/2022	$48.53	$13.00	$15.70	$0.00	$77.23
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2020	$46.74	$13.00	$15.70	$0.00	$75.44
	05/01/2021	$47.90	$13.00	$15.70	$0.00	$76.60
	11/01/2021	$48.91	$13.00	$15.70	$0.00	$77.61
	05/01/2022	$50.07	$13.00	$15.70	$0.00	$78.77
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2020	$22.73	$13.00	$15.70	$0.00	$51.43
	05/01/2021	$23.41	$13.00	$15.70	$0.00	$52.11
	11/01/2021	$24.01	$13.00	$15.70	$0.00	$52.71
	05/01/2022	$24.68	$13.00	$15.70	$0.00	$53.38
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER *ELECTRICIANS LOCAL 103*	03/01/2021	$55.41	$13.00	$20.01	$0.00	$88.42
	09/01/2021	$56.84	$13.00	$20.06	$0.00	$89.90
	03/01/2022	$58.04	$13.00	$20.09	$0.00	$91.13
	09/01/2022	$59.48	$13.00	$20.13	$0.00	$92.61
	03/01/2023	$60.67	$13.00	$20.17	$0.00	$93.84
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING*ELECTRICIANS LOCAL 103*	03/01/2021	$42.11	$13.00	$17.88	$0.00	$72.99
	09/01/2021	$43.77	$13.00	$18.00	$0.00	$74.77
	03/01/2022	$45.27	$13.00	$18.12	$0.00	$76.39
	09/01/2022	$46.99	$13.00	$18.24	$0.00	$78.23
	03/01/2023	$48.54	$13.00	$18.37	$0.00	$79.91
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN (ASST. ENGINEER) *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$40.75	$13.50	$15.70	$0.00	$69.95
	06/01/2021	$41.66	$13.50	$15.70	$0.00	$70.86
	12/01/2021	$42.61	$13.50	$15.70	$0.00	$71.81
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2020	$24.50	$8.60	$16.06	$0.00	$49.16
	06/01/2021	$24.50	$8.60	$16.06	$0.00	$49.16
	12/01/2021	$24.50	$8.60	$16.06	$0.00	$49.16
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FLOORCOVERER *FLOORCOVERERS LOCAL 2168 ZONE I*	03/01/2021	$48.59	$9.40	$19.25	$0.00	$77.24
	09/01/2021	$49.39	$9.40	$19.25	$0.00	$78.04
	03/01/2022	$50.19	$9.40	$19.25	$0.00	$78.84

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *FLOORCOVERER - Local 2168 Zone I*

Effective Date - 03/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.30	$9.40	$1.79	$0.00	$35.49
2	55	$26.72	$9.40	$1.79	$0.00	$37.91
3	60	$29.15	$9.40	$13.88	$0.00	$52.43
4	65	$31.58	$9.40	$13.88	$0.00	$54.86
5	70	$34.01	$9.40	$15.67	$0.00	$59.08
6	75	$36.44	$9.40	$15.67	$0.00	$61.51
7	80	$38.87	$9.40	$17.46	$0.00	$65.73
8	85	$41.30	$9.40	$17.46	$0.00	$68.16

Effective Date - 09/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.70	$9.40	$1.79	$0.00	$35.89
2	55	$27.16	$9.40	$1.79	$0.00	$38.35
3	60	$29.63	$9.40	$13.88	$0.00	$52.91
4	65	$32.10	$9.40	$13.88	$0.00	$55.38
5	70	$34.57	$9.40	$15.67	$0.00	$59.64
6	75	$37.04	$9.40	$15.67	$0.00	$62.11
7	80	$39.51	$9.40	$17.46	$0.00	$66.37
8	85	$41.98	$9.40	$17.46	$0.00	$68.84

Notes: Steps are 750 hrs.
% After 09/1/17; 45/45/55/55/70/70/80/80 (1500hr Steps)
Step 1&2 $33.03/ 3&4 $39.64/ 5&6 $59.08/ 7&8 $65.73

Apprentice to Journeyworker Ratio:1:1

FORK LIFT/CHERRY PICKER *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.98	$13.50	$15.70	$0.00	$79.18
	06/01/2021	$51.08	$13.50	$15.70	$0.00	$80.28
	12/01/2021	$52.23	$13.50	$15.70	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GENERATOR/LIGHTING PLANT/HEATERS *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$33.00	$13.50	$15.70	$0.00	$62.20
	06/01/2021	$33.75	$13.50	$15.70	$0.00	$62.95
	12/01/2021	$34.54	$13.50	$15.70	$0.00	$63.74
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) *GLAZIERS LOCAL 35 (ZONE 2)*	01/01/2021	$41.56	$8.25	$22.75	$0.00	$72.56

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *GLAZIER - Local 35 Zone 2*

Effective Date - 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.78	$8.25	$0.00	$0.00	$29.03
2	55	$22.86	$8.25	$6.16	$0.00	$37.27
3	60	$24.94	$8.25	$6.72	$0.00	$39.91
4	65	$27.01	$8.25	$7.28	$0.00	$42.54
5	70	$29.09	$8.25	$19.39	$0.00	$56.73
6	75	$31.17	$8.25	$19.95	$0.00	$59.37
7	80	$33.25	$8.25	$20.51	$0.00	$62.01
8	90	$37.40	$8.25	$21.63	$0.00	$67.28

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

HOISTING ENGINEER/CRANES/GRADALLS *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.98	$13.50	$15.70	$0.00	$79.18
	06/01/2021	$51.08	$13.50	$15.70	$0.00	$80.28
	12/01/2021	$52.23	$13.50	$15.70	$0.00	$81.43

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *OPERATING ENGINEERS - Local 4*

Effective Date - 12/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$27.49	$13.50	$0.00	$0.00	$40.99
2	60	$29.99	$13.50	$15.70	$0.00	$59.19
3	65	$32.49	$13.50	$15.70	$0.00	$61.69
4	70	$34.99	$13.50	$15.70	$0.00	$64.19
5	75	$37.49	$13.50	$15.70	$0.00	$66.69
6	80	$39.98	$13.50	$15.70	$0.00	$69.18
7	85	$42.48	$13.50	$15.70	$0.00	$71.68
8	90	$44.98	$13.50	$15.70	$0.00	$74.18

Effective Date - 06/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$28.09	$13.50	$0.00	$0.00	$41.59
2	60	$30.65	$13.50	$15.70	$0.00	$59.85
3	65	$33.20	$13.50	$15.70	$0.00	$62.40
4	70	$35.76	$13.50	$15.70	$0.00	$64.96
5	75	$38.31	$13.50	$15.70	$0.00	$67.51
6	80	$40.86	$13.50	$15.70	$0.00	$70.06
7	85	$43.42	$13.50	$15.70	$0.00	$72.62
8	90	$45.97	$13.50	$15.70	$0.00	$75.17

Notes:

Apprentice to Journeyworker Ratio:1:6

HVAC (DUCTWORK) *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2021	$51.67	$13.65	$24.57	$2.70	$92.59
	08/01/2021	$53.42	$13.65	$24.57	$2.75	$94.39
	02/01/2022	$55.17	$13.65	$24.57	$2.80	$96.19
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (ELECTRICAL CONTROLS) *ELECTRICIANS LOCAL 103*	03/01/2021	$55.41	$13.00	$20.01	$0.00	$88.42
	09/01/2021	$56.84	$13.00	$20.06	$0.00	$89.90
	03/01/2022	$58.04	$13.00	$20.09	$0.00	$91.13
	09/01/2022	$59.48	$13.00	$20.13	$0.00	$92.61
	03/01/2023	$60.67	$13.00	$20.17	$0.00	$93.84
For apprentice rates see "Apprentice- ELECTRICIAN"						
HVAC (TESTING AND BALANCING - AIR) *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2021	$51.67	$13.65	$24.57	$2.70	$92.59
	08/01/2021	$53.42	$13.65	$24.57	$2.75	$94.39
	02/01/2022	$55.17	$13.65	$24.57	$2.80	$96.19
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING -WATER) *PIPEFITTERS LOCAL 537 (Local 138)*	03/01/2021	$54.86	$10.95	$19.74	$0.00	$85.55
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC *PIPEFITTERS LOCAL 537 (Local 138)*	03/01/2021	$54.86	$10.95	$19.74	$0.00	$85.55

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS *LABORERS - ZONE 2*	12/01/2020	$35.41	$8.60	$16.06	$0.00	$60.07
	06/01/2021	$36.33	$8.60	$16.06	$0.00	$60.99
	12/01/2021	$37.24	$8.60	$16.06	$0.00	$61.90
	06/01/2022	$38.14	$8.60	$16.06	$0.00	$62.80
	12/01/2022	$38.99	$8.60	$16.06	$0.00	$63.65
	06/01/2023	$39.89	$8.60	$16.06	$0.00	$64.55
	12/01/2023	$40.79	$8.60	$16.06	$0.00	$65.45
For apprentice rates see "Apprentice- LABORER"						
HYDRAULIC DRILLS (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2020	$35.41	$8.60	$16.06	$0.00	$60.07
	06/01/2021	$36.33	$8.60	$16.06	$0.00	$60.99
	12/01/2021	$37.24	$8.60	$16.06	$0.00	$61.90
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
INSULATOR (PIPES & TANKS) *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	09/01/2020	$49.00	$13.80	$17.14	$0.00	$79.94
	09/01/2021	$51.40	$13.80	$17.14	$0.00	$82.34
	09/01/2022	$53.85	$13.80	$17.14	$0.00	$84.79

Apprentice - *ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Boston*

Effective Date - 09/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.50	$13.80	$12.42	$0.00	$50.72
2	60	$29.40	$13.80	$13.36	$0.00	$56.56
3	70	$34.30	$13.80	$14.31	$0.00	$62.41
4	80	$39.20	$13.80	$15.25	$0.00	$68.25

Effective Date - 09/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.70	$13.80	$12.42	$0.00	$51.92
2	60	$30.84	$13.80	$13.36	$0.00	$58.00
3	70	$35.98	$13.80	$14.31	$0.00	$64.09
4	80	$41.12	$13.80	$15.25	$0.00	$70.17

Notes:
Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER *IRONWORKERS LOCAL 7 (LAWRENCE AREA)*	09/16/2020	$44.25	$8.10	$25.10	$0.00	$77.45

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *IRONWORKER - Local 7 Lawrence*

Effective Date - 09/16/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$26.55	$8.10	$25.10	$0.00	$59.75
2	70	$30.98	$8.10	$25.10	$0.00	$64.18
3	75	$33.19	$8.10	$25.10	$0.00	$66.39
4	80	$35.40	$8.10	$25.10	$0.00	$68.60
5	85	$37.61	$8.10	$25.10	$0.00	$70.81
6	90	$39.83	$8.10	$25.10	$0.00	$73.03

Notes:
Structural 1:6; Ornamental 1:4

Apprentice to Journeyworker Ratio:

JACKHAMMER & PAVING BREAKER OPERATOR *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
LABORER *LABORERS - ZONE 2*	12/01/2020	$34.66	$8.60	$16.06	$0.00	$59.32
	06/01/2021	$35.58	$8.60	$16.06	$0.00	$60.24
	12/01/2021	$36.49	$8.60	$16.06	$0.00	$61.15
	06/01/2022	$37.39	$8.60	$16.06	$0.00	$62.05
	12/01/2022	$38.24	$8.60	$16.06	$0.00	$62.90
	06/01/2023	$39.14	$8.60	$16.06	$0.00	$63.80
	12/01/2023	$40.04	$8.60	$16.06	$0.00	$64.70

Apprentice - *LABORER - Zone 2*

Effective Date - 12/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$20.80	$8.60	$16.06	$0.00	$45.46
2	70	$24.26	$8.60	$16.06	$0.00	$48.92
3	80	$27.73	$8.60	$16.06	$0.00	$52.39
4	90	$31.19	$8.60	$16.06	$0.00	$55.85

Effective Date - 06/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$21.35	$8.60	$16.06	$0.00	$46.01
2	70	$24.91	$8.60	$16.06	$0.00	$49.57
3	80	$28.46	$8.60	$16.06	$0.00	$53.12
4	90	$32.02	$8.60	$16.06	$0.00	$56.68

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2020	$34.66	$8.60	$16.06	$0.00	$59.32
	06/01/2021	$35.58	$8.60	$16.06	$0.00	$60.24
	12/01/2021	$36.49	$8.60	$16.06	$0.00	$61.15

Apprentice - *LABORER (Heavy & Highway) - Zone 2*

Effective Date - 12/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$20.80	$8.60	$16.06	$0.00	$45.46
2	70	$24.26	$8.60	$16.06	$0.00	$48.92
3	80	$27.73	$8.60	$16.06	$0.00	$52.39
4	90	$31.19	$8.60	$16.06	$0.00	$55.85

Effective Date - 06/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$21.35	$8.60	$16.06	$0.00	$46.01
2	70	$24.91	$8.60	$16.06	$0.00	$49.57
3	80	$28.46	$8.60	$16.06	$0.00	$53.12
4	90	$32.02	$8.60	$16.06	$0.00	$56.68

Notes:

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: CARPENTER TENDER *LABORERS - ZONE 2*	12/01/2020	$34.66	$8.60	$16.06	$0.00	$59.32
	06/01/2021	$35.58	$8.60	$16.06	$0.00	$60.24
	12/01/2021	$36.49	$8.60	$16.06	$0.00	$61.15
	06/01/2022	$37.39	$8.60	$16.06	$0.00	$62.05
	12/01/2022	$38.24	$8.60	$16.06	$0.00	$62.90
	06/01/2023	$39.14	$8.60	$16.06	$0.00	$63.80
	12/01/2023	$40.04	$8.60	$16.06	$0.00	$64.70
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER *LABORERS - ZONE 2*	12/01/2020	$34.66	$8.60	$16.06	$0.00	$59.32
	06/01/2021	$35.58	$8.60	$16.06	$0.00	$60.24
	12/01/2021	$36.49	$8.60	$16.06	$0.00	$61.15
	06/01/2022	$37.39	$8.60	$16.06	$0.00	$62.05
	12/01/2022	$38.24	$8.60	$16.06	$0.00	$62.90
	06/01/2023	$39.14	$8.60	$16.06	$0.00	$63.80
	12/01/2023	$40.04	$8.60	$16.06	$0.00	$64.70
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER *LABORERS - ZONE 2*	12/01/2020	$34.75	$8.60	$16.12	$0.00	$59.47
	06/01/2021	$35.67	$8.60	$16.12	$0.00	$60.39
	12/01/2021	$36.58	$8.60	$16.12	$0.00	$61.30
	06/01/2022	$37.48	$8.60	$16.12	$0.00	$62.20
	12/01/2022	$38.33	$8.60	$16.12	$0.00	$63.05
	06/01/2023	$39.23	$8.60	$16.12	$0.00	$63.95
	12/01/2023	$40.13	$8.60	$16.12	$0.00	$64.85
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
LABORER: MULTI-TRADE TENDER *LABORERS - ZONE 2*	12/01/2020	$34.66	$8.60	$16.06	$0.00	$59.32
	06/01/2021	$35.58	$8.60	$16.06	$0.00	$60.24
	12/01/2021	$36.49	$8.60	$16.06	$0.00	$61.15
	06/01/2022	$37.39	$8.60	$16.06	$0.00	$62.05
	12/01/2022	$38.24	$8.60	$16.06	$0.00	$62.90
	06/01/2023	$39.14	$8.60	$16.06	$0.00	$63.80
	12/01/2023	$40.04	$8.60	$16.06	$0.00	$64.70
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: TREE REMOVER *LABORERS - ZONE 2*	12/01/2020	$34.66	$8.60	$16.06	$0.00	$59.32
	06/01/2021	$35.58	$8.60	$16.06	$0.00	$60.24
	12/01/2021	$36.49	$8.60	$16.06	$0.00	$61.15
	06/01/2022	$37.39	$8.60	$16.06	$0.00	$62.05
	12/01/2022	$38.24	$8.60	$16.06	$0.00	$62.90
	06/01/2023	$39.14	$8.60	$16.06	$0.00	$63.80
	12/01/2023	$40.04	$8.60	$16.06	$0.00	$64.70
This classification applies to the removal of standing trees, and the trimming and removal of branches and limbs when related to public works construction or site clearance incidental to construction . For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
MARBLE & TILE FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2021	$42.57	$11.39	$20.14	$0.00	$74.10
	08/01/2021	$43.69	$11.39	$20.30	$0.00	$75.38
	02/01/2022	$44.16	$11.39	$20.30	$0.00	$75.85

Apprentice - *MARBLE & TILE FINISHER - Local 3 Marble & Tile*

Effective Date - 02/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.29	$11.39	$20.14	$0.00	$52.82
2	60	$25.54	$11.39	$20.14	$0.00	$57.07
3	70	$29.80	$11.39	$20.14	$0.00	$61.33
4	80	$34.06	$11.39	$20.14	$0.00	$65.59
5	90	$38.31	$11.39	$20.14	$0.00	$69.84

Effective Date - 08/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.85	$11.39	$20.30	$0.00	$53.54
2	60	$26.21	$11.39	$20.30	$0.00	$57.90
3	70	$30.58	$11.39	$20.30	$0.00	$62.27
4	80	$34.95	$11.39	$20.30	$0.00	$66.64
5	90	$39.32	$11.39	$20.30	$0.00	$71.01

Notes:

Apprentice to Journeyworker Ratio:1:3

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
MARBLE MASONS,TILELAYERS & TERRAZZO MECH *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2021	$55.77	$11.39	$22.08	$0.00	$89.24
	08/01/2021	$57.17	$11.39	$22.24	$0.00	$90.80
	02/01/2022	$57.74	$11.39	$22.24	$0.00	$91.37

Apprentice - *MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile*

Effective Date - 02/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.89	$11.39	$22.08	$0.00	$61.36
2	60	$33.46	$11.39	$22.08	$0.00	$66.93
3	70	$39.04	$11.39	$22.08	$0.00	$72.51
4	80	$44.62	$11.39	$22.08	$0.00	$78.09
5	90	$50.19	$11.39	$22.08	$0.00	$83.66

Effective Date - 08/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.59	$11.39	$22.24	$0.00	$62.22
2	60	$34.30	$11.39	$22.24	$0.00	$67.93
3	70	$40.02	$11.39	$22.24	$0.00	$73.65
4	80	$45.74	$11.39	$22.24	$0.00	$79.37
5	90	$51.45	$11.39	$22.24	$0.00	$85.08

Notes:

Apprentice to Journeyworker Ratio:1:5

MECH. SWEEPER OPERATOR (ON CONST. SITES) *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MECHANICS MAINTENANCE *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MILLWRIGHT (Zone 2) *MILLWRIGHTS LOCAL 1121 - Zone 2*	01/04/2021	$39.72	$9.40	$20.45	$0.00	$69.57
	01/03/2022	$40.97	$9.40	$20.45	$0.00	$70.82
	01/02/2023	$42.22	$9.40	$20.45	$0.00	$72.07

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MILLWRIGHT - Local 1121 Zone 2*

Effective Date - 01/04/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$21.85	$9.40	$5.58	$0.00	$36.83
2	65	$25.82	$9.40	$16.90	$0.00	$52.12
3	75	$29.79	$9.40	$17.92	$0.00	$57.11
4	85	$33.76	$9.40	$18.93	$0.00	$62.09

Effective Date - 01/03/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$22.53	$9.40	$5.58	$0.00	$37.51
2	65	$26.63	$9.40	$16.90	$0.00	$52.93
3	75	$30.73	$9.40	$17.92	$0.00	$58.05
4	85	$34.82	$9.40	$18.93	$0.00	$63.15

Notes: Step 1&2 Appr. indentured after 1/1/2020 receive no pension, but do receive annuity. (Step 1 $5.58, Step 2 $6.50)
Steps are 2,000 hours

Apprentice to Journeyworker Ratio:1:5

MORTAR MIXER *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
OILER (OTHER THAN TRUCK CRANES,GRADALLS) *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$23.20	$13.50	$15.70	$0.00	$52.40
	06/01/2021	$23.75	$13.50	$15.70	$0.00	$52.95
	12/01/2021	$24.33	$13.50	$15.70	$0.00	$53.53
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OILER (TRUCK CRANES, GRADALLS) *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$27.97	$13.50	$15.70	$0.00	$57.17
	06/01/2021	$28.61	$13.50	$15.70	$0.00	$57.81
	12/01/2021	$29.29	$13.50	$15.70	$0.00	$58.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS II *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2021	$52.06	$8.25	$22.75	$0.00	$83.06

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.03	$8.25	$0.00	$0.00	$34.28
2	55	$28.63	$8.25	$6.16	$0.00	$43.04
3	60	$31.24	$8.25	$6.72	$0.00	$46.21
4	65	$33.84	$8.25	$7.28	$0.00	$49.37
5	70	$36.44	$8.25	$19.39	$0.00	$64.08
6	75	$39.05	$8.25	$19.95	$0.00	$67.25
7	80	$41.65	$8.25	$20.51	$0.00	$70.41
8	90	$46.85	$8.25	$21.63	$0.00	$76.73

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, NEW) * * If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 2*	01/01/2021	$42.96	$8.25	$22.75	$0.00	$73.96

Apprentice - *PAINTER Local 35 Zone 2 - Spray/Sandblast - New*

Effective Date - 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.48	$8.25	$0.00	$0.00	$29.73
2	55	$23.63	$8.25	$6.16	$0.00	$38.04
3	60	$25.78	$8.25	$6.72	$0.00	$40.75
4	65	$27.92	$8.25	$7.28	$0.00	$43.45
5	70	$30.07	$8.25	$19.39	$0.00	$57.71
6	75	$32.22	$8.25	$19.95	$0.00	$60.42
7	80	$34.37	$8.25	$20.51	$0.00	$63.13
8	90	$38.66	$8.25	$21.63	$0.00	$68.54

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, REPAINT) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2021	$41.02	$8.25	$22.75	$0.00	$72.02

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 2 - Spray/Sandblast - Repaint*

Effective Date - 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.51	$8.25	$0.00	$0.00	$28.76
2	55	$22.56	$8.25	$6.16	$0.00	$36.97
3	60	$24.61	$8.25	$6.72	$0.00	$39.58
4	65	$26.66	$8.25	$7.28	$0.00	$42.19
5	70	$28.71	$8.25	$19.39	$0.00	$56.35
6	75	$30.77	$8.25	$19.95	$0.00	$58.97
7	80	$32.82	$8.25	$20.51	$0.00	$61.58
8	90	$36.92	$8.25	$21.63	$0.00	$66.80

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, NEW) *	01/01/2021	$41.56	$8.25	$22.75	$0.00	$72.56

* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 2*

Apprentice - *PAINTER - Local 35 Zone 2 - BRUSH NEW*

Effective Date - 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.78	$8.25	$0.00	$0.00	$29.03
2	55	$22.86	$8.25	$6.16	$0.00	$37.27
3	60	$24.94	$8.25	$6.72	$0.00	$39.91
4	65	$27.01	$8.25	$7.28	$0.00	$42.54
5	70	$29.09	$8.25	$19.39	$0.00	$56.73
6	75	$31.17	$8.25	$19.95	$0.00	$59.37
7	80	$33.25	$8.25	$20.51	$0.00	$62.01
8	90	$37.40	$8.25	$21.63	$0.00	$67.28

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2021	$39.62	$8.25	$22.75	$0.00	$70.62

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 2 - BRUSH REPAINT*

Effective Date - 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.81	$8.25	$0.00	$0.00	$28.06
2	55	$21.79	$8.25	$6.16	$0.00	$36.20
3	60	$23.77	$8.25	$6.72	$0.00	$38.74
4	65	$25.75	$8.25	$7.28	$0.00	$41.28
5	70	$27.73	$8.25	$19.39	$0.00	$55.37
6	75	$29.72	$8.25	$19.95	$0.00	$57.92
7	80	$31.70	$8.25	$20.51	$0.00	$60.46
8	90	$35.66	$8.25	$21.63	$0.00	$65.54

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER TRAFFIC MARKINGS (HEAVY/HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2020	$34.66	$8.60	$16.06	$0.00	$59.32
	06/01/2021	$35.58	$8.60	$16.06	$0.00	$60.24
	12/01/2021	$36.49	$8.60	$16.06	$0.00	$61.15
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
PANEL & PICKUP TRUCKS DRIVER *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2020	$34.98	$12.91	$14.82	$0.00	$62.71
	06/01/2021	$35.78	$12.91	$14.82	$0.00	$63.51
	08/01/2021	$35.78	$13.41	$14.82	$0.00	$64.01
	12/01/2021	$35.78	$13.41	$16.01	$0.00	$65.20
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$49.07	$9.40	$23.12	$0.00	$81.59
For apprentice rates see "Apprentice- PILE DRIVER"						
PILE DRIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$49.07	$9.40	$23.12	$0.00	$81.59

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PILE DRIVER - Local 56 Zone 1*

Effective Date - 08/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.54	$9.40	$23.12	$0.00	$57.06
2	60	$29.44	$9.40	$23.12	$0.00	$61.96
3	70	$34.35	$9.40	$23.12	$0.00	$66.87
4	75	$36.80	$9.40	$23.12	$0.00	$69.32
5	80	$39.26	$9.40	$23.12	$0.00	$71.78
6	80	$39.26	$9.40	$23.12	$0.00	$71.78
7	90	$44.16	$9.40	$23.12	$0.00	$76.68
8	90	$44.16	$9.40	$23.12	$0.00	$76.68

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 $34.01/ 3&4 $41.46/ 5&6 $62.80/ 7&8 $69.25

Apprentice to Journeyworker Ratio:1:5

PIPEFITTER & STEAMFITTER *PIPEFITTERS LOCAL 537 (Local 138)*	03/01/2021	$54.86	$10.95	$19.74	$0.00	$85.55

Apprentice - *PIPEFITTER Local 537 (Local 138)*

Effective Date - 03/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$21.94	$10.95	$8.00	$0.00	$40.89
2	45	$24.69	$10.95	$19.74	$0.00	$55.38
3	60	$32.92	$10.95	$19.74	$0.00	$63.61
4	70	$38.40	$10.95	$19.74	$0.00	$69.09
5	80	$43.89	$10.95	$19.74	$0.00	$74.58

Notes:

** 1:3; 3:15; 1:10 thereafter / Steps are 1 yr.
Refrig/AC Mechanic **1:1;1:2;2:4;3:6;4:8;5:10;6:12;7:14;8:17;9:20;10:23(Max)

Apprentice to Journeyworker Ratio:**

PIPELAYER *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95

For apprentice rates see "Apprentice- LABORER"

PIPELAYER (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PLUMBER *PLUMBERS & GASFITTERS LOCAL 12 (Local 138)*	03/01/2021	$56.11	$13.57	$17.26	$0.00	$86.94

Apprentice - *PLUMBER/GASFITTER - Local 12 (Local 138)*

Effective Date - 03/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$19.64	$13.57	$6.24	$0.00	$39.45
2	40	$22.44	$13.57	$7.08	$0.00	$43.09
3	55	$30.86	$13.57	$9.63	$0.00	$54.06
4	65	$36.47	$13.57	$11.33	$0.00	$61.37
5	75	$42.08	$13.57	$13.03	$0.00	$68.68

Notes:

Steps are 1 yr

Step 4 with lic$65.04, Step5 with lic$72.34

Apprentice to Journeyworker Ratio:1:5

PNEUMATIC CONTROLS (TEMP.) *PIPEFITTERS LOCAL 537 (Local 138)*	03/01/2021	$54.86	$10.95	$19.74	$0.00	$85.55
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
PNEUMATIC DRILL/TOOL OPERATOR *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
PNEUMATIC DRILL/TOOL OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
POWDERMAN & BLASTER *LABORERS - ZONE 2*	12/01/2020	$35.66	$8.60	$16.06	$0.00	$60.32
	06/01/2021	$36.58	$8.60	$16.06	$0.00	$61.24
	12/01/2021	$37.49	$8.60	$16.06	$0.00	$62.15
	06/01/2022	$38.39	$8.60	$16.06	$0.00	$63.05
	12/01/2022	$39.24	$8.60	$16.06	$0.00	$63.90
	06/01/2023	$40.14	$8.60	$16.06	$0.00	$64.80
	12/01/2023	$41.04	$8.60	$16.06	$0.00	$65.70
For apprentice rates see "Apprentice- LABORER"						
POWDERMAN & BLASTER (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2020	$35.66	$8.60	$16.06	$0.00	$60.32
	06/01/2021	$36.58	$8.60	$16.06	$0.00	$61.24
	12/01/2021	$37.49	$8.60	$16.06	$0.00	$62.15
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
POWER SHOVEL/DERRICK/TRENCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.98	$13.50	$15.70	$0.00	$79.18
	06/01/2021	$51.08	$13.50	$15.70	$0.00	$80.28
	12/01/2021	$52.23	$13.50	$15.70	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PUMP OPERATOR (CONCRETE) *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.98	$13.50	$15.70	$0.00	$79.18
	06/01/2021	$51.08	$13.50	$15.70	$0.00	$80.28
	12/01/2021	$52.23	$13.50	$15.70	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$33.00	$13.50	$15.70	$0.00	$62.20
	06/01/2021	$33.75	$13.50	$15.70	$0.00	$62.95
	12/01/2021	$34.54	$13.50	$15.70	$0.00	$63.74
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY-MIX CONCRETE DRIVER *TEAMSTERS 170 - J.G. MacLellan (Lowell)*	01/01/2021	$25.15	$10.01	$6.35	$0.00	$41.51
	05/01/2021	$25.50	$10.01	$6.35	$0.00	$41.86
	01/01/2022	$25.50	$10.37	$6.35	$0.00	$42.22
	05/01/2022	$25.85	$10.37	$6.35	$0.00	$42.57
	01/01/2023	$25.85	$10.77	$6.35	$0.00	$42.97
RECLAIMERS *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RIDE-ON MOTORIZED BUGGY OPERATOR *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
ROLLER/SPREADER/MULCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg) *ROOFERS LOCAL 33*	02/01/2021	$46.60	$12.28	$17.15	$0.00	$76.03
	08/01/2021	$48.03	$12.28	$17.15	$0.00	$77.46
	02/01/2022	$49.46	$12.28	$17.15	$0.00	$78.89

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ROOFER - Local 33*

Effective Date - 02/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.30	$12.28	$4.31	$0.00	$39.89
2	60	$27.96	$12.28	$17.15	$0.00	$57.39
3	65	$30.29	$12.28	$17.15	$0.00	$59.72
4	75	$34.95	$12.28	$17.15	$0.00	$64.38
5	85	$39.61	$12.28	$17.15	$0.00	$69.04

Effective Date - 08/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.02	$12.28	$4.31	$0.00	$40.61
2	60	$28.82	$12.28	$17.15	$0.00	$58.25
3	65	$31.22	$12.28	$17.15	$0.00	$60.65
4	75	$36.02	$12.28	$17.15	$0.00	$65.45
5	85	$40.83	$12.28	$17.15	$0.00	$70.26

Notes: ** 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1
Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.
(Hot Pitch Mechanics' receive $1.00 hr. above ROOFER)

Apprentice to Journeyworker Ratio:**

ROOFER SLATE / TILE / PRECAST CONCRETE *ROOFERS LOCAL 33*	02/01/2021	$46.85	$12.28	$17.15	$0.00	$76.28
	08/01/2021	$48.28	$12.28	$17.15	$0.00	$77.71
	02/01/2022	$49.71	$12.28	$17.15	$0.00	$79.14
For apprentice rates see "Apprentice- ROOFER"						
SHEETMETAL WORKER *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2021	$51.67	$13.65	$24.57	$2.70	$92.59
	08/01/2021	$53.42	$13.65	$24.57	$2.75	$94.39
	02/01/2022	$55.17	$13.65	$24.57	$2.80	$96.19

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SHEET METAL WORKER - Local 17-A*

Effective Date - 02/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	42	$21.70	$13.65	$5.89	$0.00	$41.24
2	42	$21.70	$13.65	$5.89	$0.00	$41.24
3	47	$24.28	$13.65	$11.13	$1.48	$50.54
4	47	$24.28	$13.65	$11.13	$1.48	$50.54
5	52	$26.87	$13.65	$12.08	$1.58	$54.18
6	52	$26.87	$13.65	$12.33	$1.59	$54.44
7	60	$31.00	$13.65	$13.70	$1.76	$60.11
8	65	$33.59	$13.65	$14.65	$1.88	$63.77
9	75	$38.75	$13.65	$16.56	$2.08	$71.04
10	85	$43.92	$13.65	$17.96	$2.28	$77.81

Effective Date - 08/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	42	$22.44	$13.65	$5.89	$0.00	$41.98
2	42	$22.44	$13.65	$5.89	$0.00	$41.98
3	47	$25.11	$13.65	$11.13	$1.48	$51.37
4	47	$25.11	$13.65	$11.13	$1.48	$51.37
5	52	$27.78	$13.65	$12.08	$1.58	$55.09
6	52	$27.78	$13.65	$12.33	$1.59	$55.35
7	60	$32.05	$13.65	$13.70	$1.76	$61.16
8	65	$34.72	$13.65	$14.65	$1.88	$64.90
9	75	$40.07	$13.65	$16.56	$2.08	$72.36
10	85	$45.41	$13.65	$17.96	$2.28	$79.30

Notes:
Steps are 6 mos.

Apprentice to Journeyworker Ratio:1:4

SPECIALIZED EARTH MOVING EQUIP < 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2020	$35.44	$12.91	$14.82	$0.00	$63.17
	06/01/2021	$36.24	$12.91	$14.82	$0.00	$63.97
	08/01/2021	$36.24	$13.41	$14.82	$0.00	$64.47
	12/01/2021	$36.24	$13.41	$16.01	$0.00	$65.66
SPECIALIZED EARTH MOVING EQUIP > 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2020	$35.73	$12.91	$14.82	$0.00	$63.46
	06/01/2021	$36.53	$12.91	$14.82	$0.00	$64.26
	08/01/2021	$36.53	$13.41	$14.82	$0.00	$64.76
	12/01/2021	$36.53	$13.41	$16.01	$0.00	$65.95
SPRINKLER FITTER *SPRINKLER FITTERS LOCAL 550 - (Section B) Zone 2*	03/01/2021	$56.21	$10.00	$21.25	$0.00	$87.46

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SPRINKLER FITTER - Local 550 (Section B) Zone 2*

Effective Date - 03/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$19.67	$10.00	$11.99	$0.00	$41.66
2	40	$22.48	$10.00	$12.70	$0.00	$45.18
3	45	$25.29	$10.00	$13.41	$0.00	$48.70
4	50	$28.11	$10.00	$14.13	$0.00	$52.24
5	55	$30.92	$10.00	$14.84	$0.00	$55.76
6	60	$33.73	$10.00	$15.55	$0.00	$59.28
7	65	$36.54	$10.00	$16.26	$0.00	$62.80
8	70	$39.35	$10.00	$16.98	$0.00	$66.33
9	75	$42.16	$10.00	$17.69	$0.00	$69.85
10	80	$44.97	$10.00	$18.40	$0.00	$73.37

Notes: Apprentice entered prior 9/30/10:
40/45/50/55/60/65/70/75/80/85
Steps are 850 hours

Apprentice to Journeyworker Ratio:1:3

STEAM BOILER OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TELECOMMUNICATION TECHNICIAN *ELECTRICIANS LOCAL 103*	03/01/2021	$42.11	$13.00	$17.88	$0.00	$72.99
	09/01/2021	$43.77	$13.00	$18.00	$0.00	$74.77
	03/01/2022	$45.27	$13.00	$18.12	$0.00	$76.39
	09/01/2022	$46.99	$13.00	$18.24	$0.00	$78.23
	03/01/2023	$48.54	$13.00	$18.37	$0.00	$79.91

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TELECOMMUNICATION TECHNICIAN - Local 103*

Effective Date - 03/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$18.95	$13.00	$0.57	$0.00	$32.52
2	45	$18.95	$13.00	$0.57	$0.00	$32.52
3	50	$21.06	$13.00	$14.47	$0.00	$48.53
4	50	$21.06	$13.00	$14.47	$0.00	$48.53
5	55	$23.16	$13.00	$14.80	$0.00	$50.96
6	60	$25.27	$13.00	$15.14	$0.00	$53.41
7	65	$27.37	$13.00	$15.47	$0.00	$55.84
8	70	$29.48	$13.00	$15.80	$0.00	$58.28
9	75	$31.58	$13.00	$16.15	$0.00	$60.73
10	80	$33.69	$13.00	$16.48	$0.00	$63.17

Effective Date - 09/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$19.70	$13.00	$0.59	$0.00	$33.29
2	45	$19.70	$13.00	$0.59	$0.00	$33.29
3	50	$21.89	$13.00	$14.57	$0.00	$49.46
4	50	$21.89	$13.00	$14.57	$0.00	$49.46
5	55	$24.07	$13.00	$14.91	$0.00	$51.98
6	60	$26.26	$13.00	$15.26	$0.00	$54.52
7	65	$28.45	$13.00	$15.59	$0.00	$57.04
8	70	$30.64	$13.00	$15.94	$0.00	$59.58
9	75	$32.83	$13.00	$16.28	$0.00	$62.11
10	80	$35.02	$13.00	$16.63	$0.00	$64.65

Notes:

Apprentice to Journeyworker Ratio:1:1

TERRAZZO FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2021	$54.69	$11.39	$22.09	$0.00	$88.17
	08/01/2021	$56.09	$11.39	$22.25	$0.00	$89.73
	02/01/2022	$56.68	$11.39	$22.25	$0.00	$90.32

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TERRAZZO FINISHER - Local 3 Marble & Tile*

Effective Date - 02/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.35	$11.39	$22.09	$0.00	$60.83
2	60	$32.81	$11.39	$22.09	$0.00	$66.29
3	70	$38.28	$11.39	$22.09	$0.00	$71.76
4	80	$43.75	$11.39	$22.09	$0.00	$77.23
5	90	$49.22	$11.39	$22.09	$0.00	$82.70

Effective Date - 08/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.05	$11.39	$22.25	$0.00	$61.69
2	60	$33.65	$11.39	$22.25	$0.00	$67.29
3	70	$39.26	$11.39	$22.25	$0.00	$72.90
4	80	$44.87	$11.39	$22.25	$0.00	$78.51
5	90	$50.48	$11.39	$22.25	$0.00	$84.12

Notes:

Apprentice to Journeyworker Ratio:1:3

TEST BORING DRILLER *LABORERS - FOUNDATION AND MARINE*	12/01/2020	$41.30	$8.60	$17.47	$0.00	$67.37
	06/01/2021	$42.32	$8.60	$17.47	$0.00	$68.39
	12/01/2021	$43.33	$8.60	$17.47	$0.00	$69.40
For apprentice rates see "Apprentice- LABORER"						
TEST BORING DRILLER HELPER *LABORERS - FOUNDATION AND MARINE*	12/01/2020	$40.02	$8.60	$17.47	$0.00	$66.09
	06/01/2021	$41.04	$8.60	$17.47	$0.00	$67.11
	12/01/2021	$42.05	$8.60	$17.47	$0.00	$68.12
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER *LABORERS - FOUNDATION AND MARINE*	12/01/2020	$39.90	$8.60	$17.47	$0.00	$65.97
	06/01/2021	$40.92	$8.60	$17.47	$0.00	$66.99
	12/01/2021	$41.93	$8.60	$17.47	$0.00	$68.00
For apprentice rates see "Apprentice- LABORER"						
TRACTORS/PORTABLE STEAM GENERATORS *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.45	$13.50	$15.70	$0.00	$78.65
	06/01/2021	$50.54	$13.50	$15.70	$0.00	$79.74
	12/01/2021	$51.68	$13.50	$15.70	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2020	$36.02	$12.91	$14.82	$0.00	$63.75
	06/01/2021	$36.82	$12.91	$14.82	$0.00	$64.55
	08/01/2021	$36.82	$13.41	$14.82	$0.00	$65.05
	12/01/2021	$36.82	$13.41	$16.01	$0.00	$66.24
TUNNEL WORK - COMPRESSED AIR *LABORERS (COMPRESSED AIR)*	12/01/2020	$52.13	$8.60	$17.92	$0.00	$78.65
	06/01/2021	$53.15	$8.60	$17.92	$0.00	$79.67
	12/01/2021	$54.16	$8.60	$17.92	$0.00	$80.68
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) *LABORERS (COMPRESSED AIR)*	12/01/2020	$54.13	$8.60	$17.92	$0.00	$80.65
	06/01/2021	$55.15	$8.60	$17.92	$0.00	$81.67
	12/01/2021	$56.16	$8.60	$17.92	$0.00	$82.68
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR *LABORERS (FREE AIR TUNNEL)*	12/01/2020	$44.20	$8.60	$17.92	$0.00	$70.72
	06/01/2021	$45.22	$8.60	$17.92	$0.00	$71.74
	12/01/2021	$46.23	$8.60	$17.92	$0.00	$72.75
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) *LABORERS (FREE AIR TUNNEL)*	12/01/2020	$46.20	$8.60	$17.92	$0.00	$72.72
	06/01/2021	$47.22	$8.60	$17.92	$0.00	$73.74
	12/01/2021	$48.23	$8.60	$17.92	$0.00	$74.75
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2020	$35.44	$12.91	$14.82	$0.00	$63.17
	06/01/2021	$36.24	$12.91	$14.82	$0.00	$63.97
	08/01/2021	$36.24	$13.41	$14.82	$0.00	$64.47
	12/01/2021	$36.24	$13.41	$16.01	$0.00	$65.66
WAGON DRILL OPERATOR *LABORERS - ZONE 2*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
	06/01/2022	$37.64	$8.60	$16.06	$0.00	$62.30
	12/01/2022	$38.49	$8.60	$16.06	$0.00	$63.15
	06/01/2023	$39.39	$8.60	$16.06	$0.00	$64.05
	12/01/2023	$40.29	$8.60	$16.06	$0.00	$64.95
For apprentice rates see "Apprentice- LABORER"						
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 2 (HEAVY & HIGHWAY)*	12/01/2020	$34.91	$8.60	$16.06	$0.00	$59.57
	06/01/2021	$35.83	$8.60	$16.06	$0.00	$60.49
	12/01/2021	$36.74	$8.60	$16.06	$0.00	$61.40
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
WASTE WATER PUMP OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2020	$49.98	$13.50	$15.70	$0.00	$79.18
	06/01/2021	$51.08	$13.50	$15.70	$0.00	$80.28
	12/01/2021	$52.23	$13.50	$15.70	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
WATER METER INSTALLER *PLUMBERS & GASFITTERS LOCAL 12 (Local 138)*	03/01/2021	$56.11	$13.57	$17.26	$0.00	$86.94
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						
Outside Electrical - East						
CABLE TECHNICIAN (Power Zone) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$29.67	$9.25	$1.89	$0.00	$40.81
For apprentice rates see "Apprentice- LINEMAN"						
CABLEMAN (Underground Ducts & Cables) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$42.03	$9.25	$10.27	$0.00	$61.55
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN CDL *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$34.62	$9.25	$10.07	$0.00	$53.94
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$27.20	$9.25	$1.82	$0.00	$38.27
For apprentice rates see "Apprentice- LINEMAN"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
EQUIPMENT OPERATOR (Class A CDL) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104* For apprentice rates see "Apprentice- LINEMAN"	08/30/2020	$42.03	$9.25	$14.35	$0.00	$65.63
EQUIPMENT OPERATOR (Class B CDL) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104* For apprentice rates see "Apprentice- LINEMAN"	08/30/2020	$37.09	$9.25	$10.87	$0.00	$57.21
GROUNDMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104* For apprentice rates see "Apprentice- LINEMAN"	08/30/2020	$27.20	$9.25	$1.82	$0.00	$38.27
GROUNDMAN -Inexperienced (<2000 Hrs.) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104* For apprentice rates see "Apprentice- LINEMAN"	08/30/2020	$22.25	$9.25	$1.82	$0.00	$33.32
JOURNEYMAN LINEMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$49.45	$9.25	$17.48	$0.00	$76.18

Apprentice - *LINEMAN (Outside Electrical) - East Local 104*

Effective Date - 08/30/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$29.67	$9.25	$3.39	$0.00	$42.31
2	65	$32.14	$9.25	$3.46	$0.00	$44.85
3	70	$34.62	$9.25	$3.54	$0.00	$47.41
4	75	$37.09	$9.25	$5.11	$0.00	$51.45
5	80	$39.56	$9.25	$5.19	$0.00	$54.00
6	85	$42.03	$9.25	$5.26	$0.00	$56.54
7	90	$44.51	$9.25	$7.34	$0.00	$61.10

Notes:

Apprentice to Journeyworker Ratio:1:2

TELEDATA CABLE SPLICER *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	02/04/2019	$30.73	$4.70	$3.17	$0.00	$38.60
TELEDATA LINEMAN/EQUIPMENT OPERATOR *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	02/04/2019	$28.93	$4.70	$3.14	$0.00	$36.77
TELEDATA WIREMAN/INSTALLER/TECHNICIAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	02/04/2019	$28.93	$4.70	$3.14	$0.00	$36.77

Additional Apprentice Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)
Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

** Multiple ratios are listed in the comment field.
*** APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.
**** APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

ATTACHMENT B

Massachusetts Weekly Certified Payroll Report Form

NEW AMESBURY ELEMENTARY SCHOOL
MINIMUM WAGE RATES
018300 - B

MASSACHUSETTS WEEKLY CERTIFIED PAYROLL REPORT FORM

Company's Name:	Address:	Phone No.:	Payroll No.:

Employer's Signature:	Title:	Contract No:	Tax Payer ID Number	Work Week Ending:

Awarding Authority's Name:	Public Works Project Name:	Public Works Project Location:	Min. Wage Rate Sheet Number

General / Prime Contractor's Name:	Subcontractor's Name:		"Employer" Hourly Fringe Benefit Contributions

Employee Name & Complete Address	Work Classification:	Employee is OSHA 10 certified (?)	Appr. Rate (%)	Hours Worked Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Project Hours (A) All Other Hours	Hourly Base Wage (B)	Health & Welfare Insurance (C)	ERISA Pension Plan (D)	Supp. Unemp. (E)	Total Hourly Prev. Wage (B+C+D+E) (F)	Project Gross Wages (A x F) Total Gross Wages	Check No. (H)

Are all apprentice employees identified above currently registered with the MA DLS's Division of Apprentice Standards? YES ☐ NO ☐

For all apprentices performing work during the reporting period, attach a copy of the apprentice identification card issued by the Massachusetts Department of Labor Standards / Division of Apprentice Standards. No apprentices are identified above ☐

NOTE: Pursuant to MGL c. 149, s. 27B, every contractor and subcontractor is required to submit a **true and accurate** copy of their certified weekly payroll records to the awarding authority by first-class mail or e-mail. In addition, each weekly payroll must be accompanied by a statement of compliance signed by the employer. Failure to comply may result in the commencement of a criminal action or the issuance of a civil citation.

Date Received by Awarding Authority
/ /

SECTION 018623

INTEGRATED AUTOMATION PERFORMANCE REQUIREMENTS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

C. System integration shall be responsibility of BAS sub-subcontractor and made an integral part of SECTION 250001.

1.02 SCOPE OF WORK

A. This Section shall comprise of the comprehensive monitoring of the Integrated Building Management Systems (IBMS).

1. Building Automation System (BAS)
2. Lighting Control System
3. Electrical System
4. Security System
5. Fire Alarm System
6. Plumbing System
7. Food Service Equipment System
8. Monitoring & Control Software: The Building Operating System (BOS), providing the comprehensive monitoring & integration platform for IBMS.

1.03 BASIS OF DESIGN

A. The purpose of this SECTION is to integrate individual building systems into a unified comprehensive management system for HVAC, electrical, plumbing, security and other building components identified herein.

1.04 OVERALL ARCHITECTURE OF IBMS

A. The Integrated Building Management System (IBMS) shall incorporate industry standard operating systems, communication networks and protocols. The system shall be designed to be completely modular in structure and freely expandable at any stage. Refer to system integration architecture diagrams on Drawings 8.5.07, 9.7.07 and 10.3.13.

1.05 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Heating, ventilating and air conditioning systems: SECTION 230001-HVAC.
2. Building HVAC automation system: SECTION 250001-BUILDING AUTOMATION SYSTEM.
3. Lighting controls system, fire alarm system, meters and submeters, emergency generator, intrusion detection system, video surveillance system, door access controls and CO detection system: SECTION 260001-ELECTRICAL.
4. Gas meters, water meters, water submeters, domestic hot water heater, domestic hot water temperature monitoring, and other requirements: SECTION 220001-PLUMBING.
5. Ansul system, walk-in freezer, walk-in cooler, and other requirements: SECTION 114000-FOOD SERVICE EQUIPMENT.

1.06 SUBMITTALS

A. Submit complete shop drawings in accordance with the requirements of SECTION 013300-SUBMITTALS.

B. All shop drawings shall be prepared in both hard copy and electronic form (in a standard format such as AutoCAD 2012 or newer). In addition to the drawings, the Contractor shall furnish a CD/diskette containing the identical information. Drawings shall be B size or larger. See Section 230001-HVAC for additional requirements. Upon request, VAV INTERNATIONAL Engineers shall provide via email the CAD floor plan drawings for use by the BAS contractor. The drawings are diagrammatic and final floor plans and equipment locations are the responsibility of the BAS contractor.

C. Shop Drawings shall include:

1. A single integrated submittal for IBMS and Section 250001-BAS components of which are to be included in graphic form (refer to attachments) and in narrative form.
2. Work by others designated for integration under this SECTION shall be completely defined and include:
    a. Sequence of operation
    b. Points list
    b. Point list of all BACnet interface
    c. Control Diagrams.
    d. Work specified in other Sections shall submit a certificate of compatibility with IBMS requirements

3. Riser diagrams and floor plans depicting locations of all controllers, routers, hubs, workstations, and the like with associated network architecture and wiring. Floor plans used shall be the common files shared by all graphic components.

4. Individual schematics of each mechanical system showing all connected points with reference to their associated controller. “Typicals” to be allowed where appropriate.

5. Wiring diagrams detailing interconnecting devices such as fan and pump starts, freezestats, smoke detectors, relays and similar items, shall be provided for each system.

6. All HVAC systems being integrated shall have full information whether the controller is being supplied by BAS or supplied as part of the system. Specific examples are:

   a. Packaged Rooftop Units- provide BACnet interface points, provide external points being furnished, provide sequence of operation.

   b. Kitchen DCV- provide BACnet interface points, provide external points being furnished, provide other means of interface, include other components being interfaced (i.e. makeup air unit, Ansul, fire alarm), provide comprehensive diagrams and sequence of operation.

7. Written narratives for all sequences shall be included, edited for specific BAS system and specific equipment being controlled (i.e. ERU’s heat wheel frost and/or capacity control may be achieved through wheel speed modulation or through a bypass damper modulation- this contractor shall specify which type and specific sequence of operation). Any deviations from the original design shall be highlighted. A “Bill of Materials” list shall be provided for each system indicating part numbers, descriptions, manufacturer, and quantities of each component utilized.

D. Submittal data shall contain manufacturer’s data sheets on all hardware and software products required by the specification and sequences. Valve, damper, and airflow station schedules shall indicate size, type, configuration, capacity, maximum pressure rating, pressure drop, maximum differential pressure shut-off capabilities and name and location of all equipment served.

E. Software submittals shall contain narrative descriptions of sequences of operation, program listings, point lists, and a complete description of the graphics, reports, trends, alarms and configuration to be furnished with the workstation software. Provide complete information on user programming (commands, sequences, and similar items). Information shall be bound or in a three-ring binder with an index and tabs.

1.07 COMMISSIONING

A. Where indicated in the equipment or commissioning specifications, engage a factory-authorized service representative, to perform startup service in accordance with functional test sheets and seamless integration with the work of this SECTION 019113-GENERAL COMMISSIONING.

B. Complete installation and startup checks and functional tests according to SECTION 019113-GENERAL COMMISSIONING and manufacturers written instructions.

C. Naming System:

1. Air Handling Unit - AHU, Energy Recovery Unit - ERU, Boiler - B, Exhaust Fan - EF, Electric Unit Heater - EUH, Electric Wall Heater - EWH, Kitchen Exhaust Fan - KEF, Supply Fan - SF, Makeup Air Unit - MAU, Packaged Rooftop Unit- RTU, Chiller - CH, Chilled Beam - CB, Fan Coil Unit - FCU, Pump - P, Fintube Radiation - FTR, Variable Volume Terminal - VAV.

2. Each equipment shall be assigned a unique tag number. Certain equipments are tagged to indicate its capacity or type, and is not indicated dedicated with unique tag; such equipment shall be assigned to nearest major room number which it is serving. i.e., if a VAV terminal size 8 is serving a group of rooms including room 174, it shall be assigned a unique tag number of VAV-174.

3. Room names and numbers shall be the final designations chosen by Owner, which may be different from that are shown on the contract documents. It is responsibility of this contractor to coordinate with Architect to assure that the information is current.

1.08 TRAINING

A. The BAS Contractor shall provide both on-site and classroom training to the Owner's representative and maintenance personnel using the BAS acceptance testing documents.

B. On-site training shall also include a minimum of 40 hours of hands-on instruction geared toward the operation and maintenance of the systems. Duration and schedule of training sessions shall be as dictated by the Owner. Prior to training, the necessary lesson plans, training documents, handouts, and the like shall be provided with the curriculum outline.

1.09 OPERATION AND MAINTENANCE MANUALS

A. The operation and maintenance manuals shall contain all information necessary for the operation, maintenance, replacement, installation, and parts procurement for the entire BAS. This documentation shall include specific part numbers and software versions and dates. A complete list of recommended spare parts shall be included with the lead time and expected frequency of use of each part clearly identified. These manuals shall be delivered to the Owner's representative within two months of the final approved submittals before substantial completion. (Refer to SECTION 017823-OPERATION AND MAINTENANCE DATA.)

B. The preventative maintenance shall include all tasking, frequency, and special instructions required for a proactive preventative maintenance action plan.

C. Following project completion and testing, the BAS contractor shall submit "as-built" record drawings reflecting the exact installation of the system. The as-built documentation shall also include a copy of all application software both in written form and on CD/diskette.

1.10 WARRANTY

A. The IBMS contractor shall warrant the entire system (parts and labor) for 12 months after successful system acceptance testing is accepted by Owner's Representative. Beneficial use by the Owner may be an alternative method to begin the warrantee period (providing there is a minimum of 12 months left after successful system acceptance testing and system acceptance by Owner's Representative). During the warranty period, the IBMS contractor shall be responsible for all software and hardware upgrades and revisions during normal workday schedule, and within 48 hours of notification if solution cannot be resolved via the remote or web-site connection, to provide and maintain complete and workable building control systems.

B. Updates to the manufacturer's software shall be provided at no charge during the warranty period.

1.11 QUALIFICATIONS

A. Firm performing work as sub-subcontractor (IBMS) and (BAS) shall have a minimum continuous experience under the same name or successor name under the same ownership.

1. Twenty (20) years experience in installation and service of BAS systems.
2. Ten (10) years of experience in installation and service of Tridium Jace and Niagara platform-based integrations.
3. Ten (10) years experience in lighting control system integration in BAS using Niagara platform.
4. Ten (10) full time certified technicians (current staff) in office(s) within 50-mile radius to job sites.
5. Technicians shall have a minimum of ten (10) years experience with specified integration platforms as a certified technician.
6. Is a factory authorized installer of BAS system with a complete line of BACnet/IP components and system.
7. Reference list of the following shall be submitted:
    a. Three (3) open protocol BACnet based BAS installations of Buildings of 100,000 SF or more which have been operated for a minimum of five years after date of Substantial Completion.
    b. Three (3) municipalities with integrated buildings using Niagara platform, with minimum of five (5) buildings each of minimum of 20,000 SF, all of which have been operated for a minimum of two (2) years after date of Substantial Completion.
    c. Completed comprehensive BACnet/IP based BAS system in minimum of two building projects of over 10,000 SF in floor area.

PART 2 PRODUCTS

2.01 BUILDING AUTOMATION / BUILDING MANAGEMENT SYSTEM

A. General - Refer to SECTION 250001-BAS

B. BAS shall be based on Open Protocol non-proprietary BACnet/IP system down to its lowest components.

C. All components and software utilized in Integration shall be open-license non-proprietary without any restrictions.

D. Acceptable BAS System:

1. Distech
2. Honeywell
3. Johnson Controls

E. Basic Graphics Requirement:

1. First layer of graphics display shall be based on floor plans of the building that is common to all systems, with each space having room name and number.
2. The floor plan shall reside in a central file to be shared so that updated floor plan shall reflect in all subsystems.
3. The final graphics shall reflect “as-built” conditions, including but not limited to room numbers and names.

F. Remote Access

1. The integrated BAS system shall be accessible to VNS through web-based internet access without any special software.
2. Access to the web site shall be provided with varying degree of security clearances, and such access shall be recorded.
3. Remote access devices can be smart phone, tablet computer, laptop computer or desktop computer.

2.02 ELECTRICAL INTEGRATION

A. Lighting Control System:

1. Refer to SECTION 260001 for full information of the Lighting Control System provided under electrical.
2. The system shall communicate integrate via open protocol BACnet/IP.
3. Entire capability of the Lighting Control System, including but not limited to lighting zone controls, space lighting controls, scheduling, read/write, alarm, trend logging shall be integrated.

4. It is the intent of the Owner to have simplified control interface for their day to day usage. The simplified interface requirement shall be as directed by the Owner.

5. Certain interface to security system shall be defined at a later date. Currently, 3 set of contacts are provided for the intruder alert system which shall be monitored by IBMS. Upon intruder alarm, selected outdoor lights shall be energized along with selected indoor lights.

B. Security System

1. Refer to Section 26001 for full information of the Security System provided under electrical.

2. Intrusion Detection- 3 sets of dry contacts is provided. Single or group point assigning to each contact shall be determined by owner.

3. Card Access- 3 sets of dry contacts are provided. Single or group point assigning to each contact shall be determined by owner.

4. Electrical shall run unshielded #16 twisted pair wiring for each dry contact to the BAS panel designated by BAS.

5. Final wiring connections and programming by BAS.

6. It is envisioned that certain security alarm condition shall turn on selected outdoor and indoor lights, to be finalized by the City.

C. Fire Alarm System

1. Refer to Section 26001 for full information of the Fire Alarm System provided under electrical.

2. Three sets of dry contacts are provided. Single or group point assigning to each contact shall be determined by owner.

3. Full interface to the Amesbury Fire Department is by electrical.

D. Meters and Submeters

1. Refer to Section 26001 for full information of the smart panels with integral meters.

2. Pertinent panels provided by electrical have integral meters which shall be daisy chained, and the daisy chain wiring brought to the BAS panel designated.

3. Final wiring connection, programming and interface by BAS.

4. KW and KWh monitoring and trend logging for each group of submetering as defined by the City. Envisioned grouping is lighting, HVAC, and lights & pugs.

5. Demand limiting to be defined by the City. City shall define priority load shedding groups, and as the demand reaches the set point KW, load shedding shall occur based on the priority. It is envisioned that the load shedding shall involve lighting by zones and HVAC systems. BAS contractor shall work with the City to incorporate full load shedding programming into the BAS.

E. Generator

1. BAS to monitor run status of the generator and the transfer switches.

2.03 PLUMBING INTEGRATION

A. Refer to Section 220001- Plumbing for full information on items listed below.

B. City Water Meter

1. Plumbing is to provide new meters with a proper BAS interface, to trend log flow in GPM as well as GPD totalization.
2. In addition to the trend logging, the information shall alarm the unusually high consumption rate or flow during unoccupied hours to alert owner of the potential system leakage.

C. Gas Meters

1. Plumbing is to provide new gas meters.
2. Gas Consumption- plumbing shall provide new gas. BAS to wire, and trend log flow and totalization.
3. Gas Pressure- plumbing shall provide a ¾" tap with a valve. BAS to provide pressure sensor, wiring and programming to monitor the gas pressure. Alarm status shall be registered when gas pressure drops below 5.5" WG.

D. Domestic Hot Water

1. Digital mixing valves provides 16-point of data to be integrated into the BAS. BAS to provide trend logging.
2. When hot water supply temperature falls below 10°F below set point (refer to Plumbing Section for specific settings) for more than 5 minutes or when recirculating water temperature falls below 100°F, alarm shall be registered.
3. BAS contractor shall provide current transducer to monitor status of recirculation pump.

E. Elevator Sump Pump

1. BAS contractor shall provide current transducer to monitor status of elevator sump pump.

2.04 FOOD SERVICE INTEGRATION

A. Refer to SECTION 1140001- FOOD SERVICE EQUIPMENT for full information on items listed below.

B. Walk in Freezer and Cooler- are each provided with monitoring panel, which allows output for alarm status as well as to read temperatures. BAS to run wires, alarms, and provide trend logging. If the temperature deviates by 5 degrees from set point for more than 3 minutes, alarm status shall register.

C. Ansul System- is provided with a dry set of contacts. Electrical to run wiring to designated BAS panel. BAS to make final contact, trend log, and control pertinent selected HVAC equipment as required by Code and as directed by local Fire Department. It is envisioned that upon Ansul system discharge, kitchen exhaust fan continues to run but makeup air unit shall be shut off.

2.05 CIVIL

A. Refer to SECTION - CIVIL for full information on items listed below.

B. There are (2) duplex sewage pump system, each with a control panel. Electrical to run wiring to designated BAS panel. BAS to make final contact, trend log. Control panel to report pump statuses and high level alarms.

PART 3 EXECUTION

3.01 SYSTEM STARTUP AND ACCEPTANCE TESTING

A. BAS and other trade system shall be tested and commissioned independently to assure that it is working properly, and so certified by factory representatives, prior to the Integration process.

B. Other trades shall provide a full detail of interface requirement to the BAS/ System Integrator.

C. System integration is part of the Substantial Completion requirements.

D. Comply with commissioning requirements.

3.02 TRAINING

A. The BAS/ Integration Contractor shall provide both on-site and classroom training to the Owner's representative and maintenance personnel using the BAS acceptance testing documents.

B. On-site training shall also include a minimum of 40 hours of hands-on instruction geared toward the operation and maintenance of the systems. Owner shall dictate duration and schedule of the training sessions. Prior to training, the necessary lesson plans, training documents, handouts, and the like shall be provided with the curriculum outline.

C. Training shall also include remote access device usage, within minimum of 6 designated City employees, using smart phones, tablet computers, laptop and computers through web access. Simulation of alarm status alert to designated on-call person's smart phone, remote access, information retrieval, override, adjustments, or shut downs shall be reviewed through real time simulation.

D. All training sessions shall be professionally videotaped with high quality sound and copy of the recording provided to the City of Amesbury.

3.03 OPERATION AND MAINTENANCE MANUALS

A. The operation and maintenance manuals shall contain all information necessary for the operation, maintenance, replacement, installation, and parts procurement for the entire BAS. This documentation shall include specific part numbers and software versions and dates. A complete list of recommended spare parts shall be included with the lead time and expected frequency of use of each part clearly identified. These manuals shall be delivered to the Owner's representative within 2 months of the final approved submittals before substantial completion. (Refer to Section 017823-Operation and Maintenance Data.)

B. The preventative maintenance shall include all tasking, frequency, and special instructions required for a proactive preventative maintenance action plan.

C. Following project completion and testing, the BAS contractor shall submit “as-built” record drawings reflecting:

1. The exact installation of the system.
2. If the shop drawing was mark with any comments such comments shall also be integrated.
3. Reduced size plans showing locations of sensors (not including space sensors) such as duct DP sensors, pipe DP sensors, space static pressure sensors, and field control panels.
4. The as-built documentation shall also include a copy of all application software both in written form and on CD/diskette.

END OF SECTION

SECTION 019113

BUILDING COMMISSIONING REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. All related Specification sections shall be used in conjunction with this Section.

C. OPR and BoD documentation prepared by the Owner and Architect / Engineer contain requirements that apply to this section.

1.02 SUMMARY

A. This section includes requirements for commissioning during the construction phase, functional testing phase and the building turnover phase. Includes requirements for all specified and associated systems, subsystems and equipment. The intent of this section is to specify the commissioning responsibilities of the Contractor, HVAC Subcontractor, TAB Subcontractor, Automated Temperature Controls Subcontractor, Plumbing Subcontractor, Electrical Subcontractor and the Fire Protection Subcontractor. The Contractor will assure participation and cooperation of his subcontractors for the commissioning process. The Commissioning Authority for this project will be hired by the Owner.

B. This project has been designed to meet the requirements of the Silver rating level for the US Green Building Council's Leadership in Energy and Environmental Design for Building Design & Construction – Schools (LEED BD&C – Schools) (Version 4) Green Building Rating System. This commissioning section includes all requirements of the LEED program for EA Prerequisite 1, Fundamental Commissioning of the Building Energy Systems and EA Credit 3, Enhanced Commissioning as described in the Energy and Atmosphere section. These requirements will be adhered to, regardless of whether the owner chooses to formally register this project with USGBC.

C. The Commissioning Authority is not responsible for construction means, methods, coordination between trades, job safety or any other related management function on the job site.

1.03 DEFINITIONS

A. Architect: Includes Architect identified in the Contract for Construction between Owner and Contractor.

B. Automated temperature controls (ATC): building management system and components providing automated control of related environmental and/or process systems and equipment.

C. Basis of Design (BoD): A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

D. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

E. Contractor: The prime Contractor identified in the Contract for Construction between Owner and Contractor.

F. Construction Checkout Documents / Pre-Functional Checklists: The CxA will produce pre-functional checklists that can be used by the Contractor / Subcontractors prior to the start of functional testing. These checklists are tools to help the Contractor and Subcontractors verify that the installation complies with the Contract Documents. Any deficiencies that are found can then be corrected early in the process when the Contractors are fully mobilized on the site. The pre-functional checklists will be created for all equipment included in the scope of the commissioning process.

G. Commissioning Authority (referred to herein as the CxA): The individual or group responsible for executing the commissioning process.

H. Engineering Professionals: Includes the Engineers identified in the Contract for Construction between Owner and Contractor, responsible for design of HVAC, plumbing, fire protection, electrical, communications, controls for HVAC systems and other related systems.

I. Leadership in Energy and Environmental Design for Building Design & Construction - Schools (LEED BD&C - Schools): A rating system provided by the U.S. Green Building Council that rates the environmentally friendly and energy efficient performance of a newly renovated building based on established guidelines.

J. Mock-up (system or component): A system, or component of a system, that is constructed ahead of other similar pieces of equipment that allows the commissioning agent and the installing contractors the ability to evaluate the installation. It allows early testing of system / equipment applications, user interfaces, component interaction techniques and check out of the building automation logic.

K. Owner's Project Requirements (OPR): A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

L. Subcontractor: Individual contractors responsible to the Contractor for installation of specific systems to be commissioned.

M. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

N. Testing, Adjusting, and Balancing (TAB): Testing, adjusting and balancing of air and water systems, subsystems, equipment and components per the contract documents.

1.04 COMMISSIONING TEAM

A. Members Appointed by Contractor(s): Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions. The commissioning team will consist of, but not be limited to, representatives of each Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.

B. Members Appointed by Owner or Owner representative:

1. The CxA: Owner or Owner representative has engaged the CxA under a separate contract.
2. Representatives of the Owner or Owner representative including facility users and operation and maintenance personnel.
3. Architect and engineering design professionals.

1.05 OWNER'S or OWNER'S REPRESENTATIVES RESPONSIBILITIES

A. Provide the OPR and BoD documentation for use in developing the commissioning plan, checklists and testing plans, operation and maintenance training plan, and a systems manual.

B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities, including but not limited to, the following:

1. Coordination and testing meetings.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration of operation of systems, subsystems and equipment.
4. Review system performance and recent building history approximately 10 months into the 12 month warranty period with the CxA.

1.06 COMMISSIONING RESPONSIBILITIES

A. The responsibilities of various parties in the commissioning process are provided in this section. It is noted that the services for the Owners Project Manager, Architect, HVAC mechanical and electrical designers/engineers, and Commissioning Authority are not provided for in this contract. That is, the Contractor is not responsible for providing their services. Their responsibilities are listed here to clarify the commissioning process.

B. All Parties:

1. Follow the Commissioning Plan: (The commissioning plan is an informational document that clarifies how the commissioning process will proceed. This plan is developed by the Commissioning Authority and outlines the responsibilities of the Commissioning Authority, Owner as well as what services will be required of the Design Team, Contractor and their subcontractors. This document fully describes the processes that will be used to carry out commissioning.)
2. Attend commissioning scoping meeting and additional meetings, as necessary.

C. Architect / Engineer - Construction and Acceptance Phase:

1. The owner manages the Commissioning Authority contract.
2. Attend the commissioning scoping meeting and selected commissioning team meetings.
3. Perform normal submittal review, construction observation as contracted.
4. Coordinate resolution of system deficiencies identified during commissioning, according to the contract documents.
5. Provide the Commissioning Authority with a copy of all bulletins, sketches, RFIs, addenda and any project document updates to help keep the commissioning plan up to date.

D. Commissioning Authority - Construction and Acceptance Phase:

1. The Commissioning Authority is not responsible for design concept, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management. The Commissioning Authority may assist with problem solving, non-conformance or deficiencies but, ultimately, that responsibility resides with the general contractor and the A/E. The primary role of the Commissioning Authority is to develop and coordinate the testing plan manual, to observe and document performance – which systems are functioning in accordance with the documented design intent and in accordance with the Contract Documents. The Contractors will provide all tools or the use of tools to start, checkout and functionally test equipment and systems, except for specified testing with portable data-loggers, which will be supplied and installed by the Commissioning Authority.
2. Coordinates and directs the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules and technical expertise.
3. Coordinate the commissioning work and, with the Contractor, ensure that commissioning activities are being scheduled into the master schedule.
4. Plan and conduct a commissioning scoping meeting and other commissioning meetings.
5. Request and review additional information required to perform commissioning tasks, including O&M materials, contractor start-up and checkout procedures.
6. Before startup, gather and review the current control sequences and interlocks and work with contractors and design engineers until sufficient clarity has been obtained, in writing, to be able to write detailed testing procedures.
7. Review normal Contractor submittals applicable to systems being commissioned for compliance with commissioning needs, concurrent with the A/E reviews.
8. Write and distribute pre-functional tests and checklists.
9. Overview the development of an enhanced start-up and initial systems checkout plan with Subs.
10. Perform site visits to observe component and system installations. Attends selected planning and job-site meetings to obtain information on construction progress. Review construction meeting minutes for revisions/substitutions relating to the commissioning process. Assist in resolving any discrepancies.

11. Witnessing the cleaning, flushing and chemical treatment of the hydronic systems prior to balancing.
12. Witnessing any ductwork pressure testing and cleaning. Verifying adherence of the Indoor Air Quality during construction by LEED EQ Credit 3.1.
13. Verify pre-functional tests and checklist completion by reviewing pre-functional checklist reports and by selected site observation and spot-checking.
14. Verify systems startup by reviewing start-up reports and by selected site observation.
15. Review Testing Adjustment and Balancing execution plan and sample report.
16. Verify air and water systems balancing by reviewing completed reports and by selected site observation.
17. Write the functional performance test procedures for equipment and systems.
18. Coordinate, witness and approve “mock-up” installations of systems and equipment as defined in this division, section 3.03.
19. Analyze any functional performance trend logs and monitoring data to verify performance.
20. Coordinate witness and approve manual functional performance tests performed by installing contractors. Coordinate retesting as necessary until satisfactory performance is achieved.
21. Maintain a master deficiency and resolution log and a separate testing record. Provide the Contractor with written progress reports and test results with recommended actions.
22. Oversee the training of the Owner’s operating personnel.
23. Review of equipment warranties.
24. Review and approve the preparation of the O&M manuals (one master set).
25. Development of a systems training manual.
26. Provide a final commissioning report.
27. Organize and perform seasonal or deferred testing of equipment and systems.
28. Organize and perform 10th month warranty review of systems and equipment.

E. Project Manager – Owner's Representative – Construction and Acceptance Phase:

1. Facilitate the coordination of the commissioning work by the Commissioning Authority, and, with the Contractor to ensure that commissioning activities are being scheduled into the master schedule by the Contractor well in advance.
2. Review the final Commissioning Plan.
3. Attend a commissioning scoping meeting and other commissioning team meetings.
4. Perform the normal review of contractor submittals.
5. Furnish a copy of all construction documents, addenda, change orders and approved submittals and shop drawings related to commissioned equipment to the Commissioning Authority.
6. Review the functional performance test procedures submitted by the Commissioning Authority, prior to testing.
7. When necessary, observe and witness pre-functional checklists, startup and functional testing of selected equipment.
8. Review commissioning progress and deficiency reports (Commissioning Portal) and respond to issues assigned.
9. Coordinate the resolution of non-compliance and design deficiencies identified in all phases of commissioning.
10. A representative will attend a commissioning scoping meeting and other necessary meetings scheduled by the Commissioning Authority to facilitate the commissioning process.
11. Arrange for facility operating and maintenance personnel to attend various field commissioning activities including equipment & system "mock-ups" and field training sessions.

F. General Contractor (GC) – Construction and Acceptance Phase:

1. General Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:
    a. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
    b. Provide the CxA with a detailed and accurate construction schedule updated on a monthly basis. Coordinate scheduling of commissioning activities with the CxA and include them in the construction schedule.

c. Provide a schedule for equipment submittals, installation manual submittals, operation and maintenance data submittals, equipment start-up, and testing to CxA for incorporation into the commissioning plan. Update schedule on a monthly basis throughout the construction period.

d. Provide CxA with copies of all approved change orders or other modifications impacting construction when approved.

e. Participate in construction phase coordination meetings.

f. Participate in commissioning inspections.

g. Ensure accurate completion of construction checkout documents for all systems to be commissioned prior to verification site visits by the CxA.

h. Certify readiness of systems to be commissioned prior to functional performance testing.

i. Participate in functional performance testing of systems to be commissioned.

j. Resolving issues identified during commissioning and coordinating correction of deficiencies. Ensure responses to open issues within two weeks of being posted via online tracking database (Commissioning Portal).

k. Participate in operation and maintenance planning and verification.

l. Participate in operation and maintenance training sessions.

m. Participate in final review of equipment and systems and participate in final acceptance meeting.

n. Certify the work is complete and systems are operational according to the contract documents, including calibration of controls and any instrumentation.

o. Coordinate subcontractor commissioning activities.

p. Review and approve final commissioning documentation.

q. Assist in coordinating the Subcontractors, as needed, to perform testing of systems and equipment as it relates to project phasing.

r. Assist in coordinating the Subcontractors, as needed, to perform deferred or opposite seasonal testing of systems and equipment.

s. Assist in coordinating the Subcontractors to resolve issues discovered during the system performance review 10 months into the 12 month warranty period.

t. Assist in coordinating personnel and providing documentation, as needed, to meet the LEED-NC requirements.

u. Coordinate and arrange for mock-up systems and equipment as defined in this division, section 3.03.

G. Subcontractors shall assign representatives with the expertise and the authority to act on behalf of the entity responsible for installation of systems to be commissioned who shall participate in and perform commissioning team activities including, but not limited to, the following:

1. Provide a schedule for equipment submittals, installation manual submittals, operation and maintenance data submittals, equipment start-up, and testing to CxA for incorporation into the commissioning plan. Update schedule on a monthly basis throughout the construction period.
2. Participate in construction phase coordination meetings.
3. Provide information to the CxA for developing construction phase commissioning plan including, but not limited to:
4. Schedule as mentioned above.
5. Equipment submittals.
6. Installation manual submittals.
7. Operation and maintenance information submittals.
8. Complete construction checkout documents for all systems to be commissioned.
9. Provide all necessary assistance and work associated with the completeness and installation of “mock-up” equipment as defined in this division, section 3.03.
10. Maintain updated Project Record Documents for periodic review by the CxA and submit final record documents at project completion.
11. Certify readiness of systems to be commissioned prior to functional performance testing.
12. Participate in functional performance testing of systems to be commissioned.
13. Participate in test procedures meeting.
14. Provide technicians who are familiar with the construction and operation of the installed systems, are trained in the use of required testing instruments and procedures to participate in testing of installed systems, subsystems and equipment.
15. Participate in operation and maintenance planning, documentation and verification.
16. Resolving issues identified during commissioning and coordinating correction of deficiencies. Ensure responses to open issues within two weeks of being posted via online tracking database (Commissioning Portal).

17. Participate in training sessions for Owner's operation and maintenance personnel.

18. Participate in final review at acceptance meeting.

19. Participate, as needed, in performing deferred or opposite seasonal testing of systems and equipment.

20. Assist in coordinating personnel and providing documentation, as needed, to meet the LEED-NC for Schools & MA-CHPS requirements.

1.07 COMMISSIONING DOCUMENTATION

A. Commissioning Plan: A document, prepared by the CxA, that outlines the schedule, allocation of resources and documentation requirements of the commissioning process, including but not limited to, the following:

1. Plan for delivery and review of submittals, systems manuals and other documents and reports. Identification of the relationship of these documents to other functions and a description of submittals that are required to support the commissioning processes. Submittal dates include the latest date approved submittals must be received without adversely affecting commissioning.

2. Overview of the organization, layout and content of commissioning documentation and a description of documents to be provided along with identification of responsible parties.

3. Identification of systems and equipment to be commissioned.

4. Description of schedules for testing procedures along with identification of parties involved in performing and verifying tests.

5. Identification of items that must be completed before the next operation can proceed.

6. Description of responsibilities of commissioning team members.

7. Description of observations to be made.

8. Description of requirements for operation and maintenance training, including required training materials.

9. Description of expected performance for systems, subsystems, equipment and controls.

10. Requirements for documenting changes on a continuous basis to appear in the project record documents.

11. Process and schedule for completing construction checklists for systems to be commissioned.

12. Step by step procedures for testing systems, subsystems and equipment with descriptions for methods of verifying relevant data, recording the results obtained and listing parties involved in performing and verifying tests.

B. Construction Checkout Documents / Pre-functional Checklists: The CxA will develop construction checklists for each system to be commissioned including interfaces with the ATC system, safeties, and interlocks. Separate entries will be provided for each item to be checked. Construction checklists will be completed by the installing Subcontractor and verified by the Contractor and CxA. Space will be provided for sign off of installing Subcontractor, Contractor and CxA. Each checklist will include, but not limited to, the following:

1. Name and identification code of each item being checked.
2. Verification of each item including verification of all required data and construction practices listed in the construction checklists. This list outlines all work necessary to be completed prior to the start of functional testing for the particular system, subsystem and equipment.
3. Notation of any equipment or installation that deviates from approved submittals or the construction documents.
4. Name(s) of personnel involved with verification and dates on which verification activities and construction checklists were completed.

C. Witness systems, assemblies, equipment, and component startup.

D. Hydronic Start-up Documents: Documentation that narrates the flushing, cleaning, chemical treatment, pressure testing and air bleeding of any associated hydronic systems, assemblies, equipment, and component start-up. Documentation should identify individuals present who witnessed said testing.

E. Certificate of Readiness: Certificate of Readiness shall be signed by the Contractor, Subcontractor(s), Installer(s) and CxA certifying that systems, subsystems, equipment, and associated controls are ready for testing and that all relevant information including submittals, installation data and operation and maintenance documentation has been submitted. Completed construction checklists signed by the responsible parties shall accompany this certificate.

F. Functional Performance Testing: CxA will develop functional performance test documents for each system to be commissioned including interfaces and interlocks. Separate entries will be provided for each item to be tested. CxA will prepare separate tests for each mode of operation and provide space to indicate whether the mode under test responded. All information gathered will be documented by the CxA. Each test will include, but not limited to, the following:

1. Name and identification of each item being checked.
2. Date of test.
3. Indication of whether the record is for a first test or retest following correction of a problem or issue.
4. List of deficiencies.
5. Calibration of sensors and sensor function.

6. Testing conditions under which test was conducted, including (where applicable) ambient conditions, setpoints, override conditions, and status and operating conditions that impact the results of the test.

7. Control sequences for mechanical and electrical systems.

8. Verification of control signals for each setpoint at specified conditions.

9. Responses to control signal at specified conditions.

10. Sequence of responses to control signals at specified conditions.

11. Electrical demand or power input at specified conditions.

12. Expected performance of systems, subsystems and equipment at each step of the tests. Narrative description of observed performance of systems, subsystems and equipment. Notation to indicate whether the observed performance at each step meets the expected results.

13. Interaction of auxiliary equipment.

G. Test and Verification Reports: CxA will create test scenarios, record test data, observations, and measurements on test documents. Photographs, forms and other means appropriate for the application will be included with test documentation. CxA will compile test and verification reports and verification certificates and include them in the commissioning report.

H. Training Plans: To be prepared by the contractor and submitted to the CxA and the Owner for review and comment prior to finalizing training plans.

I. Corrective Action Documents: CxA will document corrective action taken for systems and equipment that fail tests including required modifications to systems and equipment and revisions to test procedures. Retest and final results will also be documented.

1. Issues Log or Commissioning Notice: CxA prepares and maintains an issues log that describes design, installation and performance issues that are at variance with the OPR, BoD and contract documents. Identification and tracking of issues as they are encountered, documenting the status of unresolved and resolved issues. Issues log is shared with members of the Design/Construction/Commissioning team via an internet portal which is maintained by the CxA.

    a. BVH Commissioning Portal: The CxA Commissioning Portal is an on-line issue tracking database developed by BVH Integrated Services, Inc. The Portal is used by the CxA to track issues and assign responsibility for corrective action. All members of the Commissioning Team will be given access to the Portal to respond to issues and / or deficiencies. Open issues will be sorted by the individual trades. Once the Contractor / Subcontractor(s) have made any necessary corrections they will update their specific issues on line for re-verification by the commissioning provider.

J. Systems Training Manual: CxA will develop a systems training manual for the operation and maintenance personnel that includes the intended operation of the systems and equipment listed as well as document setpoints and schedules. It should be noted that the Systems Training Manual does not in any way replace the Subcontractor / vendor training nor does it relieve Subcontractor(s) of their responsibilities as outlined in other divisions within the contract documents.

1.08 SUBMITTALS BY CONTRACTOR

A. Information listed below shall be submitted with the product and system product literature and shop drawing submittals for review and approval by the Owner, Architect, Engineering Professionals and the CxA. This information will be used to confirm the product compliance with the Contract Documents and to establish detailed commissioning requirements and procedures. The information shall be specific to each system to be commissioned and shall be inclusive of all related systems, equipment and components.

1. Manufacturer cut sheets and product literature and shop drawings in accordance with the requirements of other divisions.
2. Manufacturer's detailed installation and start-up requirements including equipment checklists for each piece of equipment.
3. Operation instructions.
4. Manufacturer's recommended maintenance and troubleshooting procedures.
5. Warranty and owners obligations to maintain warranty.
6. Detailed product data for each piece of equipment including part load capacities, electrical components and requirements. (As appropriate)
7. Manufacture's certified test reports on each piece of equipment.
8. Performance curves for each piece of equipment being submitted. (As appropriate)
9. Coordination and Record Drawings.
10. Logic flow diagrams for control systems sequences of operation. Include detailed sections of the Sequence of Operations for related function groups.
11. Interpret function groups for clarity.
12. Indicate initial setpoints, reset schedules, sensor locations.

B. Operation and Maintenance Manuals:

1. The Contractor shall develop the Operation and Maintenance manuals in accordance with the requirements indicated in Division 01.

2. All submittal information indicated in item 1.8A above shall be included in the operations and maintenance manual in addition to the information required below.

3. Manufacturer's break-in instructions.

4. Manufacturer suggested service requirements.

5. Spare parts list edited for specific equipment used on the project. Provide names/numbers of local distributors for spare parts

6. Preventative maintenance instructions

7. Troubleshooting guides

8. Plumbing and HVAC piping sanitation certificates

9. Approved Final Air and Water Balancing Report

10. Warranties with Warranty start & completion dates

11. Equipment Start-up Reports

1.09 QUALITY ASSURANCE

A. Operations and Maintenance Training Instructor Qualifications: Equipment training shall be provided by a factory authorized technical representatives, experienced in training, operation and maintenance procedures for installed systems, subsystems and equipment.

1.10 COORDINATION

A. Coordination Meetings: CxA will conduct periodic coordination meetings of the commissioning team to review progress on the commissioning plan, to discuss scheduling conflicts and to discuss upcoming commissioning process activities.

B. Pretesting Meetings: CxA will conduct pretest meetings of the commissioning team to review start-up reports, pretest verification results, testing procedures, testing personnel and instrumentation requirements and manufacturer's authorized service representative services for each system, subsystem, equipment and component to be tested.

C. Testing Coordination: CxA shall coordinate sequence of testing activities to accommodate required quality assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and verification.

D. Manufacturer's Field Services: CxA will coordinate services with the help of the Contractor/Subcontractor of manufacturer's field services.

1.11 SYSTEMS TO BE COMMISSIONED

A. The following systems will be commissioned where applicable in this project at the following random sampling rates, selected by the CxA at any chosen time at the discretion of the CxA including up to the day of testing:

1. Includes:

a. Heating, ventilation and air conditioning systems.

1) Boilers, chillers, air handling units including rooftop units, make up air units and split a/c systems

2) Terminal equipment – induction units, cabinet heaters, unit heaters, fan coil units, radiant panels

3) Pumps and drives

b. All Direct Digital Controls (DDC) will be verified for proper operation as they relate to the above equipment including interfaces for remote monitoring. All security and system interlocks associated with the control system will be commissioned.

c. Spot checking of air and water balancing readings.

d. Building domestic water systems including hot and cold systems

e. Any water booster pumps

f. Sewage ejector pumps

g. Backflow preventers

h. Fire protection systems includes the fire pump and alarm check valves

i. Building Envelope including but not limited to:

1) Insulation

2) Wall Framing

3) Thermal Bridging

4) Air & Water Leakage

5) Solar Glazing

6) Thermal Glazing

7) Fenestration Framing

8) Infra-red (IR) scans of roof and exterior wall assemblies

j. Building Electrical Power Systems

k. Occupancy sensors

l. Emergency generator and associated transfer switches

m. Fire alarm system

n. Fire protection system

o. Telecommunication systems

p. Security system

2. Any building system deemed as renewable energy will be commissioned by the LEED guidelines.

3. Central building automation and controls systems, and all equipment forming a part of these systems (including linkages to remote monitoring and control sites).

PART 2 PRODUCTS

2.01 TEST EQUIPMENT

A. All standard testing equipment required to perform start-up and initial checkout and required functional performance testing shall be provided by the Division contractor for the equipment being tested.

B. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerance specified in this Section. The Contractor(s) instrumentation shall meet the following standards:

1. Be of sufficient quality and accuracy to test and/or measure system performance within the tolerances required to determine adequate performance.
2. Be calibrated on the manufacturer's recommended intervals with calibration tags permanently affixed to the instrument being used.
3. Be maintained in good repair and operating condition throughout the duration of use on this project.
4. Be recalibrated / repaired if dropped and/or damaged in any way since last calibrated.

PART 3 EXECUTION

3.01 TESTING PREPARATION

A. Prerequisites for Testing:

1. Certify that systems to be commissioned have been completed, calibrated and manufacturer start-ups (where required) are complete. Verify systems to be commissioned are operating according to the OPR, BoD, and the contract documents and the Certificates of Readiness are signed and submitted.
2. Certify that building instrumentation and automated temperature controls associated with the systems to be commissioned have been completed and calibrated and are operating according to the OPR, BoD, and the contract documents and that preset set points have been recorded.
3. Certify that TAB procedures have been completed and that TAB reports have been submitted, discrepancies corrected and corrective work approved.
4. Test systems and intersystem performance after approval of construction checklists for systems, subsystems, and equipment.
5. Set systems, subsystems, and equipment into operating mode to be tested (i.e. normal shut down, normal auto position, normal manual position, unoccupied cycle, and emergency power and alarm conditions.)
6. Verify each operating cycle after it has been running for a specified period and is operating in a steady state condition.
7. Inspect and verify the position of each device and interlock identified on checklists. Sign off each item as acceptable or failed. Repeat this test for each operating cycle that applies to system being tested.
8. Check safety cutouts, alarms and interlocks with smoke control and life safety systems during each mode of operation.
9. Update checklists or data sheet after a deficiency is observed and corrected.
10. Verify equipment interface with monitoring and control system and TAB criteria including the following:
    a. Supply and return flow rated for variable flow and constant volume systems in each operational mode, including maximum and minimum flow capacity
    b. Operation of terminal units in both heating and cooling cycles
    c. Minimum outdoor air intake in each operational mode and at minimum and maximum airflows
    d. Building pressurization
    e. Total exhaust airflows and total outdoor air intake

f. Operation of indoor air quality monitoring systems

11. Verify proper responses of monitoring and control systems controllers and sensors to include the following:

    a. For each controller or sensor, record the indicated monitoring and control system reading and the test instrument reading. If the initial test indicates that the test reading is outside of the control range of the installed device, check calibration of the installed device and adjust. Retest malfunctioning devices and record results on checklist or data sheet.

    b. Report deficiencies and prepare an issues log entry.

12. Verify that construction checkout of systems to be commissioned has been completed and approved. CxA will verify construction checkout and start-up including requirements specified in individual Division Sections and equipment manufacturer's recommendations.

B. Testing Instrumentation: Install measuring instruments and logging devices to record test data for the required test periods. Instrumentation will monitor and record full range of operating conditions and will allow for calculation of total capacity of system for each mode of operation. Operational modes may include the following:

1. Occupied and unoccupied
2. Full load and minimum flow
3. Maximum flow and minimum flow
4. Warm up and cool down
5. Economizer cycle
6. Emergency power supply
7. Life safety alarm modes
8. Temporary upset of system operation
9. Partial occupancy conditions
10. Special cycles

3.02 START-UP, CONSTRUCTION CHECKLISTS AND INITIAL CHECKOUT

A. The following procedures apply to all equipment to be commissioned.

B. General: Each piece of equipment receives full construction checkout. There will be some sampling strategies used for terminal equipment. The construction checkout protocol for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system. Before any system start-ups begin, the Contractor(s) shall conduct a final installation verification audit for their work. The Contractor shall be responsible for completion of all work including change orders and punch list. This visual check of the various systems to be commissioned shall verify that all components are properly installed. The following items as a minimum shall be observed, but not be limited to, check of:

1. Air Distribution Systems:
    a. Mounting and support of equipment.
    b. Noise, vibration, air and water leaks.
    c. Air filtration, presence and operation of dampers, diffusers, grilles, fire dampers and access doors.
    d. Presence of thermostats and other adjustable temperature control devices.
    e. Presence of smoke sensors and other safety devices.
    f. Instrumentation, gauges, thermometers and flow measuring devices.
    g. Access to equipment and filters.
    h. Insulation of ductwork is complete.
    i. Ductwork is sealed.
    j. Power available to equipment.
    k. Temperature controls are complete.
    l. Air and water balancing is complete and a hand written report available.
2. Heating and Cooling Systems Equipment and Piping:
    a. Service access is acceptable.
    b. Proper cycling.
    c. Excessive noise, vibration or leaks.
    d. Presence of safety devices and controls.
    e. Proper identification of all piping, valves, starters and equipment.
    f. Pressure testing and flushing of systems.

g. Power available to equipment.

h. Temperature controls are complete.

i. Equipment start-up and checkout by the manufacturer's representatives are complete.

j. Air and water balancing is complete and a hand written report available.

3. Plumbing Systems and Equipment:

a. Service access is acceptable.

b. Proper cycling.

c. Excessive noise, vibration or leaks.

d. Presence of safety devices and controls.

e. Proper identification of all piping, valves, starters and equipment.

f. Pressure testing and flushing of systems.

g. Power available to equipment.

h. Equipment start-up and checkout by the manufacturer's representatives are complete.

4. Fire Protection System and Equipment:

a. Service access is acceptable.

b. Proper cycling.

c. Excessive noise, vibration or leaks.

d. Presence of safety devices and controls.

e. Proper identification of all piping, valves, starters and equipment.

f. Pressure testing and flushing of systems.

g. Power available to equipment.

h. Equipment start-up and checkout by the manufacturer's representatives are complete.

i. Emergency power complete and in place.

5. Building Electrical System and Equipment:

a. Service access is acceptable to all devices.

b. Presence of safety devices and controls.

c. Proper identification of all starters, switches and equipment.

d. Power available to equipment.

e. Equipment start-up and checkout by the manufacturer's representatives are complete.

C. If any work is found incomplete, incorrect, or non-functional, the Contractor shall correct the deficiency before system start-up work proceeds.

D. Contractor shall provide a full start-up plan for each system to be commissioned including all subsystems; equipment and components which shall at a minimum include the following documentation:

1. Construction Check-out Documents
2. Manufacturer's standard written start-up procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.
3. Manufacturer's normally used field checkout sheets.

E. Construction Checkout Documents / Pre Functional Checklists

1. Job specific prefunctional checklists will be provided by the CxA along with additional minimum testing and demonstration requirements as set forth by the Owner.

F. Sensor Calibration:

1. Calibration of all sensors shall be included as part of the construction checklists performed by the Contractors.

3.03 FUNCTIONAL PERFORMANCE TESTING

A. This sub section applies to commissioning functional performance testing for all Divisions.

B. Objectives and Scope:

1. The objective of functional performance testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. Functional testing facilitates bringing the systems from a state of substantial completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and function of the systems.
2. In general, each system to be commissioned should be operated through all modes of operation where there is a specified system response. Verifying each sequence in the sequences of operation is required. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure shall be tested.

C. The responsible subcontractor or his/her designee executes the performance of the construction checkout, start-up, and checkout. When checking off construction checklists, signatures may be required of other subcontractors for verification of completion of their work.

D. The CxA will observe, at minimum, the procedures for each piece of primary equipment.

E. The subcontractors shall execute start-up and provide the CxA with a signed and dated copy of the completed start-up and construction checklists.

F. Only individuals that have a direct knowledge and witness that a line item task on the construction checklist was actually performed shall initial or check that item off.

G. Test Methods:

1. Mock-Up Systems

a. "Mock-Up" equipment and systems are to be completed in all respects and readied for functional testing prior to building completion. These systems are as follows:

1) Window glazing / curtainwall structures

2) Any exterior wall structures – masonry, brick, stucco, metal panels, wood.

3) Roofing

4) Typical Classroom

5) Typical Dedicated Outside Air Handling Unit

6) Typical Terminal Unit

7) Typical Hydronic Base-Mounted Pump

b. "Mock-up" equipment is defined as systems and equipment that are in sufficient quantities where early detection of system deficiencies will help to reduce future rejection of equipment. These are permanent installations – not temporary for the sake of demonstration only. The equipment "mock-up" will establish a level of quality of the equipment installation and its operation. This proactive approach will reduce future installation and operational errors of repetitive equipment.

c. "Mock-up" equipment will be reviewed and approved by the Engineer, CA, and Owner's Representative

d. “Mock-up” equipment will be deemed readied for testing and approval as defined below:

1) Dedicated Outside Air Handling Unit,

a) Manufacturer start-up completed and report submitted

b) Associated VFD is operational (if applicable)

c) Discharge and Return Ducts to unit completed, sealed, and insulated

d) Piping to coils for unit is completed per detail

e) Pump is installed and powered if applicable

f) Piping is insulated

g) Equipment identification installed

h) Pipe and Duct identification completed

i) Valve Tags installed

j) Final filters installed

k) All Gages and Thermometers installed

l) Condensate pans trapped and piped to floor drain

m) VAV boxes downstream under control to at least allow BMS command to open.

n) Automatic Temperature Controls installed, functioning, and reporting to the BAS, including all associated sensors and airflow measuring devices

2) Terminal Unit / Variable Air Volume Boxes (VAV)

a) Equipment identification installed

b) Piping to VAV reheat coil is completed as per detail. Pipe Identification and Valve tagging completed

c) Piping is insulated

d) Primary and secondary air ducts are completed, sealed, and insulated

e) All diffusers served by VAV are installed with proper flex runs to limit any air velocity noise.

f) Unit supports in place.

g) Automatic Temperature Controls installed, functioning, and reporting to the BAS, including all associated sensing devices.

h) Hydronic Base-Mounted Pump (HW, CHW, CW)

i) Manufacturer start-up completed and report submitted

j) Vibration isolation installed

k) Piping supports installed

l) Associated VFD is operational (if applicable)

m) Discharge and inlet piping to unit completed, sealed, and insulated

n) Pump is powered

o) Piping is insulated

p) Equipment identification installed

q) Pipe identification completed

r) Valve Tags installed

s) Construction strainer mesh removed and final strainer installed

t) All Gages and Thermometers installed

u) Automatic Temperature Controls installed, functioning, and reporting to the BAS, including all associated sensors and flow/pressure measuring devices

e. GC is responsible to schedule and provide all necessary time and personnel to achieve the “mock-up” installations. GC will coordinate this effort with the CA and Owners Representative for acceptance.

2. Functional performance testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system’s graphic trend log capabilities.

3. Tests shall be performed using design conditions whenever possible and where required.

4. Set-up:

a. Each function and test shall be performed under conditions that simulate actual conditions to the closest practical approximation.

b. The Contractor executing the test shall provide all necessary materials, system modifications, to produce the flows, pressures, temperatures, necessary to execute the test under specified conditions.

c. At completion of the test, the Contractor shall return all affected building equipment and systems to their pre-test condition.

d. Functional performance testing will commence as systems are brought to substantial completion and will be done on a system by system basis. The results of these tests will be documented and submitted to the Owner for final system acceptance. The Commissioning Authority will attain this objective by developing individual systems testing protocols which, when implemented by the trade Contractor, will allow the Commissioning Authority to observe, evaluate, identify deficiencies, recommend modifications, adjust, and document the systems and systems equipment performance over a range of load and functional levels. Functional performance testing as a minimum will be performed on the following systems:

5. Air Distribution Systems:

   a. The Testing and Balancing Contractor (TAB) shall demonstrate total airflow at each piece of air handling equipment at simulated full cooling, heating and/or max/min or fresh (outside) air.

   b. Spot checks of approximately 10% of air outlets will be made. The Commissioning Authority will select outlets and the air balancer shall demonstrate a reading of that outlet. Where appropriate, the thermostat shall be adjusted to simulate full cooling, full heating.

   c. The Testing and Balancing Contractor (TAB) shall demonstrate proper room static pressure with respect to the adjacent space(s).

   d. Observe motor HP draw at selected fan motors.

   e. Discrepancies between the balancing report and spot check results will be dealt with to correct all deficiencies. In the event that significant deficiencies are detected, the entire balancing procedure shall be repeated.

      1) Any noted drafts or noisy air distribution devices will be evaluated and corrective action taken.

      2) The Testing and Balancing Contractor (TAB) shall verify the proper calibration of temperature, pressure and safety devices as installed on the various pieces of mechanical equipment. The Testing and Balancing Contractor (TAB) shall assist the Commissioning Authority in the proper setting of all temperature, pressure and safety devices.

      3) Any balancing related problems identified during the functional testing procedures shall be addressed and corrected.

6. Hydronic Systems:

   a. The Testing and Balancing Contractor shall demonstrate total water flows at each pump, air handler, chiller and terminal heating equipment.

b. Spot checks of approximately 10% of hydronic terminals will be made. The CxA will select terminals and the balancer shall demonstrate a reading at the equipment via the flow control device or by using an ultrasonic device.

c. Discrepancies between the balancing report and actual testing results shall be dealt with to correct all deficiencies. In the event that significant deficiencies are detected, the entire balancing procedure shall be repeated.

d. Assist in verifying the calibration and operation of any flow meters and differential pressure sensors.

e. Assist in verifying the calibration and operation of any temperature sensors.

f. Any balancing related problems identified during the functional testing procedures shall be addressed and corrected.

7. Exhaust Systems:

a. The Testing and Balancing Contractor (TAB) shall demonstrate total airflow at each exhaust fan system.

b. Spot checks of approximately 10% of air outlets will be made. The Commissioning Authority will select outlets and the air balancer shall demonstrate a reading of that outlet.

c. The Testing and Balancing Contractor (TAB) shall demonstrate proper room static pressure with respect to the adjacent space(s).

d. Observe motor HP draw at selected fan motors.

e. Discrepancies between the balancing report and spot check results shall be dealt with to correct all deficiencies. In the event that significant deficiencies are detected, the entire balancing procedure shall be repeated.

f. Any noted drafts or noisy air distribution devices shall be evaluated and corrective action taken.

g. Any balancing related problems identified during the functional testing procedures shall be addressed and corrected.

8. Automatic Temperature Controls (ATC):

a. ATC Contractor shall demonstrate the proper operation of the temperature control sequences for each air handling systems, variable air volume boxes, boilers, chillers, pumps, exhaust and terminal heating/cooling equipment as listed in 1.11 of this Section.

b. ATC Contractor shall demonstrate the proper sequences as they apply to the equipment listed in 1.11 of this Section: This includes but not limited to the following:

1) Occupied/unoccupied time sequences.

2) Night setback/night set-up features.

3) Morning warm-up sequences.

4) Air-side economizers.

5) Proper control of steam boilers and associated equipment such as deaerator, boiler feed pumps, condensing economizer system and combustion air.

6) Proper control of discharge air temperature from air handling equipment including reset temperature sequences.

7) Heating hot water discharge temperature control to the building systems including hot water reset.

8) Proper staging and control of the heat exchangers.

9) Lead/lag operation of the various pumps.

10) Control of hot water freeze pumps.

11) Proper control and discharge temperatures from the reheat coils.

12) Operation and control of the fan coils and unit heaters.

13) Proper operation and control of the chillers and cooling towers.

14) Run standby operation of pumps.

15) Proper operation and control of any energy recovery systems.

16) Proper control of the exhaust fans

17) Proper annunciation of building alarms including fail safe controls and proper shut down of equipment.

18) Proper control of all air handling equipment with respect to air volume.

19) Demonstrate any terminal box operation for 30 consecutive days (24 / 7) without a system problem. Shall include temperature and humidity (where applicable) and recording of same.

20) Calibration of all temperature pressure and safety devices.

21) Proper display of all ATC graphics.

22) Control of all automatic control valves and dampers.

23) Assist in calibration of all airflow stations.

9. Plumbing Systems:
    a. Verify proper operation and control of the domestic water heating system.
    b. Proper operation and calibration of the thermostatic mixing valves.
    c. Verify proper operation of the backflow preventer systems.
    d. Verify proper operation of the storm water systems.
    e. Demonstrate proper operation and control of the various pumping systems – (i.e. domestic water booster, sewage ejector, re-circulation pumps)
    f. Demonstrate the ability of the domestic hot water system to maintain the design minimum water temperature at all the faucets serviced by the system for 5 minutes while all faucets are active.
    g. Demonstrate domestic hot water at the faucet within a reasonable amount of time of faucet opening.
10. Electrical Systems:
    a. Demonstrate proper operation of all building lighting, lighting control systems and occupancy sensors.
    b. Demonstrate proper operation of electrical supply and distribution metering system.
    c. Demonstrate proper operation of the emergency generator, transfer switch, emergency power and uninterruptible power supply (UPS) systems.
    d. Verify proper operation of variable frequency drive systems, main electrical gear systems, low and medium voltage systems, and ground systems.
    e. Demonstrate proper operation of elevator systems.
11. Life Safety Systems:
    a. Verify operation of fire pump, fire alarm, egress pressurization, fire suppression and egress lighting.
12. Coordination and Scheduling:
    a. Scheduling is the responsibility of the Contractor. Commissioning activities shall be scheduled through the Contractor. The Contractor shall be responsible for integrating functional performance testing and commissioning requirements into the master activity schedule.
    b. The subcontractors shall provide sufficient notice to the CxA regarding their completion schedule for the construction checklists and start-up of all equipment and systems. The CxA will direct, witness and document the functional testing of all equipment and systems.

c. Subcontractors are responsible for execution of all tests.

d. Functional testing is conducted after construction checklists and start-up has been satisfactorily completed. The control system is sufficiently tested and approved by the CxA before it is used for TAB or to verify performance of other components or systems.

e. The Contractor shall verify completeness of the building envelope, perimeter and interior items which affect proper operation and control of HVAC, Plumbing, Fire Protection and electrical equipment and systems.

f. The air and water balancing is completed and debugged before functional testing of air and water related equipment or systems.

g. Testing proceeds from components to subsystems to systems.

h. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems is checked.

13. Problem Solving:

a. The CxA will recommend solutions to problems found, however the burden of responsibilities to solve, correct and retest problems rests with the Contractor, Subcontractor, Architect and Engineering Professionals.

14. Trend Logs:

a. Upon completion of successful functional performance testing, contractor shall submit graphic trend logs to CxA.

b. Submit graphic trend log for each piece of controlled equipment for each controlled parameter.

c. Trend logs shall demonstrate successful performance for a seven day period unless the controlled process requires a longer timeline.

d. Trend log color printouts shall be submitted demonstrating successful seasonal performance.

e. Trend logs shall be color graphic with legend submitted to the CxA in printout.

3.04 SEASONAL/DEFFERRED TESTING

A. The purpose of (opposite) seasonal functional testing is to evaluate the performance of selected equipment during design weather conditions that may not have been available during the initial functional testing. Ideally cooling equipment needs to be functionally tested under hot, humid summer conditions to ensure proper operation in accordance with design specifications. The same is true for heating hot water and steam systems is which require colder, winter climates.

B. The functional testing performed during seasonal testing will adhere to the guidelines listed above in item 3.03 in this section.

C. Any deficiencies will be documented and submitted to the Contractor and correction of these items will be the responsibility of the respective Subcontractors.

3.05 POST OCCUPANCY/WARRANTY REVIEW

A. The purpose of a post occupancy/warranty review is to review the building systems and equipment prior to warranty expiration. The post occupancy/warranty review will take place approximately 10 months into the 12 month warranty period. The facilities operating staff will be interviewed to discuss any issues discovered during the previous month's operation of the facility (concerning previously commissioned equipment). The building control system and equipment will be inspected to identify any deficiencies.

B. Any warranty related deficiencies will be documented and submitted to the Contractor and correction of these items will be the responsibility of the respective Subcontractors.

3.06 DOCUMENTATION, NON-COMFORMANCE AND APPROVAL OF TESTS

A. Documentation:

1. The CxA will witness and document the results of functional performance tests using the specific procedural forms developed for that purpose.
2. Reports will include measured data, data sheets and a comprehensive summary describing the operation of systems at the time of testing.
3. Data sheets for each controller verifying proper operation of the control system, the system it serves, the service it provides and its location will be provided.

B. Non-Conformance:

1. The CxA will record the results of the functional testing on the procedure or test form.
2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA. In such cases the deficiency and resolution will be documented on the procedure form.
3. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the CxA will not be pressured into overlooking deficient work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so at the request of the Owner.

4. Should a deficiency be identified during checkout, start-up or testing, the CxA will discuss the issue with the responsible subcontractor. When there is no dispute on the deficiency and the subcontractor accepts responsibility to correct it:

    a. The CxA documents the deficiency and the subcontractor's response and intentions and they go on to another test or sequence.

    b. After a system performance testing is complete, the CxA submits the noncompliance issues on the internet portal.

5. If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:

    a. The deficiency will be documented on the BVH portal with the subcontractor's response and the item will be tagged for the Engineer / Architect to review and comment for resolution.

6. Resolutions are made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive authority is with the Owner.
7. The CxA documents the resolution process.
8. Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency. The CxA reschedules the test and the test is repeated until satisfactory performance is achieved. Also, an additional test of another like system or piece of equipment will be completed at the cost of the party responsible for the faulty test.
9. If it is determined that the system is constructed according to the Contract Documents, Owner will decide whether modifications required to bring the performance of the system to the OPR and BoD documents shall be implemented or if tests will be accepted as submitted. If corrective Work is performed, Owner will decide if tests will be repeated and a revised report submitted.
10. Cost of Retesting.
    a. The cost to re-perform a construction check-out or functional test, shall be by the party responsible for the faulty test. If they are not responsible, any cost recovery for retesting costs proposed shall be negotiated with the appropriate party.

    b. The time for the CxA to direct any retesting required because a specific construction checklist or start-up test item, reported to have been successfully completed, but determined during functional testing to be faulty, will be negotiated with the appropriate party, who may choose to recover costs from the party responsible for executing the faulty test.

c. Failure Due to Manufacturer Defect:

1) If 10% or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the CxA. In such case, the subcontractor shall provide the following:

a) Within one week of notification from the Contractor, the subcontractor or manufacturer's representative shall examine all other identical units making a record of the findings.

b) The findings shall be provided by the CxA within two weeks of the original notice.

c) Within two weeks of the original notification, the Contractor, subcontractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, and all proposed solutions which shall include full equipment submittals.

2) The proposed solutions shall significantly exceed the specification requirements of the original installation.

3) The Owner and Design Team will determine whether a replacement of all identical units or a repair is acceptable.

4) Two examples of the proposed solution will be installed by the subcontractor and the subcontractor will be allowed to test the installations for up to one week, upon which the Owner and Design Team will decide whether to accept the solution.

5) Upon Acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

a) Approval: The CxA notes each satisfactorily demonstrated function on the test form. The CxA recommends acceptance of each test using a standard form.

b) Deferred Testing:

(1) If tests cannot be completed because of a deficiency outside the scope of the subcontractor responsible for installation of the System to be commissioned, the deficiency shall be documented and reported. Deficiencies shall be resolved and corrected by appropriate parties and test rescheduled.

(2) If the testing plan indicates specific seasonal testing, appropriate initial performance tests shall be completed, documented, and additional tests scheduled.

3.07 OPERATION AND MAINTENANCE TRAINING REQUIREMENTS

A. The Contractor shall be responsible for coordination, scheduling and completing operations and maintenance training for the Owners designated personnel on all Systems to be commissioned.

1. Training materials shall be submitted for review and approval of the CxA well in advance of training.
2. Trainer qualifications and certifications shall be submitted for review and approval of the CxA well in advance of training.
3. Each subcontractor responsible for training will submit a written training plan to the CxA for review and approval prior to training. The plan will include field orientation during installation, classroom instruction and field training after the completion of installation and cover the following elements:
   a. Equipment (included in training)
   b. Intended audience
   c. Location of training
   d. Objectives
   e. Subjects covered (description, duration of discussion, special methods)
   f. Duration of training on each subject.
   g. Instructor for each subject
   h. Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts)
   i. Instructor and qualifications

4. For the primary equipment, the Controls subcontractor shall provide a short discussion of the control of the equipment during the mechanical or electrical training conducted by others.

5. Subcontractors shall provide all qualified personnel, including manufacturer representatives, for equipment and system training.

B. The CxA will verify and approve the content and adequacy of the training of Owner personnel for systems to be commissioned.

1. Training rigor: to be established by Owner & CxA

2. In addition to these general requirements, the specific training requirements for Owner personnel are specified in Division 01.

C. Training Planning Meeting: Before operation and maintenance training, CxA shall convene a training planning meeting to include Owner's operation and maintenance personnel, each Contractor, and subcontractors. In addition to requirements specified in other Divisions, perform the following:

1. Review the OPR and BoD.

a. Review installed systems, subsystems, and equipment.

b. Review instructor qualifications

c. Review instructional methods and procedures.

d. Review training module outlines and contents.

e. Review course materials (including operation and maintenance manuals.

f. Verify and discuss locations and other facilities required for instruction.

g. Review and finalize training schedule and verify availability of educational materials, instructors, audiovisual equipment, and facilities needed to avoid delays.

h. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

3.08 EXCLUSIONS

A. The Commissioning Authority is not responsible for construction means, methods, coordination between trades, job safety or any other related management function on the job site.

B. The Contractor and Subcontractors will provide all technician services requiring tools or the use of tools to functionally test, adjust or otherwise bring equipment into a fully operational state. It is required by this specification that the person to represent the automated temperature control system shall be the person who wrote the control programming. The CxA will observe technicians as they complete testing, and may make minor adjustments, but will not perform construction or technician services.

END OF SECTION

Division 2
Existing Conditions

SECTION 023000

SUBSURFACE EXPLORATION DATA

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SUBSURFACE DATA

A. Subsurface soil investigations have been made and the results are attached to this Section. Refer to the Drawings for additional information.

Attachment A – GZA Geotechnical Engineering Report (CES Site) (dated 01/15/20)
Attachment B – DGT Soils Reports (dated 06/10/20, 01/16/20 & 12/14/18)
Attachment C – ECMS Phase 1 Environmental Site Assessment (ESA) (dated 09/13/18)
Attachment D – ECMS ACM PLM Sample Results (dated 06/09/20)
Attachment E – ECMS Imminent Hazard Evaluation (dated 07/28/20)

B. The subsurface data are provided for the information of the Bidders. Bidders shall interpret these subsurface data according to their own judgment and shall understand that the subsurface conditions may vary from those recorded herein. Neither the Owner, nor the Architect shall be liable for any error or discrepancy in the information given. Bidders shall make such investigations on the site as necessary to verify conditions, and shall assume for themselves the character of materials to be encountered.

1.03 PROTECTION OF EXISTING CONDITIONS

A. Take all proper precautions to protect the Owner and adjoining property from injury or unnecessary interference; and replace or put in good condition any existing items which are damaged or injured in carrying out the work, unless designated to permanently be done away with.

B. Keep all access drives and walks clear of debris during building operations. Repair streets, drives, curbs, sidewalks, poles, and the like, where disturbed by building operation and leave them in as good condition after completion of the work as before operations started.

END OF SECTION

Attachment A

Geotechnical Engineering Report

NEW AMESBURY ELEMENTARY SCHOOL
SUBSURFACE EXPLORATION DATA
023000



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249 Vanderbilt Avenue
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F: 781.278.5701
F: 781.278.5702
www.gza.com

January 15, 2020
File No. 01.0174490.00

Ms. Vivian Low
DINISCO DESIGN | architects + planners
99 Chauncy Street, Suite 901
Boston, MA 02111

Re: Geotechnical Engineering Report
Proposed Amesbury Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts

Dear Ms. Low:

In accordance with our agreement dated November 12, 2019, GZA GeoEnvironmental, Inc. (GZA) is pleased to submit this geotechnical engineering report for the above-referenced project. The objectives of our services were to evaluate subsurface conditions and to provide geotechnical design and construction recommendations for a proposed elementary school adjacent to the existing Cashman Elementary School at 193 Lions Mouth Road in Amesbury, Massachusetts (Site). Please note that this report is subject to the Limitations attached as **Appendix A**.

Elevations cited in this report were estimated using the topographic survey dated December 17, 2019, provided by DINISCO DESIGN | architects + planners (Dinisco), which is based on the North American Vertical Datum (NAVD88).

BACKGROUND

Our understanding of the project is based on discussions with Dinisco, our work at the Site and electronic conceptual plans prepared by Dinisco titled "25286 – Additional Testing Map – DGT TPS & GZA prop borings 10-24-2019.pdf."

The Site is currently occupied by play areas and ball fields with associated structures, including sheds and wooden canopies. The proposed school location is bordered by the Woodsom Farms property and residential property to the west and southwest, the existing Cashman Elementary School to the south, and undeveloped land to the north and northeast. The proposed building area currently has an undulating topography, ranging between approximately elevations (EL) 115 and 120 feet. Existing grades rise to the southwest of the site to elevations of up to about 142 feet. A stream and wetlands are located to the west, north, and northeast of the Site. Refer to **Figure 1** for a Site Locus.

Prior to construction of the original Cashman School, it appears that elevations in the proposed building area were lower, ranging from about EL 110 to 115 feet, and that fill was placed to construct the existing ball fields. This is based on "The Site Plan, Friend Street Elementary School, Amesbury Massachusetts," prepared by Campbell, Aldrich & Nulty, dated 1973, that shows existing and proposed grades for the existing Cashman Elementary school construction. Though no elevation datum is given, it appears that the grades on the 1973 plan

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are about 5-1/2 feet lower than current grades based on a comparison of building slab elevations noted on the current project plans to the 1973 architectural plans.

GZA previously performed borings for this project in 2018 and submitted a Preliminary Geotechnical Engineering Report dated September 14, 2018. The previous borings are included in this report, which supersedes our September 2018 report.

Based on schematic plans provided by DiNisco, we understand that proposed development will consist of constructing a new school building with a footprint of approximately 40,000-square feet to the north of the existing school building. The bus drop-off and parking area for the proposed school building will be to the south of the proposed building and west of the existing school building. The proposed finished floor elevation of the building ranges from approximately 119.5 to 120.5 feet (which will require filling up to about 5 feet from current grades), with a portion of the gymnasium in the southwest corner of the school at approximately EL 134 feet. We understand that fills of up to about 5 feet are also expected in some of the parking areas Existing site conditions and the proposed building, parking area, and driveways are shown on **Figure 2**.

SCOPE OF SERVICES

GZA performed the following scope of services:

1. Developed and executed a subsurface exploration program consisting of twelve soil borings (including the 2018 borings) to evaluate soil and groundwater conditions.
2. Performed gradation analyses on five selected samples collected from the borings to confirm field classifications and assist in evaluating potential on-site reuse of soils excavated during construction.
3. Developed geotechnical design recommendations and prepared this report summarizing our findings.

SUBSURFACE EXPLORATIONS

GZA BORINGS

GZA engaged New England Boring Contractors of Derry, New Hampshire to perform two sets of borings using an ATV-mounted drill rig. Borings GZA-1 through 4, DTG-1 and DTG-2 were performed in August 2018; borings GZA-5 through GZA-10 were performed on December 14, 2019 and January 3, 2020. The 2018 borings were advanced using cased, drive-and-wash drilling techniques, and the 2019/2020 borings were advanced using cased, drive-and-wash and hollow-stem-auger drilling techniques.

The 2018 borings were terminated at depths ranging from 7.4 to 18.3 feet below ground surface (bgs) due to split spoon refusal. The 2018 borings were located based on conceptual site layouts provided by DiNisco and to avoid being within the baseball fields. The 2019/2020 borings were performed to depths ranging from 15.1 to 29.5 feet bgs and were located prior to drilling by the project surveyors, Hancock Associates. Borings GZA-6 and GZA-8 were terminated at depths of 15.1 feet and 18.4 feet, respectively, due to split spoon refusal. Bedrock was cored at GZA-7 from depths of 19.5 feet to 29.5 feet.

In general, Standard Penetration Tests (SPTs) were performed, and split spoon samples were obtained, continuously in the top 10 feet and then at 5-foot intervals to the bottom of the borehole. The borings were backfilled with drill cuttings to the existing ground surface.

A GZA representative observed the borings, classified the soil samples and prepared the boring logs attached as **Appendix B**. The approximate boring locations are shown on **Figure 2**. Ground surface elevations at the boring locations were estimated using Google Earth.

RECENT TEST PITS BY OTHERS

The project site engineer, DGT Associates (DGT), observed 13 test pits excavated at the Site by the Town on November 14 through 29, 2018 to evaluate the seasonal high water table and suitability of onsite soils for stormwater management. Ten additional test pits were performed by the Town and observed by DGT in November and December 2019 to assess the depth to bedrock where shallow bedrock was anticipated. The test pit data and a plan of the test pit locations are attached in **Appendix C**.

LABORATORY TESTING

Five soil samples obtained from the borings were submitted to Thielsch Laboratories in Cranston, Rhode Island for gradation analysis to confirm field classifications and assist in evaluating on-site reuse of soils excavated during construction. Geotechnical laboratory test results are attached as **Appendix D.**

SUBSURFACE CONDITIONS

Below the existing topsoil, subsurface conditions encountered in the borings and test pits in the proposed building area generally consisted of the following strata (in order of increasing depth): Fill; Sand; Silty Sand, Sand and Gravel; Glacial Till; possible weathered Bedrock; and Bedrock. Boring GZA-1 encountered subsoil below the topsoil. Borings GZA-1, GZA-2, GZA-5 to GZA-10 and DGT-1 were terminated in possible weathered Bedrock at elevations ranging from approximately EL 105 to 101 feet. Rock coring was performed at boring GZA-7 where top of Bedrock was encountered at approximately EL 98.7 feet.

Conditions were similar in the proposed parking areas except that Bedrock was shallower in many locations. DGT encountered Weathered Bedrock that could be excavated by backhoe in 18 of the 23 test pits at depths ranging from 1 foot to 9 feet below grade, which corresponds to EL 133.5 to 106 feet; and refusal in nine test pits at depths of EL 129.5 to 121.5 feet. Boring GZA-4, also located in the proposed parking lot, encountered SPT refusal at EL 126.7 feet.

The strata encountered in the borings are described below in further detail. The depths and thicknesses referenced herein should be considered approximate. Refer to the borings logs attached as **Appendix B** for more detailed subsurface conditions at specific exploration locations.

Fill – Fill was encountered below the topsoil layer and at the ground surface in borings GZA-2, GZA-5 through GZA-10, and DGT-2. The thickness of the fill was observed to be approximately 2 to 8 feet in thickness, and generally consisted of brown, fine to coarse sand, with up to 50 percent gravel, up to 50 percent silt, and up to 10 percent roots, grass and brick. SPT N-Values within the Fill ranged from 2 to 34 blows per foot (bpf), indicating that the Fill was a very loose to dense consistency. Bottom of Fill (or subsoil where present) varied from approximately EL 111 to 117.5 feet in the borings within and immediately adjacent to the proposed building.

Sand – Sand was encountered below the Topsoil in borings GZA-3 and DGT-1 to depths of 3.5 to 6 feet. The Sand generally consisted of brown, fine to coarse sand, with up to 20 percent gravel, up to 20 percent silt. The upper portion of the Sand contained trace amounts of roots. SPT N-Values within the Sand ranged from 10 to 24 bpf, indicating that the Sand was a medium dense consistency.

Silty Sand – Silty Sand was encountered below the Topsoil, Fill, and Sand and Gravel in borings GZA-1 to GZA-6, GZA-8, GZA-10, and DGT-2 to depths 8 to 14.5 feet and had an approximate thickness ranging from 4 to 9 feet. The Silty Sand generally consisted of brown fine to coarse sand, with up to 50 percent silt, and up to 20 percent gravel. GZA-6 contained up to 35 percent Clayey Silt. SPT N-Values within the Silty Sand ranged from 11 to 28 bpf, indicating that the Silty Sand was a medium dense consistency.

Sand and Gravel – Sand and Gravel was encountered below the Fill (or subsoil) at borings GZA-1, GZA-6, and GZA-7, and below the Silty Sand in borings GZA-5, DGT-1, and DGT-2. The Sand and Gravel was observed to be approximately 2 to 7 feet in thickness and was not fully penetrated in boring DGT-2 before it was terminated at a depth of 10 feet. The Sand and Gravel generally consisted of brown, fine to coarse sand, with up to 50 percent gravel and up to 20 percent silt. SPT N-Values within the Sand and Gravel ranged from 10 to 61 bpf (but typically at least 20), indicating that the Sand and Gravel was a medium dense to very dense consistency.

Glacial Till – Glacial Till was encountered below the Fill, Silty Sand, Sand and Gravel, and Sand strata in borings GZA-1, GZA-2, GZA-4, GZA-5, GZA-8, GZA-9, GZA-10, and DGT-1. Depths to the top of Glacial Till ranged from 4 to 13 feet and the Glacial Till thickness (where penetrated) ranged from 2.5 to 6 feet. The Glacial Till was not fully penetrated in borings GZA-4 and DGT-1 before the borings were terminated at depths of 8.3 and 7.4 feet, respectively. The Glacial Till generally consisted of light brown to brown, fine to coarse sand, with up to 50 percent gravel, and up to 50 percent silt and clayey silt. SPT N-Values within the Glacial Till ranged from 11 bpf to split spoon refusal, indicating that the Glacial Till was a medium dense to very dense consistency.

Possible Weathered Bedrock/ Bedrock – Severely to completely weathered bedrock was encountered in borings GZA-1, GZA-2, and GZA-5 to GZA-10. These borings were terminated due to split spoon refusal in the very dense weathered bedrock at depths of approximately 13.5 feet and 17 feet, corresponding to EL 111 to 102 feet. The weathered bedrock generally consisted of dark brown/gray, fine to coarse sand and gravel with up to 35 percent silt. Practical split spoon refusal was encountered at the bottom of borings GZA-4 and DGT-1 within or at the bottom of the glacial till at depths of approximately 4 to 6 feet, corresponding to EL 131 105.4 feet.

Bedrock was cored in boring GZA-7 between the depths of 19.5 feet to 29.5 feet (EL 98.7 to 88.7 feet). The bedrock consisted of gray, hard, slightly weathered Phyllite.

DGT encountered Weathered Bedrock and rippable bedrock (that is rock that could be excavated by backhoe) in 18 out of 23 test pits at depths ranging from 1 foot to 9 feet below grade, which corresponds to EL 133.5 to 106 feet; and refusal in competent bedrock in nine test pits at depths of EL 129.5 to 121.5 feet.

GROUNDWATER

Groundwater was observed in borings GZA-1, GZA-2, and GZA-6 through GZA-10 during drilling at depths of about 4.1 to 13.9 feet, corresponding to elevations 115.3 and 105.6 feet, respectively. Groundwater was not encountered in borings GZA-3, GZA-4 and DGT-2, and was not recorded upon completion in boring DGT-1. A stabilized water reading was obtained in the groundwater monitoring well at GZA-5 at a depth of 1.6 feet, corresponding to approximately EL 118.9 feet. The groundwater reading may have been artificially high due to melting snow. Groundwater elevations varied throughout the site in DGT test pits, ranging from EL 127 to 111 feet. The test pits closest to the proposed building location observed groundwater at EL 120.3 to 111 feet. Existing site grades indicate that the ground surface slopes downward towards the north side of the Site near the wetland area; indicating that the groundwater may be shallower in the northern end of the Site.

It should be noted that fluctuations in groundwater levels may occur due to variations in season, rainfall, site features and other factors different from those existing at the time of the explorations and measurements. During times of the year, we would expect the groundwater level to be higher than measured during the exploration programs.

RECOMMENDATIONS

The geotechnical design and construction recommendations presented below are based on our evaluation of the available data and design concepts provided to GZA and are subject to the limitations contained in **Appendix A**. References to the IBC refer to the International Building Code 2015 with Massachusetts State Building Code 9th Edition (MSBC) amendments.

FOUNDATION TYPE

We recommend a shallow foundation system consisting of spread and/or continuous footings bearing on undisturbed, natural granular soils (Sand, Silty Sand, Sand and Gravel, and/or Glacial Till) or on compacted Structural Fill placed over the undisturbed, natural granular soil, after removal of the existing topsoil and fill. In areas where proposed bottom of footing is in the natural granular soils (that is, overexcavation of fill not required), we recommend that the natural soils be overexcavated to 1 foot below bottom of footing and replaced with Sand-Gravel Fill or ¾-inch Crushed Stone wrapped in non-woven filter fabric. Structural Fill consists of off-site Granular Fill or Sand-Gravel Fill or on-site Sand and Gravel provided it does not contain debris, boulders and/or organics, and can be compacted as required herein. Recommended gradation requirements for Granular Fill, Sand-Gravel Fill and ¾-inch Crushed Stone are presented in **Table 1**.

The recommended maximum net allowable bearing pressure for footings supported on the undisturbed natural soils or on Structural Fill placed over the undisturbed natural soils at this Site is 2.5 tons per square foot (tsf).

Following excavation and replacement, estimated post-construction total settlement is anticipated to be less than about 1 inch, and differential settlement between adjacent columns is expected to be less than about 1/2 inch, provided that the recommendations for footing design, subgrade preparation, and backfilling presented herein are followed.

For foundations that are smaller than 3 feet wide, reduce the bearing value to one third of the above value multiplied by the least lateral footing dimension in feet. Continuous wall footings should be at least 18 inches wide and isolated footings at least 24 inches wide.

For frost protection, exterior footings and interior footings in unheated areas should bear at least 4 feet below final exterior grades. Interior footings in heated areas should bear at least 1.5 feet below top of slab.

BUILDING SLAB

Slab-on-grade construction is recommended for proposed floor slabs. Provide a base course consisting of at least 6-inches of compacted Sand-Gravel Fill or ¾-inch Crushed Stone below the building slab. After removing topsoil, the existing fill may be left in place beneath proposed slab areas, provided that the subgrade is stable during proof compaction.

We recommend using a vertical subgrade reaction coefficient (k_1) of 100 pounds per cubic inch (pci) for the concrete slab-on-grade supported on a compacted Sand-Gravel or Crushed Stone base course placed over properly prepared Structural Fill or naturally deposited Sand, Silty Sand, Sand and Gravel. This recommended value is based on empirical correlations and our experience on other projects. This modulus of subgrade reaction value is for loading applied over a 1-foot by 1-foot square area and must be adjusted for the actual size and geometry of the loaded area prior to use in analysis.

We recommend subslab drainage and a perimeter drain be provided, based on the high groundwater levels observed in the borings and test pits.

SEISMIC DESIGN

Soils encountered in the building area are not considered susceptible to liquefaction based on criteria set forth in Section 1806.4 of the MSBC. In accordance with Section 1613.5.2 of the IBC, we recommend that Site Class C be used for seismic design assuming that building foundations are designed and constructed as recommended herein.

In accordance with the MSBC 9th Edition, the structure should be designed using the following seismic parameters:

S_S =0.267g	S_1=0.078g
S_{DS} =0.214g	S_{D1}=0.089g
PGA_M=0.184g	PGA=0.153

Where:

- S_S and S_{DS} are the spectral acceleration and design spectral response acceleration parameters at 0.2-second period, respectively;
- S_1 and S_{D1} are the spectral acceleration and design spectral response acceleration parameters at 1.0-second period, respectively; and
- PGA and PGA_M are the peak ground acceleration and the maximum considered earthquake peak ground acceleration, respectively.

LATERAL EARTH PRESSURES FOR BELOW GRADE WALLS

Buried foundation walls (such as, for elevator pits and exterior below-grade walls) should be designed to resist lateral earth pressures. Static lateral earth pressures and the resultant force per unit width applied to the walls should be based on at-rest conditions (such as, where the top of wall is restrained by the floor slab).

In accordance with Section 1610 of the MSBC, we recommend that the design earth pressures for these fixed, below-grade walls be designed using an at-rest pressure of 60 pounds per cubic foot (pcf), which is applicable for walls above groundwater and walls with perimeter drains. This pressure applies to foundation walls that are laterally supported at the bottom and top, subject to backfill with a horizontal surface, and assumes that the walls are backfilled with free draining soils such as Granular Fill (provided that it has less than 8 percent passing sieve No. 200) or Sand-Gravel (see **Table 2**) within at least 3 feet of the walls and with perimeter drains provided so that no water pressure develops behind the wall.

If walls are cantilevered or free to move at the top, such as site retaining walls, we recommend that the (active) design earth pressures for below-grade walls be designed using an equivalent fluid pressure of 40 pcf above the estimated design groundwater elevation. The resultant force, P_o, should act at a height of one-third the height of the wall (H/3) from the base of the wall.

Where the calculated earth pressure behind the wall is less than 250 pounds per square foot (psf), it should be increased to 250 psf to account for stresses created by compaction within 5 feet of the wall.

Retaining walls should be designed for appropriate surcharge loads. In addition, exterior below-grade foundation walls and site retaining walls should also be designed to resist an earthquake lateral force F_w evaluated in accordance with MSBC Section 1610.2 that is equal to:

$$F_w=0.100\ (S_s)(F_a)(\gamma_t)(H^2)$$

Where:

- S_S is the design spectral response acceleration parameters at 0.2-second period (See Seismic Design above);
- F_a is the site coefficient from Table 1613.3.3(1) of 2015 IBC (F_a = 1.2 for this site) ;
- γ_t is the soil total unit weight (γ_t=125 pcf for compacted Sand and Gravel fill);
- H is the height of the foundation wall.

Foundation Stability

The building foundation system should be checked for sliding between the base of the footings and base slab and the subgrade soils. The recommended coefficient of friction to resist sliding between mass concrete/formed concrete and silty sand is 0.3. The minimum factor of safety for sliding under static loads should be 1.5. Passive resistance may be computed using an equivalent fluid pressure of 180 pcf, neglecting the upper foot of embedment, provided that backfilling and compaction adjacent to the embedded portion of the foundations is performed.

GROUNDWATER CONTROL

As previously noted, we recommend the use of perimeter and subslab drains below the entire building footprint based on groundwater levels observed in the explorations.

The perimeter and subslab drains should consist of a 4-inch perforated PVC pipe, surrounded by a minimum 6-inch-thick zone of ¾-inch Crushed Stone wrapped in non-woven filter fabric (Mirafi 140N or equivalent). The top of pipe should be at least 6 inches below bottom of slab; pipe invert should be at or above bottom of footing elevation. The perimeter and subslab drain solid piping should be sloped to convey water by gravity away from the building to a storm drain or designated infiltration area. Additionally, we recommend a backflow preventer on the subslab drain to prevent water from rising up under the slab through the solid piping. Perforated piping adjacent to the building foundation may be laid flat.

CONSTRUCTION CONSIDERATIONS

Footing Subgrade Preparation

We anticipate that the soil encountered at footing subgrade level will consist of fill in most areas of the proposed building. The topsoil, subsoil (where present) and fill should be removed from below the bearing zone of proposed building footings to undisturbed, natural granular soil or weathered bedrock. The bearing zone is defined as the zone extending at a 1H:1V sloping down and outward from 1 foot horizontally from the bottom exterior edge of the footing. After excavation to natural soils (Sand, Sand and Gravel, Silty Sand and Glacial Till), or weathered rock, the subgrade should be proof-compacted with a minimum of six passes of a walk-behind vibratory drum roller or walk-behind heavy vibratory plate compactor (with a static weight of at least 500 pounds) in confined areas. Weak or soft spots identified during proof-compaction should be excavated and replaced with compacted Structural Fill. In areas where existing fill is removed from below proposed bottom of footing, the excavation should be backfilled to footing subgrade with compacted Structural Fill.

Where the proposed bottom of footing elevation is within the natural soils, the natural soils should be overexcavated by 1 foot, the subgrade proof-compacted as described above (after removal of soil disturbed by excavation), and a 1-foot-thick "pad" of compacted Sand-Gravel or ¾-inch Crushed Stone placed to bottom of footing grade.

Final excavations to footing subgrade should not be made until the areas are ready for fill or concrete placement. Excavation to final subgrade elevation should be performed using a smooth-edged bucket, if practical, to limit disturbance to the subgrade. Loose or disturbed material should be removed by hand.

Slab Subgrade Preparation

Existing soils may be left in place below slab base course elevation after removal of the topsoil and subsoil (if any), provided the subgrade is stable when proof-compacted with at least six passes of a large vibratory drum roller (minimum 10,000 pound static weight with 20,000 dynamic force). Excavate any weak or soft spots identified during proof-compaction and replace with compacted Sand-Gravel Fill. Recommended gradation requirements are presented in **Table 1**.

Subgrade Preparation for Driveway and Parking Areas

We understand that up to 5 feet of fill will be placed within the parking lot. Prior to placement of fill, any vegetation and topsoil, should be removed from proposed pavement areas and the subgrade proof-compacted with at least six passes of a large vibratory drum roller (minimum 10,000 pound static weight with 20,000 dynamic force). Excavate any weak or soft spots identified during proof-compaction and replace with compacted Sand-Gravel Fill.

Construction Dewatering

Based on the observed groundwater levels in the borings and test pits, construction dewatering will likely be required to construct footings and utilities "in the dry." We anticipate that dewatering may be accomplished using localized sumps and pumps, and discharged on-site into excavated pits located outside of the building area. If discharged to an off-site drainage system, pumped groundwater will need to be treated to remove total suspended solids (at a minimum). All construction dewatering should be conducted in accordance with local, state and federal regulations.

Reuse of Existing Soils

Based on visual and laboratory classifications, the existing on-site soil will not meet gradation and material requirements for Sand-Gravel. Some existing Fill materials may meet the gradation requirements of Granular Fill. However, though it will be difficult due to the high silt content, we anticipate that some of the on-site soils will be able to be reused as Structural Fill below building and pavement base courses provided that the water content is controlled and the material is not placed during wet and/or cold conditions. Handling, placement, and compaction of soil with a high silt content is difficult, especially during cold temperatures or when wet. To re-use some silty excavated soils on-site, it may be necessary to sandwich layers of the on-site soil between layers of off-site Sand-Gravel. Fill for use as building slab and pavement base course will need to be imported to the Site. In addition, imported fill will be required for the 1-foot-thick Sand-Gravel or Crushed Stone "pad" below footings.

Excavated soil from the Site may need to be exported depending on final site grades. Excavated soil should be disposed of in accordance with applicable local, state and federal regulations. Off-site disposal of soil may require chemical precharacterization testing to assess disposal options depending on the receiving facility.

Potential for Bedrock

Based on the borings and test pit data, we do not anticipate encountering bedrock for foundation construction, assuming footings are constructed above EL 113 feet. However, rippable weathered bedrock was encountered in seven of the twelve borings and 18 of the test pits and may be encountered in excavating for deeper utilities. Competent bedrock was encountered in the southern portion of the site at elevations ranging from EL 129.5 to 121.5 feet. In addition, bedrock outcrops were observed in the northern portion of the adjacent Woodsom Farms property. If encountered, we recommend bedrock be removed to at least 1 foot below proposed utility invert, and backfilled to the invert elevation with pipe bedding materials.

Excavation Slopes and Temporary Earth Support

Where space is not available to safely lay back excavations, a temporary earth support system will be required. Temporary earth support systems, if required, should be selected by the Contractor and be designed by an experienced Professional Engineer registered in the Commonwealth of Massachusetts and retained by the Contractor.

The Owner and the Contractor should make themselves aware of and become familiar with applicable local, state, and federal safety regulations, including the current Occupational Safety and Health Administration (OSHA) Excavation and Trench Safety Standards. Construction site safety generally is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. We are providing this information solely as a service to our Client. Under no circumstances should the information provided below be interpreted to mean that GZA is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred.

The Contractor should be aware that slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, or federal safety regulations, e.g.; OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations. Such regulations are strictly enforced and, if they are not followed, the Owner, Contractor, and/or earthwork and utility subcontractors could be liable for substantial penalties.

As a safety measure, it is recommended that all vehicles and soil piles be kept a minimum lateral distance from the crest of the slope equal to no less than the slope height. Exposed slope faces should also be protected against the elements.

FINAL DESIGN AND CONSTRUCTION

We trust that the information presented herein addresses your needs related to the geotechnical aspects of the project at this time for the proposed Amesbury Elementary School. GZA will prepare earthwork specifications and review near-final foundation, grading, and utility plans for geotechnical issues and to confirm that our recommendations are incorporated into the design documents.

During construction, we recommend that GZA be engaged to review contractor submittals and to observe subgrade preparation and building earthwork construction for compliance with our recommendations, project foundation plans, and specifications.

We thank you for the opportunity to work on this project and would look forward to our continued involvement. Please do not hesitate to contact the undersigned if you have any questions.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Heather Audet, P.E.
Senior Project Manager

Bruce W. Fairless, P.E.
Consultant/Reviewer

Mary B. Hall, P.E.
Senior Principal

Attachments: Table
Figures
Appendix A – Limitations
Appendix B –Boring Logs
Appendix C – Test Pit Logs and Soil Test Location Map
Appendix D – Geotechnical Laboratory Test Results

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TABLE

Proposed Amesbury Elementary School
Amesbury, MA

TABLE 1
RECOMMENDED USE AND GRADATION CRITERIA FOR FILL MATERIALS

Granular Fill: Within building area below slab-on-grade base course.
Within 2 feet of pavement basecourse.

Sand-Gravel: For use as slab-on-grade and pavement base course and as backfill within three feet laterally of below grade walls. Use for 1-foot thick pad below footings.

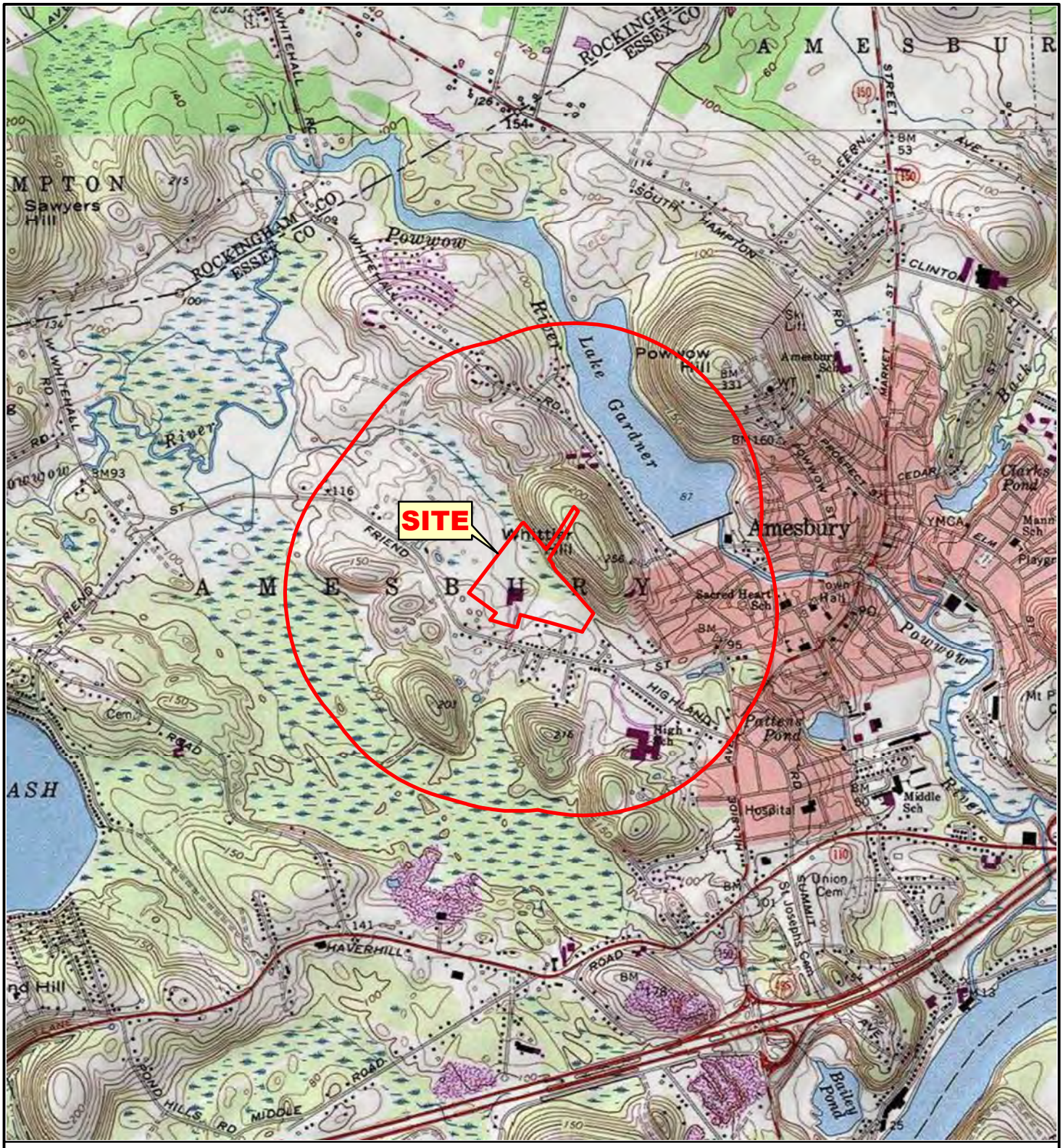
Crushed Stone: For use in underdrain system, slab base course, in bottom of excavations to aid in construction dewatering and maintaining subgrade stability during wet conditions, backfill behind walls, and in confined areas. Use for 1-foot thick pad below footings.

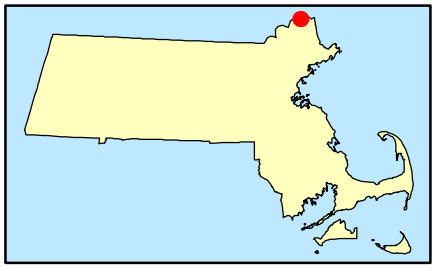
Ordinary Fill: General landscape areas, or more than 2 feet below pavement.

GRADATION REQUIREMENTS

Sieve Size	Percent Finer by Weight
Granular Fill shall be free from ice and snow, roots, sod, rubbish and other deleterious or organic matter. Granular Fill shall conform to the following gradation requirements:	
⅔ of the loose lift thickness	100
No. 10	30 - 90
No. 40	10 - 70
No. 200	*0 - 15 * 0 -8 for backfill behind walls
Sand-Gravel shall consist of durable sand and gravel and shall be free from ice and snow, roots, sod, rubbish and other deleterious or organic matter. Sand-Gravel shall conform to the following gradation requirements:	
3 inch	100
½ inch	50 - 85
No. 4	40 - 75
No. 40	10 - 35
No. 200	0 - 8
Crushed Stone shall consist of durable crushed rock or durable crushed gravel stone and shall be free from ice and snow, clay, loam and other deleterious material. Crushed Stone shall conform to the following gradation requirements:	
1 inch	100
3/4 inch	90 - 100
1/2 inch	10 - 50
3/8 inch	0 - 20
No. 4	0 - 5
Ordinary Fill	Ordinary Fill shall be free from trash, ice, snow, tree stumps, roots, organic materials, and other deleterious matter. Ordinary Fill shall contain no stone greater than two-thirds (⅔) the loose lift thickness with a maximum stone size of six (6) inches in diameter and contain no more than 30% passing the No. 200 sieve. It shall have physical properties such that it can be readily spread and compacted during filling.

FIGURES





SOURCE : USGS TOPOGRAPHIC QUADRANGLES SCANNED BY THE NATIONAL GEOGRAPHIC SOCIETY & I-CUBED, COPYRIGHT 2011

Data Supplied by : esri

0 1,000 2,000 4,000 6,000

SCALE IN FEET

N W E S

GZA	PROJ. MGR.: HLA DESIGNED BY: HLA REVIEWED BY: MBH OPERATOR: 781 DATE: 08-27-2018	LOCUS PLAN SHOWING HALF MILE OFFSET PROPOSED AMESBURY ELEMENTARY SCHOOL 193 LIONS MOUTH ROAD AMESBURY, MASSACHUSETTS	JOB NO. 01.0174490.00 FIGURE NO. 1

© 2018 - GZA GeoEnvironmental, Inc., J:\170,000-179,999\173748\173748-00.HLA\FIGURES\Cashman_Elementary_School\173748_CashmanElementary_LocusPlan_FIG1.mxd, 8/27/2018, 3:26:20 PM, elaine.donohue



GENERAL NOTES

1. BASE MAP DEVELOPED FROM THE FOLLOWING ELECTRONIC DRAWING FILES:
   - 21288ec_WBLOCK 12-17-19.DWG PREPARED BY HANCOCK ASSOCIATES TRANSMITTED TO GZA ON 12-18-19.
   - 25286 - ADDITIONAL TESTING MAP - DGT TPS & GZA PROP BORINGS 10-24-19.PDF PREPARED BY DINISCO DESIGN TRANSMITTED TO GZA ON 10-24-19.
   - CASHMAN ELEMENTARY COMPILED PLAN REV 11-27-18 SOIL TESTS.PDF.
2. LOCATION OF 2019 AND 2020 EXPLORATIONS WERE SURVEYED BY HANCOCK ASSOCIATES. LOCATION OF 2018 EXPLORATIONS WERE BASED ON TAPED MEASUREMENTS TO EXISTING SITE FEATURES. EXPLORATION LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
3. THE PURPOSE OF THIS DRAWING IS TO LOCATE, DESCRIBE, AND REPRESENT THE POSITIONS OF EXPLORATIONS IN RELATION TO THE SUBJECT SITE. THIS DRAWING IS NOT CONSIDERED A LAND SURVEY. THE LOCATIONS SHOWN SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

LEGEND

GZA- INDICATES BORINGS PERFORMED BY NEW ENGLAND BORING CONTRACTORS ON AUGUST 8, 2018. OBSERVED AND LOGGED BY GZA PERSONNEL.

GZA- INDICATES BORINGS PERFORMED BY NEW ENGLAND BORING CONTRACTORS ON DECEMBER 14, 2019 AND JANUARY 3, 2020. OBSERVED AND LOGGED BY GZA PERSONNEL.
(OW) INDICATES OBSERVATION WELL INSTALLED IN BORING.

NO.	ISSUE/DESCRIPTION	BY	DATE

UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

PROPOSED AMESBURY ELEMENTARY SCHOOL
AMESBURY, MASSACHUSETTS

EXPLORATION LOCATION PLAN

PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		DINISCO DESIGN, INC. ARCHITECTS & PLANNERS BOSTON, MASSACHUSETTS	
PROJ MGR: HLA	REVIEWED BY: MBH	CHECKED BY:	FIGURE 2
DESIGNED BY: HLA	DRAWN BY: AJP	SCALE: AS SHOWN	
DATE: JANUARY, 2020	PROJECT NO. 01.0174490.00	REVISION NO. -	

©2020 - GZA GeoEnvironmental, Inc.
G:\ZA-\GZANORTJOBS\170.000-179.999\174490\174490-00.HLA\FIGURES\CAD\DWGS\01.0174490.00_EXPLORATION LOCATION.DWG EXPLORATION LOCATION PLAN JANUARY 10, 2020 ALEXANDER PEREZ

APPENDIX A - LIMITATIONS

USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the contract documents, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in Proposal for Services and/or Report, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. If conditions other than those described in this report are found at the subject location(s), or the design has been altered in any way, GZA shall be so notified and afforded the opportunity to revise the report,as appropriate, to reflect the unanticipated changed conditions .

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

4. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

SUBSURFACE CONDITIONS

5. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs. The nature and extent of variations between these explorations may not become evident until further exploration or construction. If variations or other latent conditions then become evident, it will be necessary to reevaluate the conclusions and recommendations of this report.

6. In preparing this report, GZA relied on certain information provided by the Client, state and local officials, and other parties referenced therein which were made available to GZA at the time of our evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.

7. Water level readings have been made in test holes (as described in this Report) at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this Report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The water table encountered in the course of the work may differ from that indicated in the Report.

8. Recommendations for foundation drainage, waterproofing, and moisture control address the conventional geotechnical engineering aspects of seepage control. These recommendations may not preclude an environment that allows the infestation of mold or other biological pollutants.

COMPLIANCE WITH CODES AND REGULATIONS

9. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

ADDITIONAL SERVICES

10. GZA recommends that we be retained to provide services during any future: site observations, design, implementation activities, construction and/or property development/redevelopment. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

APPENDIX B - BORING LOGS

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Proposed Amesbury Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts

BORING NO.: DGT-1
SHEET: 1 of 1
PROJECT NO: 01.0173748.00
REVIEWED BY: HLA

Drilling Co.: New England Boring Contractors	**Type of Rig:** Tracked ATV	**Boring Location:** See Plan	**H. Datum:** See Plan
Foreman: Matt Soucy	**Rig Model:** Mobile B-53	**Ground Surface Elev. (ft.):** 112.8	
Logged By: Alex Karp	**Drilling Method:** Drive & Wash	**Final Boring Depth (ft.):** 7.4	**V. Datum:** NAVD88
		Date Start - Finish: 8/8/2018 - 8/8/2018	

Auger/Casing Type: HW	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 4/4.5	**I.D./O.D. (in.):** 1.375/2	
Hammer Weight (lb.): 300	**Sampler Hmr Wt (lb):** 140	
Hammer Fall (in.): 30	**Sampler Hmr Fall (in):** 30	
Other: Safety Hammer	**Other:** Auto Hammer	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
08/08/2018		Not Recorded		

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	10	2 7 10 12	17	S-1A: Top 2": Dry, brown,GRASS and TOPSOIL, trace Roots. S-1B: Bottom 8": Dry, brown, fine to coarse SAND, little Silt, trace Gravel, trace Roots.	1		0.3	TOPSOIL	112.5'
		S-2	2-4	24	21	10 10 14 27	24	S-2A: Top 12": Dry, brown, fine to coarse SAND, little Gravel, little Silt. S-2B: Bottom 9": Dry, brown, fine to coarse SAND and GRAVEL, trace Silt.			3.5	SAND	109.3'
5		S-3	4-6	24	21	24 36 25 24	61	S-3: Dry, very dense, brown, fine to coarse SAND and GRAVEL, little Silt.			6	SAND AND GRAVEL	106.8'
		S-4	6-7.4	16	8	13 21 75/4"	R	S-4: Wet, very dense, brown, fine to coarse SAND and GRAVEL, some Silt.	2		7.4	GLACIAL TILL	105.4'
10								Bottom of boring at 7.4 feet.					
15													
20													
25													

REMARKS

1. Ground surface elevations estimated from Google Earth.
2. Encountered split spoon refusal approximately 7.4 feet below ground surface (bgs); therefore the boring was terminated at approximately 7.4 feet bgs. Upon completion borehole was backfilled up to existing grade with drill cuttings and sand.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: DGT-1

173748.00 CASHMAN ELEMENTARY SCHOOL.GPJ; STRATUM ONLY; 1/10/2020

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Proposed Amesbury Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts

BORING NO.: DGT-2
SHEET: 1 of 1
PROJECT NO: 01.0173748.00
REVIEWED BY: HLA

Drilling Co.: New England Boring Contractors	**Type of Rig:** Tracked ATV	**Boring Location:** See Plan	**H. Datum:** See Plan
Foreman: Matt Soucy	**Rig Model:** Mobile B-53	**Ground Surface Elev. (ft.):** 122.5	
Logged By: Alex Karp	**Drilling Method:** Drive & Wash	**Final Boring Depth (ft.):** 10	
		Date Start - Finish: 8/8/2018 - 8/8/2018	**V. Datum:** NAVD88

Auger/Casing Type: HW	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 4/4.5	**I.D./O.D. (in.):** 1.375/2	
Hammer Weight (lb.): 300	**Sampler Hmr Wt (lb):** 140	
Hammer Fall (in.): 30	**Sampler Hmr Fall (in):** 30	
Other: Safety Hammer	**Other:** Auto Hammer	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
08/08/2018		Not Encountered		

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	6	3 9 9 13	18	S-1: Dry, medium dense, brown, fine to coarse SAND and SILT, little (-) Gravel, trace Roots/Grass.	1		0.3	TOPSOIL	122.2'
		S-2	2-4	24	18	9 8 17 16	25	S-2: Dry, medium dense, brown, fine to coarse SAND, some Gravel, little Silt, trace (-) Roots.				FILL	
		S-3	4-6	24	19	15 16 12 11	28	S-3: Dry, medium dense, brown, fine to coarse SAND, some Silt, little Gravel.			4		118.5'
5		S-4	6-8	24	13	13 12 11 11	23	S-4: Moist, medium dense, brown, fine to coarse SAND and SILT, little (-) Gravel.				SILTY SAND	
		S-5	8-10	24	22	10 16 20 21	36	S-5: Dry, dense, brown, fine to coarse SAND and GRAVEL, little Silt.			8		114.5'
10									2			SAND AND GRAVEL	
								Bottom of boring at 10 feet.			10		112.5'
15													
20													
25													

REMARKS

1. Ground surface elevations estimated from Google Earth.
2. Terminated boring at approximately 10 feet below ground surface (bgs). Upon completion borehole was backfilled up to existing grade with drill cuttings and sand.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: DGT-2

173748.00 CASHMAN ELEMENTARY SCHOOL.GPJ; STRATUM ONLY; 1/10/2020

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Proposed Amesbury Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts

BORING NO.: GZA-1
SHEET: 1 of 1
PROJECT NO: 01.0173748.00
REVIEWED BY: HLA

Drilling Co.: New England Boring Contractors	**Type of Rig:** Tracked ATV	**Boring Location:** See Plan	**H. Datum:** See Plan
Foreman: Matt Soucy	**Rig Model:** Mobile B-53	**Ground Surface Elev. (ft.):** 118.7	
Logged By: Alex Karp	**Drilling Method:** Drive & Wash	**Final Boring Depth (ft.):** 15	
		Date Start - Finish: 8/8/2018 - 8/8/2018	**V. Datum:** NAVD88

Auger/Casing Type: HW	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 4/4.5	**I.D./O.D. (in.):** 1.375/2	
Hammer Weight (lb.): 300	**Sampler Hmr Wt (lb):** 140	
Hammer Fall (in.): 30	**Sampler Hmr Fall (in):** 30	
Other: Safety Hammer	**Other:** Auto Hammer	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
08/08/2018	0845	4.1 ft.	*casing extracted	0.25 hr.

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	18	3 5 9 9	14	S-1A: Top 2": Brown, TOPSOIL, trace Grass/Roots. S-1B: Bottom 16": Dry, brown, fine to coarse SAND, little Silt, trace (-) Gravel, trace (-) Root Fibers.	1		0.3	TOPSOIL	118.4'
		S-2	2-4	24	12	8 7 8 10	15	S-2: Dry, medium dense, brown, fine to coarse SAND, little Silt, trace (-) Gravel, trace (-) Roots.				SUBSOIL	
											4		114.7'
5		S-3	4-6	24	15	7 5 5 4	10	S-3: Moist, medium dense, brown, GRAVEL, some fine to coarse Sand, some Silt.	2			SAND AND GRAVEL	
											6		112.7'
		S-4	6-8	24	13	5 6 10 11	16	S-4: Moist, medium dense, brown, fine to coarse SAND and SILT, little Gravel.					
		S-5	8-10	24	22	13 11 13 13	24	S-5: Moist, medium dense, light brown, fine to coarse SAND and SILT, little Gravel.	3 4			SILTY SAND	
10											10		108.7'
												GLACIAL TILL	
									5 6		13.5		105.2'
		S-6	14-15.0	2	2	65/2"	R	S-6: Wet, very dense, gray/brown, fine to coarse SAND and GRAVEL, trace Silt (possible Weathered Bedrock).	7 8		15	POSSIBLE WEATHERED BEDROCK	103.7'
15								Bottom of boring at 15 feet.					
20													
25													

REMARKS

1. Ground surface elevations estimated from Google Earth.
2. Advanced casing and commenced drive & wash drilling methods to a depth of 4 feet below ground surface (bgs).
3. Observed slight color change and increased silt content over bottom 2-inches of sample S-5, possible strata change.
4. Advanced casing to approximately 9 feet bgs and continued in an open hole after sample S-5.
5. Change in strata based on change in drilling resistance.
6. Observed increased roller-bit resistance and rig chatter approximately 13.3 feet bgs. Encountered split spoon refusal approximately 14.2 feet bgs in sample S-6.
7. Observed increased roller bit resistance approximately 60 sec/inch from 14.2 to 15 feet bgs. Observed small, angular rock fragments in return water.
8. Terminated boring approximately 15 feet bgs. Upon completion borehole was backfilled up to existing grade with drill cuttings and sand.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZA-1

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Proposed Amesbury Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts

BORING NO.: GZA-2
SHEET: 1 of 1
PROJECT NO: 01.0173748.00
REVIEWED BY: HLA

Drilling Co.: New England Boring Contractors	**Type of Rig:** Tracked ATV	**Boring Location:** See Plan	**H. Datum:** See Plan
Foreman: Matt Soucy	**Rig Model:** Mobile B-53	**Ground Surface Elev. (ft.):** 118.9	
Logged By: Alex Karp	**Drilling Method:** Drive & Wash	**Final Boring Depth (ft.):** 18.3	**V. Datum:** NAVD88
		Date Start - Finish: 8/8/2018 - 8/8/2018	

Auger/Casing Type: HW	**Sampler Type:** Split Spoon		
I.D/O.D.(in): 4/4.5	**I.D./O.D. (in.):** 1.375/2		
Hammer Weight (lb.): 300	**Sampler Hmr Wt (lb):** 140		
Hammer Fall (in.): 30	**Sampler Hmr Fall (in):** 30		
Other: Safety Hammer	**Other:** Auto Hammer		

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
08/08/2018	1000	5.2 ft.	*casing extracted	0.25 hr

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	17	3 8 13 16	21	S-1A: Top 2": Dry, brown, Grass TOPSOIL, Roots. S-1B: Bottom 15": Dry, brown, fine to coarse SAND and GRAVEL, some Silt, trace Roots.	1		0.3	TOPSOIL	118.6'
		S-2	2-4	24	13	17 16 18 16	34	S-2: Dry, dense, brown, fine to coarse SAND and SILT, little Gravel.					
5		S-3	4-6	24	13	9 7 4 10	11	S-3: Moist, medium dense, brown, fine to coarse SAND, little (+) Gravel, little Silt, trace Debris (brick fragments).	2			FILL	
		S-4	6-8	24	11	16 13 7 11	20	S-4: Wet, medium dense, brown to gray, fine to coarse SAND and SILT, trace Gravel, trace Debris (brick fragments) (slight H2S like odor).			8		110.9'
10		S-5	8-10	24	12	11 13 13 12	26	S-5: Wet, medium dense, brown, fine to coarse SAND and SILT, little (-) Gravel.				SILTY SAND	
											12		106.9'
15		S-6	14-16	24	8	12 20 21 19	41	S-6: Wet, dense, brown, fine to coarse SAND, some Silt, little (+) Gravel.				GLACIAL TILL	
											17		101.9'
		S-7	18-18.3	4	3	75/11	R	S-7: Wet, very dense, gray, GRAVEL, trace fine to coarse Sand, trace Silt (possible Weathered Bedrock).	3 4		18.3	POSSIBLE WEATHERED BEDROCK	100.6'
20								Bottom of boring at 18.3 feet.					
25													

REMARKS

1. Ground surface elevations estimated from Google Earth.
2. Advanced casing and commence drive & wash drilling methods at a depth of 4 feet below ground surface (bgs).
3. Observed increased roller bit resistance and rig chatter approximately 17 to 18 feet bgs. Observed gray, angular rock fragments in return water.
4. Encountered split soon refusal approximately 18.3 feet bgs; therefore boring was terminated at approximately 18.3 feet bgs. Upon completion borehole was backfilled up to existing grade with drill cuttings and sand.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZA-2

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Proposed Amesbury Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts

BORING NO.: GZA-3
SHEET: 1 of 1
PROJECT NO: 01.0173748.00
REVIEWED BY: HLA

Drilling Co.: New England Boring Contractors	**Type of Rig:** Tracked ATV	**Boring Location:** See Plan	**H. Datum:** See Plan
Foreman: Matt Soucy	**Rig Model:** Mobile B-53	**Ground Surface Elev. (ft.):** 133.6	
Logged By: Alex Karp	**Drilling Method:** Drive & Wash	**Final Boring Depth (ft.):** 10	**V. Datum:** NAVD88
		Date Start - Finish: 8/8/2018 - 8/8/2018	

Auger/Casing Type: HW	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 4/4.5	**I.D./O.D. (in.):** 1.375/2	
Hammer Weight (lb.): 300	**Sampler Hmr Wt (lb):** 140	
Hammer Fall (in.): 30	**Sampler Hmr Fall (in):** 30	
Other: Safety Hammer	**Other:** Auto Hammer	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
08/08/2018		Not Encountered		

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	6	2 4 6 8	10	S-1: Dry, medium dense, brown, fine to coarse SAND, some Silt, trace Gravel, trace Roots/Grass.	1		0.3	TOPSOIL	133.3'
		S-2	2-4	24	13	6 7 12 12	19	S-2: Dry, medium dense, brown, fine to coarse SAND, little Gravel, little Silt, trace (-) Roots fibers.				SAND	
5		S-3	4-6	24	11	10 10 9 11	19	S-3: Dry, medium dense, brown, fine to coarse SAND, little Silt, little Gravel.			6		127.6'
		S-4	6-8	24	18	13 10 12 14	22	S-4: Dry, medium dense, brown, fine to coarse SAND and GRAVEL, some Silt.				SILTY SAND	
		S-5	8-10	24	12	20 14 12 13	26	S-5: Dry, medium dense, brown, fine to coarse SAND and SILT, little Gravel.					
10									2		10		123.6'
								Bottom of boring at 10 feet.					
15													
20													
25													

REMARKS

1. Ground surface elevations estimated from Google Earth.
2. Terminated boring approximately at 10 feet below ground surface. Upon completion borehole was backfilled up to existing grade with drill cuttings and sand.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZA-3

173748.00 CASHMAN ELEMENTARY SCHOOL.GPJ; STRATUM ONLY; 1/10/2020

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Proposed Amesbury Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts

BORING NO.: GZA-4
SHEET: 1 of 1
PROJECT NO: 01.0173748.00
REVIEWED BY: HLA

Drilling Co.: New England Boring Contractors
Foreman: Matt Soucy
Logged By: Alex Karp

Type of Rig: Tracked ATV
Rig Model: Mobile B-53
Drilling Method: Drive & Wash

Boring Location: See Plan
Ground Surface Elev. (ft.): 135
Final Boring Depth (ft.): 8.3
Date Start - Finish: 8/8/2018 - 8/8/2018

H. Datum: See Plan
V. Datum: NAVD88

Auger/Casing Type: HW
I.D/O.D.(in): 4/4.5
Hammer Weight (lb.): 300
Hammer Fall (in.): 30
Other: Safety Hammer

Sampler Type: Split Spoon
I.D./O.D. (in.): 1.375/2
Sampler Hmr Wt (lb): 140
Sampler Hmr Fall (in): 30
Other: Auto Hammer

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
08/08/2018		Not Encountered		

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	12	3 9 7 7	16	S-1: Dry, medium dense, brown, fine to coarse SAND, some Silt, trace Gravel, trace Roots/Grass.	1		0.3	TOPSOIL	134.7'
		S-2	2-4	24	15	12 11 12 13	23	S-2: Dry, medium dense, brown, fine to coarse SAND, some Silt, little Gravel, trace Roots.			4	SILTY SAND	131.0'
5		S-3	4-6	24	14	20 22 24 24	46	S-3: Dry, dense, brown, fine to coarse SAND, some Silt, little Gravel.					
		S-4	6-8	24	19	23 27 26 26	53	S-4: Dry, very dense, brown, fine to coarse SAND and SILT, trace Gravel.				GLACIAL TILL	
		S-5	8-8.3	3	3	60/3"	R	S-5: Dry, very dense, brown, fine to coarse SAND, some Silt, trace Gravel.	2		8.3		126.7'
10								Bottom of boring at 8.3 feet.					
15													
20													
25													

REMARKS

1. Ground surface elevations estimated from Google Earth.
2. Encountered split spoon refusal approximately 8.3 feet below ground surface (bgs); therefore the boring was terminated boring at approximately 8.3 feet bgs. Upon completion borehole was backfilled up to existing grade with drill cuttings and sand.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZA-4

173748.00 CASHMAN ELEMENTARY SCHOOL.GPJ; STRATUM ONLY; 1/10/2020

TEST BORING LOG

GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Proposed Amesbury Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts

BORING NO.: GZA-5 (OW)
SHEET: 1 of 1
PROJECT NO: 01.0174490.00
REVIEWED BY: HLA

Drilling Co.: New England Boring Contractors
Foreman: Ben Cross
Logged By: Daniella Roitman

Type of Rig: ATV
Rig Model: Mobile B-53
Drilling Method: Drive & Wash

Boring Location: See Plan
Ground Surface Elev. (ft.): 120.5
Final Boring Depth (ft.): 18.5
Date Start - Finish: 12/14/2019 - 12/14/2019

H. Datum: See Plan
V. Datum: NAVD88

Auger/Casing Type: HW
I.D./O.D.: 4"/4.5"
Hmr Weight (lb.): 300
Hmr Fall (in.): 30
Other: Auto Hammer

Sampler Type: Split Spoon
I.D./O.D (in.): 1.375"/2"
Sampler Hmr Wt: 140
Sampler Hmr Fall: 30
Other: Auto Hammer

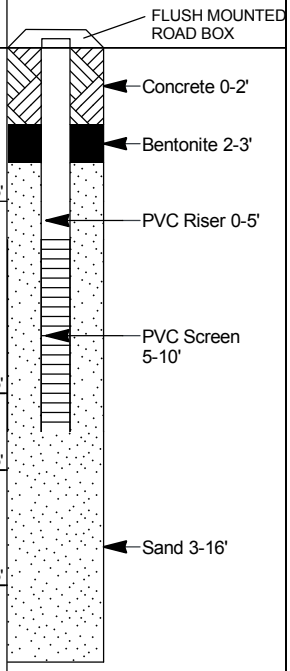
Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
1/3/20	08:00	1.65	10	20 Days

Depth (ft)	Casing Blows/ Core Rate Min/ft	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description Modified Burmister	Remark	Field Test Data
0		S-1	0-2	24	18	1 4 9 9	13	S-1: Medium dense, dark brown to brown, fine to coarse SAND, little Silt, little Gravel, trace (+) Organics.	1	
		S-2	2-4	24	16	4 4 2 5	6	S-2: Loose, brown, fine to coarse SAND, some Silt & Clay, trace fine Gravel, trace Brick.		
5		S-3	4-6	24	22	7 10 9 9	19	S-3: Medium dense, brown, fine to coarse SAND, some Silt, little Gravel.	2	
10		S-4	9-11	24	10	39 17 6 7	23	S-4: Medium dense, brown, fine to coarse GRAVEL and SAND, some Silt & Clay.	3	
15		S-5	14-14.25	3	3	100/3"	R	S-5: Very dense, gray-brown, fine to coarse GRAVEL, little Sand, trace Silt.		
		S-6	15-16.5	18	8	35 44 100/6"	R	S-6: Very dense, brown-gray, fine to coarse GRAVEL, little Sand, trace Silt.		
		S-7	17-18.5	18	8	50 84 100/6"	R	S-7: Very dense, gray, fine to coarse GRAVEL, trace Sand, trace Silt.	4 5	
20								Bottom of boring at 18.5 feet.		
25										
30										

Depth (ft)	Stratum Description	Elev. (ft)
0	FILL	
4'		116.5'
	SILTY SAND	
9'		111.5'
	SAND AND GRAVEL	
11'		109.5'
	GLACIAL TILL	
14'		106.5'
	POSSIBLE WEATHERED BEDROCK	
18'		102.5'

Equipment Installed



REMARKS

1. Ground surface elevation estimated from a plan entitled "Additional Soil Test Location Plan", dated 10/18/19, prepared by Dinisco Design.
2. Wash is returning light brown color and no sediment.
3. Very dense soils encountered at depth of 11 feet below ground surface; wash water returning sediment that appears to be glacial till.
4. Rock structure observed in gravel-sized pieces in sample S-7.
5. Monitoring well installed and a flush-mounted cover installed upon completion.

See log key for explanation of sample descriptions and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZA-5 (OW)

174490.00 - CHARLES C. CASHMAN ELEMENTARY SCHOOL.GPJ; STANDARD BORING W/E W/O SMP 2PG2; 1/15/2020

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Proposed Amesbury Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts

BORING NO.: GZA-6
SHEET: 1 of 1
PROJECT NO: 01.0174490.00
REVIEWED BY: HLA

Drilling Co.: New England Boring Contractors	**Type of Rig:** ATV	**Boring Location:** See Plan	**H. Datum:** See Plan
Foreman: M. Misiaszek	**Rig Model:** Mobile B-53	**Ground Surface Elev. (ft.):** 119.5	
Logged By: Luke Prohaske	**Drilling Method:** HSA	**Final Boring Depth (ft.):** 15.2	**V. Datum:** NAVD88
		Date Start - Finish: 1/3/2020 - 1/3/2020	

Auger/Casing Type: HSA	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 2.25"/6"	**I.D./O.D. (in.):** 1.375"/2"	
Hammer Weight (lb.): NA	**Sampler Hmr Wt (lb):** 140	
Hammer Fall (in.): NA	**Sampler Hmr Fall (in):** 30	
Other: NA	**Other:** Auto Hammer	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
1/3/20	09:50	4.2	14	0 min.

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	6	WOH 1 4 8	5	S-1: Loose, brown, GRAVEL, some fine to coarse Sand, little Silt, trace Organic Fibers.	1			FILL	
		S-2	2-4	24	8	8 18 10 22	28	S-2: Dense, brown, fine to coarse SAND, some Gravel, some Silt.	2		2		117.5'
5		S-3	4-6	24	15	10 12 7 4	19	S-3: (Top 12") Medium dense, brown, fine to coarse SAND and GRAVEL, some Silt. S-3: (Bottom 3") Gray, fine to coarse SAND, some Clayey Silt.				SAND AND GRAVEL	
											5.8		113.7'
10		S-4	9-11	24	14	4 5 6 6	11	S-4: Medium dense, brown, fine to coarse SAND, some Clayey Silt, little Gravel.				SILTY SAND	
15		S-5	14-15.2	14	7	13 10 50/2"	R	S-5: Very dense, brown to gray, fine to coarse SAND and Clayey SILT.	3		14.5 15.2	POSSIBLE WEATHERED BEDROCK	105.0' 104.3'
								Bottom of boring at 15.2 feet.					
20													
25													
30													

REMARKS

1. Ground surface elevations estimated from an undated plan entitled "21288ec_WBLOCK 12-17-19_3-PLAN SET (ANSI E)" (NAVD88 datum) received from DiNisco Design on December 23, 2019.
2. Sample S-2 was obtained using AW rods. The SPT value in not representative of insitu conditions.
3. Boring terminated at approximately 15.1 feet below ground surface. Upon completion, borehole backfilled with soil cuttings and sand to approximate ground surface.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZA-6

174490.00 - CHARLES C. CASHMAN ELEMENTARY SCHOOL.GPJ; STRATUM ONLY; 1/14/2020

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Proposed Amesbury Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts

BORING NO.: GZA-7
SHEET: 1 of 1
PROJECT NO: 01.0174490.00
REVIEWED BY: HLA

Drilling Co.: New England Boring Contractors	**Type of Rig:** ATV	**Boring Location:** See Plan	**H. Datum:** See Plan
Foreman: Ben Cross	**Rig Model:** Mobile B-53	**Ground Surface Elev. (ft.):** 118.2	
Logged By: Daniella Roitman	**Drilling Method:** Drive & Wash	**Final Boring Depth (ft.):** 29.5	**V. Datum:** NAVD88
		Date Start - Finish: 12/14/2019 - 12/14/2019	

Auger/Casing Type: HW	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 4"/4.5"	**I.D./O.D. (in.):** 1.375"/2"	
Hammer Weight (lb.): 300	**Sampler Hmr Wt (lb):** 140	
Hammer Fall (in.): 30	**Sampler Hmr Fall (in):** 30	
Other: Auto Hammer	**Other:** Auto Hammer	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
12/14/19	03:00	4.2	19	0

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	10	1 1 2 1	3	S-1: Very loose, brown, fine to coarse SAND, little (+) Silt, trace Gravel, little Gravel, trace (+) Organics.	1	115	0.3	TOPSOIL	117.9'
		S-2	2-4	24	18	3 3 4 6	7	S-2: Loose, brown, fine to coarse SAND, little Silt, trace Gravel, trace Organics.				FILL	
		S-3	4-6	24	16	7 13 14 15	27	S-3: Medium dense, brown, fine to coarse GRAVEL, some fine Sand, little Clayey Silt, trace Organics.			4		114.2'
5												SAND AND GRAVEL	
											7		111.2'
		S-4	9-11	24	20	11 28 28 33	56	S-4: Dense, brown, fine to coarse Silty SAND, and fine to coarse Gravel.					
10												POSSIBLE WEATHERED BEDROCK	
		S-5	14-15	12	12	50 100/6"	R	S-5: Very dense, brown, fine to coarse GRAVEL, some Sand, little Silt.	2				
15													
		S-6	19-	1	1	45/1"	R	S-6: Very dense, gray, fine to coarse GRAVEL, little Silt.			19.5		98.7'
20		C-1	19.1 19.5- 24.5	60	60			C-1: Hard, slightly to very slightly weathered, fine to medium grained, gray, PHYLLITE, very close to moderately close joints/fractures.	3				
	4.5 3.5 3 3.5 5 6.5 4.5												
25		C-2	24.5- 29.5	60	60			C-2: Hard, slightly to very slightly weathered, fine to medium grained, gray, PHYLLITE, very close to moderately close joints/fractures.				BEDROCK	
									4		29.5		88.7'
30								Bottom of boring at 29.5 feet.					

REMARKS

1. Ground surface elevation estimated from a plan entitled "Additional Soil Test Location Plan", dated 10/18/19, prepared by Dinisco Design.
2. Driller encountered very dense material and gravel-sized pieces that appear to have rock structure in samples S-5 and S-6.
3. Cored rock from 19.5 feet to 29.5 feet below ground surface. Data in Column Blows per 6 inches represents core barrel penetration in min./ft.
4. Boring terminated at approximately 29 feet below ground surface. Upon completion, borehole backfilled with soil cuttings to approximate ground surface.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZA-7

174490.00 - CHARLES C. CASHMAN ELEMENTARY SCHOOL.GPJ; STRATUM ONLY; 1/14/2020

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Proposed Amesbury Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts

BORING NO.: GZA-8
SHEET: 1 of 1
PROJECT NO: 01.0174490.00
REVIEWED BY: HLA

Drilling Co.: New England Boring Contractors	**Type of Rig:** ATV	**Boring Location:** See Plan	**H. Datum:** See Plan
Foreman: M. Misiaszek	**Rig Model:** Mobile B-53	**Ground Surface Elev. (ft.):** 119.7	
Logged By: Luke Prohaske	**Drilling Method:** HSA	**Final Boring Depth (ft.):** 18.4	**V. Datum:** NAVD88
		Date Start - Finish: 1/3/2020 - 1/3/2020	

Auger/Casing Type: HSA	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 2.25"/6"	**I.D./O.D. (in.):** 1.375"/2"	
Hammer Weight (lb.): NA	**Sampler Hmr Wt (lb):** 140	
Hammer Fall (in.): NA	**Sampler Hmr Fall (in):** 30	
Other: NA	**Other:** Auto Hammer	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
1/3/20	13:12	10.8	18.4	0 min.

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	8	1 2 6 7	8	S-1: Loose, brown, fine to medium SAND, some Silt, trave Gravel, trace Organic Fibers.	1				
		S-2	2-4	24	9	4 2 1 2	3	S-2: Very loose, brown, fine to coarse SAND, some Silt, some Gravel.	2				
5		S-3	4-6	24	10	1 1 1 2	2	S-3: Very loose, brown, fine to coarse SAND, some Gravel, some Silt.				FILL	
											8		111.7'
10		S-4	9-11	24	17	6 11 11 10	22	S-4: Medium dense, brown, fine to coarse SAND, some (-) Silt, little Gravel.				SILTY SAND	
											13		106.7'
									3				
15		S-5	14-16	24	16	8 9 12 38	21	S-5: Medium dense, brown to gray, fine to coarse SAND, some Gravel, some Silt.	4			GLACIAL TILL	
											15.5		104.2'
												POSSIBLE WEATHERED ROCK	
							R		5		18.4		101.3'
		S-6	18.4-18.4	0	0	50/0"		S-6: No recovery.	6				
20								Bottom of boring at 18.4 feet.					
25													
30													

REMARKS

1. Ground surface elevations estimated from an undated plan entitled "21288ec_WBLOCK 12-17-19_3-PLAN SET (ANSI E)" (NAVD88 datum) received from DiNisco Design on December 23, 2019.
2. Sample S-2 was obtained using AW rods. The SPT value may not be representative of insitu conditions.
3. Increased drilling effort at approximately 13 feet below ground surface (bgs).
4. Weathered rock observed in bottom of split spoon in sample S-5.
5. Auger refusal at 18.4 feet bgs.
6. Boring terminated at approximately 18.4 feet bgs. Upon completion, borehole backfilled with soil cuttings and sand to approximate ground surface.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZA-8

174490.00 - CHARLES C. CASHMAN ELEMENTARY SCHOOL.GPJ; STRATUM ONLY; 1/14/2020

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Proposed Amesbury Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts

BORING NO.: GZA-9
SHEET: 1 of 1
PROJECT NO: 01.0174490.00
REVIEWED BY: HLA

Drilling Co.: New England Boring Contractors	**Type of Rig:** ATV	**Boring Location:** See Plan	**H. Datum:** See Plan
Foreman: M. Misiaszek	**Rig Model:** Mobile B-53	**Ground Surface Elev. (ft.):** 119.5	
Logged By: Luke Prohaske	**Drilling Method:** HSA	**Final Boring Depth (ft.):** 20	**V. Datum:** NAVD88
		Date Start - Finish: 1/3/2020 - 1/3/2020	

Auger/Casing Type: HSA	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 2.25"/6"	**I.D./O.D. (in.):** 1.375"/2"	
Hammer Weight (lb.): NA	**Sampler Hmr Wt (lb):** 140	
Hammer Fall (in.): NA	**Sampler Hmr Fall (in):** 30	
Other: NA	**Other:** Auto Hammer	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
1/3/20	11:05	13.9	19	0 min.

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	15	1 2 7 6	9	S-1: (Top 6") Brown, SILT and fine SAND, trace Organic Fibers. S-1: (Bottom 9") Medium dense, brown, fine to coarse SAND, some Gravel, some Silt.	1				
		S-2	2-4	24	8	10 9 8 7	17	S-2: Medium dense, brown, fine to coarse SAND, some Silt, little Gravel.	2			FILL	
5		S-3	4-6	24	9	3 3 1 WOH	4	S-3: Loose, brown, fine to coarse SAND, some Silt, little (-) Gravel.	3		7		112.5'
10		S-4	9-11	24	7	5 9 10 7	19	S-4: Medium dense, brown to gray, fine to medium SAND and Clayey SILT, little (-) Gravel.				GLACIAL TILL	
15		S-5	14-16	24	7	5 6 5 5	11	S-5: Medium dense, brown to gray, fine to coarse SAND, some Silt, some Gravel.	4		17		102.5'
									5			POSSIBLE WEATHERED BEDROCK	
20		S-6	19-20	12	8	21 50/6"	R	S-6: Very dense, brown to gray, fine to coarse SAND, some Silt, trace Gravel.	6		20		99.5'
								Bottom of boring at 20 feet.	7				
25													
30													

REMARKS

1. Ground surface elevations estimated from an undated plan entitled "21288ec_WBLOCK 12-17-19_3-PLAN SET (ANSI E)" (NAVD88 datum) received from DiNisco Design on December 23, 2019.
2. Sample S-2 was obtained using AW rods. The SPT value is not representative of insitu conditions.
3. Due to the use of hollow stem auger drilling methods, the SPT-value may not be representative at samples S-3 through S-5.
4. Completely weathered rock observed in sample S-5.
5. Increase in drilling effort at approximately 17 feet below ground surface (bgs).
6. Rock structure observed in Sample S-6.
7. Boring terminated at approximately 20 feet bgs. Upon completion, borehole backfilled with soil cuttings and sand to approximate ground surface.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZA-9

174490.00 - CHARLES C. CASHMAN ELEMENTARY SCHOOL.GPJ; STRATUM ONLY; 1/14/2020

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Proposed Amesbury Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts

BORING NO.: GZA-10
SHEET: 1 of 1
PROJECT NO: 01.0174490.00
REVIEWED BY: HLA

Drilling Co.: New England Boring Contractors
Foreman: M. Misiaszek
Logged By: Luke Prohaske

Type of Rig: ATV
Rig Model: Mobile B-53
Drilling Method: HSA

Boring Location: See Plan
Ground Surface Elev. (ft.): 120
Final Boring Depth (ft.): 16
Date Start - Finish: 1/3/2020 - 1/3/2020

H. Datum: See Plan
V. Datum: NAVD88

Auger/Casing Type: HSA
I.D/O.D.(in): 2.25"/6"
Hammer Weight (lb.): NA
Hammer Fall (in.): NA
Other: NA

Sampler Type: Split Spoon
I.D./O.D. (in.): 1.375"/2"
Sampler Hmr Wt (lb): 140
Sampler Hmr Fall (in): 30
Other: Auto Hammer

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
1/3/20	08:30	5.9	14	0 min.

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	11	1 3 8 11	11	S-1: Medium dense, brown to gray, fine to medium SAND, little (+) Silt.	1				
		S-2	2-4	24	19	15 13 15 13	28	S-2: Medium dense, brown, fine to coarse SAND, little Gravel, little Silt.	2			FILL	
											4		116.0'
5		S-3	4-6	24	12	6 7 7 7	14	S-3: Medium dense, brown, fine to coarse SAND, some Silt, little Gravel.				SILTY SAND	
											8		112.0'
10		S-4	9-11	24	10	7 10 10 8	20	S-4: Medium dense, brown, fine to coarse SAND, some Silt, little Gravel, trace Clay.				GLACIAL TILL	
											13		107.0'
15		S-5	14-16	24	8	4 6 18 18	24	S-5: Medium dense, brown to gray, fine to coarse SAND, some Silt, some (-) Gravel.	3			POSSIBLE WEATHERED BEDROCK	
											16		104.0'
								Bottom of boring at 16 feet.	4				
20													
25													
30													

REMARKS

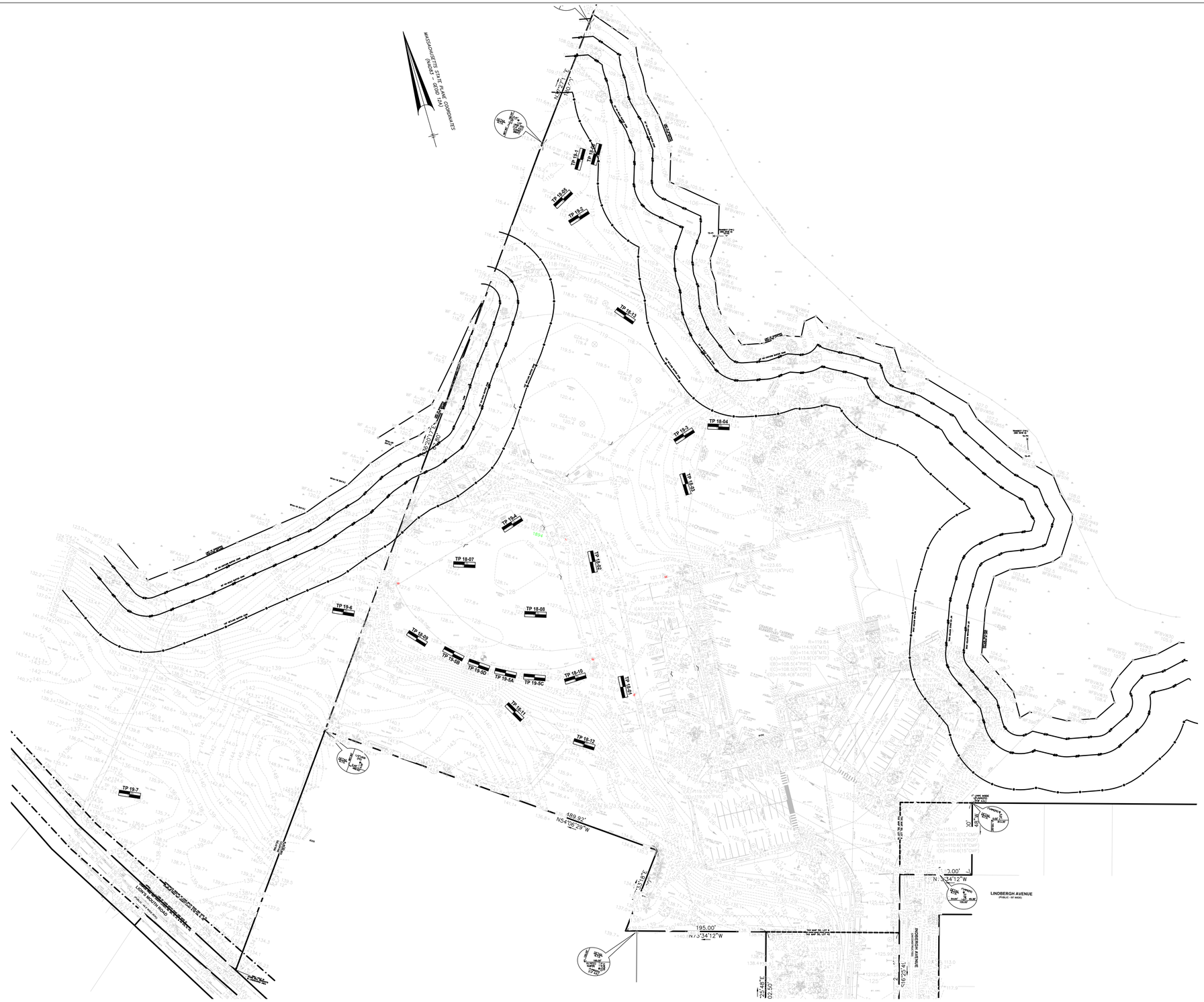
1. Ground surface elevations estimated from an undated plan entitled "21288ec_WBLOCK 12-17-19_3-PLAN SET (ANSI E)" (NAVD88 datum) received from DiNisco Design on December 23, 2019.
2. Sample S-2 was obtained using AW rods. The SPT value in not representative of insitu conditions.
3. Rock structure observed in Sample S-5.
4. Boring terminated at approximately 16 feet below ground surface. Upon completion, borehole backfilled with soil cuttings and sand to approximate ground surface.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZA-10

174490.00 - CHARLES C. CASHMAN ELEMENTARY SCHOOL.GPJ; STRATUM ONLY; 1/14/2020

APPENDIX C - TEST PIT LOGS AND SOIL TEST LOCATION MAP



Amesbury Elementary School

Amesbury Massachusetts

DINISCO DESIGN
architects + planners

99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2858

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030
FAX: (508) 879-1797

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-9600
FAX: (617) 527-9606

Crabtree McGrath Assoc., Inc.
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161 West Main Street
Georgetown, MA 01833
(978) 352-8500
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Electrical Engineers
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Boston, MA 02129
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#Consultant #5 Fax

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Danvers, MA 09123
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Technology Consultants
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Andover, MA 01880
(978) 256-9900
FAX: (978) 560-1771

The Green Engineer, Inc.
Energy Consultants
54 Junction Square Drive
Concord, MA 01742
(978) 369-8978

NORTH ARROW

LICENSE STAMP

Date: 23 DECEMBER 2019

Drawn By: KMR

Scale: 0 50 100

Revisions

Number	Date	Description

Soil Test Location Plan

ST-01

© I:\Contract Jobs\ 2XX\96\ Dwg\ 2X096 Eng Rfp.dwg

25286

Attachment 2

Deep Test Hole Logs

for

Charles C. Cashman Elementary School

193 Loins Mouth Road
Amesbury, Massachusetts 01913

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-01 Date: 11/14/2018 Time: A.M. Weather 30°, sunny

Location (identify on site plan) see attached sketch

Land Use Playground Area Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body see sketch Feet Drainageway see sketch Feet

Possible Wet Area see sketch Feet Property Line see sketch Feet

Drinking Water Well see sketch Feet Other

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 10”	Imported Topsoil	Silt Loam	10 YR 3/3	None Observed	Massive-Friable
10 – 60”	C	Sandy Loam	2.5 Y 5/4	Some @ 15”	Massive-Friable, w/ gravel and weathered rock (30-40%)

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive – difficult to determine

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-02 Date: 11/14/2018 Time: A.M. Weather 30°, sunny

Location (identify on site plan) see attached sketch

Land Use Playground Area Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 8”	Imported Topsoil	Silt Loam	10 YR 3/3	None Observed	Massive-Friable
8 – 20”	Fill	Loamy Sand (Fine)	10 YR 4/4	None Observed	Massive-Friable, w/ gravel
20 – 60”	C	Sandy Loam	2.5 Y 5/4	> 5% @ 20” Concentrations: 7.5 YR 4/6 Depletions: 5 Y 4/1	Massive-Friable, w/ gravel and weathered rock (10%)

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 57” Weeping from Pit Face: @ 49”

Estimated Seasonal High Ground Water: @ 20” based on soil morphology & weathered rock

Note: Fill material observed appears to be the same material as the natural substratum. Based on knowledge of the development of the site, it is assumed that the material removed for the leveling of the baseball field was placed above the natural substratum and then covered by the imported topsoil observed.

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-03 Date: 11/14/2018 Time: A.M. Weather 30°, sunny

Location (identify on site plan) see attached sketch

Land Use Playground Area Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 6”	Imported Topsoil	Silt Loam	10 YR 3/3	None Observed	Massive-Friable
6 – 56”	C	Sand (Fine)	2.5 Y 4/4	> 5% @ 8” Concentrations: 7.5 YR 4/6 Depletions: 5 Y 4/1	Massive-Friable, w/ gravel

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 53” Weeping from Pit Face: @ 12”

Estimated Seasonal High Ground Water: @ 8” based on soil morphology

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-04 Date: 11/14/2018 Time: A.M. Weather 30°, sunny

Location (identify on site plan) see attached sketch

Land Use Playground Area Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 6”	Imported Topsoil	Silt Loam	10 YR 3/3	None Observed	Massive-Friable
6 – 55”	C	Loamy Sand (Fine)	2.5 Y 4/4	> 5% @ 8” Concentrations: 7.5 YR 4/6 Depletions: 5 Y 4/1	Massive-Friable, w/ gravel

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 33” Weeping from Pit Face: @ 11”

Estimated Seasonal High Ground Water: @ 8” based on soil morphology

Note: Test Hole was extremely saturated. Soil Samples were taken to run a sieve analysis to confirm texture observed in field.

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-07 Date: 11/29/2018 Time: A.M. Weather 40°, sunny

Location (identify on site plan) see attached sketch

Land Use Baseball Field Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 7”	Imported Topsoil	Sandy Loam (Fine)	10 YR 4/2	None Observed	Massive-Friable
7 – 32”	Fill	Sand (Fine)	2.5 Y 5/4	Some @ 19”	Loose-Single Grained, trace silt
32 – 66”	C	Sandy Loam	2.5 Y 4/3		Massive-Friable, very gravelly, w/ stones, cobbles, and fractured rock
66”	R	Fractured Ledge			

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: @ 66” (fractured)

Depth to Groundwater: Standing Water in the Hole: @ 62” Weeping from Pit Face: @ 56”

Estimated Seasonal High Ground Water: @ 56” based on weeping / standing groundwater observed during high groundwater

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-08 Date: 11/29/2018 Time: A.M. Weather 40°, sunny

Location (identify on site plan) see attached sketch

Land Use Baseball Field Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body see sketch Feet Drainageway see sketch Feet

Possible Wet Area see sketch Feet Property Line see sketch Feet

Drinking Water Well see sketch Feet Other

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 12”	Imported Topsoil	Sandy Loam (Fine)	10 YR 4/2	None Observed	Massive-Friable
12 – 34”	Fill	Sand (Fine)	2.5 Y 5/4	Some @ 19”	Loose-Single Grained, trace silt
34 – 78”	C	Sandy Loam	2.5 Y 4/3		Massive-Friable, very gravelly, w/ stones, cobbles, and fractured rock
78”	R	Fractured Ledge			

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: @ 78” (fractured)

Depth to Groundwater: Standing Water in the Hole: @ 75” Weeping from Pit Face: @ 64”

Estimated Seasonal High Ground Water: @ 64” based on weeping / standing groundwater observed during high groundwater

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-09 Date: 11/29/2018 Time: A.M. Weather 40°, sunny

Location (identify on site plan) see attached sketch

Land Use Grass Lawn Landscaping Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 9”	Imported Topsoil	Sandy Loam (Fine)	10 YR 4/2	None Observed	Massive-Friable
9 – 18”	Fill	Sand (Fine)	2.5 Y 5/4	Some @ 11”	Loose-Single Grained, trace silt
18 – 32”	R	Fractured Ledge			

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: @ 18” (fractured)

Depth to Groundwater: Standing Water in the Hole: @28” Weeping from Pit Face: @ 28”

Estimated Seasonal High Ground Water: @ 28” based on weeping / standing groundwater observed during high groundwater

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-10 Date: 11/29/2018 Time: A.M. Weather 40°, sunny

Location (identify on site plan) see attached sketch

Land Use Grass Lawn Landscaping Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 8”	Imported Topsoil	Sandy Loam (Fine)	10 YR 4/2	None Observed	Massive-Friable
8 – 22”	Fill	Sand (Fine)	2.5 Y 5/4	Some @ 16”	Loose-Single Grained, trace silt
22 – 90”	C	Sandy Loam	2.5 Y 4/3		Massive-Friable, very gravelly, w/ stones, cobbles, and fractured rock

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 76” Weeping from Pit Face: @ 70”

Estimated Seasonal High Ground Water: @ 70” based on weeping / standing groundwater observed during high groundwater

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-11 Date: 11/29/2018 Time: A.M. Weather 40°, sunny

Location (identify on site plan) see attached sketch

Land Use Grass Lawn Landscaping Slope (%) 10-15 Surface Stones None

Vegetation Grass Lawn

Landform Side Slope of Hill

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body see sketch Feet Drainageway see sketch Feet

Possible Wet Area see sketch Feet Property Line see sketch Feet

Drinking Water Well see sketch Feet Other

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 8”	Imported Topsoil	Sandy Loam (Fine)	10 YR 4/2	None Observed	Massive-Friable
8 – 90”	C	Loamy Sand	2.5 Y 4/3	None Observed	Massive-Friable, very gravelly, w/ stones, cobbles, and fractured rock
90”	R	Fractured Ledge			

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: @ 90” (fractured)

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-12 Date: 11/29/2018 Time: A.M. Weather 40°, sunny

Location (identify on site plan) see attached sketch

Land Use Grass Lawn Landscaping Slope (%) 10-15 Surface Stones None

Vegetation Grass Lawn

Landform Side Slope of Hill

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 8”	Imported Topsoil	Sandy Loam (Fine)	10 YR 4/2	None Observed	Massive-Friable
8 – 96”	C	Loamy Sand	2.5 Y 4/3	Spot mottles from 16” – 27” (inconsistent)	Massive-Friable, very gravelly, w/ stones, cobbles, and fractured rock
96”	R	Fractured Ledge			

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: @ 96” (fractured)

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-13 Date: 11/29/2018 Time: A.M. Weather 40°, sunny

Location (identify on site plan) see attached sketch

Land Use Grass Lawn Landscaping Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 8”	Imported Topsoil	Sandy Loam (Fine)	10 YR 3/2	None Observed	Massive-Friable
8 – 50”	Fill	Sandy Loam	2.5 Y 4/3	Spot mottles from 14” – 36” (inconsistent)	Massive-Friable, very gravelly, w/ stones, cobbles, and fractured rock w/ <5% bricks

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 44” Weeping from Pit Face: @ 44”

Estimated Seasonal High Ground Water: @ 44” based on weeping / standing groundwater observed during high groundwater

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 18-05 Date: 11/26/19 Time: A.M. Weather 50° Sunny

Location (identify on site plan) see sketch

Land Use Wetland Buffer Area Slope (%) 3-8 Surface Stones None

Vegetation Tall Grass Field

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 15”	A	Sandy Loam (Fine)	10 YR 3/3	-	Topsoil
15 – 90”	C_1	Sandy Loam	2.5 Y 4/3	>5% @ 20” Low Chroma 2.5 Y 6/3 High Chroma 10 YR 5/8	Massive-Firm with some Gravel
90 – 113”	C_2	Sandy Loam	10 YR 4/6		Massive-Firm with rip-able ledge

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 111” Weeping from Pit Face: @ 47”

Estimated Seasonal High Ground Water: @ 20” based on soil morphology

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-01 Date: 11/26/19 Time: A.M. Weather 50° Sunny

Location (identify on site plan) see sketch

Land Use Wetland Buffer Area Slope (%) 3-8 Surface Stones None

Vegetation Tall Grass Field

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 10”	A	Sandy Loam (Fine)	10 YR 3/3	None Observed	Massive-Friable
10 – 108”	C_1	Sandy Loam	2.5 Y 4/3	Variegated Colors @ 32”	Massive-Firm with some Gravel
108 – 129”	C_2	Sandy Loam	10 YR 4/6	None Observed	Massive-Firm with rip-able ledge

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @129” Weeping from Pit Face: @ 127”

Estimated Seasonal High Ground Water: Inconclusive

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-02 Date: 11/26/19 Time: A.M. Weather 50° Sunny

Location (identify on site plan) see sketch

Land Use Wetland Buffer Area Slope (%) 3-8 Surface Stones None

Vegetation Tall Grass Field

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 15”	A	Sandy Loam (Fine)	10 YR 3/3	None Observed	Massive-Friable
15 – 86”	C_1	Sandy Loam	2.5 Y 4/3	>5% @ 24” Low Chroma 2.5 Y 6/3 High Chroma 10 YR 5/8	Massive-Firm with some Gravel
86 – 106”	C_2	Sandy Loam	10 YR 4/6		Massive-Firm with rip-able ledge

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 89” Weeping from Pit Face: @ 58”

Estimated Seasonal High Ground Water: @ 24” based on soil morphology

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-03 Date: 11/26/19 Time: A.M. Weather 50° Sunny

Location (identify on site plan) see sketch

Land Use Lawn Landscaping Slope (%) 3-8 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 7”	Imported Topsoil	Sandy Loam (Fine)	10 YR 4/3	-	-
7 – 24”	Fill	Loamy Sand	10 YR 5/4	-	Gravelly with some Cobbles and Stones, and weathered rock
24 – 34”	C_1	Fractured Ledge	-	>5% @ 32”	-
34 – 75”	C_2	Sandy Loam	10 YR 5/3	-	Massive-Friable, Gravelly with Cobbles and Stones

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 60” Weeping from Pit Face: @ 60”

Estimated Seasonal High Ground Water: @ 32” Based on soil morphology

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-04 Date: 11/26/19 Time: A.M. Weather 50° Sunny

Location (identify on site plan) see sketch

Land Use Baseball Field Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 13”	Imported Topsoil	Sandy Loam (Fine)	10 YR 4/3	-	-
13 – 39”	Fill	Sand (Fine)	2.5 Y 6/4	-	-
39 – 95”	C_1	Sandy Loam	10 YR 4/6	None Observed	Massive-Friable, Gravelly with Cobbles and Stones
95 – 129”	C_2	Sandy Loam	10 YR 4/6	Variegated mottles in ledge	Massive-Firm, with rip-able ledge

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-05a Date: 11/26/19 Time: P.M. Weather 50° Sunny

Location (identify on site plan) see sketch

Land Use Baseball Field Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 10”	Imported Topsoil	Sandy Loam (Fine)	10 YR 3/3	-	-
10”	R	Ledge	-	-	-

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: @ 10”

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-05b Date: 11/26/19 Time: P.M. Weather 50° Sunny

Location (identify on site plan) see sketch

Land Use Baseball Field Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 12”	Imported Topsoil	Sandy Loam (Fine)	10 YR 3/3	-	-
12 – 25”	C_1	Fractured Ledge	-	-	-
25”	R	Ledge / Refusal			

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: @ 25”

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-05c Date: 11/26/19 Time: P.M. Weather 50° Sunny

Location (identify on site plan) see sketch

Land Use Baseball Field Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 10”	Imported Topsoil	Sandy Loam (Fine)	10 YR 3/3	-	-
10 – 20”	Fill	Sand (Fine)	2.5 Y 6/4	-	-
20 – 39”	C_1	Fractured Ledge	-	-	80 – 90% Rock / Fractured Ledge
39”	R	Ledge / Refusal			

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: @ 39”

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-06 Date: 12/12/19 Time: A.M. Weather 30° Sunny

Location (identify on site plan) see sketch

Land Use Wetland Buffer Area Slope (%) 3-8 Surface Stones None

Vegetation Tall Grass Field

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 9”	A	Sandy Loam (Fine)	10 YR 3/3	None Observed	Massive-Friable
9 – 19”	B_w	Sandy Loam (Fine)	10 YR 4/6	None Observed	Massive-Friable, with wavy boundaries
19 – 96”	C	Sandy Loam	10 YR 5/3	None Observed	Massive-Friable, Very Gravelly with Stones, Cobbles, and lenses of Rip-able / Shattered Ledge (rip-able ledge starts at 48” below grade)
96”	R	Ledge			

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: @ 96”

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-07 Date: 12/12/19 Time: A.M. Weather 30° Sunny

Location (identify on site plan) see sketch

Land Use Wetland Buffer Area Slope (%) 3-8 Surface Stones None

Vegetation Tall Grass Field

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 22”	Imp	Sandy Loam	10 YR 4/3	-	Massive-Friable, Some Gravel
22 – 34”	A_b	Sandy Loam (Fine)	10 YR 3/3	None Observed	Massive-Friable
34 – 44”	B_{wb}	Sandy Loam (Fine)	10 YR 5/4	None Observed	Massive-Friable, Gravelly with some Stones
44 – 110”	C	Sandy Loam	10 YR 4/3	@ 47” Concentrations 7.5 YR 5/6 Depletions 5 Y 4/2	Massive-Friable, Very Gravelly with some Stones

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 80” Weeping from Pit Face: @ 51”

Estimated Seasonal High Ground Water: @ 47” based on soil morphology

SOIL TEST PIT SUMMARY
GROUNDWATER AND LEDGE
Page 1

TH #	DATE	ESHGW	GW ON TEST DATE	LEDGE / REFUSAL
18-01	11/14/18	Inconclusive (3)	No water at 60”	10”-60” Weathered Rock (2) No refusal
18-02	11/14/18	20”	Weeping at 49”	20”-30” Some Weathered Rock (1) No refusal.
18-03	11/14/18	8”	Weeping at 12”	No refusal at 56”
18-04	11/14/18	8”	Weeping at 11”	No refusal at 55”
18-05	**11/26/19**	20”	Weeping at 47”	Rip-able ledge 90”-113”(2) No refusal
18-06	11/14/18	>30”	None observed at 30”	No refusal at 30” Test hole hand dug.
18-07	11/29/18	56”	Weeping at 56”	Fractured Rock in soil profile 32”-66” (1). Refusal at 66”.
18-08	11/29/18	64”	Weeping at 64”	Fractured Rock in soil profile 34”-78” (1). Refusal at 78 inches
18-09	11/29/18	28”	Weeping at 28”	Refusal at 32” – Fractured Ledge.
18-10	11/29/18	70”	Weeping at 70”	22”-90” some Fractured Rock (1) No Refusal.
18-11	11/29/18	Inconclusive (3)	No water at 90”.	8”-90” some Fractured Rock (1) 90 Refusal (Fractured ledge.)
18-12	11/29/18	Inconclusive (3)	No water at 96”	8”-96” some Fractured Rock (1) 96 Refusal (Fractured ledge.)
18-13	11/29/18	44”	Weeping at 44”	Fill – No refusal at 50”

(1.) Denotes profile that included some weathered rock in portions in the profile with the soil.
(2.) Denotes Profile that included a significant proportion of weathered rock in the profile with the soil.
(3.) Inconclusive due to inconsistent redoximorphic features (variegated mottles), or possibly obscured due to the presence of weathered rock. Likely not an indicator of seasonal high groundwater.

ESHGW = Estimated Seasonal High Groundwater.

SOIL TEST PIT SUMMARY
GROUNDWATER AND LEDGE
Page 2

TH #	DATE	ESHGW	GW ON TEST DATE	LEDGE / REFUSAL
19-01	11/26/19	Inconclusive (3)	Weeping at 127”	108”- 129” rip-able ledge (2) No refusal
19-02	11/26/19	24”	Weeping at 58”	86”-106” rip-able ledge (2) No refusal.
19-03	11/26/19	32”	Weeping at 60”	7”-24” Some weathered rock (1) 24”-34” Fractured ledge (2) 34”-75” No weathered rock. No refusal
19-04	11/26/19	Inconclusive (3)	No water at 129”	95”-129” Rip-able ledge (2) No Refusal.
19-05a	11/26/19	Inconclusive (4)	No water at 10”	Refusal - Ledge at 10”.
19-05b	11/26/19	Inconclusive (4)	No water at 25”	12”-25” Fractured Ledge (2) Refusal – Ledge at 25”.
19-05c	11/26/19	Inconclusive (4)	No water at 39”	20”-39” Fractured Ledge (2)
19-05d	11/26/19			Ledge (Refusal) at surface.
19-06	12/12/19	Inconclusive (3)	No water at 96”	48”-96” rip-able ledge (1) Refusal-Ledge at 96.
19-07	12/12/19	47”	Weeping at 51”	No refusal.

(1.) Denotes profile that included some weathered rock in portions in the profile with the soil.
(2.) Denotes Profile that included a significant proportion of weathered rock in the profile with the soil.
(3.) Inconclusive due to inconsistent redoxemorphic features (variegated mottles), or possibly obscured due to the presence of weathered rock. Likely not an indicator of seasonal high groundwater.
(4.) Inconclusive as no signs of water and shallow presence of fractured ledge.

ESHGW = Estimated Seasonal High Groundwater.

APPENDIX D – GEOTECHNICAL LABORATORY RESULTS

THIELSCH ENGINEERING
195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
thielsch.com
Let's Build a Solid Foundation

Client Information:
GZA GeoEnvironmental
249 Vanderbilt Ave, Norwood, MA 02062
PM: Heather Audet
Assigned By: Heather Audet
Collected By: A. Karp

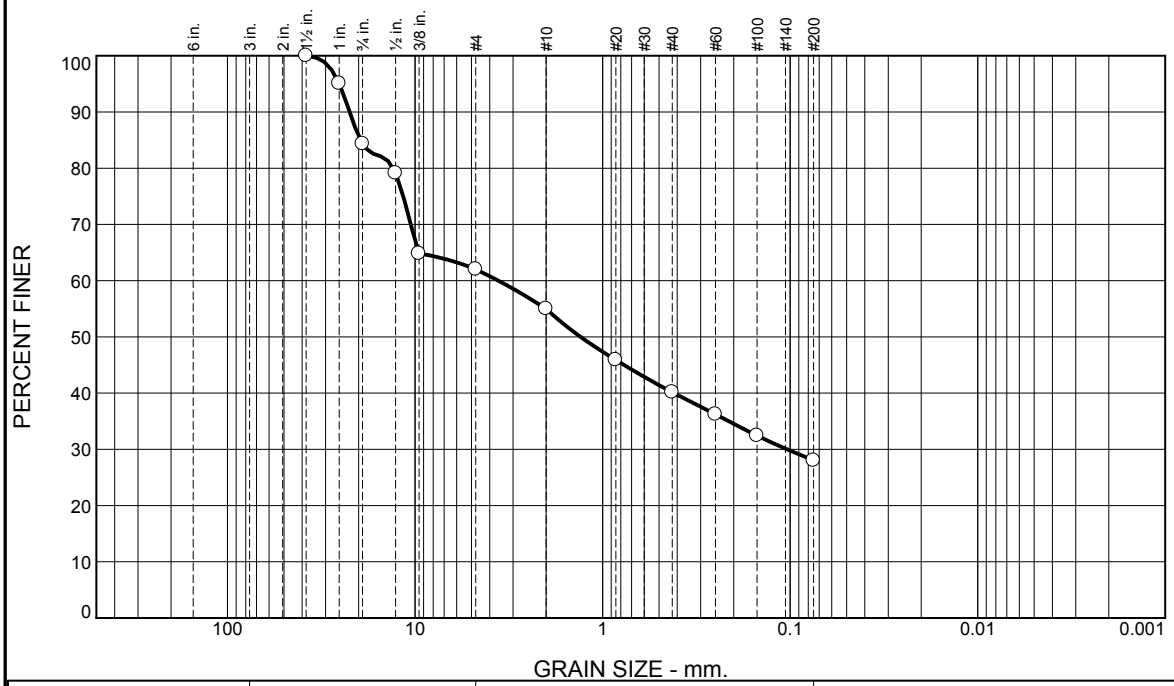
Project Information:
Cashman Elementary School
Amesbury, MA
GZA Project Number: 01.0173748.00
Summary Page: 1 of 1
Report Date: 08.17.18

LABORATORY TESTING DATA SHEET

Boring ID	Sample No.	Depth (ft)	Laboratory No.	Identification Tests						Corrosivity Tests								Laboratory Log and Soil Description
				Water Content %	LL %	PL %	Gravel %	Sand %	Fines %	Org. %	Sulfate (mg/kg)	Chloride (mg/kg)	Sulfide (mg/kg)	Redox Potential (mv)	Electrical Resist. As Received Ohm-cm	Electrial Resist. Saturated Ohm-cm	pH	
				D2216	D4318		D6913			D2874	EPA				G57		G51	
GZA-1	S-3	4-6	S-1				38.0	34.0	28.0									Brown f-c GRAVEL, some f-c Sand, some Silt
DGT-2	S-3	4-6	S-2				19.1	46.1	34.8									Brown f-c SAND, some Silt, little fine Gravel

Reviewed By _____ 08.20.2018

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	15.7	22.3	7.0	14.8	12.2	28.0	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	95.1		
0.75"	84.3		
0.5"	79.1		
0.375"	64.8		
#4	62.0		
#10	55.0		
#20	45.9		
#40	40.2		
#60	36.2		
#100	32.4		
#200	28.0		

* (no specification provided)

Material Description

Brown f-c GRAVEL, some f-c Sand, some Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 22.3209 D_{85}= 19.5328 D_{60}= 3.5995
D_{50}= 1.3101 D_{30}= 0.1037 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 08.15.18 **Date Tested:** 08.17.18

Tested By: MN

Checked By: Steven Accetta

Title: Laboratory Manager

Source of Sample: Borings **Depth:** 4-6' **Date Sampled:**
Sample Number: GZA-1 / S-3

Thielsch Engineering Inc.

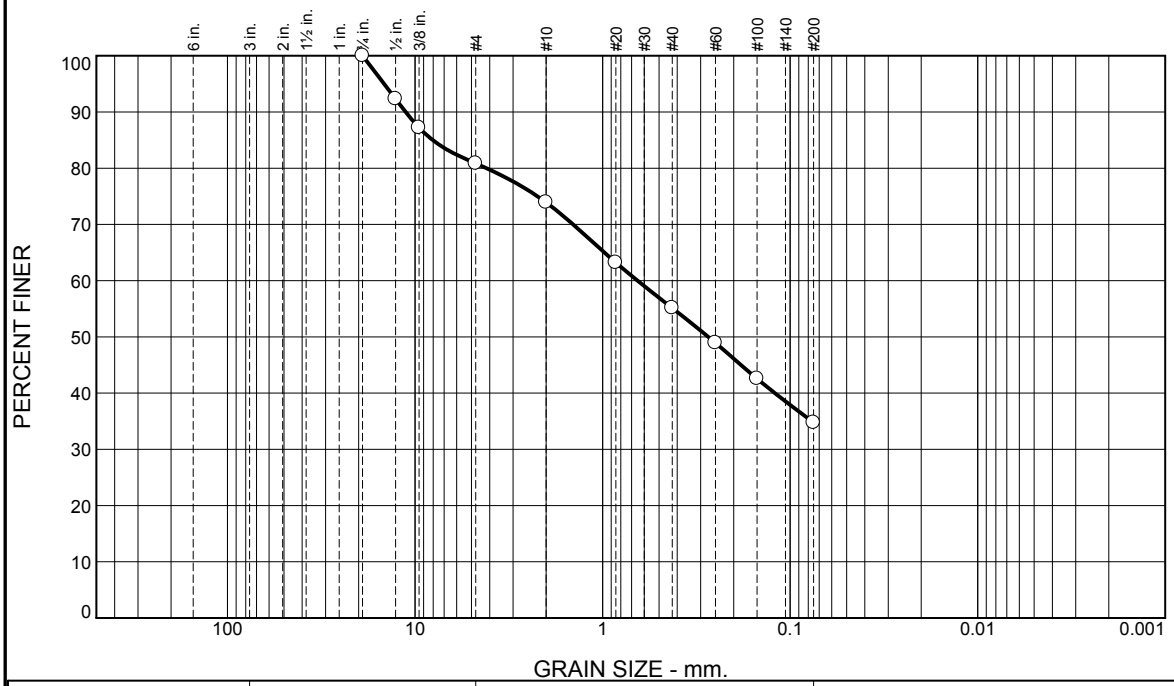
Cranston, RI

Client: GZA GeoEnvironmental

Project: Cashman Elementary School
Amesbury, MA

Project No: 01.0173748.00 **Figure** S-1

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	19.1	7.0	18.8	20.3	34.8	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	92.3		
0.375"	87.2		
#4	80.9		
#10	73.9		
#20	63.2		
#40	55.1		
#60	48.9		
#100	42.6		
#200	34.8		

* (no specification provided)

Material Description

Brown f-c SAND, some Silt, little fine Gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 11.2246 D_{85}= 8.0448 D_{60}= 0.6515
D_{50}= 0.2732 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as non-plastic.

Date Received: 08.15.18 **Date Tested:** 08.17.18

Tested By: MN

Checked By: Steven Accetta

Title: Laboratory Manager

Source of Sample: Borings **Depth:** 4-6' **Date Sampled:**
Sample Number: DGT-2 / S-3

Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental

Project: Cashman Elementary School
Amesbury, MA

Project No: 01.0173748.00 **Figure** S-2

THIELSCH ENGINEERING

195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
thielsch.com
Let's Build a Solid Foundation

Client Information:
GZA GeoEnvironmental
Norwood, MA
PM: Joseph Benoit
Assigned By: Heather Audet
Collected By: D. Roitman

Project Information:
Amesbury Elementary School
Amesbury, MA
GZA Project Number: 01.0174490.00
Summary Page: 1 of 1
Report Date: 01.06.2020

LABORATORY TESTING DATA SHEET, REPORT No. 7419-M-B115

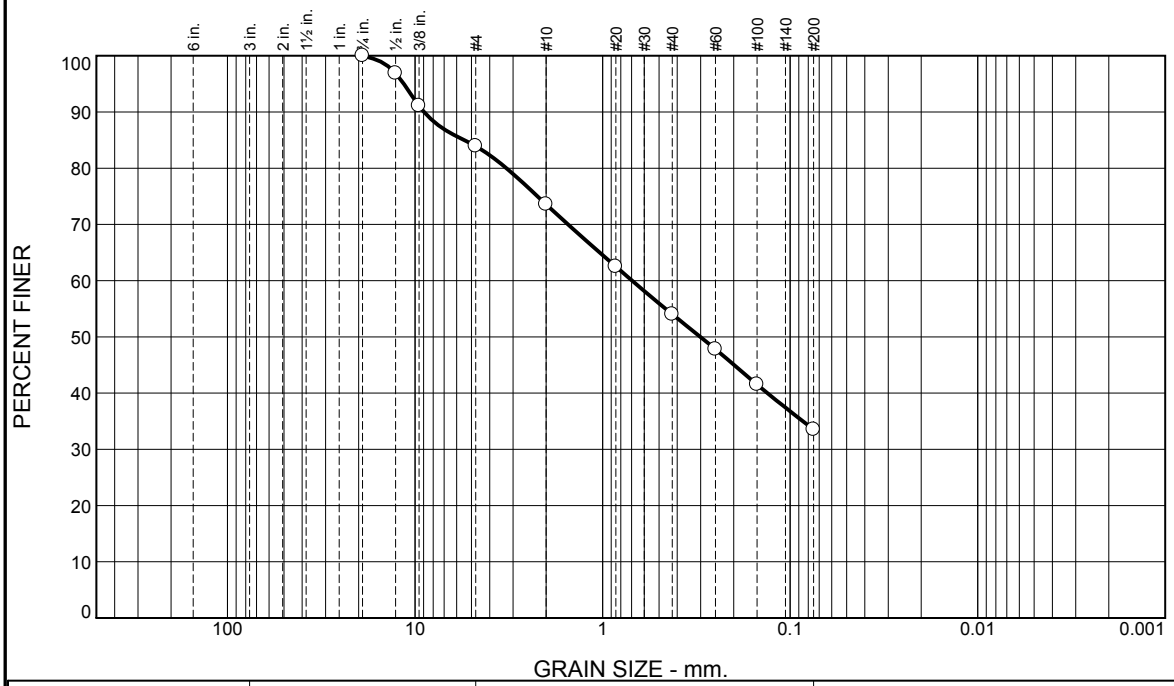
Boring / Test Pit No.	Sample No.	Depth (Ft)	Laboratory No.	Identification Tests								Proctor / Thermal Resistivity								Laboratory Log and Soil Description
				As Received Water Content %	LL %	PL %	Gravel %	Sand %	Fines %	Org. %	G_s	Dry unit wt. pcf	Test Water Content %	γ_d MAX (pcf) / W_{opt} (%)	γ_d MAX (pcf) / W_{opt} (%) (Corr.)	Target Test Setup as % of Proctor	Thermal Resistivity Optimum (°C*cm/W)	Thermal Resistivity Mid Point (°C*cm/W)	Thermal Resistivity Oven Dried (°C*cm/W)	
				D2216	D4318		D6913			D2874	D854			D1557			D5334			
GZA-5	S-2	2-4'	19-S-B407				16.1	50.4	33.5											Light brown f-c SAND, some Silt & Clay, little fine Gravel
GZA-5	S-4	9-11'	19-S-B408				39.0	36.5	24.5											Light brown f-c GRAVEL and f-c SAND, some Silt & Clay
GZA-7	S-3	4-6'	19-S-B409				56.1	27.3	16.6											Light brown f-c GRAVEl, some fine Sand, little Clayey Silt

Date Received: *12.27.2019*

Reviewed By: Ronelle L. Blanc

Date Reviewed: *01.06.2020*

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	16.1	10.3	19.6	20.5	33.5	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	96.9		
0.375"	91.1		
#4	83.9		
#10	73.6		
#20	62.5		
#40	54.0		
#60	47.8		
#100	41.5		
#200	33.5		

* (no specification provided)

Material Description

Light brown f-c SAND, some Silt & Clay, little fine Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 8.9591 D_{85}= 5.4645 D_{60}= 0.6958
D_{50}= 0.3009 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 12/27/2019 **Date Tested:** 12/30/2019

Tested By: GP

Checked By: Ronelle LeBlanc, E.I.T.

Title: Laboratory Coordinator

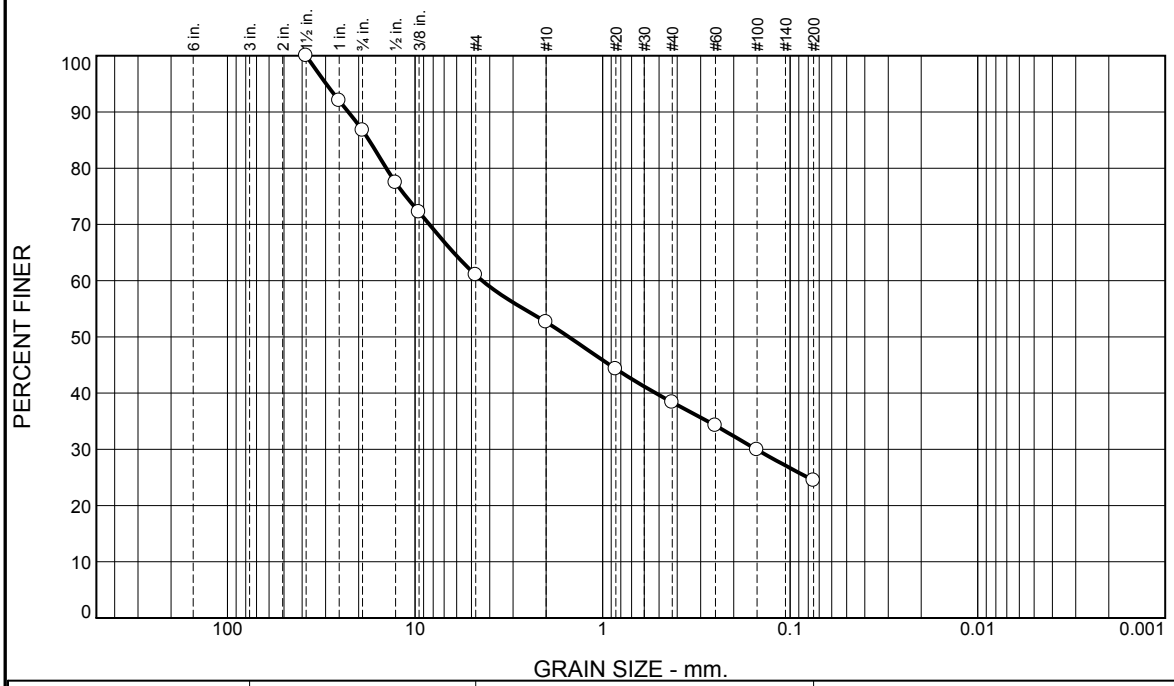
Source of Sample: GZA-5 **Depth:** 2-4' **Date Sampled:** 12/26/2019
Sample Number: S-2

Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: Amesbury Elementary School
Amesbury, MA
Project No: 01.0174490.00 **Figure** 19-S-B407

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.3	25.7	8.4	14.2	13.9	24.5	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1-1/2"	100.0		
1"	92.0		
3/4"	86.7		
1/2"	77.4		
3/8"	72.2		
#4	61.0		
#10	52.6		
#20	44.3		
#40	38.4		
#60	34.2		
#100	29.9		
#200	24.5		

* (no specification provided)

Material Description

Light brown f-c GRAVEL and f-c SAND, some Silt & Clay

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GC **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 22.6696 D_{85}= 17.6084 D_{60}= 4.3832
D_{50}= 1.5148 D_{30}= 0.1515 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 12/27/2019 **Date Tested:** 12/30/2019

Tested By: GP

Checked By: Ronelle LeBlanc, E.I.T.

Title: Laboratory Coordinator

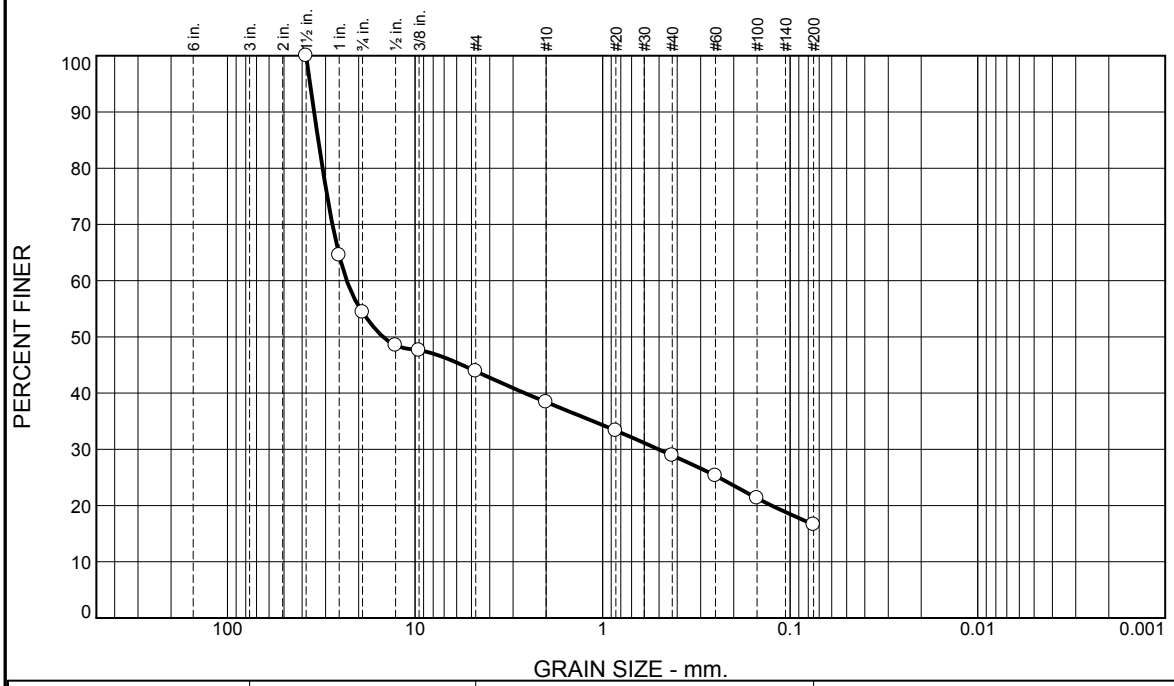
Source of Sample: GZA-5 **Depth:** 9-11' **Date Sampled:** 12/26/2019
Sample Number: S-4

Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: Amesbury Elementary School
Amesbury, MA
Project No: 01.0174490.00 **Figure** 19-S-B408

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	45.6	10.5	5.5	9.5	12.3	16.6	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1-1/2"	100.0		
1"	64.5		
3/4"	54.4		
1/2"	48.5		
3/8"	47.6		
#4	43.9		
#10	38.4		
#20	33.3		
#40	28.9		
#60	25.3		
#100	21.3		
#200	16.6		

* (no specification provided)

Material Description

Light brown f-c GRAVEL, some fine Sand, little Clayey Silt

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 34.5221 D_{85}= 32.8059 D_{60}= 23.1352
D_{50}= 14.8155 D_{30}= 0.5023 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/4".

Date Received: 12/27/2019 **Date Tested:** 12/30/2019

Tested By: GP

Checked By: Ronelle LeBlanc, E.I.T.

Title: Laboratory Coordinator

Source of Sample: GZA-7 **Depth:** 4-6' **Date Sampled:** 12/26/2019
Sample Number: S-3

Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental

Project: Amesbury Elementary School
Amesbury, MA

Project No: 01.0174490.00 **Figure** 19-S-B409

Attachment B

Soils Reports

NEW AMESBURY ELEMENTARY SCHOOL
SUBSURFACE EXPLORATION DATA
023000

DGT Associates
Surveying & Engineering

1071 Worcester Rd.
Framingham, MA 01701
508.879.0030
www.dgtassociates.com

June 10, 2020 Job: 25286

DiNisco Design
Attn: Vivian Low
99 Chauncy Street, Suite 901
Boston, MA 02111

RE: Amesbury Elementary School Project at 193 Lions Mouth Road, Amesbury, MA.
Additional Soil Testing on May 12 and 13, 2020

Dear Ms. Low:

This report contains the results of the on-site soil testing conducted by DGT Associates on May 12 and 13, 2020 at the subject property. This testing was conducted to provide additional soils information within the area of certain planned stormwater management facilities to confirm soil conditions and estimated seasonal high groundwater elevations. This was done to supplement the data as recommended by the Peer Reviewers of the project to check any assumptions made in the design of the stormwater facilities that were based on previous testing. Analysis of the data will be used to make any necessary adjustments in the designs if found necessary.

The testing consisted of ten (10) deep test pits and permeability tests were also performed at four (4) of the test pit locations. Testing was performed by Massachusetts Licensed Soil Evaluator (Fredric W. King, PE) of DGT. The City of Amesbury Department of Public Works provided the excavation services on both days of testing. *Note that the permeability tests are for saturated hydraulic conductivity as added supporting information of the textural analysis of the on-site soils. The soil infiltration rates will utilize the Rawls infiltration rates per the Mass. Stormwater Management Handbook.*

The test pit logs are included on Attachment 1. The permeability tests are in Attachment 2. A Summary Table is included in Attachment 3 that shows the surface elevation and ESHGW depth and elevation at each of the Test Holes. The locations of the test pits, are included in the Soil Test Hole Location Plan in Attachment 4.

Please contact me if you have any questions regarding this report.

Sincerely,
DGT Associates

Fredric W. King

Fredric W. King (SE 1232)
Senior Engineer

Attachments:
1. Deep Hole Logs
2. Permeability Test Logs
3. Summary Table of ESHGW depths and elevations.
4. Soil Test Hole Location Plan (Updated June 10, 2020)

DGT Associates
Surveying &
Engineering

1071 Worcester Rd.
Framingham, MA 01701
508.879.0030
www.dgtassociates.com

25286

ATTACHMENT 1

TEST PIT LOGS

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 20-01 Date: 2020-05-12 Time: P.M. Weather 55º Sunny

Location (identify on site plan) see sketch

Land Use Lawn-Open Playground Slope (%) 3-5 Surface Stones None

Vegetation Mown grass lawn

Landform Fill and graded over Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	NA	Feet	Drainageway	Int.Stream +200	Feet
Possible Wet Area	120	Feet	Property Line	See Site Plan	Feet
Drinking Water Well	NA	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 12”	Imported Topsoil	Sandy Loam (fine)	10 YR 3/4	-	-
12 – 60”	Fill	Sandy Loam	10 YR 5/4	None Observed	Massive-Friable, gravally.
60 – 66”	Ab	Sandy Loam (Fine)	10 YR 3/3	None Observed	Compacted former topsoil
66 – 80”	B	Sandy Loam	10 YR 5/4	None Observed”	Massive-Friable, gravelly
80 – 115	C	Sandy Loam	10 YR 4/3	@ 93” - 7.5 YR 5/6 Common	Massive-Friable, very gravelly

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: None Weeping from Pit Face: None (wet at 108

Estimated Seasonal High Ground Water: @ 93” based on soil morphology

FORM 11 - SOIL EVALUATOR FORM
Page of

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 20-02 Date: 2020-05-12 Time: P.M. Weather 55º Sunny

Location (identify on site plan) see sketch

Land Use Lawn-Open Playground Slope (%) 8% Surface Stones None

Vegetation Mown grass lawn

Landform Fill and graded over Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	NA	Feet	Drainageway	Int.Stream +200	Feet
Possible Wet Area	170	Feet	Property Line	See Site Plan	Feet
Drinking Water Well	NA	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 7”	Imported Topsoil	Sandy Loam (fine)	10 YR 4/3	-	-
7 – 43”	Fill	Sandy Loam	10 YR 5/4	None Observed	Massive-Friable, gravelly.
43 – 106”	C	Sandy Loam	10 YR 4/3	@ 80” - 7.5 YR 5/6 Common	Massive, friable, very gravelly. Massive-Friable, very gravelly

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: None Weeping from Pit Face: 89

Estimated Seasonal High Ground Water: @ 80” based on soil morphology

FORM 11 - SOIL EVALUATOR FORM
Page of

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 20-03 Date: 2020-05-12 Time: A.M. Weather 55º Sunny

Location (identify on site plan) see sketch

Land Use Lawn-Open Playground Slope (%) 3 Surface Stones None

Vegetation Mown grass lawn

Landform Fill and graded over Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	NA	Feet	Drainageway	Int.Stream +200	Feet
Possible Wet Area	75	Feet	Property Line	See Site Plan	Feet
Drinking Water Well	NA	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 8”	Imported Topsoil	Sandy Loam (fine)	10 YR 3/3	-	-
8 – 80”	Fill	Sandy Loam	10 YR 4/4	None Observed	Massive-Friable, gravelly.
80 – 120”	C	Sandy Loam	10 YR 5/4	7.5 YR 5/8 @103” Common”	Massive, very gravelly

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: None Weeping from Pit Face: 115”

Estimated Seasonal High Ground Water: @ 103”

FORM 11 - SOIL EVALUATOR FORM
Page of

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 20-04 Date: 2020-05-12 Time: A.M. Weather 55° Sunny

Location (identify on site plan) see sketch

Land Use Lawn-Open Playground Slope (%) 3 Surface Stones None

Vegetation Mown grass lawn

Landform Fill and graded over Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	NA	Feet	Drainageway	Int.Stream +200	Feet
Possible Wet Area	70	Feet	Property Line	See Site Plan	Feet
Drinking Water Well	NA	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 9”	Imported Topsoil	Sandy Loam (fine)	10 YR 3/3	-	-
9 – 74”	Fill	Sandy Loam	10 YR 4/3	None Observed	Massive-Friable, gravally.
74 – 104”	C1	Sandy Loam	10 YR 4/4	None Observed	Massive, gravally
104 – 108”	C2	Sandy Loam	10 YR 5/3	@ 106” – 7.5 YR 5/8 Common Low Chroma depletions Some	Massive-Friable, gravelly

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: None Weeping from Pit Face: 108”

Estimated Seasonal High Ground Water: @ 106” based on soil morphology

FORM 11 - SOIL EVALUATOR FORM
Page of

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 20-05 Date: 2020-05-12 Time: P.M. Weather 55° Sunny

Location (identify on site plan) see sketch

Land Use Lawn-Open Playground Slope (%) 3 Surface Stones None

Vegetation Mown grass lawn

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	NA	Feet	Drainageway	Int.Stream +200	Feet
Possible Wet Area	105	Feet	Property Line	See Site Plan	Feet
Drinking Water Well	NA	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 6”	Imported Topsoil	Sandy Loam (v.fine)	10 YR 3/3	-	-
6 – 17”	B	Sandy Loam	10 YR 5/4	@ 10” - 5 YR 5/8 Comm. @ 16” low chroma-Some Gray	Massive-Friable, some gravel
17 – 52”	C	Loamy Sand	10 YR 4/4	Same as above. ”	Massive-friable, gravelly

Parent Material (geologic) Ground moraine Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: 43” Weeping from Pit Face: 15”

Estimated Seasonal High Ground Water: @ 10” based on soil morphology

DEP APPROVED FORM - 12/07/95

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 20-06 Date: 2020-05-12 Time: A.M. Weather 55° Sunny

Location (identify on site plan) see sketch

Land Use Wooded Slope (%) 6 Surface Stones Some

Vegetation Trees and shrubs

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	NA	Feet	Drainageway	Int.Stream +200	Feet
Possible Wet Area	160	Feet	Property Line	See Site Plan	Feet
Drinking Water Well	NA	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 14”	Al	Sandy Loam	10 YR 3/4	-	-
14 – 22”	Bw	Sandy Loam	10 YR 5/6	None Observed	Massive-Friable, gravelly.
22 – 74”	C1	Loamy Sand	10 YR 5/4	None Observed	Massive, gravelly with some stones
74 – 90”	C2	Loamy Sand	10 YR 4/3	@ 74” - 7.5 YR 5/6 Common Low chroma depletions some	Massive-Friable, gravelly

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: 90 Weeping from Pit Face: 80”

Estimated Seasonal High Ground Water: @ 74” based on soil morphology

FORM 11 - SOIL EVALUATOR FORM
Page of

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 20-07 Date: 2020-05-12 Time: A.M. Weather 55º Sunny

Location (identify on site plan) see sketch

Land Use Long grass meadow Slope (%) 3-5 Surface Stones None

Vegetation Meadow grasses

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	NA	Feet	Drainageway	Int.Stream +200	Feet
Possible Wet Area	130	Feet	Property Line	See Site Plan	Feet
Drinking Water Well	NA	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 7”	Apl	Sandy Loam (fine)	10 YR 3/4	-	-
7 – 16”	Bw	Sandy Loam	10 YR 5/4	None Observed	Massive-Friable, Some gravelly.
16 – 116”	C	Sandy Loam	10 YR 5/3	None Observed	Massive, gravelly, with cobbles

Parent Material (geologic) Ground moraine Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: None Weeping from Pit Face:

Estimated Seasonal High Ground Water: Deeper than 116 inches

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 20-08 Date: 2020-05-13 Time: A.M. Weather 58° Sunny

Location (identify on site plan) see sketch

Land Use Lawn-Landscape Slope (%) 3-4 Surface Stones None

Vegetation Mown grass lawn

Landform Fill and graded over Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	NA	Feet	Drainageway	Int.Stream +200	Feet
Possible Wet Area	140	Feet	Property Line	See Site Plan	Feet
Drinking Water Well	NA	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 7”	Imported Topsoil	Sandy Loam (fine)	10 YR 3/3	-	-
7 – 27”	Fill	Sandy Loam	10 YR 4/4	None Observed	Massive-Friable, gravelly.
27 – 42”	B	Loamy Sand	10 YR 5/4	None Observed	Massive-Friable
42 – 120”	C	Loamy Sand	10 YR 4/3	None Observed”	Massive-Friable, very gravelly

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: None Weeping from Pit Face: None

Estimated Seasonal High Ground Water: Deeper than 120 inches

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 20-09 Date: 2020-05-13 Time: A.M. Weather 58° Sunny

Location (identify on site plan) see sketch

Land Use Lawn-Landscape Slope (%) 3-4 Surface Stones None

Vegetation Mown grass lawn

Landform Fill and graded over Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	NA	Feet	Drainageway	Int.Stream +200	Feet
Possible Wet Area	120	Feet	Property Line	See Site Plan	Feet
Drinking Water Well	NA	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 7”	Imported Topsoil	Sandy Loam (fine)	10 YR 3/3	-	-
7 – 40”	Fill	Sandy Loam	10 YR 4/4	None Observed	Massive-Friable, gravelly.
40 – 52”	B	Loamy Sand	10 YR 5/4	None Observed	Massive-Friable, some gravel
52 – 133”	C	Loamy Sand	10 YR 4/3	@ 125” - 10 YR 5/8” Common	Massive-Friable, very gravelly

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: 133 inches Weeping from Pit Face: 132 inches

Estimated Seasonal High Ground Water: 125 inches by morphology

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 20-10 Date: 2020-05-13 Time: A.M. Weather 58° Sunny

Location (identify on site plan) see sketch

Land Use Maintained Meadow Slope (%) 2 - 3 Surface Stones None

Vegetation Meadow Grass

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	300 (Pond)	Feet	Drainageway		Feet
Possible Wet Area	270	Feet	Property Line	See Site Plan	Feet
Drinking Water Well	NA	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 13”	A	Sandy Loam	10 YR 3/4	None Observed-	-
13 – 24”	B	Sandy Loam	10 YR 4/3	None Observed	Massive-Friable
24 – 60”	C1	Sandy Loam	10 YR 5/3	None Observed	Massive – Friable, some gravel
60 – 100”	C2	Sandy Loam (fine)	10 YR 5/1	@ 60” - 10 YR 5/6” Many	Massive-Friable

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: 92 inches Weeping from Pit Face: 78 Inches

Estimated Seasonal High Ground Water: @ 60” based on soil morphology

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ATTACHMENT 2

PERMEABILITY TEST RESULTS

Permeability Test @ TH 20-02

Date Performed: 12-May-20
Soil Horizon of Perm Test: C
Depth to water level = 39"
Depth to bottom of tube = 51"
Start Soak: 1:13 P.M.
Start Test: 1:28 P.M.

	Time Interval (Minutes)	Incremental Volume(L)
	5	1.000
	5	0.750
	3	0.500
	3	0.500
	3	0.500
	3	0.500
	3	0.500
	3	0.500
	3	0.500
	3	0.500
Cumulative Time/Volume	**34**	**5.750**

Q=Cumulative Volume cm^3 / Total time in seconds

Q= 2.819 cm^3/sec

Computation of Permeability(k)

k=Q / 5.5 r Hw=

k=coefficient of permeability (cm/sec)
r=inside radius of pipe in centimeters= 7.6 (6" DIA.)
Hw=applied head in centimeters= 28 cm (11 inches)
Q=Computed flow rate in CC/sec= 2.819 cm^3/sec

k=Q / 5.5 r Hw= 0.00241 cm/sec 3.413 IN/HR

Permeability Test @ TH 20-06

Date Performed: 12-May-20
Soil Horizon of Perm Test: C1
Depth to water level = 20"
Depth to bottom of tube = 32"
Start Soak: 11:33 A.M.
Start Test: 11:48 A.M.

	Time Interval (Minutes)	Incremental Volume(L)
	1	1.250
	1	1.250
	1	1.250
	1	1.000
	1	1.500
	1	1.000
	1	0.750
	1	1.250
	1	1.250
	1	1.000
Cumulative Time/Volume	**10**	**11.500**

Q=Cumulative Volume cm^3 / Total time in seconds

Q= 19.167 cm^3/sec

Computation of Permeability(k)

k=Q / 5.5 r Hw=

k=coefficient of permeability (cm/sec)
r=inside radius of pipe in centimeters= 7.6 (6" DIA.)
Hw=applied head in centimeters= 28 cm (11 inches)
Q=Computed flow rate in CC/sec= 19.167 cm^3/sec

k=Q / 5.5 r Hw= 0.01638 cm/sec 23.210 IN/HR

Permeability Test @ TH 20-07

Date Performed: 12-May-20
Soil Horizon of Perm Test: C
Depth to water level = 25"
Depth to bottom of tube = 37"
Start Soak: 9:00 A.M.
Start Test: 9:15 A.M.

	Time Interval (Minutes)	Incremental Volume(L)
	3	0.250
	3	0.250
	5	0.250
	5	0.250
	5	0.250
	5	0.250
	5	0.250
	5	0.250
	5	0.250
	5	0.250
Cumulative Time/Volume	**46**	**2.500**

Q=Cumulative Volume cm^3 / Total time in seconds

Q= 0.906 cm^3/sec

Computation of Permeability(k)

k=Q / 5.5 r Hw=

k=coefficient of permeability (cm/sec)
r=inside radius of pipe in centimeters= 7.6 (6" DIA.)
Hw=applied head in centimeters= 28 cm (11 inches)
Q=Computed flow rate in CC/sec= 0.906 cm^3/sec

k=Q / 5.5 r Hw= **0.00077 cm/sec** 1.097 IN/HR

Permeability Test @ TH 20-10

Date Performed: 13-May-20
Soil Horizon of Perm Test: C
Depth to water level = 35"
Depth to bottom of tube = 47"
Start Soak: 10:06 A.M.
Start Test: 10:21 A.M.

	Time Interval (Minutes)	Incremental Volume(L)
	3	0.500
	3	0.750
	3	0.500
	3	0.500
	3	0.750
	3	0.750
	3	0.750
	3	0.750
	3	0.750
	3	0.750
Cumulative Time/Volume	**30**	**6.750**

Q=Cumulative Volume cm^3 / Total time in seconds

Q= 3.750 cm^3/sec

Computation of Permeability(k)

k=Q / 5.5 r Hw=

k=coefficient of permeability (cm/sec)
r=inside radius of pipe in centimeters= 7.6 (6" DIA.)
Hw=applied head in centimeters= 28 cm (11 inches)
Q=Computed flow rate in CC/sec= 3.750 cm^3/sec

k=Q / 5.5 r Hw= 0.00320 cm/sec 4.541 IN/HR

ATTACHMENT #3

Summary Table of Test Pit Elevations

Test Pit Number	Surface Elevation	ESHGW Depth	ESHGW Elevation
TH 20-01	118.2	93 inches	110.5
TH 20-02	117.4	80 inches	110.7
TH 20-03	118.2	103 inches	109.6
TH 20-04	118.0	106 inches	109.2
TH 20-05	111.3	10 inches	110.5
TH 20-06	115.4	74 inches	109.2
TH 20-07	114.4	116 inches	104.7
TH 20-08	119.8	120 inches	109.8
TH 20-09	118.2	125 inches	107.8
TH 20-10	135.1	60 inches	130.1



AMESBURY ELEMENTARY SCHOOL

AMESBURY, MA

DINISCO DESIGN
architects + planners

99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2858

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-9600

Crabtree McGrath Assoc., Inc.
Food Service Consultants
161 West Main Street
Georgetown, MA 01833
(978) 352-8500

VAV International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 935-7228

Thompson Engineering Company, Inc.
Electrical Engineers
89 Newbury Street, Suite 103
Danvers, MA 01923
(617) 866-9066

EdVance Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01880
(978) 256-9900

KEY PLAN

NORTH ARROW

STAMP

Date: 23 DECEMBER 2019

Drawn By: KMR

Scale: 0 40 80

Revisions

Number	Date	Description
1	10 JUNE 2020	2020 TEST PITS ADDED

Soil Test Location Plan

G:\Carlson Jobs\25286\Dwg\25286 Eng Wp.dwg

ST-01

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DGT Associates
Surveying & Engineering

1071 Worcester Rd.
Framingham, MA 01701
508.879.0030
www.dgtassociates.com

January 16, 2020 Job: 25286

DiNisco Design
Attn: Vivian Low
99 Chauncy Street, Suite 901
Boston, MA 02111

RE: Charles C. Cashman Elementary School at 193 Lions Mouth Road, Amesbury

Dear Ms. Low:

This report contains the results of the on-site soil testing conducted by DGT Associates on November 26, 2019 and December 12, 2019 at the Charles C. Cashman Elementary School property in Amesbury, Massachusetts for the proposed New Amesbury Elementary School Project. The testing consisted of ten (10) deep test pits, and two (2) permeability test holes.

DGT had previously conducted soil testing at this property on November 14th and 29th of 2018. This testing was completed to provide supplemental information on the character of the soils at the site, estimated seasonal high groundwater table (ESHGWT) depths and to assess the suitability of the soils for stormwater management design purposes for the proposed project. Testing was performed by Massachusetts Licensed Soil Evaluator (Joseph A. Losanno, EIT) of DGT. The City of Amesbury Department of Public Works provided the excavation services on both days of testing.

According to the NRCS Soils Mapping, the soil in the area of testing are Leicester fine sandy loam and Charlton fine sandy loam. The testing generally confirmed this data except that depths to ESHGW were shallower than expected in the areas of Charlton series soils. Soil Report dated 12/14/19 contains all NRCS data.

Generally, throughout the area of testing, the soils observed consisted of an imported topsoil, over a loamy sand or fine sand fill, over a sandy loam substratum, over fractured / weathered ledge. For more detailed information, see the test logs contained in Attachment 1. The locations of the test pits, are included in the Soil Test Hole Location Plan in Attachment 3.

The ESHGWT was determined by the presence of redoximorphic features in conjunction with groundwater weeping / standing groundwater observed in test pits TH 18-05, 19-02, 19-03 and 19-07. Test pits 19-01 were determined to have variegated colors within the test pit (weeping groundwater was observed at TH 19-01 at 127"). No signs of redoximorphic features were observed within TH 19-05a, 19-05b, 19-05c and 19-06.

Refusal / Ledge (non-rip-able) was observed within TH 19-05a, 19-05b and 19-05c between 10 and 39 inches below grade. Refusal was also encountered in TH 19-06 at 96 inches below grade. Ledge encountered in all of the other test pits containing ledge was determined to be rip-able.

Two (2) permeability tests utilizing the US Army Corps of Engineers method "In-situ Permeability Testing in the Vadose Zone" were performed in the substratum of test pit 19-01 and 19-03 to help characterize the soils in certain strata at these locations (note: that these are not infiltration rates). The resulting permeability rates were 0.32 inches per hour and 1.68 inches per hour respectively. The tabulation of these tests are included in Attachment 2. These tests were in representative soil types at the site and confirm the soils are relatively permeable and suitable for infiltration purposes. Design infiltration rates will based on the RAWLS rates published in the Massachusetts Stormwater Handbook in coordination with our testing results.

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1071 Worcester Rd
Framingham, MA 01701
508.879.0030
www.dgtassociates.com

Soil samples were gathered from the site to run sieve analyses of the on-site material in order to confirm the field textural analysis. At this time DGT has not completed the sieve analyses due to mechanical issues with our in house test equipment. Therefore, some of the information contained in this report is subject to slight variation. An updated report will be supplied if any significant modifications to this report are required.

Please contact me if you have any questions regarding this report.

Sincerely,
DGT Associates

Joseph A. Losanno, EIT (SE 13870)
Project Engineer

Attachments:

1. Deep Hole Logs
2. Permeability Test Logs
3. Soil Test Hole Location Plan

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-01 Date: 11/26/19 Time: A.M. Weather 50° Sunny

Location (identify on site plan) see sketch

Land Use Wetland Buffer Area Slope (%) 3-8 Surface Stones None

Vegetation Tall Grass Field

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 10"	A	Sandy Loam (Fine)	10 YR 3/3	None Observed	Massive-Friable
10 – 108"	C_1	Sandy Loam	2.5 Y 4/3	Variegated Colors @ 32"	Massive-Firm with some Gravel
108 – 129"	C_2	Sandy Loam	10 YR 4/6	None Observed	Massive-Firm with rip-able ledge

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @129" Weeping from Pit Face: @ 127"

Estimated Seasonal High Ground Water: Inconclusive

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-02 Date: 11/26/19 Time: A.M. Weather 50° Sunny

Location (identify on site plan) see sketch

Land Use Wetland Buffer Area Slope (%) 3-8 Surface Stones None

Vegetation Tall Grass Field

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 15"	A	Sandy Loam (Fine)	10 YR 3/3	None Observed	Massive-Friable
15 – 86"	C_1	Sandy Loam	2.5 Y 4/3	>5% @ 24" Low Chroma 2.5 Y 6/3 High Chroma 10 YR 5/8	Massive-Firm with some Gravel
86 – 106"	C_2	Sandy Loam	10 YR 4/6		Massive-Firm with rip-able ledge

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 89" Weeping from Pit Face: @ 58"

Estimated Seasonal High Ground Water: @ 24" based on soil morphology

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-03 Date: 11/26/19 Time: A.M. Weather 50° Sunny

Location (identify on site plan) see sketch

Land Use Lawn Landscaping Slope (%) 3-8 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 7"	Imported Topsoil	Sandy Loam (Fine)	10 YR 4/3	-	-
7 – 24"	Fill	Loamy Sand	10 YR 5/4	-	Gravelly with some Cobbles and Stones, and weathered rock
24 – 34"	C_1	Fractured Ledge	-	>5% @ 32"	-
34 – 75"	C_2	Sandy Loam	10 YR 5/3	-	Massive-Friable, Gravelly with Cobbles and Stones

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 60" Weeping from Pit Face: @ 60"

Estimated Seasonal High Ground Water: @ 32" Based on soil morphology

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-04 Date: 11/26/19 Time: A.M. Weather 50° Sunny

Location (identify on site plan) see sketch

Land Use Baseball Field Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 13"	Imported Topsoil	Sandy Loam (Fine)	10 YR 4/3	-	-
13 – 39"	Fill	Sand (Fine)	2.5 Y 6/4	-	-
39 – 95"	C_1	Sandy Loam	10 YR 4/6	None Observed	Massive-Friable, Gravelly with Cobbles and Stones
95 – 129"	C_2	Sandy Loam	10 YR 4/6	Variegated mottles in ledge	Massive-Firm, with rip-able ledge

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-05a Date: 11/26/19 Time: P.M. Weather 50° Sunny

Location (identify on site plan) see sketch

Land Use Baseball Field Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 10"	Imported Topsoil	Sandy Loam (Fine)	10 YR 3/3	-	-
10"	R	Ledge	-	-	-

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: @ 10"

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-05b Date: 11/26/19 Time: P.M. Weather 50° Sunny

Location (identify on site plan) see sketch

Land Use Baseball Field Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 12"	Imported Topsoil	Sandy Loam (Fine)	10 YR 3/3	-	-
12 – 25"	C_1	Fractured Ledge	-	-	-
25"	R	Ledge / Refusal			

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: @ 25"

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-05c Date: 11/26/19 Time: P.M. Weather 50° Sunny

Location (identify on site plan) see sketch

Land Use Baseball Field Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 10"	Imported Topsoil	Sandy Loam (Fine)	10 YR 3/3	-	-
10 – 20"	Fill	Sand (Fine)	2.5 Y 6/4	-	-
20 – 39"	C_1	Fractured Ledge	-	-	80 – 90% Rock / Fractured Ledge
39"	R	Ledge / Refusal			

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: @ 39"

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-06 Date: 12/12/19 Time: A.M. Weather 30° Sunny

Location (identify on site plan) see sketch

Land Use Wetland Buffer Area Slope (%) 3-8 Surface Stones None

Vegetation Tall Grass Field

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 9"	A	Sandy Loam (Fine)	10 YR 3/3	None Observed	Massive-Friable
9 – 19"	B_w	Sandy Loam (Fine)	10 YR 4/6	None Observed	Massive-Friable, with wavy boundaries
19 – 96"	C	Sandy Loam	10 YR 5/3	None Observed	Massive-Firm, Very Gravelly with Stones, Cobbles, and lenses of Rip-able / Shattered Ledge (rip-able ledge starts at 48" below grade)
96"	R	Ledge			

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: @ 96"

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 19-07 Date: 12/12/19 Time: A.M. Weather 30° Sunny

Location (identify on site plan) see sketch

Land Use Wetland Buffer Area Slope (%) 3-8 Surface Stones None

Vegetation Tall Grass Field

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 22"	Imported Topsoil	Sandy Loam	10 YR 4/3	-	-
22 – 34"	A_b	Sandy Loam (Fine)	10 YR 3/3	None Observed	Massive-Friable
34 – 44"	B_{wb}	Sandy Loam (Fine)	10 YR 5/4	None Observed	Massive-Friable, Gravelly with some Stones
44 – 101"	C	Sandy Loam	10 YR 4/3	@ 47" Concentrations 7.5 YR 5/6 Depletions 5 Y 4/2	Massive-Friable, Very Gravelly with some Stones

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 80" Weeping from Pit Face: @ 51"

Estimated Seasonal High Ground Water: @ 47" based on soil morphology

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

On-site Soil Testing Review

Deep Hole Number TH 18-05 Date: 11/26/19 Time: A.M. Weather 50° Sunny

Location (identify on site plan) see sketch

Land Use Wetland Buffer Area Slope (%) 3-8 Surface Stones None

Vegetation Tall Grass Field

Landform Ground Moraine

Position on landscape (sketch on the back) see sketch

Distances from:

Open Water Body	See sketch	Feet	Drainageway	See sketch	Feet
Possible Wet Area	See sketch	Feet	Property Line	See sketch	Feet
Drinking Water Well	See sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 15"	A	Sandy Loam (Fine)	10 YR 3/3	-	Topsoil
15 – 90"	C_1	Sandy Loam	2.5 Y 4/3	>5% @ 20" Low Chroma 2.5 Y 6/3 High Chroma 10 YR 5/8	Massive-Firm with some Gravel
90 – 113"	C_2	Sandy Loam	10 YR 4/6		Massive-Firm with rip-able ledge

Parent Material (geologic) Course-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 111" Weeping from Pit Face: @ 47"

Estimated Seasonal High Ground Water: @ 20" based on soil morphology

Permeability Test @ TP 19-01

Date Performed: 26-Nov-19
Soil Horizon of Perm Test: C_1
Depth to water level = 47"
Depth to bottom of tube = 58"
Start Soak: 8:50 A.M.
Start Test: 9:05 A.M.

	Time Interval (Minutes)	Incremental Volume(L)
	12	0.250
	12	0.250
	24	0.250
	15	0.250
Cumulative Time/Volume	**63**	**1.000**

Q=Cumulative Volume cm^3 / Total time in seconds
Q= 0.265 cm^3/sec

Computation of Permeability(k)
k=Q / 5.5 r Hw=

k=coefficient of permeability (cm/sec)
r=inside radius of pipe in centimeters= 7.6 (6" DIA.)
Hw=applied head in centimeters= 28 cm (11 inches)
Q=Computed flow rate in CC/sec= 0.265 cm^3/sec

k=Q / 5.5 r Hw= 0.00023 cm/sec 0.320 IN/HR

Permeability Test @ TP 19-03

Date Performed: 26-Nov-19
Soil Horizon of Perm Test: C_2
Depth to water level = 35"
Depth to bottom of tube = 46"
Start Soak: 8:50 A.M.
Start Test: 9:05 A.M.

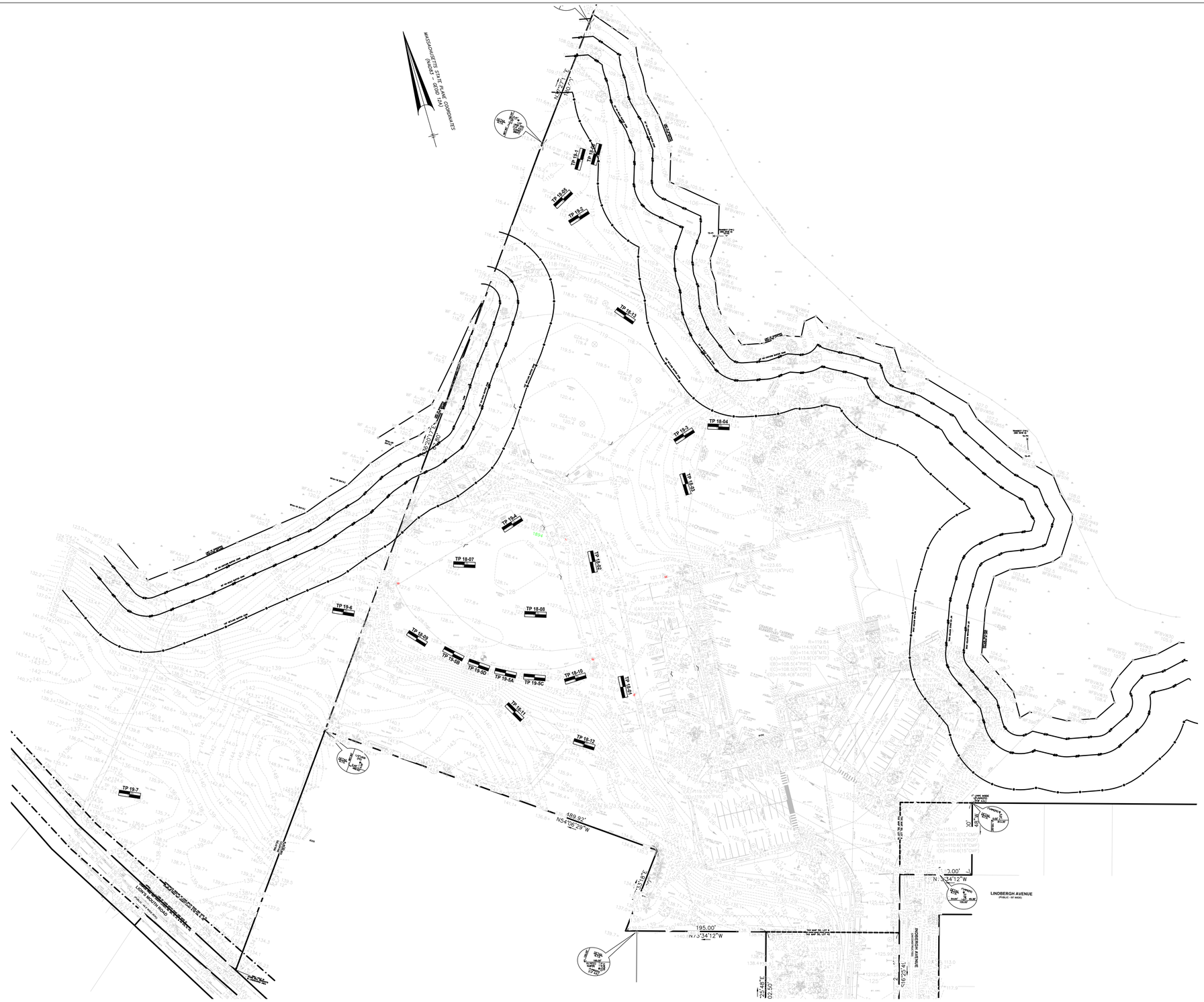
Time Interval (Minutes)	Incremental Volume(L)
3	0.250
3	0.250
3	0.250
3	0.250
3	0.250
3	0.250
3	0.250
3	0.250
3	0.250
3	0.250
Cumulative Time/Volume **30**	**2.500**

Q=Cumulative Volume cm^3 / Total time in seconds
Q= 1.389 cm^3/sec

Computation of Permeability(k)
k=Q / 5.5 r Hw=

k=coefficient of permeability (cm/sec)
r=inside radius of pipe in centimeters= 7.6 (6" DIA.)
Hw=applied head in centimeters= 28 cm (11 inches)
Q=Computed flow rate in CC/sec= 1.389 cm^3/sec

k=Q / 5.5 r Hw= 0.00119 cm/sec 1.682 IN/HR



Amesbury Elementary School

Amesbury Massachusetts

DINISCO DESIGN
architects + planners

99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2858

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030
FAX: (508) 879-1797

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

Foley Buhl Roberts & Assoc., Inc.
Structural Engineers
2150 Washington Street
Newton, MA 02462
(617) 527-9600
FAX: (617) 527-9606

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161 West Main Street
Georgetown, MA 01833
(978) 352-8500
FAX: (978) 352-8588

Thompson Engineering Company, Inc.
Electrical Engineers
10 City Square
Boston, MA 02129
(617) 866-9066
#Consultant #5 Fax

VAV International, Inc.
Mechanical Engineers
400 West Cummings Park S. 4700
Woburn, MA 01801
(781) 935-7228
FAX: (781) 935-1822

Hancock Associates
Surveyor
185 Centre Street
Danvers, MA 09123
(978) 777-3050
FAX: (978) 774-4532

EdVance Technology Design, Inc.
Technology Consultants
300 Brickstone Square, Suite 201
Andover, MA 01880
(978) 256-9900
FAX: (978) 560-1771

The Green Engineer, Inc.
Energy Consultants
54 Junction Square Drive
Concord, MA 01742
(978) 369-8978

NORTH ARROW

LICENSE STAMP

Date: 23 DECEMBER 2019

Drawn By: KMR

Scale: 0 50 100

Revisions

Number	Date	Description

Soil Test Location Plan

ST-01

© I:\Contract Jobs\ 2XX\96\ Dwg\ 2X096 Eng Rfp.dwg

DGT Associates
Surveying & Engineering

1071 Worcester Rd.
Framingham, MA 01701
508.879.0030
www.dgtassociates.com

December 14, 2018

Job: 25286

DiNisco Design
Attn: Angel Khazadian
99 Chauncy Street, Suite 901
Boston, MA 02111

RE: Charles C. Cashman Elementary School at 193 Lions Mouth Road, Amesbury

Dear Ms. Khazadian:

This report contains the results of the on-site soil testing conducted by DGT Associates on November 14, 2018 and November 29, 2018 at the Charles C. Cashman Elementary School property in Amesbury, Massachusetts. The testing consisted of eleven (11) deep test pits, one (1) hand dug test pit, and two (2) permeability test holes.

The purpose of the testing was to determine the character of the soils at the site, estimated seasonal high groundwater (ESHGW) depths and to assess the suitability of the soils for stormwater management design purposes for a proposed project. Testing was performed by Massachusetts Licensed Soil Evaluators (Fredrick W. King, P.E. and Joseph A. Losanno, EIT) of DGT. The Town of Amesbury Department of Public Works provided the excavation services on both days of testing.

According to the NRCS Soils Mapping, the soil in the area of testing are Leicester fine sandy loam and Charlton fine sandy loam. The testing generally confirmed this data except that depths to ESHGW were shallower than expected. Attachment 1 contains the NRCS Map for the site and descriptions of the soil types.

Generally throughout the area of testing the soils observed consisted of an imported topsoil, over a loamy sand or fine sand fill, over a sandy loam to fine sand substratum, over fractured / weathered ledge. For more detailed information see the test logs contained in Attachment 2. The locations of the test pits, are included in the Soil Test Hole Location Plan in Attachment 5.

Due to the abnormally high amount of precipitation that fell throughout the months of October and November, the high groundwater conditions observed at the site provided a good check on the ESHGW determinations. In some of the test holes, the observed groundwater weeping / standing groundwater elevation confirmed that observed redoximorphic soil features (mottles) were variegated when there were large differences between the observed elevation of mottles in relation to the weeping / standing groundwater. The ESHGWT was determined by observed weeping / standing groundwater between twenty-eight inches (28”) and seventy-six inches (76”) for test pits 18-07 through 18-10 and 18-13. The ESHGWT was determined by redoximorphic features observed between eight inches (8”) and twenty inches (20”) for test pits 18-02, 18-03 and 18-04. The ESHGWT was determined to be inconclusive or below the bottom of the test hole for TH 18-01, 18-11, and 18-12.

DGT Associates
Surveying & Engineering

1071 Worcester Rd.
Framingham, MA 01701
508.879.0030
www.dgtassociates.com

Two (2) permeability tests utilizing the US Army Corps of Engineers method "In-situ Permeability Testing in the Vadose Zone" were performed in the substratum of test pit 18-02 and the sand fill material in test pit 18-07. The resulting permeability rates were 5.5 inches per hour and 15.1 inches per hour respectively. The tabulation of these tests are included in Attachment 3. These tests were in representative soil types at the site and confirm the soils are relatively permeable and suitable for infiltration purposes.

Soil samples were gathered from the site to run sieve analyses of the on-site material in order to confirm the field textural analysis. These results will be used along with the permeability testing to determine design infiltration rates based on the RAWLS rates published in the Massachusetts Stormwater Handbook. For more detailed information, see the sieve analysis data and computation sheets with the particle size distribution graph in Attachment 4. Also see Figure 2.3.2: USDA, NRCS, 2007 National Soil Survey Handbook, Part 618, Exhibit 8 Comparison of Particle Size Scales for each test also contained in Attachment 4.

Please contact me if you have any questions regarding this report.

Sincerely,
DGT Associates

Joseph Losanno

Joseph A. Losanno, EIT (SE 13870)
Project Engineer

Attachments:

1. NRCS Soils Map and Information
2. Deep Hole Logs
3. Permeability Test Logs
4. Sieve Analyses Tables and Graphs
5. Soil Test Hole Location Plan
6. USGS Surficial Geology Map and Explanatory Text

25286

Attachment 1

NRCS Soils Map and Information

for

Charles C. Cashman Elementary School

193 Loins Mouth Road
Amesbury, Massachusetts 01913



Map Scale: 1:3,930 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Essex County, Massachusetts, Northern Part
Survey Area Data: Version 14, Sep 7, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Sep 12, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
67A	Leicester fine sandy loam, 0 to 3 percent slopes	5.3	19.5%
405B	Charlton fine sandy loam, 3 to 8 percent slopes	17.0	61.8%
405C	Charlton fine sandy loam, 8 to 15 percent slopes	5.1	18.7%
Totals for Area of Interest		**27.5**	**100.0%**

Essex County, Massachusetts, Northern Part

67A—Leicester fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: vjh4
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Leicester and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Leicester

Setting

Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Friable coarse-loamy eolian deposits over friable coarse-loamy basal till derived from granite and gneiss

Typical profile

O - 0 to 3 inches: muck
H2 - 3 to 8 inches: fine sandy loam
H3 - 8 to 31 inches: fine sandy loam
H4 - 31 to 60 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Hydric soil rating: Yes

Minor Components

Whitman

Percent of map unit: 8 percent
Landform: Depressions
Hydric soil rating: Yes

Woodbridge

Percent of map unit: 7 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Essex County, Massachusetts, Northern Part
Survey Area Data: Version 14, Sep 7, 2018

Essex County, Massachusetts, Northern Part

405B—Charlton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2wh0n
Elevation: 0 to 1,440 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Charlton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting

Landform: Hills, ground moraines, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw - 7 to 22 inches: gravelly fine sandy loam
C - 22 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Sutton

Percent of map unit: 8 percent
Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Paxton

Percent of map unit: 5 percent
Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Leicester

Percent of map unit: 1 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Chatfield

Percent of map unit: 1 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Data Source Information

Soil Survey Area: Essex County, Massachusetts, Northern Part
Survey Area Data: Version 14, Sep 7, 2018

Essex County, Massachusetts, Northern Part

405C—Charlton fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2wh0q
Elevation: 0 to 1,440 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Charlton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting

Landform: Ridges, hills, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw - 7 to 22 inches: gravelly fine sandy loam
C - 22 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Sutton, fine sandy loam

Percent of map unit: 5 percent
Landform: Ground moraines, hills, ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Paxton

Percent of map unit: 5 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Chatfield

Percent of map unit: 3 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Canton

Percent of map unit: 2 percent
Landform: Ground moraines, ridges, hills
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Side slope, nose slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Data Source Information

Soil Survey Area: Essex County, Massachusetts, Northern Part
Survey Area Data: Version 14, Sep 7, 2018

25286

Attachment 2

Deep Test Hole Logs

for

Charles C. Cashman Elementary School

193 Loins Mouth Road
Amesbury, Massachusetts 01913

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-01 Date: 11/14/2018 Time: A.M. Weather 30°, sunny

Location (identify on site plan) see attached sketch

Land Use Playground Area Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body see sketch Feet Drainageway see sketch Feet

Possible Wet Area see sketch Feet Property Line see sketch Feet

Drinking Water Well see sketch Feet Other

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 10”	Imported Topsoil	Silt Loam	10 YR 3/3	None Observed	Massive-Friable
10 – 60”	C	Sandy Loam	2.5 Y 5/4	Some @ 15”	Massive-Friable, w/ gravel and weathered rock (30-40%)

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive – difficult to determine

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-02 Date: 11/14/2018 Time: A.M. Weather 30°, sunny

Location (identify on site plan) see attached sketch

Land Use Playground Area Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 8”	Imported Topsoil	Silt Loam	10 YR 3/3	None Observed	Massive-Friable
8 – 20”	Fill	Loamy Sand (Fine)	10 YR 4/4	None Observed	Massive-Friable, w/ gravel
20 – 60”	C	Sandy Loam	2.5 Y 5/4	> 5% @ 20” Concentrations: 7.5 YR 4/6 Depletions: 5 Y 4/1	Massive-Friable, w/ gravel and weathered rock (10%)

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 57” Weeping from Pit Face: @ 49”

Estimated Seasonal High Ground Water: @ 20” based on soil morphology & weathered rock

Note: Fill material observed appears to be the same material as the natural substratum. Based on knowledge of the development of the site, it is assumed that the material removed for the leveling of the baseball field was placed above the natural substratum and then covered by the imported topsoil observed.

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-03 Date: 11/14/2018 Time: A.M. Weather 30°, sunny

Location (identify on site plan) see attached sketch

Land Use Playground Area Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 6”	Imported Topsoil	Silt Loam	10 YR 3/3	None Observed	Massive-Friable
6 – 56”	C	Sand (Fine)	2.5 Y 4/4	> 5% @ 8” Concentrations: 7.5 YR 4/6 Depletions: 5 Y 4/1	Massive-Friable, w/ gravel

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 53” Weeping from Pit Face: @ 12”

Estimated Seasonal High Ground Water: @ 8” based on soil morphology

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-04 Date: 11/14/2018 Time: A.M. Weather 30°, sunny

Location (identify on site plan) see attached sketch

Land Use Playground Area Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 6”	Imported Topsoil	Silt Loam	10 YR 3/3	None Observed	Massive-Friable
6 – 55”	C	Loamy Sand (Fine)	2.5 Y 4/4	> 5% @ 8” Concentrations: 7.5 YR 4/6 Depletions: 5 Y 4/1	Massive-Friable, w/ gravel

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 33” Weeping from Pit Face: @ 11”

Estimated Seasonal High Ground Water: @ 8” based on soil morphology

Note: Test Hole was extremely saturated. Soil Samples were taken to run a sieve analysis to confirm texture observed in field.

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-06 Date: 11/14/2018 Time: A.M. Weather 30°, sunny

Location (identify on site plan) see attached sketch

Land Use Wetland Buffer Area Slope (%) 0-3 Surface Stones None

Vegetation Tall Grass Field

Landform Drainageway

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 5”	A	Sandy Loam (Fine)	-	None Observed	Massive-Friable
5 – 30”	C	Loamy Sand (Fine)	10 YR 5/3	None Observed	Massive-Friable

Parent Material (geologic) Friable coarse-loamy Eolian deposits over friable coarse-loamy basal till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive: Deeper than 30 inches.

Note: Test Hole was hand dug. Further testing will be required prior to design.

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-07 Date: 11/29/2018 Time: A.M. Weather 40°, sunny

Location (identify on site plan) see attached sketch

Land Use Baseball Field Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 7”	Imported Topsoil	Sandy Loam (Fine)	10 YR 4/2	None Observed	Massive-Friable
7 – 32”	Fill	Sand (Fine)	2.5 Y 5/4	Some @ 19”	Loose-Single Grained, trace silt
32 – 66”	C	Sandy Loam	2.5 Y 4/3		Massive-Friable, very gravelly, w/ stones, cobbles, and fractured rock
66”	R	Fractured Ledge			

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: @ 66” (fractured)

Depth to Groundwater: Standing Water in the Hole: @ 62” Weeping from Pit Face: @ 56”

Estimated Seasonal High Ground Water: @ 56” based on weeping / standing groundwater observed during high groundwater

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-08 Date: 11/29/2018 Time: A.M. Weather 40°, sunny

Location (identify on site plan) see attached sketch

Land Use Baseball Field Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body see sketch Feet Drainageway see sketch Feet

Possible Wet Area see sketch Feet Property Line see sketch Feet

Drinking Water Well see sketch Feet Other

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 12”	Imported Topsoil	Sandy Loam (Fine)	10 YR 4/2	None Observed	Massive-Friable
12 – 34”	Fill	Sand (Fine)	2.5 Y 5/4	Some @ 19”	Loose-Single Grained, trace silt
34 – 78”	C	Sandy Loam	2.5 Y 4/3		Massive-Friable, very gravelly, w/ stones, cobbles, and fractured rock
78”	R	Fractured Ledge			

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: @ 78” (fractured)

Depth to Groundwater: Standing Water in the Hole: @ 75” Weeping from Pit Face: @ 64”

Estimated Seasonal High Ground Water: @ 64” based on weeping / standing groundwater observed during high groundwater

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-09 Date: 11/29/2018 Time: A.M. Weather 40°, sunny

Location (identify on site plan) see attached sketch

Land Use Grass Lawn Landscaping Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 9”	Imported Topsoil	Sandy Loam (Fine)	10 YR 4/2	None Observed	Massive-Friable
9 – 18”	Fill	Sand (Fine)	2.5 Y 5/4	Some @ 11”	Loose-Single Grained, trace silt
18 – 32”	R	Fractured Ledge			

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: @ 18” (fractured)

Depth to Groundwater: Standing Water in the Hole: @28” Weeping from Pit Face: @ 28”

Estimated Seasonal High Ground Water: @ 28” based on weeping / standing groundwater observed during high groundwater

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-10 Date: 11/29/2018 Time: A.M. Weather 40°, sunny

Location (identify on site plan) see attached sketch

Land Use Grass Lawn Landscaping Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 8”	Imported Topsoil	Sandy Loam (Fine)	10 YR 4/2	None Observed	Massive-Friable
8 – 22”	Fill	Sand (Fine)	2.5 Y 5/4	Some @ 16”	Loose-Single Grained, trace silt
22 – 90”	C	Sandy Loam	2.5 Y 4/3		Massive-Friable, very gravelly, w/ stones, cobbles, and fractured rock

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 76” Weeping from Pit Face: @ 70”

Estimated Seasonal High Ground Water: @ 70” based on weeping / standing groundwater observed during high groundwater

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-11 Date: 11/29/2018 Time: A.M. Weather 40°, sunny

Location (identify on site plan) see attached sketch

Land Use Grass Lawn Landscaping Slope (%) 10-15 Surface Stones None

Vegetation Grass Lawn

Landform Side Slope of Hill

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body see sketch Feet Drainageway see sketch Feet

Possible Wet Area see sketch Feet Property Line see sketch Feet

Drinking Water Well see sketch Feet Other

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 8”	Imported Topsoil	Sandy Loam (Fine)	10 YR 4/2	None Observed	Massive-Friable
8 – 90”	C	Loamy Sand	2.5 Y 4/3	None Observed	Massive-Friable, very gravelly, w/ stones, cobbles, and fractured rock
90”	R	Fractured Ledge			

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: @ 90” (fractured)

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-12 Date: 11/29/2018 Time: A.M. Weather 40°, sunny

Location (identify on site plan) see attached sketch

Land Use Grass Lawn Landscaping Slope (%) 10-15 Surface Stones None

Vegetation Grass Lawn

Landform Side Slope of Hill

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 8”	Imported Topsoil	Sandy Loam (Fine)	10 YR 4/2	None Observed	Massive-Friable
8 – 96”	C	Loamy Sand	2.5 Y 4/3	Spot mottles from 16” – 27” (inconsistent)	Massive-Friable, very gravelly, w/ stones, cobbles, and fractured rock
96”	R	Fractured Ledge			

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: @ 96” (fractured)

Depth to Groundwater: Standing Water in the Hole: None Observed Weeping from Pit Face: None Observed

Estimated Seasonal High Ground Water: Inconclusive

Location Address or Lot No. 193 Lions Mouth Road, Amesbury, MA 01913 – Charles C. Cashman Elementary School

TEST HOLE LOG

Soil Evaluator: Joe Losanno

Deep Hole Number 18-13 Date: 11/29/2018 Time: A.M. Weather 40°, sunny

Location (identify on site plan) see attached sketch

Land Use Grass Lawn Landscaping Slope (%) 0-3 Surface Stones None

Vegetation Grass Lawn

Landform Ground Moraine

Position on landscape (sketch on the back) Bottom Slope

Distances from:

Open Water Body	see sketch	Feet	Drainageway	see sketch	Feet
Possible Wet Area	see sketch	Feet	Property Line	see sketch	Feet
Drinking Water Well	see sketch	Feet	Other		

DEEP OBSERVATION HOLE LOG

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 8”	Imported Topsoil	Sandy Loam (Fine)	10 YR 3/2	None Observed	Massive-Friable
8 – 50”	Fill	Sandy Loam	2.5 Y 4/3	Spot mottles from 14” – 36” (inconsistent)	Massive-Friable, very gravelly, w/ stones, cobbles, and fractured rock w/ <5% bricks

Parent Material (geologic) Coarse-loamy melt-out till Depth to Bedrock: None Observed

Depth to Groundwater: Standing Water in the Hole: @ 44” Weeping from Pit Face: @ 44”

Estimated Seasonal High Ground Water: @ 44” based on weeping / standing groundwater observed during high groundwater

25286

Attachment 3

Permeability Test Logs

for

Charles C. Cashman Elementary School

193 Loins Mouth Road
Amesbury, Massachusetts 01913

Permeability Test @ TP 18-02

Date Performed: 14-Nov-18
Soil Horizon of Perm Test: C
Depth to water level = 22"
Depth to bottom of tube = 33"
Start Soak: 10:47 A.M.
Start Test: 11:02 A.M.

	Time Interval (Minutes)	Incremental Volume(L)
	2	0.750
	2	0.750
	2	0.500
	2	0.500
	2	0.500
	2	0.500
	2	0.500
	2	0.500
	2	0.500
	2	0.500
Cumulative Time/Volume	**20**	**5.500**

Q=Cumulative Volume cm^3 / Total time in seconds

Q= 4.583 cm^3/sec

Computation of Permeability(k)

k=Q / 5.5 r Hw=

k=coefficient of permeability (cm/sec)
r=inside radius of pipe in centimeters= 7.6 (6" DIA.)
Hw=applied head in centimeters= 28 cm (11 inches)
Q=Computed flow rate in CC/sec= 4.583 cm^3/sec

k=Q / 5.5 r Hw= 0.00392 cm/sec 5.550 IN/HR

Permeability Test @ TP 18-07

Date Performed: 29-Nov-18
Soil Horizon of Perm Test: Fill (Sand)
Depth to water level = 0"
Depth to bottom of tube = 11"
Start Soak: 11:00 A.M.
Start Test: 11:15 A.M.

	Time Interval (Minutes)	Incremental Volume(L)
	2	1.500
	1	0.750
	1	0.750
	1	0.750
	1	0.750
	1	0.750
	1	0.750
	1	0.750
	1	0.750
	1	0.750
Cumulative Time/Volume	**11**	**8.250**

Q=Cumulative Volume cm^3 / Total time in seconds

Q= 12.500 cm^3/sec

Computation of Permeability(k)

k=Q / 5.5 r Hw=

k=coefficient of permeability (cm/sec)
r=inside radius of pipe in centimeters= 7.6 (6" DIA.)
Hw=applied head in centimeters= 28 cm (11 inches)
Q=Computed flow rate in CC/sec= 12.500 cm^3/sec

k=Q / 5.5 r Hw= 0.01068 cm/sec 15.137 IN/HR

25286

Attachment 4

Sieve Analysis Tables and Graphs

for

Charles C. Cashman Elementary School

193 Loins Mouth Road
Amesbury, Massachusetts 01913

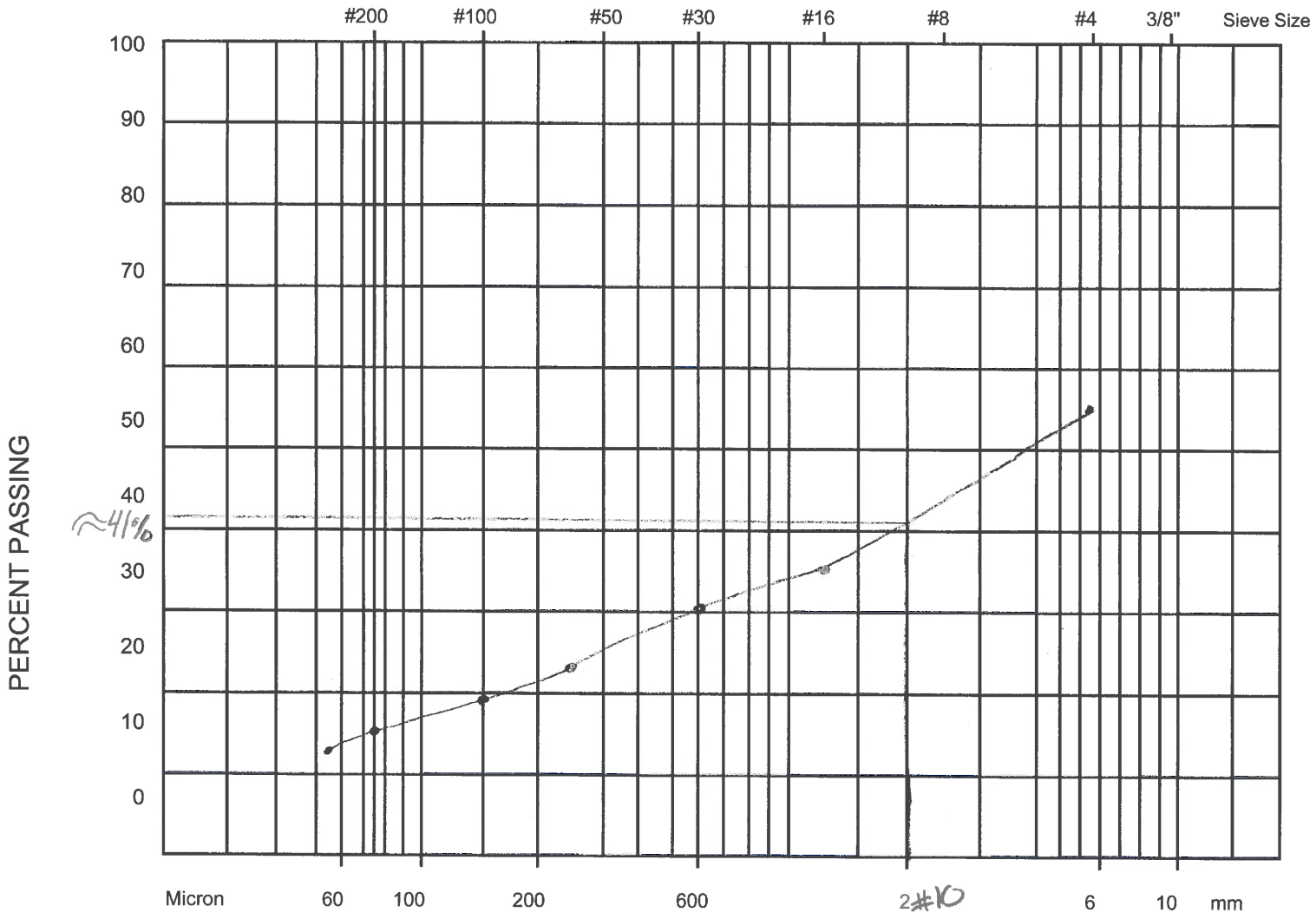
DATE: 12/10/2018 JOB NO: 25286
CLIENT: DiNisco Design
SITE: Charles C. Cashman Elementary School - 193 Lions Mouth Road, Amesbury, MA 01913

SIEVE ANALYSIS DATA AND COMPUTATION SHEET

SAMPLE NO: Sample # 1 DATE SAMPLE TAKEN: 11/14/2018
DESCRIPTION: TH 18-01 C_1
TEST SAMPLE WEIGHT (gm)= 1427.7

Sieve No.	Sieve Weight (gm)	Sieve & Soil Weight (gm)	Soil Weight Retained (gm)	Percent Passing	Percent Retained
4	515.2	1152.8	637.6	55.3	44.7
16	446.4	710.7	264.3	36.8	18.5
30	394.1	486.7	92.6	30.3	6.5
60	347.2	446.7	99.5	23.4	7.0
100	349.9	401.6	51.7	19.8	3.6
200	517.2	577.0	59.8	15.6	4.2
270	339.7	380.4	40.7	12.7	2.9
PAN	480.4	661.9	181.5	0.0	12.7
		TOTAL	1427.7		

PARTICLE SIZE DISTRIBUTION



CLIENT:	DiNisco Design	**SITE:**	Charles C. Cashman Elementary School - Amesbury
JOB NO.	25286	**SAMPLE:**	Sample #1 18-01 (C-Layer)
DATE:	12/10/18	Limits of specification	----------

DGT Associates
Surveying & Engineering

TH 18-01 (C1-Layer)
69.0% Sand 1.6% Clay
29.4% Silt

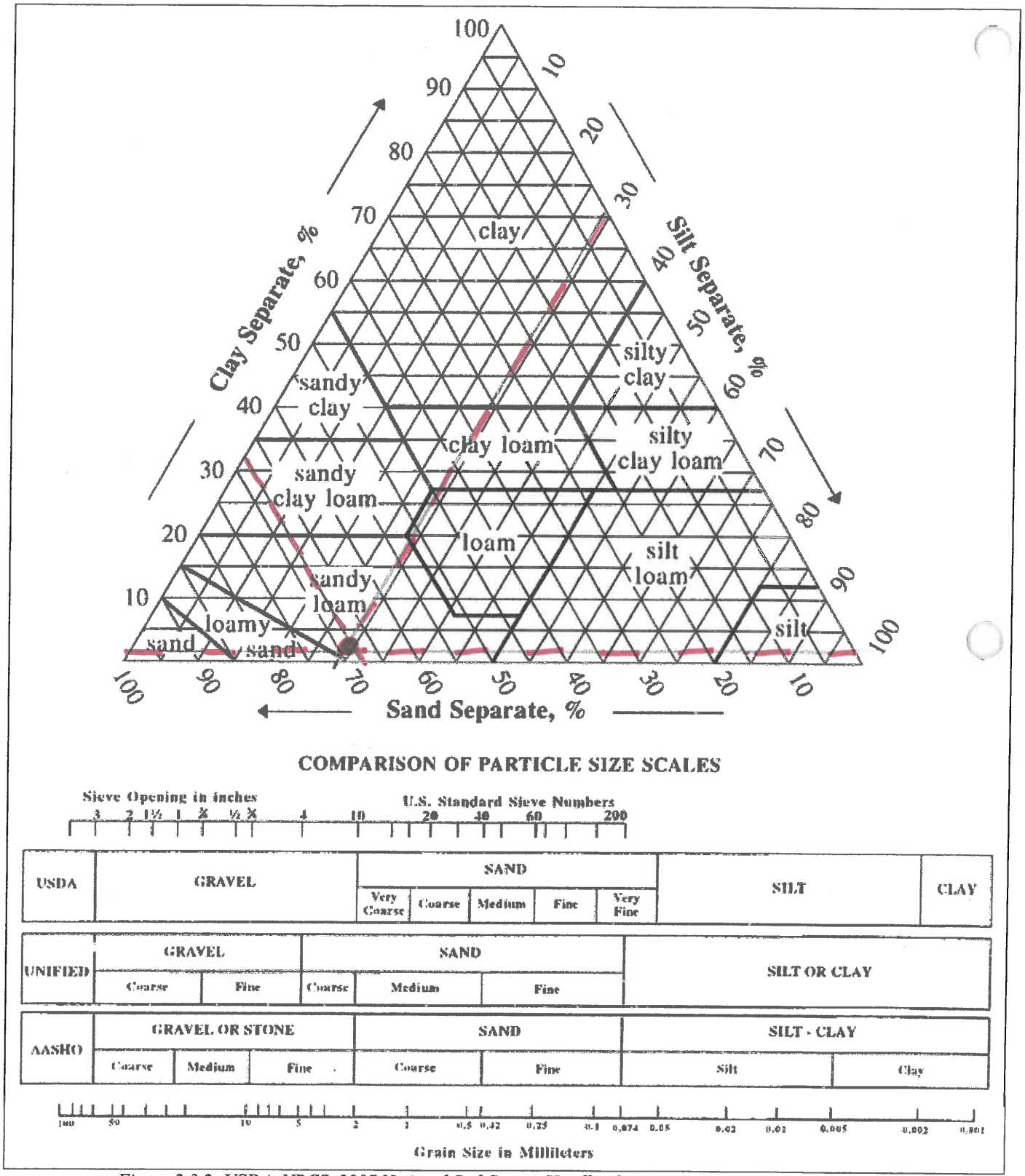


Figure 2.3.2: USDA, NRCS, 2007 National Soil Survey Handbook, Part 618, Exhibit 8, http://soils.usda.gov/technical/handbook/contents/part618ex.html#ex8

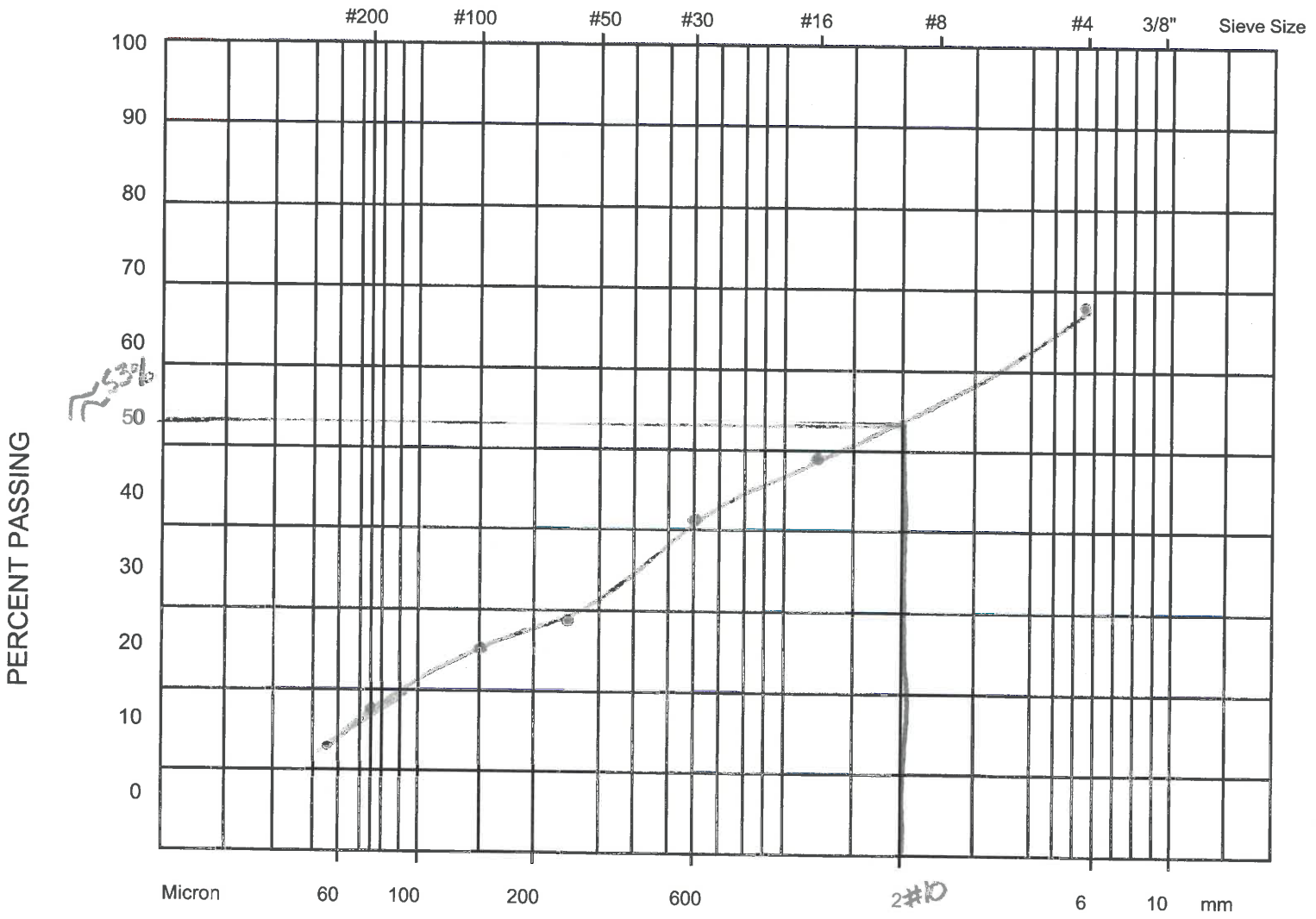
DATE: 12/10/2018 JOB NO: 25286
CLIENT: DiNisco Design
SITE: Charles C. Cashman Elementary School - 193 Lions Mouth Road, Amesbury, MA 01913

SIEVE ANALYSIS DATA AND COMPUTATION SHEET

SAMPLE NO: Sample # 1 DATE SAMPLE TAKEN: 11/14/2018
DESCRIPTION: TH 18-02 B/Fill
TEST SAMPLE WEIGHT (gm)= 1214.1

Sieve No.	Sieve Weight (gm)	Sieve & Soil Weight (gm)	Soil Weight Retained (gm)	Percent Passing	Percent Retained
4	515.2	896.8	381.6	68.6	31.4
16	446.2	678.9	232.7	49.4	19.2
30	394.1	498.8	104.7	40.8	8.6
60	347.1	480.7	133.6	29.8	11.0
100	349.8	410.4	60.6	24.8	5.0
200	517.1	596.6	79.5	18.2	6.5
270	339.5	396.1	56.6	13.6	4.7
PAN	480.4	645.2	164.8	0.0	13.6
		TOTAL	1214.1		

PARTICLE SIZE DISTRIBUTION



CLIENT:	DiNisco Design	**SITE:**	Charles C. Cashman Elementary School - Amesbury
JOB NO.	25286	**SAMPLE:**	Sample #1 TH 18-02 (B1F11-Layer)
DATE:	12/10/18	Limits of specification	----------

DGT Associates
Surveying & Engineering

TH 18-02 (B/Fill-Layer)
74.3% Sand 1.3% Clay
24.4% Silt

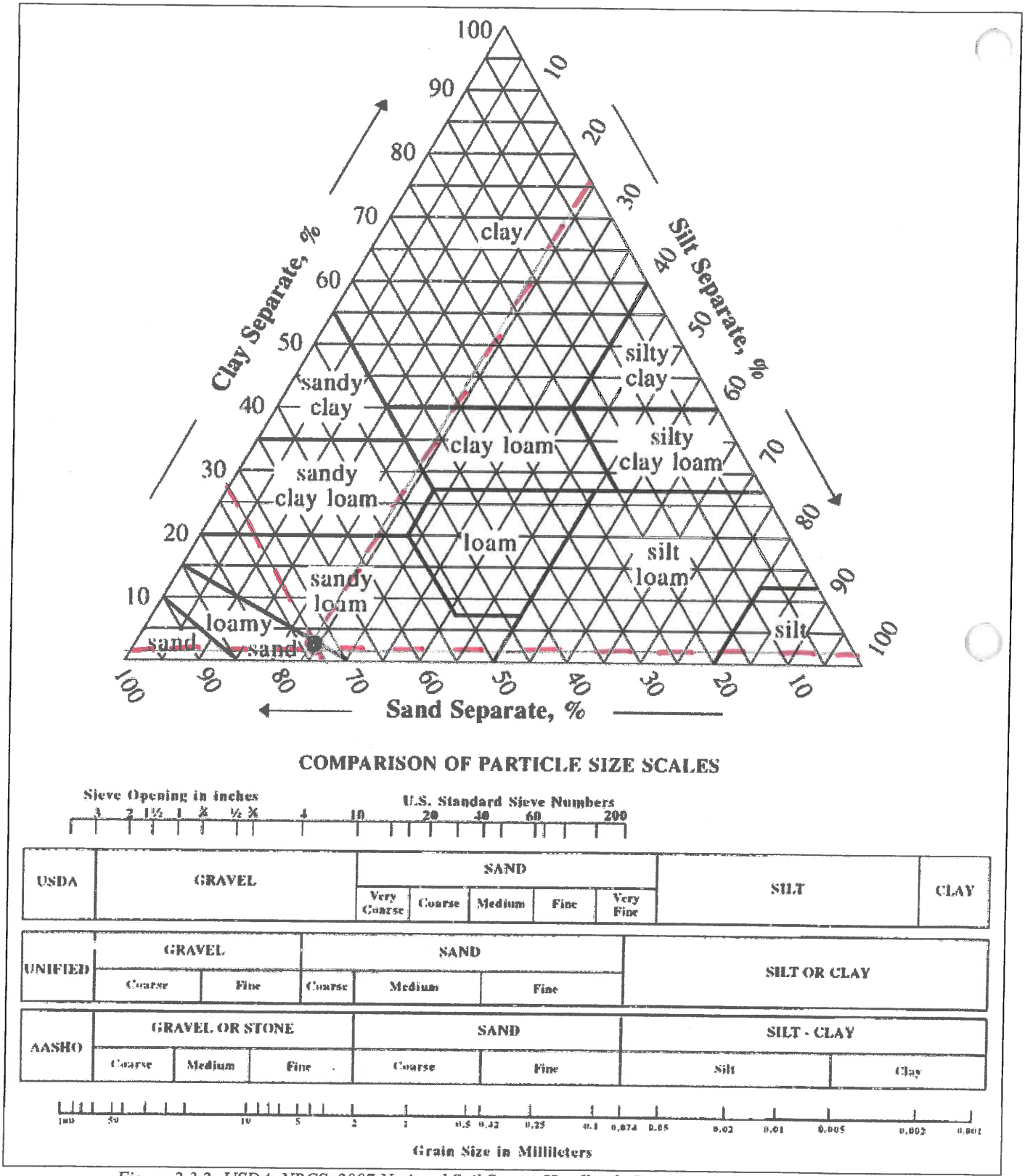


Figure 2.3.2: USDA, NRCS, 2007 National Soil Survey Handbook, Part 618, Exhibit 8, http://soils.usda.gov/technical/handbook/contents/part618ex.html#ex8

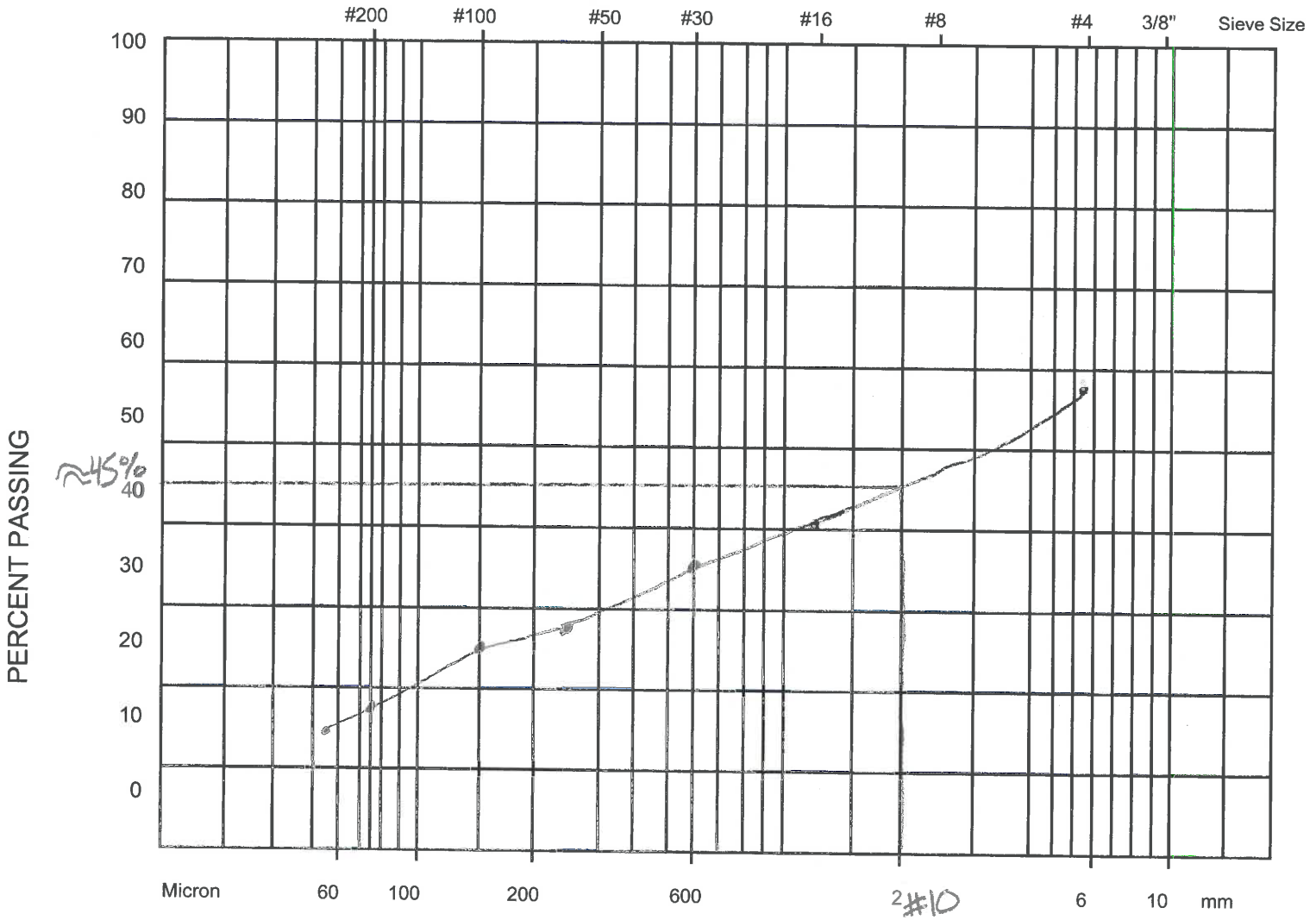
DATE: 12/10/2018 JOB NO: 25286
CLIENT: DiNisco Design
SITE: Charles C. Cashman Elementary School - 193 Lions Mouth Road, Amesbury, MA 01913

SIEVE ANALYSIS DATA AND COMPUTATION SHEET

SAMPLE NO: Sample # 1 DATE SAMPLE TAKEN: 11/14/2018
DESCRIPTION: TH 18-02 C_1
TEST SAMPLE WEIGHT (gm)= 1156.9

Sieve No.	Sieve Weight (gm)	Sieve & Soil Weight (gm)	Soil Weight Retained (gm)	Percent Passing	Percent Retained
4	515.3	997.9	482.6	58.3	41.7
16	446.4	651.8	205.4	40.5	17.8
30	394.2	459.3	65.1	34.9	5.6
60	347.2	421.0	73.8	28.5	6.4
100	349.9	395.5	45.6	24.6	3.9
200	517.2	590.8	73.6	18.2	6.4
270	339.7	385.5	45.8	14.3	4.0
PAN	480.4	645.4	165.0	0.0	14.3
		TOTAL	1156.9		

PARTICLE SIZE DISTRIBUTION



CLIENT:	D.Nisco Design	**SITE:**	Charles C. Cashman Elementary School - Amesbury
JOB NO.	25286	**SAMPLE:**	Sample #1 TH 18-02 (C-Layer)
DATE:	12/10/18	Limits of specification	----------

DGT Associates
Surveying & Engineering

TH18-02C (C Layer)
68.2% Sand 1.6% Clay
30.2% Silt

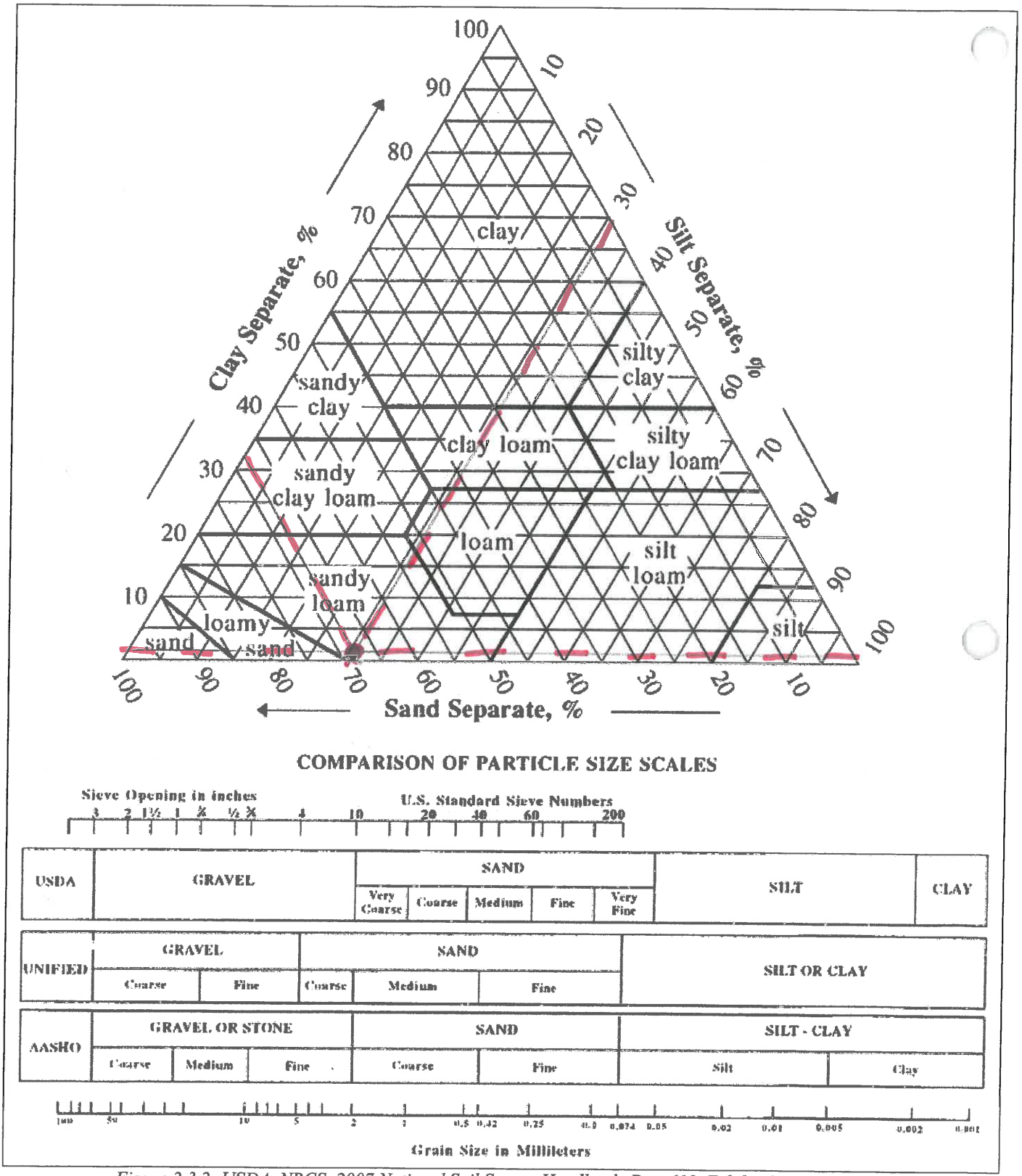


Figure 2.3.2: USDA, NRCS, 2007 National Soil Survey Handbook, Part 618, Exhibit 8, http://soils.usda.gov/technical/handbook/contents/part618ex.html#ex8

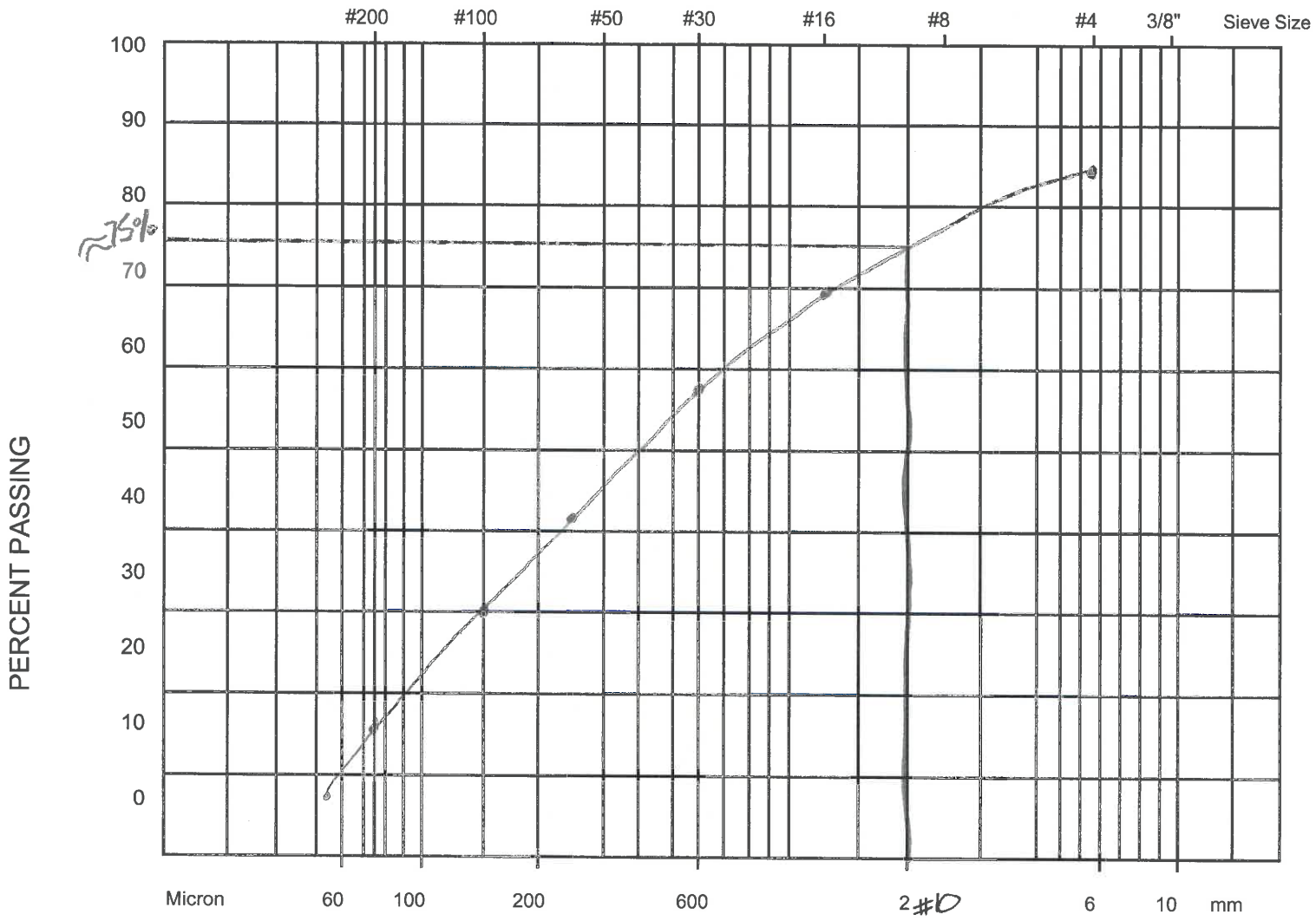
DATE: 12/11/2018 JOB NO: 25286
CLIENT: DiNisco Design
SITE: Charles C. Cashman Elementary School - 193 Lions Mouth Road, Amesbury, MA 01913

SIEVE ANALYSIS DATA AND COMPUTATION SHEET

SAMPLE NO: Sample # 1 DATE SAMPLE TAKEN: 11/14/2018
DESCRIPTION: TH 18-03 C
TEST SAMPLE WEIGHT (gm)= 1714.9

Sieve No.	Sieve Weight (gm)	Sieve & Soil Weight (gm)	Soil Weight Retained (gm)	Percent Passing	Percent Retained
4	515.2	789.7	274.5	84.0	16.0
16	446.2	690.4	244.2	69.8	14.2
30	394.0	590.3	196.3	58.3	11.4
60	347.2	639.5	292.3	41.3	17.0
100	349.8	540.4	190.6	30.1	11.1
200	517.5	752.5	235.0	16.4	13.7
270	339.6	486.3	146.7	7.9	8.6
PAN	480.4	615.7	135.3	0.0	7.9
		TOTAL	1714.9		

PARTICLE SIZE DISTRIBUTION



CLIENT: DiNisco Design

JOB NO. 25286

DATE: 12/11/18

SITE: Charles C. Cashman Elementary School - Amesbury

SAMPLE: Sample #1
TH 18-03 (C-Layer)

Limits of specification ----------

DGT Associates
Surveying & Engineering

TH 18-03 (C-Layer)
89.5% Sand 0.5% Clay
10.0% Silt

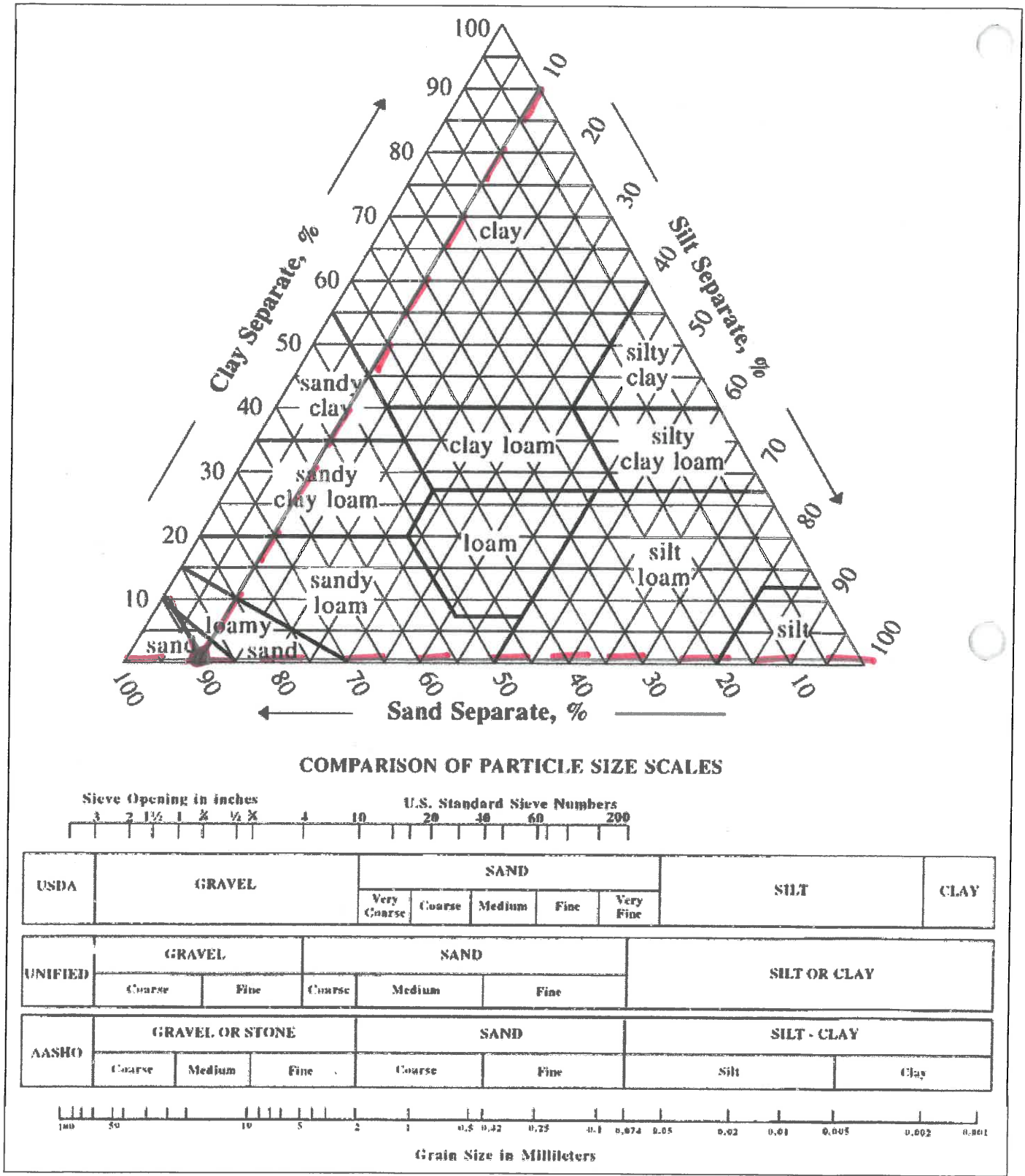


Figure 2.3.2: USDA, NRCS, 2007 National Soil Survey Handbook, Part 618, Exhibit 8, http://soils.usda.gov/technical/handbook/contents/part618ex.html#ex8

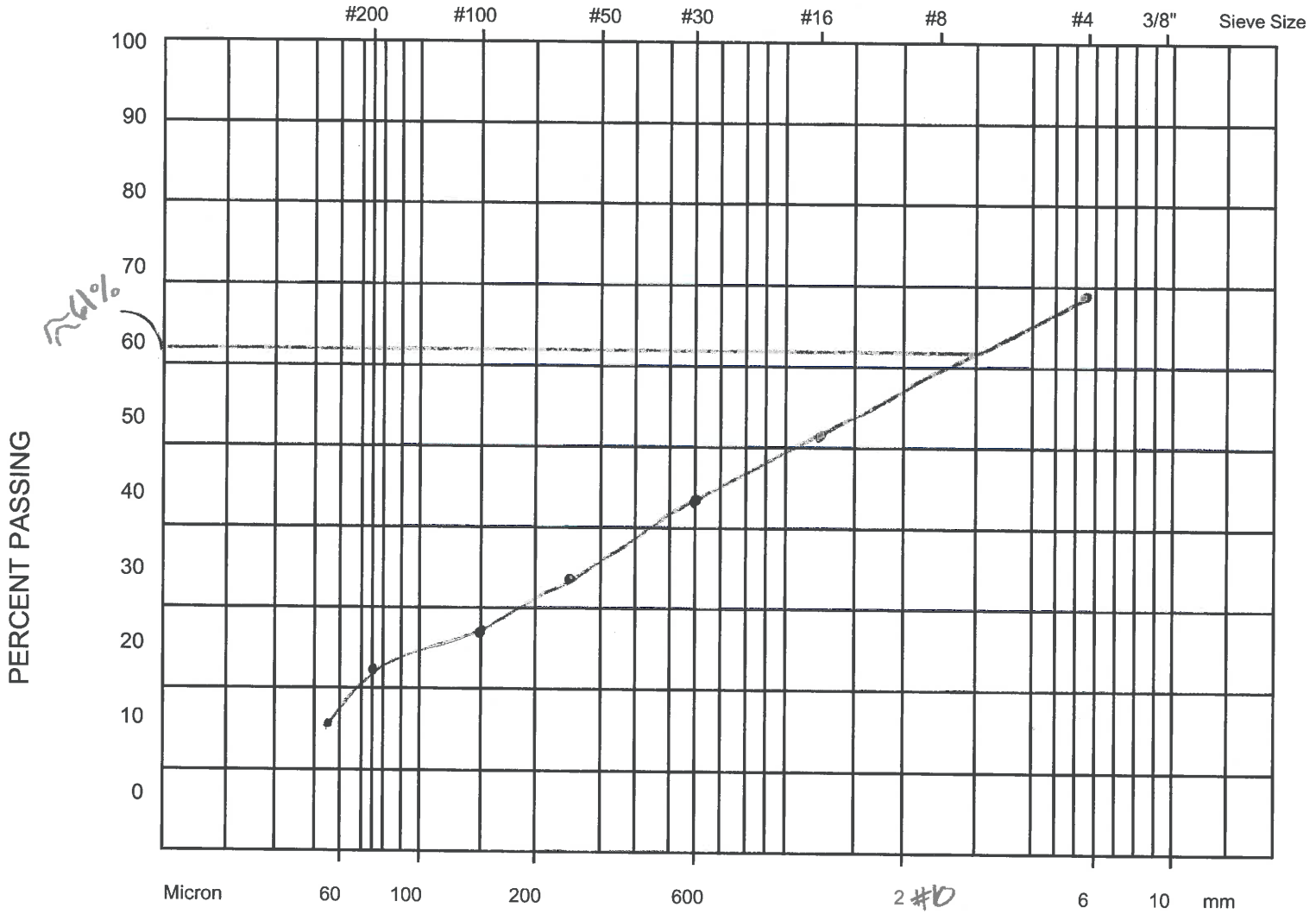
DATE: 12/14/2018 JOB NO: 25286
CLIENT: DiNisco Design
SITE: Charles C. Cashman Elementary School - 193 Lions Mouth Road, Amesbury, MA 01913

SIEVE ANALYSIS DATA AND COMPUTATION SHEET

SAMPLE NO: Sample # 1 DATE SAMPLE TAKEN: 11/14/2018
DESCRIPTION: TH 18-04 C
TEST SAMPLE WEIGHT (gm)= 1163.1

Sieve No.	Sieve Weight (gm)	Sieve & Soil Weight (gm)	Soil Weight Retained (gm)	Percent Passing	Percent Retained
4	515.1	874.9	359.8	69.1	30.9
16	446.1	657.6	211.5	50.9	18.2
30	394.1	486.0	91.9	43.0	7.9
60	347.2	459.6	112.4	33.3	9.7
100	350.0	407.3	57.3	28.4	4.9
200	517.2	584.1	66.9	22.6	5.8
270	347.9	424.9	77.0	16.0	6.6
PAN	480.4	666.7	186.3	0.0	16.0
		TOTAL	1163.1		

PARTICLE SIZE DISTRIBUTION



CLIENT: DiNisco Design

JOB NO. 25286

DATE: 12/14/18

SITE: Charles C. Cashman Elementary School - Amesbury

SAMPLE: Sample #1
TH 18-04 (C-Layer)

Limits of specification ----------

DGT Associates
Surveying & Engineering

TH 18-04 (E-Layer)
73.8% Sand 1.3% Clay
24.9% Silt

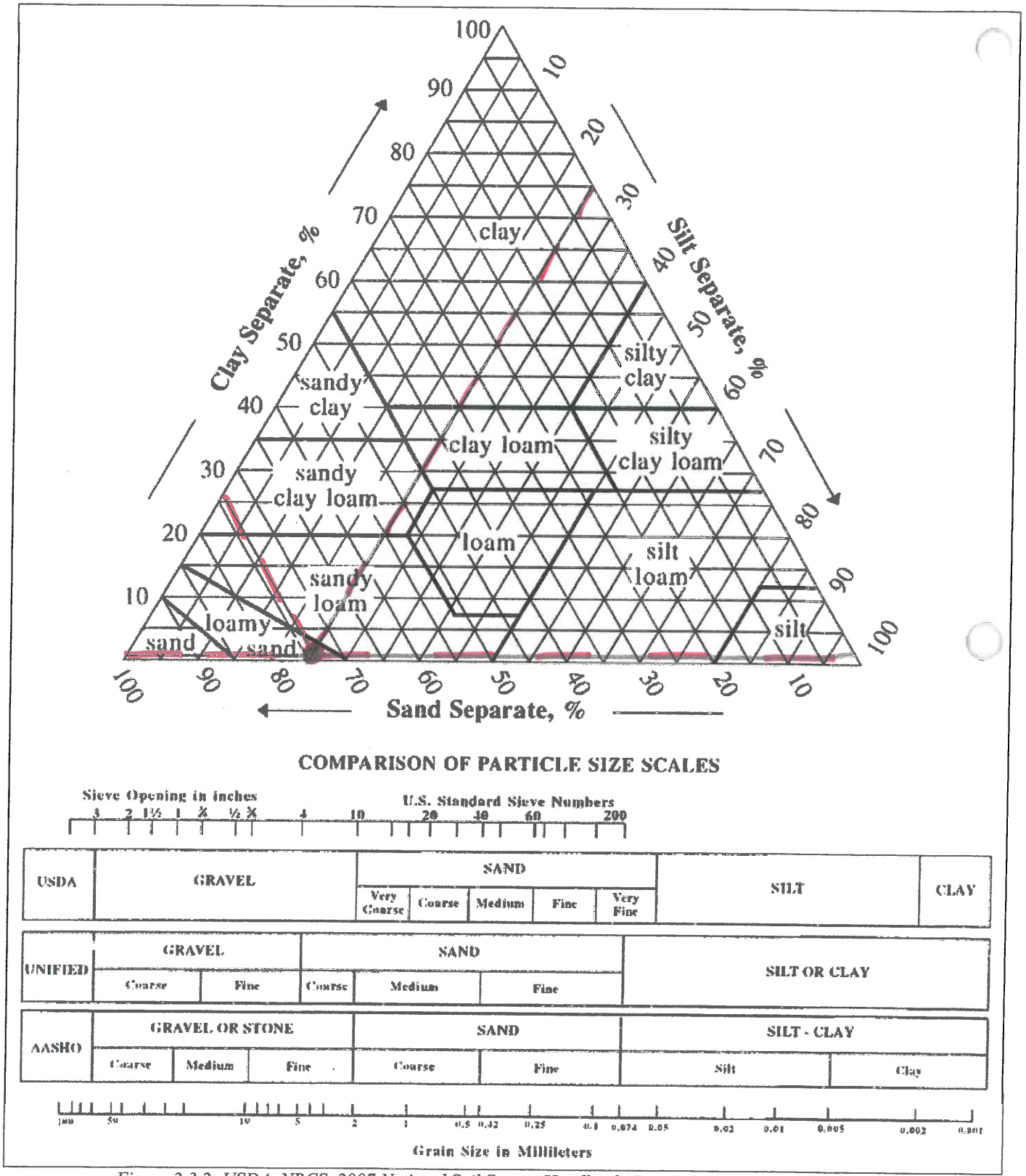


Figure 2.3.2: USDA, NRCS, 2007 National Soil Survey Handbook, Part 618, Exhibit 8, http://soils.usda.gov/technical/handbook/contents/part618ex.html#ex8

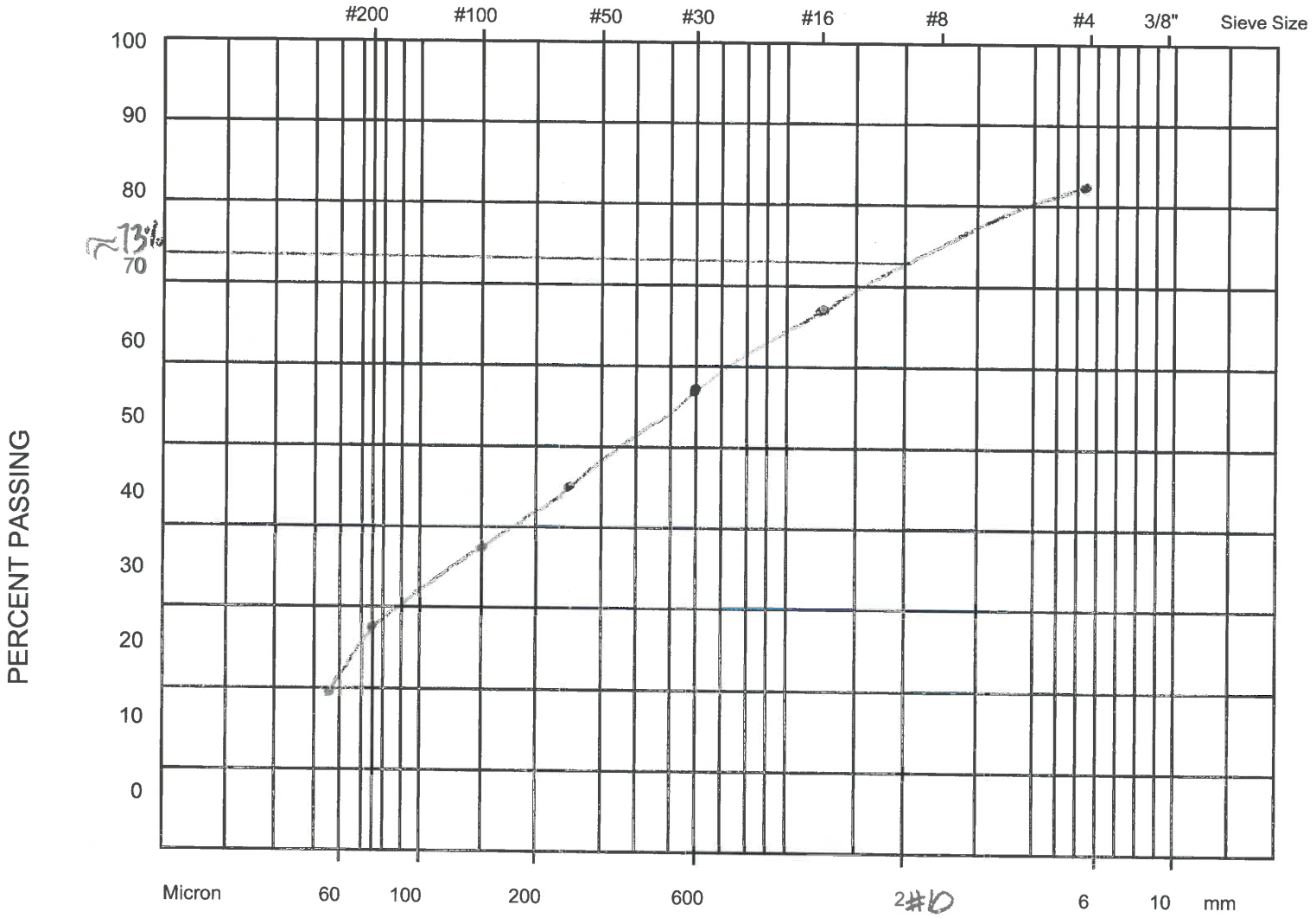
DATE: 12/13/2018 JOB NO: 25286
CLIENT: DiNisco Design
SITE: Charles C. Cashman Elementary School - 193 Lions Mouth Road, Amesbury, MA 01913

SIEVE ANALYSIS DATA AND COMPUTATION SHEET

SAMPLE NO: Sample # 1 DATE SAMPLE TAKEN: 11/14/2018
DESCRIPTION: TH 18-06 C
TEST SAMPLE WEIGHT (gm)= 1487.5

Sieve No.	Sieve Weight (gm)	Sieve & Soil Weight (gm)	Soil Weight Retained (gm)	Percent Passing	Percent Retained
4	515.2	776.3	261.1	82.4	17.6
16	446.1	674.4	228.3	67.1	15.3
30	394.1	524.6	130.5	58.3	8.8
60	347.2	534.2	187.0	45.8	12.6
100	349.9	457.9	108.0	38.5	7.3
200	517.2	687.4	170.2	27.1	11.4
270	347.7	455.9	108.2	19.8	7.3
PAN	480.4	774.6	294.2	0.0	19.8
		TOTAL	1487.5		

PARTICLE SIZE DISTRIBUTION



CLIENT:	DiNisco Design	**SITE:**	Charles C. Coleman Elementary School - Amesbury
JOB NO.	25286	**SAMPLE:**	Sample #1 TH 18-06 (C-Layer)
DATE:	12/13/18	Limits of specification	----------

DGT Associates
Surveying & Engineering

TH18-06 (C-Layer)
72.9% Sand 1.3% Clay
25.8% Silt

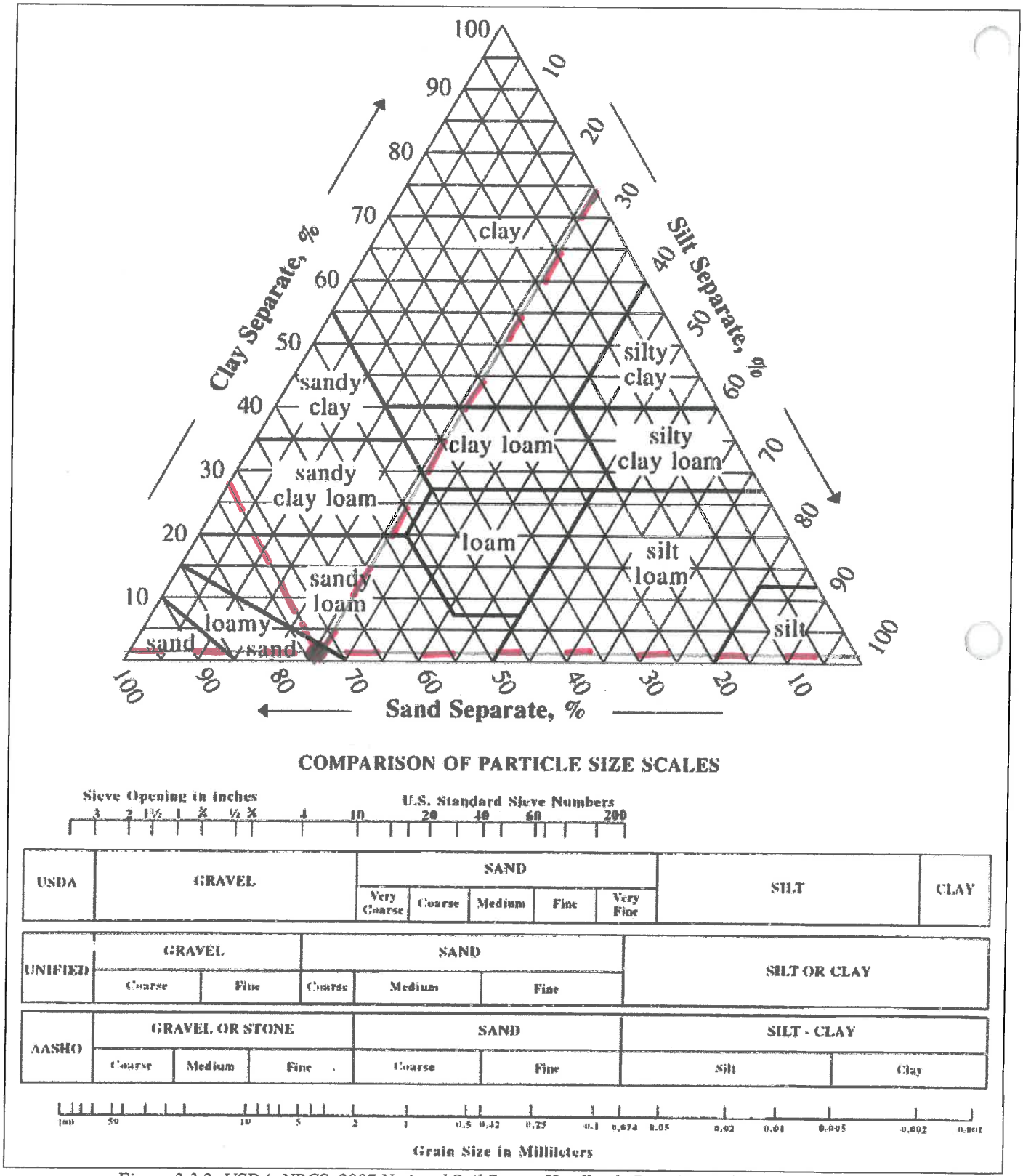


Figure 2.3.2: USDA, NRCS, 2007 National Soil Survey Handbook, Part 618, Exhibit 8, http://soils.usda.gov/technical/handbook/contents/part618ex.html#ex8

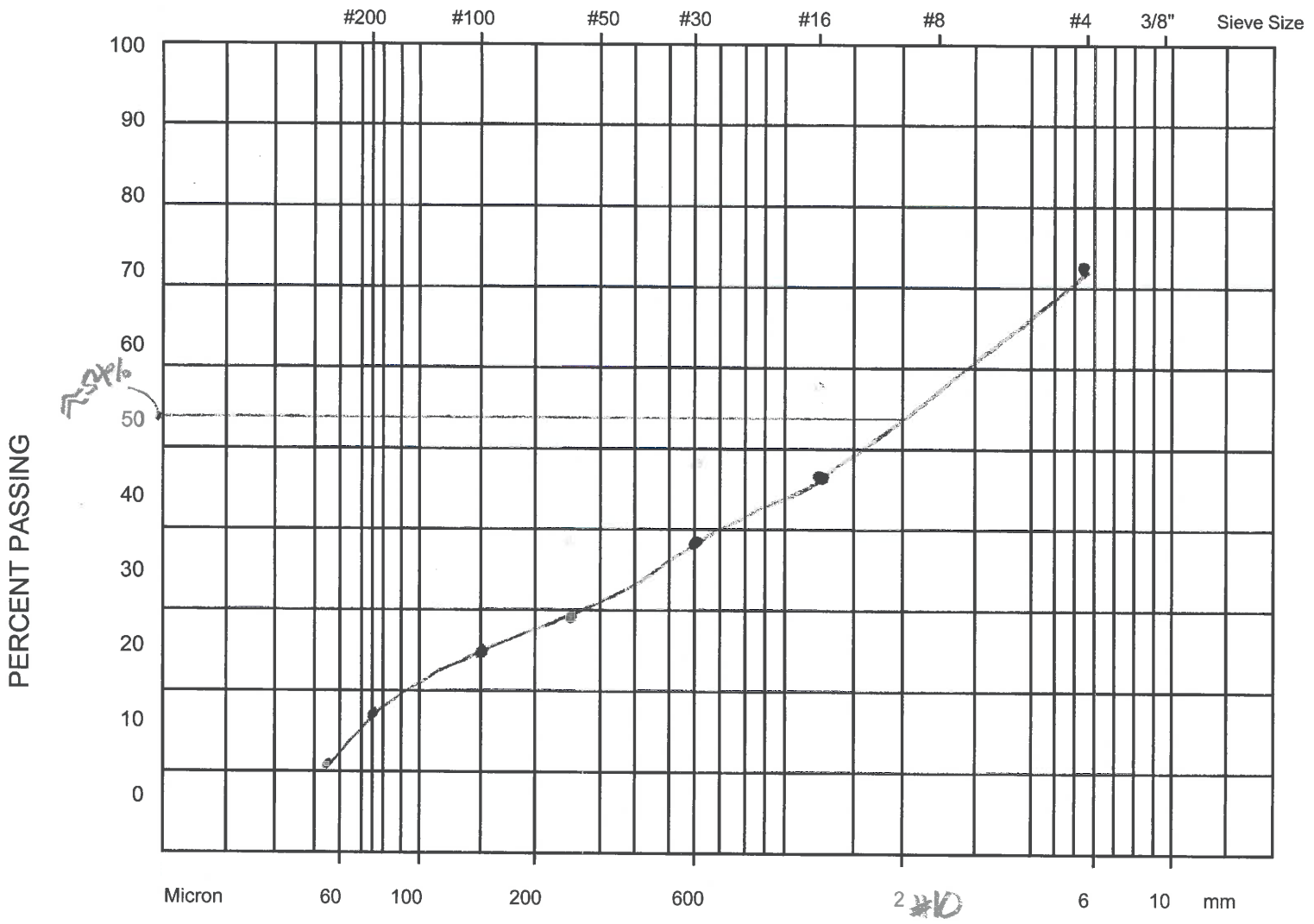
DATE: 12/14/2018 JOB NO: 25286
CLIENT: DiNisco Design
SITE: Charles C. Cashman Elementary School - 193 Lions Mouth Road, Amesbury, MA 01913

SIEVE ANALYSIS DATA AND COMPUTATION SHEET

SAMPLE NO: Sample # 1 DATE SAMPLE TAKEN: 11/29/2018
DESCRIPTION: TH 18-11 C
TEST SAMPLE WEIGHT (gm)= 1625.2

Sieve No.	Sieve Weight (gm)	Sieve & Soil Weight (gm)	Soil Weight Retained (gm)	Percent Passing	Percent Retained
4	515.2	973.0	457.8	71.8	28.2
16	446.1	822.7	376.6	48.7	23.2
30	394.2	542.2	148.0	39.6	9.1
60	347.3	507.1	159.8	29.7	9.8
100	349.9	439.5	89.6	24.2	5.5
200	517.2	633.4	116.2	17.1	7.1
270	347.8	448.3	100.5	10.9	6.2
PAN	480.4	657.1	176.7	0.0	10.9
		TOTAL	1625.2		

PARTICLE SIZE DISTRIBUTION



CLIENT: DiNisco Design

JOB NO. 25286

DATE: 12/14/18

SITE: Charles C. Cashmen Elementary School - Amesbury

SAMPLE: Sample #1
TH 18-11 (C-Layer)

Limits of specification ----------

DGT Associates
Surveying & Engineering

TH 18-11 (C-Layer)
79.8% Sand 1.0% Clay
19.2% Silt

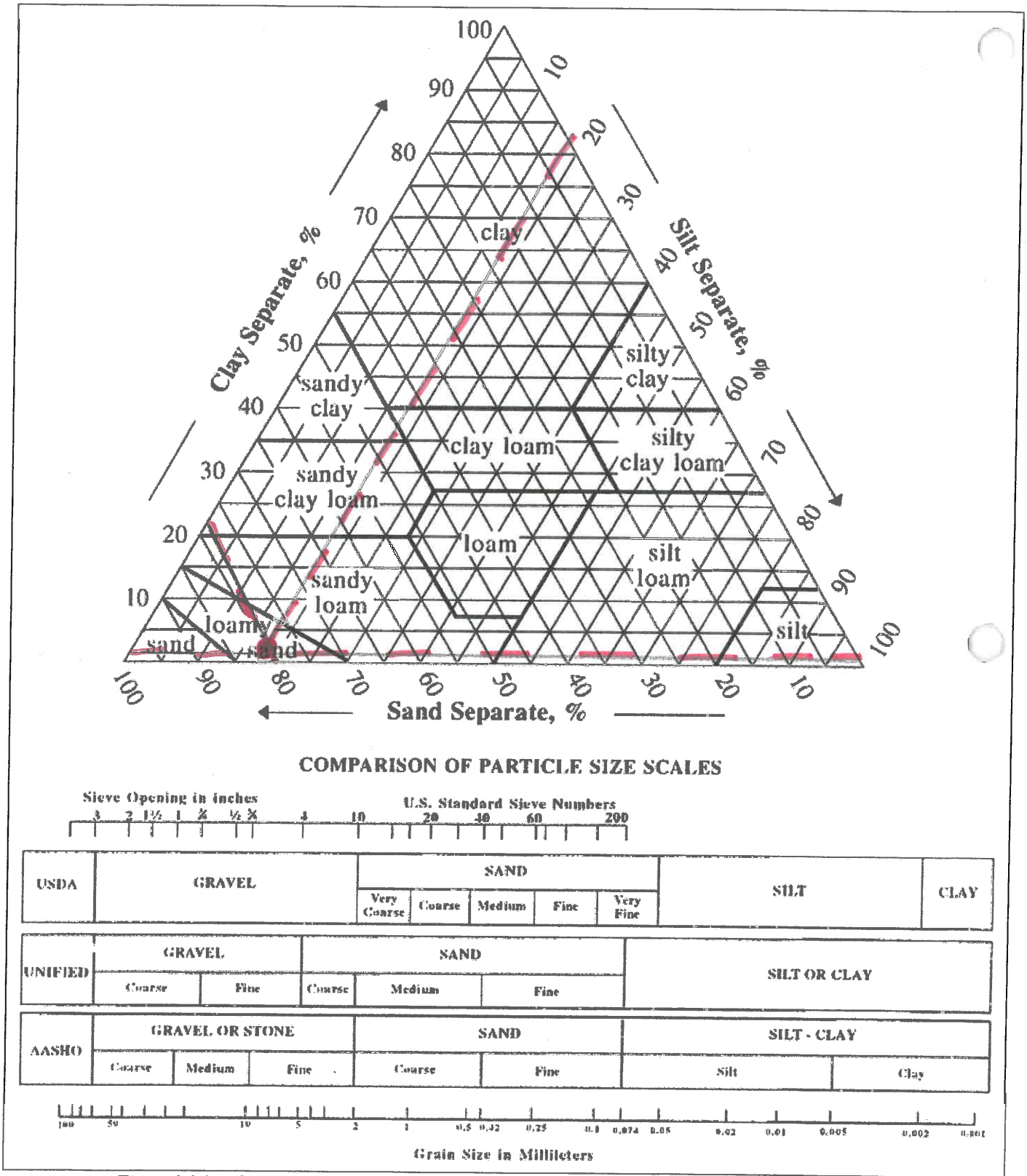


Figure 2.3.2: USDA, NRCS, 2007 National Soil Survey Handbook, Part 618, Exhibit 8, http://soils.usda.gov/technical/handbook/contents/part618ex.html#ex8

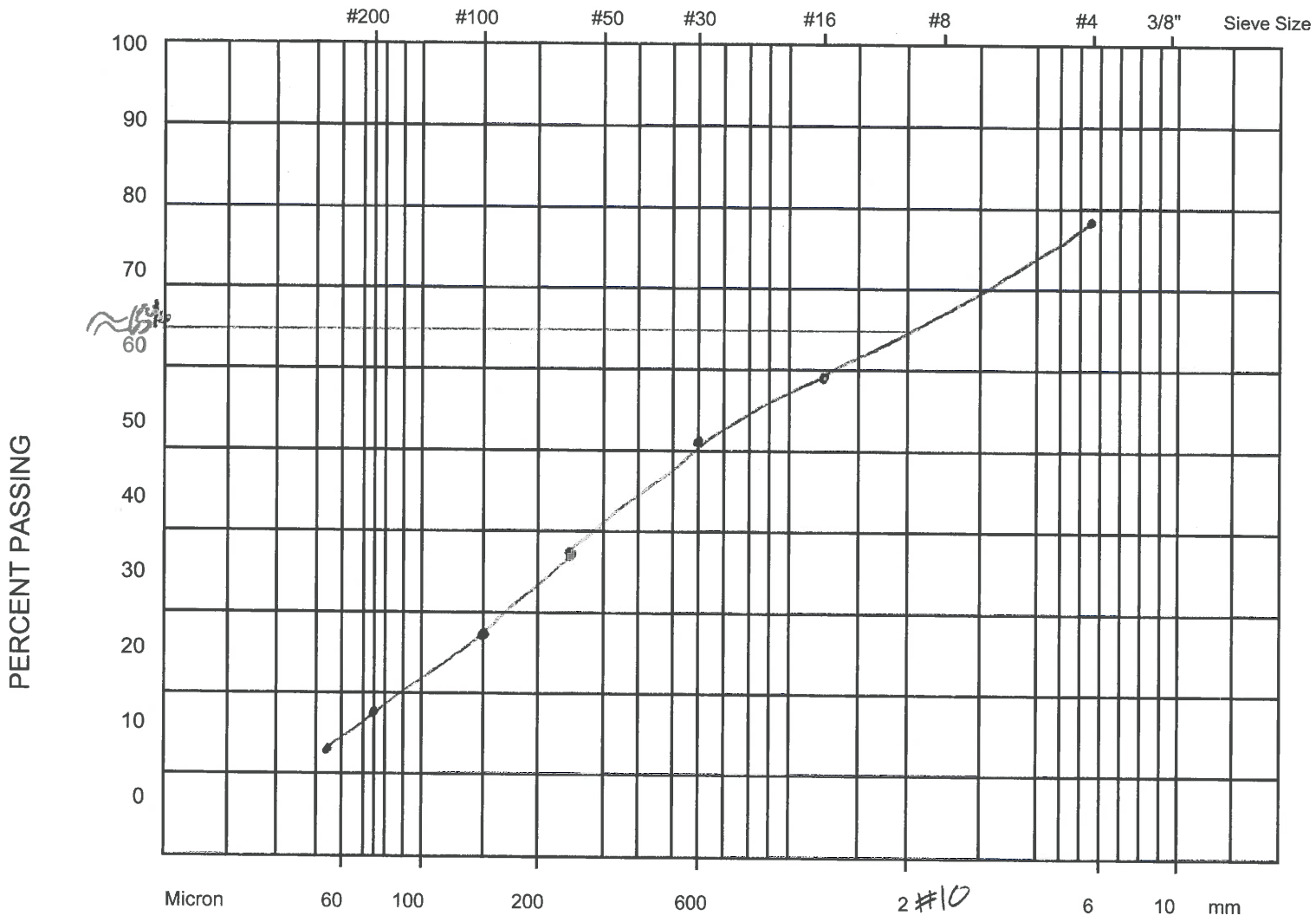
DATE: 12/14/2018 JOB NO: 25286
CLIENT: DiNisco Design
SITE: Charles C. Cashman Elementary School - 193 Lions Mouth Road, Amesbury, MA 01913

SIEVE ANALYSIS DATA AND COMPUTATION SHEET

SAMPLE NO: Sample # 1 DATE SAMPLE TAKEN: 11/29/2018
DESCRIPTION: TH 18-12 C
TEST SAMPLE WEIGHT (gm)= 1481.2

Sieve No.	Sieve Weight (gm)	Sieve & Soil Weight (gm)	Soil Weight Retained (gm)	Percent Passing	Percent Retained
4	515.2	827.0	311.8	78.9	21.1
16	446.2	731.7	285.5	59.7	19.3
30	394.1	526.8	132.7	50.7	9.0
60	347.3	540.2	192.9	37.7	13.0
100	349.9	484.4	134.5	28.6	9.1
200	517.2	671.7	154.5	18.2	10.4
270	347.8	416.4	68.6	13.5	4.6
PAN	480.4	681.1	200.7	0.0	13.5
		TOTAL	1481.2		

PARTICLE SIZE DISTRIBUTION



CLIENT: DiNisco Design

JOB NO. 25286

DATE: 12/14/18

SITE: Charles C. Eastman Elementary School - Amesbury

SAMPLE: Sample #1 TH18-12 (C-Layer)

Limits of specification ----------

DGT Associates
Surveying & Engineering

TH 16-12 (C-Layer)
79.2% Sand 1.1% Clay
19.7% Silt

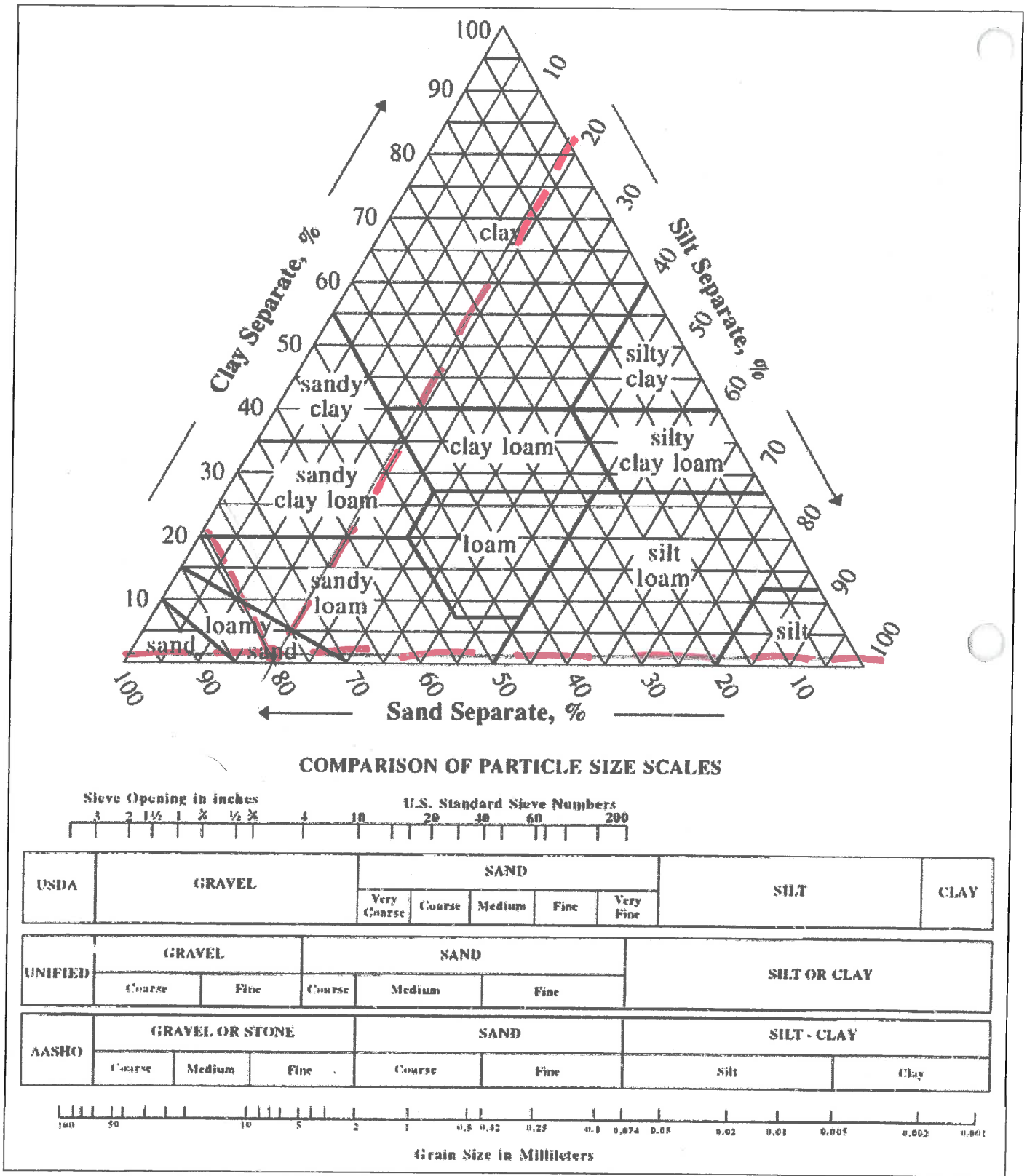


Figure 2.3.2: USDA, NRCS, 2007 National Soil Survey Handbook, Part 618, Exhibit 8, http://soils.usda.gov/technical/handbook/contents/part618ex.html#ex8

25286

Attachment 5

Soil Test Hole Location Plan

for

Charles C. Cashman Elementary School

193 Loins Mouth Road
Amesbury, Massachusetts 01913

LEGEND

- SURFACE CONTOUR
- EDGE OF PAVEMENT
- CHAIN LINK FENCE
- EDGE OF WOODED AREA
- OHW — EXISTING UTILITY POLE WITH DESIGNATION OVERHEAD WIRES AND GUY POLE
- RETAINING WALL
- EDGE OF DIRT / GRAVEL
- WFA2 — LIMIT OF BORDERING VEGETATED WETLAND WITH FLAG NUMBER
- D.E.P. HYDROLOGICAL CONNECTION (FROM MASS GIS)
- LIMIT OF BORDERING VEGETATED WETLAND (FROM PLAN IN NOTE 5)
- 100' WETLAND BUFFER ZONE
- 50' NO-BUILD BUFFER ZONE
- 25' NO-DISTURB BUFFER ZONE
- FEMA FLOOD ZONE X (SEE NOTE 6)
- × 100.7 — SPOT ELEVATION
- PROMINENT DECIDUOUS TREE
- PROMINENT CONIFEROUS TREE
- TYPICAL SHRUB
- LIGHT POLE
- WATER HYDRANT
- SIGN
- 2-POST SIGN
- VGC — VERTICAL GRANITE CURB
- BB — BITUMINOUS BERM
- BIT. CONC. — BITUMINOUS CONCRETE
- CLF — CHAIN LINK FENCE
- T1–P1 — TRANSECT # – PLOT # (SEE NOTE 7)

ASSESSORS: MAP 50, LOT 6
MAP 50, LOT 42
MAP 50, LOT 16

ZONING: OSC – OPEN SPACE CONSERVANCY

REFERENCES: DEED BOOK 5833, PAGE 124
DEED BOOK 5843, PAGE 244
PLAN BOOK 121, PLAN 52
PLAN 454 OF 1965

RECORD OWNER: THE INHABITANTS OF THE TOWN OF AMESBURY

NOTES:

1) THIS PLAN HAS BEEN PREPARED TO ASSIST ARCHITECT IN THE PRELIMINARY PLANNING PHASES OF THE NEW ELEMENTARY SCHOOL PROJECT.
2) THIS PLAN HAS BEEN COMPILED FROM INFORMATION PROVIDED BY THE CITY OF AMESBURY, RECORD PLANS, AND AERIAL PHOTOGRAPHS.
3) ELEVATIONS SHOWN HEREON FROM CITY GIS AND PURPORTS TO REFER TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29) PER THE CITY ENGINEER.
4) PROPERTY LINES SHOWN HEREON SHOULD BE CONSIDERED APPROXIMATE.
5) WETLANDS SHOWN HEREON WERE DELINEATED BY DGT ASSOCIATES ON 7/19/18 AND LOCATED BY INSTRUMENT SURVEY ON 7/24/18 AND 7/25/18 BY HANCOCK ASSOCIATES. SAID WETLANDS ARE SUPPLEMENTED BY INFORMATION SCALED FROM PLAN ENTITLED "WOODSOM FARM SOCCER FIELDS" BY OAK CONSULTING GROUP, REVISION DATE 3/5/15 AND FROM MASS GIS OLIVER MAPS WETLAND LAYERS. THE DELINEATION WAS ADJUSTED BY BSC GROUP AND DGT ASSOCIATES ON 10/2/18 AND LOCATED ON 10/3/18 BY HANCOCK ASSOCIATES.
6) FEMA FLOOD ZONE X SHOWN HEREON SCALED FROM FLOOD INSURANCE RATE MAP 25009C0101F BEARING AN EFFECTIVE DATE OF 7/3/2012. NO ELEVATION ASSOCIATED WITH SAID FLOOD ZONE.
7) TRANSECT AND PLOT NUMBERS SHOWN HEREON PROVIDED BY DGT ASSOCIATES.

"WOODSOM FARM"
THE TOWN OF AMESBURY
DEED BOOK 9963, PAGE 317
PLAN BOOK 251, PLAN 84
PLAN BOOK 251, PLAN 38

LESLIE B. CHARM
NINO MICOZZI
DEED BOOK 6841, PAGE 377
PLAN BOOK 119, PLAN 27
PLAN BOOK 119, PLAN 57
PLAN BOOK 124, PLAN 62

ESSEX COUNTY GREENBELT ASSOCIATION, INC.
DEED BOOK 35555, PAGE 177
PLAN BOOK 5, PLAN 27
PLAN BOOK 122, PLAN 62
PLAN BOOK 114, PLAN 8

CHARLES C. CASHMAN ELEMENTARY SCHOOL
EXISTING TWO STORY BRICK BUILDING

JOHN C. APONAS
KERRY J. APONAS
DEED BOOK 21986, PAGE 592
PLAN BOOK 21521, PLAN 289

MARY S. MACDOUGALL
ANNE A. ROSENBERGER
DEED BOOK 23545, PAGE 346
PLAN BOOK 370, PLAN 10

MARY J. EDE
CHERYL EDE
DEED BOOK 30158, PAGE 342

THERESA G. KYRIOS
DEED BOOK 10811, PAGE 89
PLAN 454 OF 1965

CRAIG J. BAILEY
JULIE A. BAILEY
DEED BOOK 28794, PAGE 212
PLAN BOOK 420, PLAN 39

PAUL T. & ANN M. GELINEAU
DEED BOOK 13689, PAGE 408

MICHAEL LANE
DEED BOOK 27097, PAGE 199
PLAN BOOK 5, PLAN 27

MICHAEL E. FRANCOEUR
KELLY A. FRANCOEUR
DEED BOOK 16126, PAGE 196
PLAN BOOK 5, PLAN 27

RICHARD S. THURLOW
MARIAN THURLOW
DEED BOOK 27245, PAGE 437
PLAN BOOK 5, PLAN 27

MILDRED K. WILKINS
DEED BOOK 13382, PAGE 413
PLAN BOOK 5, PLAN 27

GEORGE R. DODIER & MICHELLE M. DODIER
DEED BOOK 34409, PAGE 186
PLAN BOOK 5, PLAN 27

GEORGE R. DODIER JR. & MICHELLE PUORRO–DODIER
DEED BOOK 34409, PAGE 186
PLAN BOOK 5, PLAN 27

TOTAL AREA=
1,564,779± S.F.
(35.9224 ACRES)

LINDBERGH AVENUE
(PUBLIC – 55' WIDE)

LINDBERGH AVENUE
(NOT CONSTRUCTED)

LION'S MOUTH (PUBLIC – VARIABLE WIDTH) ROAD

TP 1, TP 2, TP 3, TP 4, TP 5, TP 6, TP 7, TP 8, TP 9, TP 10, TP 11, TP 12, TP 13
GZA 1, GZA 2, GZA 3, GZA 4
DGT 1, DGT 2

NOTES FOR TESTING PLANNED FOR 11/29/18:
- Test Holes 5 and 6 are inaccessible and will not be done this day.
- Due to time constraints, all test holes planned may not be completed. Test Hole 10 is the first to be eliminated followed by 12 and these will be done at a later date.

TEST PIT MARK-UP
DGT 11/26/18

PROPOSED TEST PITS
EXISTING TEST PITS
EXISTING BORINGS

SCALE: 1" = 60'
0 60 120 240

CHARLES C. CASHMAN ELEMENTARY SCHOOL

193 Lions Mouth Road,
Amesbury, Massachusetts 01913

PREPARED FOR:

DINISCO DESIGN, INC.

99 Chauncy Street,
Boston, Massachusetts 02111

HANCOCK ASSOCIATES

Civil Engineers

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10/4/18

NO.	BY	APP	DATE	ISSUE/REVISION DESCRIPTION
2.	EME	WCJ	10/4/18	UPDATE WETFLAG LOCATIONS
1.	EME	SRJ	8/22/18	ADDITION OF TRANSECTS

DATE: 8/8/18 DRAWN BY: EME
SCALE: 1"=60' CHECK BY: MMM

COMPILED PLAN OF LAND IN AMESBURY, MA

PLOT DATE: Oct 04, 2018 10:23 am
PATH: F:\Civil 3D Projects\21288 – DiNisco – Cashman Elementary –

DWG: 21288compiled.dwg
LAYOUT: EC30x42
SHEET: 1 OF 1

PROJECT NO.: 21288

25286

Attachment 6

Surficial Geology Maps and Explanatory Text

for

Charles C. Cashman Elementary School

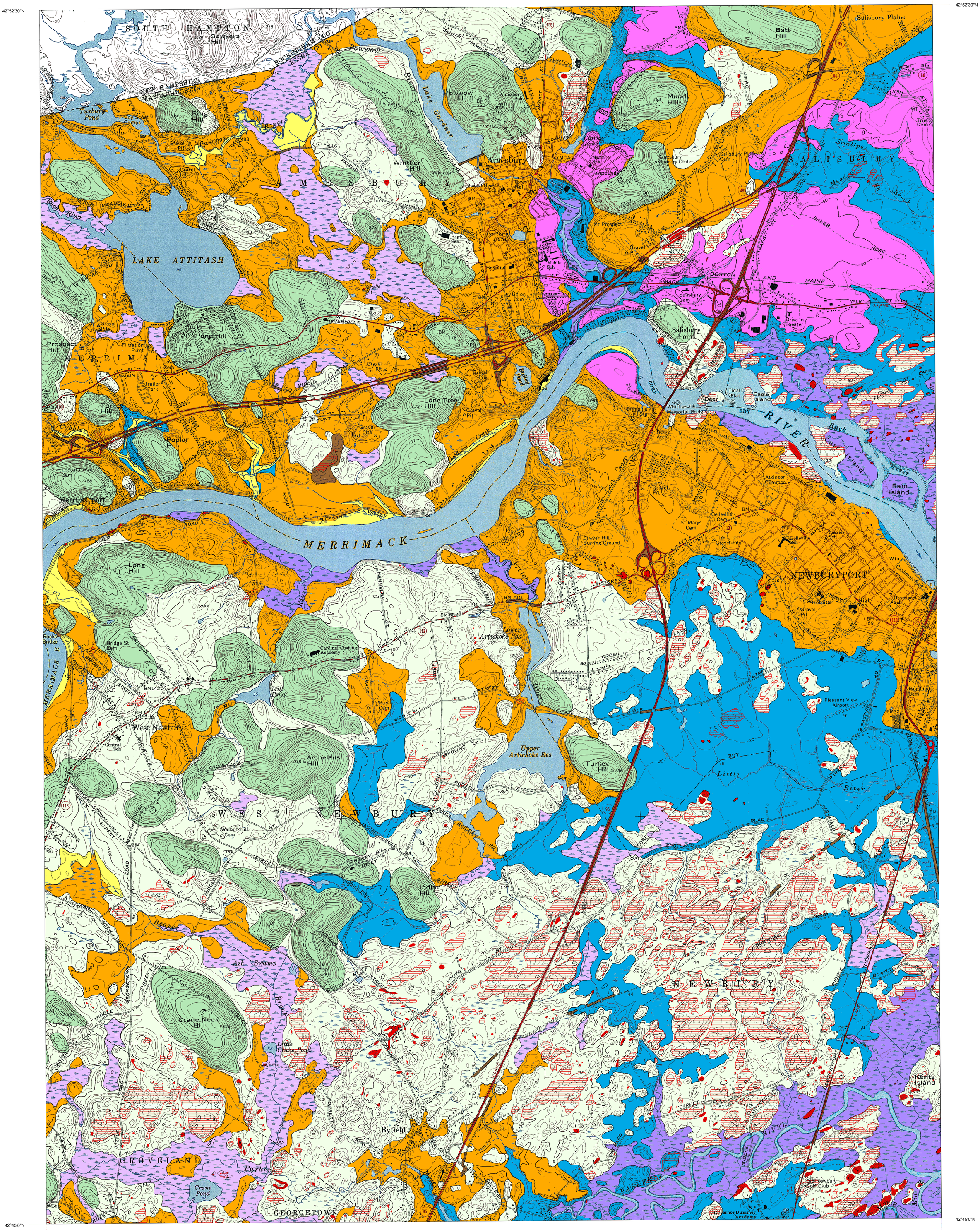
193 Loins Mouth Road
Amesbury, Massachusetts 01913

NEWBURYPORT WEST QUADRANGLE

Excerpted from: Surficial Geologic Map of the Salem Depot-Newburyport East-Wilmington-Rockport 16-Quadrangle Area in Northeast Massachusetts
By Byron D. Stone, Janet Radway Stone, and Mary L. DiGiacomo-Cohen
Open-File Report 2006-1260B

Explanatory pamphlet accompanies map

71°0'0"W 70°52'30"W
42°52'30"N 42°45'0"N



Scale 1:24,000

1 0.5 0 1 2 Miles

1 0.5 0 1 2 Kilometers

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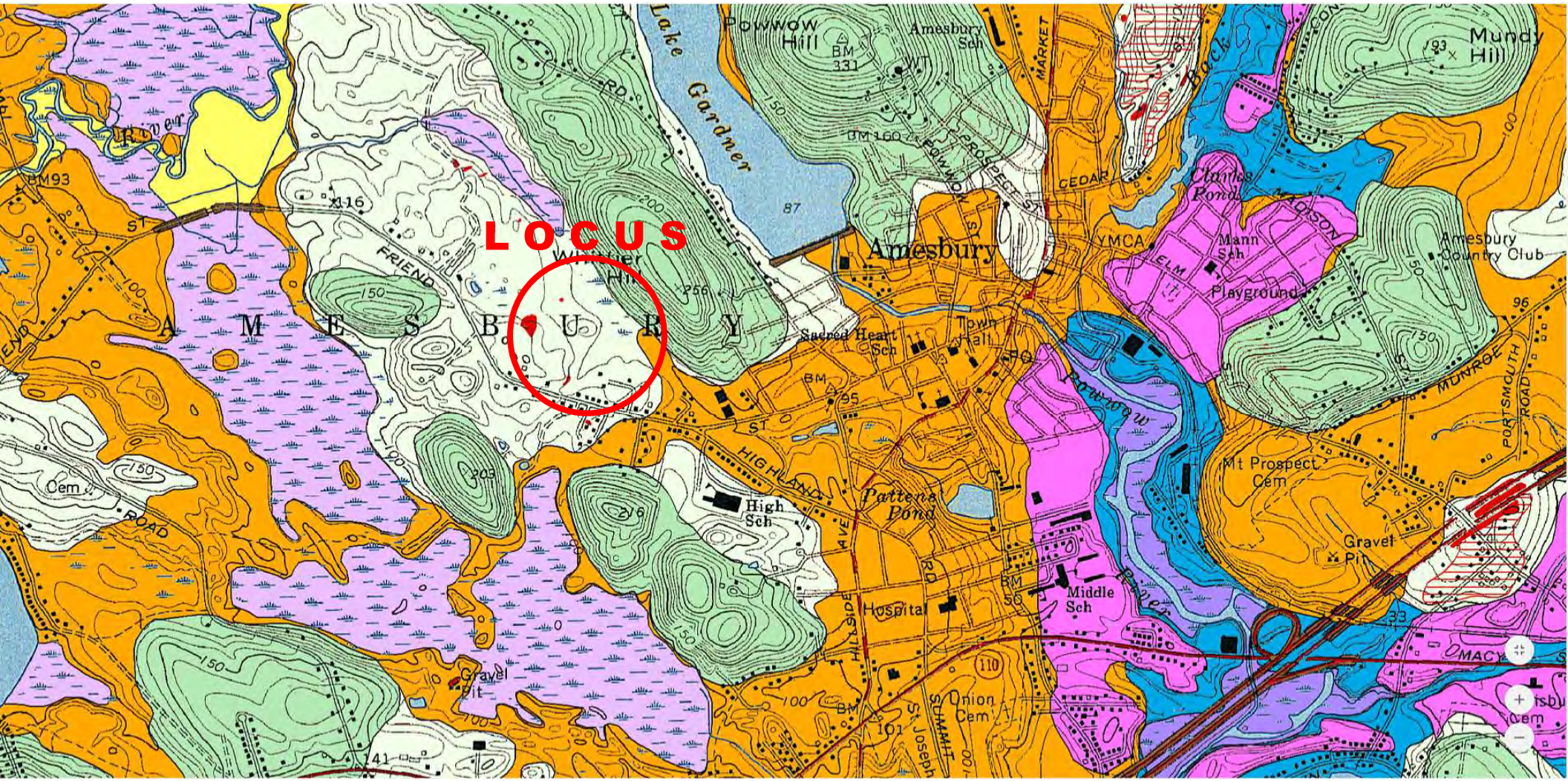
LOCUS
A M E S B U R Y
Amesbury
Powwow Hill
Amesbury Sch
Lake Gardner
Mundy Hill
Clarks Pond
Mann Sch
Playground
Amesbury Country Club
Sacred Heart Sch
Town Hall
Pattens Pond
High Sch
Hospital
Middle Sch
Mt Prospect Cem
Gravel Pit
Union Cem
Cem
Powwow River
Back River
MARKET
CEDAR
MADISON
MUNROE
PORTSMOUTH ROAD
HIGHLAND
HILLSIDE AVE
SUMMIT
FRIEND
ROAD
YMCA
ELM
BM 331
BM 160
BM 93
BM 95
BM 50
BM 101
110
141
203
216
256
87
93
96
33
150
100
200
190

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Prepared in cooperation with the Commonwealth of Massachusetts
Office of the State Geologist and Executive Office of Environmental Affairs

Surficial Geologic Map of the Salem Depot-Newburyport East-Wilmington-Rockport 16-Quadrangle Area in Northeast Massachusetts

Compiled by Byron D. Stone, Janet Radway Stone, and Mary L. DiGiacomo-Cohen



Open-File Report 2006-1260B

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
Dirk Kempthorne, Secretary

U.S. Geological Survey
Mark Myers, Director

U.S. Geological Survey, Reston, Virginia 2006

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Cover figure. View of bouldery end moraine deposits in Dogtown Commons, Gloucester, Massachusetts.

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Surficial Geologic Map of the Salem Depot-Newburyport East-Wilmington-Rockport 16-Quadrangle Area in Northeast Massachusetts

Compiled by Byron D. Stone, Janet Radway Stone, and Mary L. DiGiacomo-Cohen

Introduction

The surficial geologic map of the Salem Depot-Newburyport East-Wilmington-Rockport area shows the distribution of nonlithified earth materials at land surface in sixteen 7.5-minute quadrangles (total 658 mi^2) in northeast Massachusetts (fig. 1). Across Massachusetts, these materials range from a few feet to more than 500 ft in thickness. They overlie bedrock, which crops out in upland hills and in resistant ledges in valley areas. The geologic map differentiates surficial materials of Quaternary age on the basis of their lithologic characteristics (grain size, sedimentary structures, mineral and rock-particle composition), constructional geomorphic features, stratigraphic relationships, and age. Surficial materials also are known in engineering classifications as unconsolidated soils, which include coarse-grained soils, fine-grained soils, or organic fine-grained soils. Surficial materials underlie and are the parent materials of modern pedogenic soils, which have developed in them at the land surface. Surficial earth materials significantly affect human use of the land and an accurate description of their distribution is particularly important for water resources, construction aggregate resources, earth-surface hazards assessments, and land-use decisions.

The mapped distribution of surficial materials that lie between the land surface and the bedrock surface is based on detailed geologic mapping of 7.5-minute topographic quadrangles, as part of a cooperative state-wide mapping program between the U.S. Geological Survey and the Massachusetts Department of Public Works (now Massachusetts Highway Department) (Page, 1967, Stone, 1982), and the Office of the Massachusetts State Geologist. Each published geologic map presents a detailed description of local geologic map units, the genesis of the deposits, and age correlations among units. Regional summaries of these maps and unpublished maps discuss the ages of multiple glaciations, the nature of glaciofluvial, glaciolacustrine, and glaciomarine deposits, and the processes of ice advance and retreat across Massachusetts (Warren and Stone, 1986, Koteff and Pessl, 1981, papers in Larson and Stone, 1982, Oldale and Barlow, 1986, Stone and Borns, 1986).

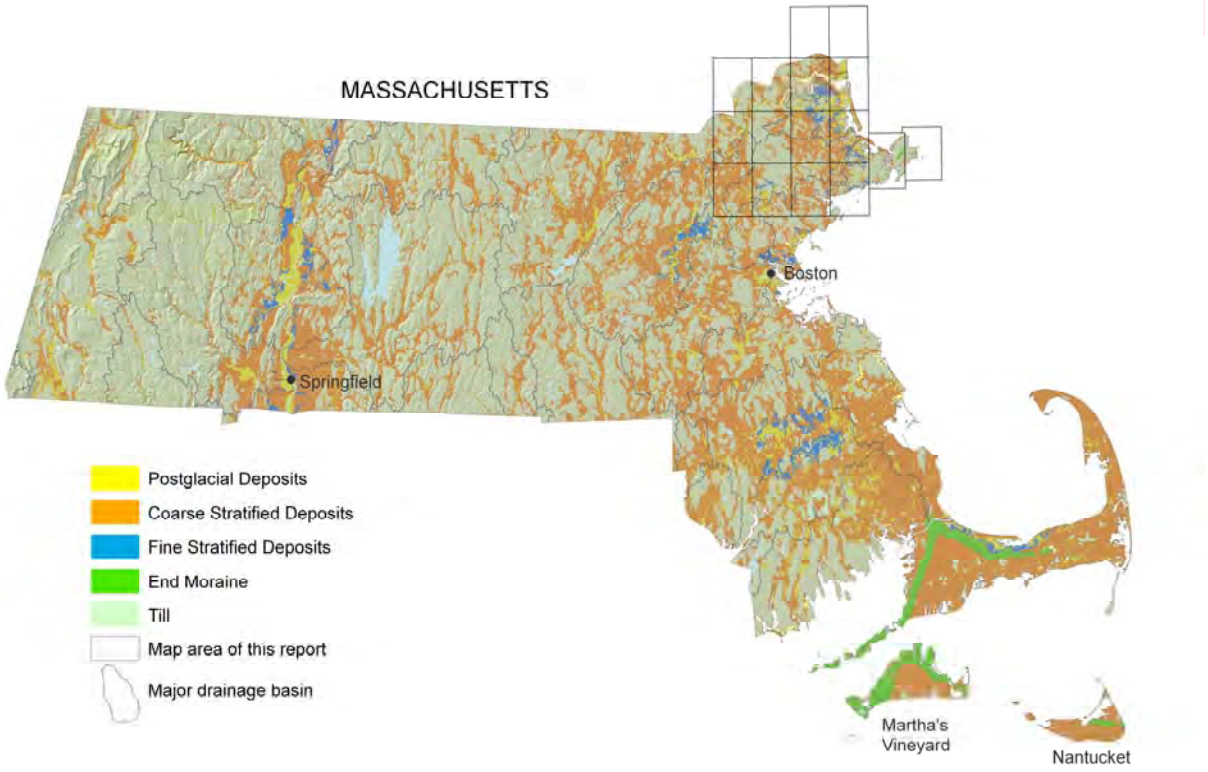


Figure 1. General distribution of glacial and postglacial deposits in Massachusetts (Stone and Beinikis, 1993, MassGIS, 1999) and map area covered by this report.

This compilation of surficial geologic materials is an interim product that defines the areas of exposed bedrock, and the boundaries between glacial till, glacial stratified deposits, and overlying postglacial deposits. This work is part of a comprehensive study to produce a statewide digital map of the surficial geology at a 1:24,000-scale level of accuracy. This map of 16 quadrangles revises previous digital surficial geologic maps (Stone and Beinikis, 1993, MassGIS, 1999) that were compiled on base maps at regional scales of 1:250,000 and 1:125,000. The purpose of this study is to provide fundamental geologic data for the evaluation of natural resources, hazards, and land information within the Commonwealth of Massachusetts.

Surficial Materials in Massachusetts

Most of the surficial materials in Massachusetts are deposits of the last two continental ice sheets that covered all of New England in the latter part of the Pleistocene ice age (Schafer and Hartshorn, 1965; Stone and Borns, 1986; Oldale and others, 1982). The glacial deposits are divided into two broad categories, ***glacial till*** and ***glacial stratified deposits***. Till, the most widespread glacial deposit, was laid down directly by glacier ice. Glacial stratified deposits are concentrated in valleys and lowland areas and were laid down by glacial meltwater in streams, lakes, and the sea in front of the retreating ice margin during the last deglaciation. Postglacial sediments, primarily

floodplain alluvium and swamp deposits, make up a lesser proportion of the unconsolidated materials.

Glacial till deposits consist of nonsorted, generally nonstratified mixtures of mineral and rock particles, ranging in grain size from clay to large boulders. The matrix of most tills is composed dominantly of fine sand and silt. Boulders within and on the surface of tills range from sparse to abundant. Some tills contain lenses of sorted sand and gravel and less commonly, masses of laminated fine-grained sediments. The color and lithologic characteristics of till deposits vary across Massachusetts, but generally reflect the composition of the local underlying and northerly adjacent bedrock from which the till was derived. Till blankets the bedrock surface in variable thickness, ranging from a few inches to more than 200 ft, and commonly underlies stratified meltwater deposits. Tills deposited during the last two glaciations occur in superposition within Massachusetts (Koteff, 1966; Newton, 1978; Weddle and others, 1989). The upper till was deposited during the last (late Wisconsinan) glaciation; it is the most extensive till and commonly is observed in surface exposures, especially in areas where till thickness is less than 15 ft (thin till unit on the map). The lower till ("old" till) was deposited during an earlier glaciation (probably Illinoian), and has a more limited distribution; it is principally a subsurface deposit that constitutes the bulk of material in drumlins and other hills where till thickness is greater than 15 ft. The distribution of lower till is shown primarily by the thick till unit on the map. Generally, the lower till generally is overlain by thin upper till deposits in these areas. In all exposures showing the superposed two tills, the base of the upper till truncates the weathered surface of the lower till. The lower part of the upper till commonly displays a zone of shearing, dislocation, and brecciation, in which clasts of lower till were mixed and incorporated into the upper till during the last glaciation.

End moraine deposits are composed predominantly of bouldery ablation till, but may also locally include sorted sediments. These deposits were laid down by glacial-melting processes along active ice margins during retreat of the last (late Wisconsinan) ice sheet. Extensive end moraines on Nantucket and Martha's Vineyard (fig. 1) are related to the terminal position of the late Wisconsinan ice sheet, and the end moraines on Cape Cod are associated with recessional positions of the last ice sheet. Less extensive end moraines occur locally elsewhere in southeastern Massachusetts, in the Boston area, and on this map in the Gloucester-Rockport area of northeastern Massachusetts.

Glacial stratified deposits consist of layers of well-sorted to poorly sorted gravel, sand, silt, and clay laid down by flowing meltwater in glacial streams, lakes, and marine embayments that occupied the valleys and lowlands of Massachusetts during retreat of the last ice sheet. Textural variations within the meltwater deposits occur both areally and vertically because meltwater-flow regimes were different in glaciofluvial (stream), glaciodeltaic (where a stream entered a lake or the sea), glaciolacustrine (lake bottom), and glaciomarine (marine bottom) depositional environments. Grain-size variations also resulted from meltwater deposition in positions either proximal to or distal from the retreating glacier margin, which was the principal sediment source. A common depositional setting contained a proximal, ice-marginal meltwater stream in which horizontally bedded glaciofluvial gravel and/or sand and gravel were laid down; farther down valley, the stream entered a glacial lake where glaciodeltaic sediments were deposited, consisting of horizontally layered sand and gravel delta-topset beds overlying inclined layers of sand in delta-foreset beds. Farther out in the glacial lake, very fine sand, silt, and clay settled out on the lake bottom in flat-lying, thinly bedded glaciolacustrine layers. Thick sequences having these textural variations commonly are present in the vertical section of meltwater deposits across the State (Stone and

others, 1992). Detailed geologic maps permit precise mapping of meltwater sedimentary units within each glacial lake or valley outwash system (Jahns, 1941; 1953; Koteff, 1966). These units, known as *morphosequences* (Koteff, 1974; Koteff and Pessl, 1981), are the smallest mappable stratigraphic units on detailed geologic maps. *Morphosequences* are bodies of stratified meltwater sediments that are contained in a continuum of landforms, grading from ice-contact forms (eskers, kames) to non-ice-contact forms (flat valley terrace, delta plains) that were deposited simultaneously at and beyond the margin of the ice sheet and, graded to a specific base level. Each morphosequence consists of a proximal part (head) deposited within or near the ice margin and a distal part deposited farther away from the ice margin. Both grain size and ice-melt collapse deformation of beds decrease from the proximal to the distal part of each morphosequence. The head of each morphosequence is either ice marginal (ice contact) or near ice marginal. The surface altitude of fluvial sediments in each morphosequence was controlled by a specific base level, either a glacial-lake or marine water plane or a valley knickpoint. Few morphosequences extend distally more than 10 km, and most are less than 2 km in length. In any one basin, individual morphosequences were deposited sequentially as the ice margin retreated systematically northward. Consequently, in many places the distal, finer grained facies of a younger morphosequence stratigraphically overlies the proximal, coarse-grained facies of a preceding morphosequence. Figure 2 shows the variability of sediment types in the subsurface of glacial stratified deposits. The figure schematically shows the relationship between coarse-grained deltaic deposits and extensive fine-grained lake (or marine) deposits in the subsurface. Such coarse- and fine-grained units are common in most of the valleys and lowlands of Massachusetts (Langer, 1979, Stone and others, 1979; Stone and others, 1992; Stone and others, 2005). On this interim map, coarse-grained and fine-grained textural variations within glacial stratified deposits are shown only where they occur at land surface. Subsurface textural variations are not shown.

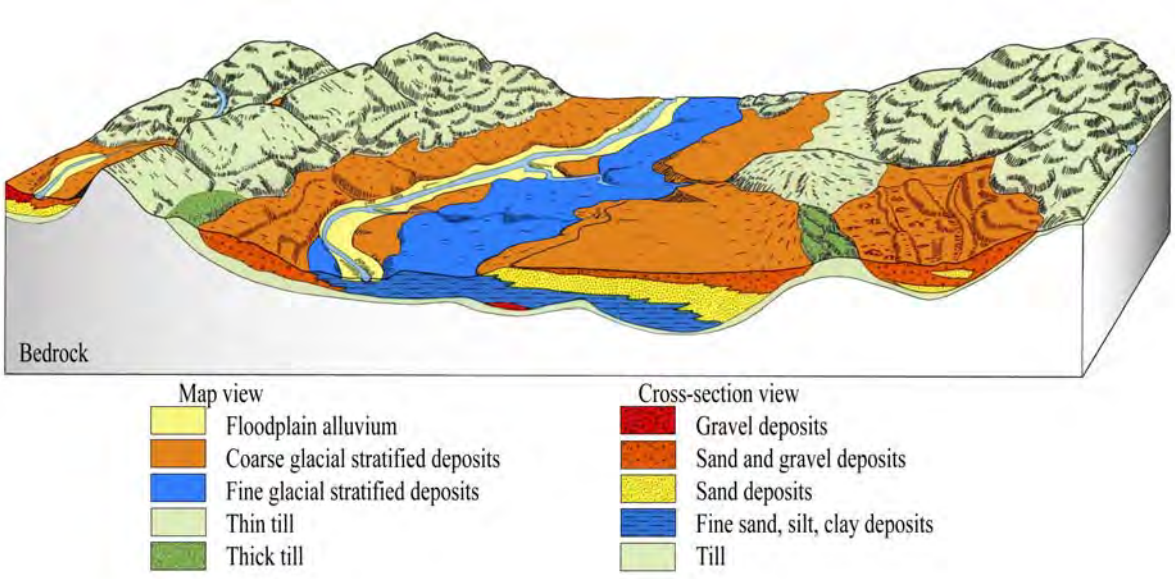


Figure 2. Block diagram illustrating the typical areal and vertical distribution of glacial and postglacial deposits overlying bedrock (modified from Stone and others, 1992).

The areal distribution of till and stratified deposits across Massachusetts is related to regional physiography (fig.1). The thickness of these materials varies considerably because of such factors as the high relief of the bedrock surface, changing environments of deposition during deglaciation, and various effects of postglacial erosion and removal of glacial sediments. In highland areas, notably in the western and central parts of the State, till is the major surficial material and is present as a discontinuous mantle of variable thickness over the bedrock surface. Till is thickest in drumlins (reportedly as much as 230 ft thick) and on the northwest slopes of most bedrock hills. Glacial meltwater deposits that average 50 feet in thickness (Stone and Beinikis, 1993) overlie the till in small upland valleys and north-sloping basins between bedrock hills. Glacial stratified deposits are the predominant surficial materials in the Connecticut River valley, the northeastern and southeastern lowlands, and on Cape Cod and the islands. In northeastern Massachusetts, glacial meltwater deposits include glaciomarine sediments deposited when sea level was as much as 100 ft above present level. Glacial meltwater deposits generally overlie till; however, well logs indicate that in some places till is not present and the stratified deposits lie directly on bedrock. On Cape Cod and the islands, in the southeastern lowland, and in parts of the Connecticut River valley these deposits completely cover the till-draped bedrock surface.

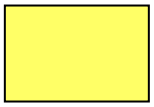
Postglacial deposits locally overlie the glacial deposits throughout the State. Alluvium underlies the floodplains of most streams and rivers. Swamps occur in low-lying, poorly drained areas in upland and lowland settings, but swamp deposits are shown only where they are estimated to be at least 3 ft thick. Salt-marsh and estuarine deposits are present mainly along the tidal portions of streams and rivers entering the offshore areas. Beach deposits occur along the shoreline. Early postglacial regressive deposits represent former, higher marine shoreline positions and are preserved at altitudes 20 ft to 60 ft above modern sea level between Gloucester and the New Hampshire state line.

Description of Map Units

Postglacial Deposits



Artificial fill—Earth materials and manmade materials that have been artificially emplaced, primarily in highway and railroad embankments, and in dams; may also include landfills, urban development areas, and filled coastal wetlands



Floodplain alluvium—Sand, gravel, silt, and some organic material, stratified and well sorted to poorly sorted, beneath the floodplains of modern streams. The texture of alluvium commonly varies over short distances both laterally and vertically, and generally is similar to the texture of adjacent glacial deposits. Along smaller streams, alluvium is commonly less than 5 ft thick. The most extensive deposit of alluvium on the map is along the Merrimack River where the texture is predominantly sand, fine gravel, and silt, and total thickness is as much as 25 ft. Alluvium typically overlies thicker glacial stratified deposits.

Swamp deposits—organic muck and peat that contain minor amounts of sand, silt, and clay, stratified and poorly sorted, in kettle depressions or poorly drained areas. Most swamp deposits are less than about 10 ft thick. Swamp deposits overlie glacial deposits or bedrock. They locally overlie glacial till even where they occur within thin glacial meltwater deposits.

Salt-Marsh deposits—peat and organic muck interbedded with sand and silt, deposited in environments of low wave energy along the coast and in river estuaries. Marsh deposits are dominantly peat and muck, generally a few feet to 25 ft thick. In the major estuaries, marsh deposits locally overlie estuarine deposits (not mapped) which are sand and silt with minor organic material as much as 30-80 ft thick. The marsh and estuarine deposits generally are underlain by adjacent glacial material, either till, coarse stratified deposits, or glaciomarine fine deposits.

Beach and Dune deposits—sand and fine gravel deposited along the shoreline by waves and currents, and by wind action. The texture of beach deposits varies over short distances and is generally controlled by the texture of nearby glacial materials exposed to wave action. Sand beach deposits are composed of moderately sorted very coarse to fine sand, commonly laminated. Coarser layers may contain some fine gravel particles; finer layers may contain some very fine sand and silt. Gravel beach deposits are composed of granule-to-cobble-sized clasts in moderately sorted thin beds. Minor amounts of sand within gravel beds, and thin beds of sand as alternating layers. Beach deposits are rarely more than a few feet thick. Sand dune deposits are composed of moderately to well sorted, fine to medium sand, variably massive, laminated, and cross bedded. Dune deposits are as much as 35 ft thick. Unit includes artificial sand deposits in locally replenished beaches.

Early postglacial marine regressive deposits—sand and gravel deposited along former, higher shorelines in northeastern Massachusetts by waves and currents, and by wind action, as well as sand and gravel deposited by fluvial and wave action in lower estuarine valleys. The fluvial estuarine-terrace deposits are shown on the map where they overlie glaciomarine fine deposits; elsewhere, sand and gravel in postglacial terrace deposits are included in the glacial coarse stratified map unit. The fluvial terrace deposits are mixtures of gravel and sand within individual layers, and as alternating layers. Sand and gravel layers generally range from 25 to 50 percent gravel particles and from 50 to 75 percent sand particles. Layers are well to poorly sorted. Beach and near-shore deposits are composed of moderately sorted very coarse to fine sand, commonly laminated. Coarser layers may contain some fine gravel particles; finer layers may contain some very fine sand and silt. Regressive beach and near-shore deposits are rarely more than a few feet thick. Regressive spit deposits are 10-30 ft thick.

Glacial Stratified Deposits

Sorted and stratified sediments composed of gravel, sand, silt, and clay (as defined in particle size diagram, fig. 3) deposited in layers by glacial meltwater. These sediments occur as four basic

textural units—gravel deposits, sand and gravel deposits, sand deposits, and fine deposits. On this interim map, gravel, sand and gravel, and sand deposits are not differentiated and are shown as *Coarse Deposits* where they occur at land surface. *Fine Deposits* also are shown where they occur at land surface. **Textural changes occur both areally and vertically (fig. 2), however subsurface textural variations are not shown on this interim map.**

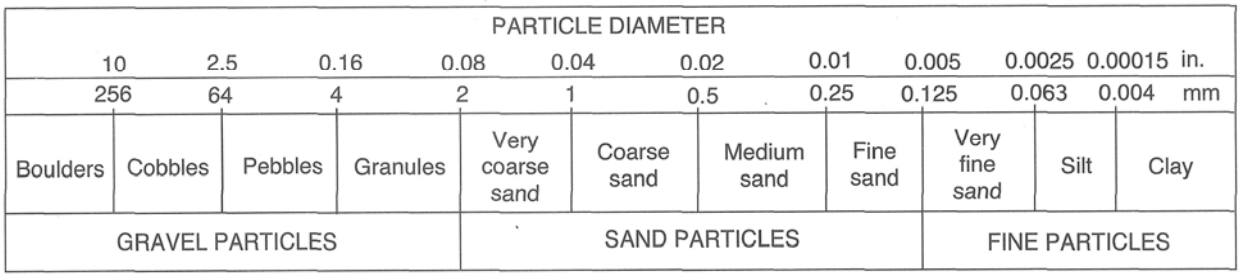


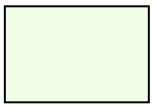
Figure 3. Grain-size classification used in this report, modified from Wentworth (1922).

Coarse deposits include: *Gravel deposits* composed mainly of gravel-sized clasts; cobbles and boulders predominate; minor amounts of sand within gravel beds, and sand comprises few separate layers. Gravel layers generally are poorly sorted and bedding commonly is distorted and faulted due to postdepositional collapse related to melting of ice. *Sand and gravel deposits* composed of mixtures of gravel and sand within individual layers and as alternating layers. Sand and gravel layers generally range from 25 to 50 percent gravel particles and from 50 to 75 percent sand particles. Layers are well to poorly sorted; bedding may be distorted and faulted due to postdepositional collapse. *Sand deposits* composed mainly of very coarse to fine sand, commonly in well-sorted layers. Coarser layers may contain up to 25 percent gravel particles, generally granules and pebbles; finer layers may contain some very fine sand, silt, and clay.

Glaciolacustrine Fine deposits include very fine sand, silt, and clay that occurs as well-sorted, thin layers of alternating silt and clay, or thicker layers of very fine sand and silt deposited in glacial lakes. Very fine sand commonly occurs at the surface and grades downward into rhythmically bedded silt and clay varves. Locally, this map unit may include areas underlain by fine sand.

Glaciomarine fine deposits include silty clay, fine sand, and some fine gravel deposited in a higher level sea in environments of low wave energy along the coast and in river estuaries. Fine to very fine sand, massive and laminated, commonly is present at the surface and grades downward into interbedded very fine sand, silt, and silty clay. Lower silty clay and clay is massive and thinly laminated. Total thickness is generally a few feet to 75 ft.

Glacial Till Deposits



Thin till—Nonsorted, nonstratified matrix of sand, some silt, and little clay containing scattered gravel clasts and few large boulders; in areas where till is generally less than 10-15 ft thick and including areas of bedrock outcrop where till is absent. Predominantly upper till of the last glaciation; loose to moderately compact, generally sandy, commonly stony. Two facies are present in some places; a looser, coarser-grained ablation facies, melted out from supraglacial position; and an underlying more compact, finer-grained lodgement facies deposited subglacially. In general, both ablation and lodgement facies of upper till derived from fine-grained bedrock are finer grained, more compact, less stony and have fewer surface boulders than upper till derived from coarser grained crystalline rocks. Fine-grained bedrock sources include the red Mesozoic sedimentary rocks of the Connecticut River lowland, marble in the western river valleys, and fine-grained schists in upland areas.



Thick till—Nonsorted, nonstratified matrix of sand, some silt, and little clay containing scattered gravel clasts and few large boulders at the surface; in the shallow subsurface, compact, nonsorted matrix of silt, very fine sand, and some clay containing scattered small gravel clasts in areas where till is greater than 10-15 ft thick, chiefly in drumlin landforms in which till thickness commonly exceeds 100 ft (maximum recorded thickness is 230 ft). Although upper till is the surface deposit, the lower till constitutes the bulk of the material in these areas. Lower till is moderately to very compact, and is commonly finer grained and less stony than upper till. An oxidized zone, the lower part of a soil profile formed during a period of interglacial weathering, is generally present in the upper part of the lower till. This zone commonly shows closely spaced joints that are stained with iron and manganese oxides.



End moraine deposits – Composed predominantly of boulders and ablation facies sandy upper till; lenses of stratified sand and gravel occur locally within the till. Surface boulders on end moraine deposits are generally more numerous than on adjacent till surfaces; dense concentrations of boulders are present in some places. Deposits occur as free-standing hummocky landforms, commonly in ridges that trend NE – SW, and range in thickness from 10 to 60 ft.

Bedrock Areas



Bedrock outcrops and areas of abundant outcrop or shallow bedrock— Solid color shows extent of individual bedrock outcrops; line pattern indicates areas of shallow bedrock or areas where small outcrops are too numerous to map individually; in areas of shallow bedrock, surficial materials are less than 5-10 ft thick.

Map Compilation

This compilation shows surficial geology in sixteen 7.5-minute quadrangles in northeast Massachusetts: Exeter, Hampton, Salem Depot, Haverill, Newburyport West, Newburyport East, Lawrence, South Groveland, Georgetown, Ipswich, Wilmington, Reading, Salem, Marblehead North, Gloucester, and Rockport (fig. 4, fig 5 area B). It is the second in a series of interim products intended to cover the entire State of Massachusetts. Figure 5 shows all of the compilation areas for surficial geology in Massachusetts. These maps will be produced sequentially by letter designation.

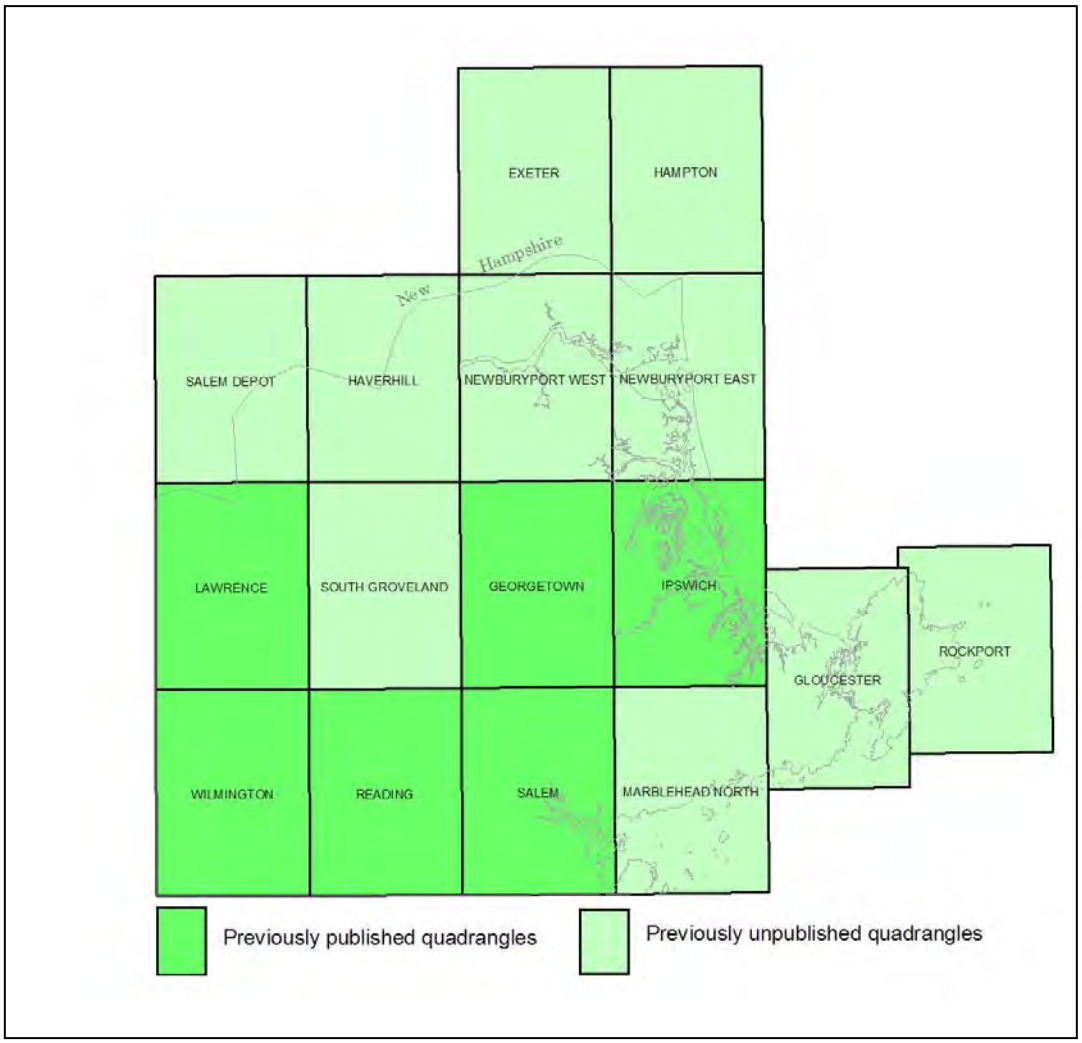


Figure 4. 7.5-minute quadrangles in this compilation.

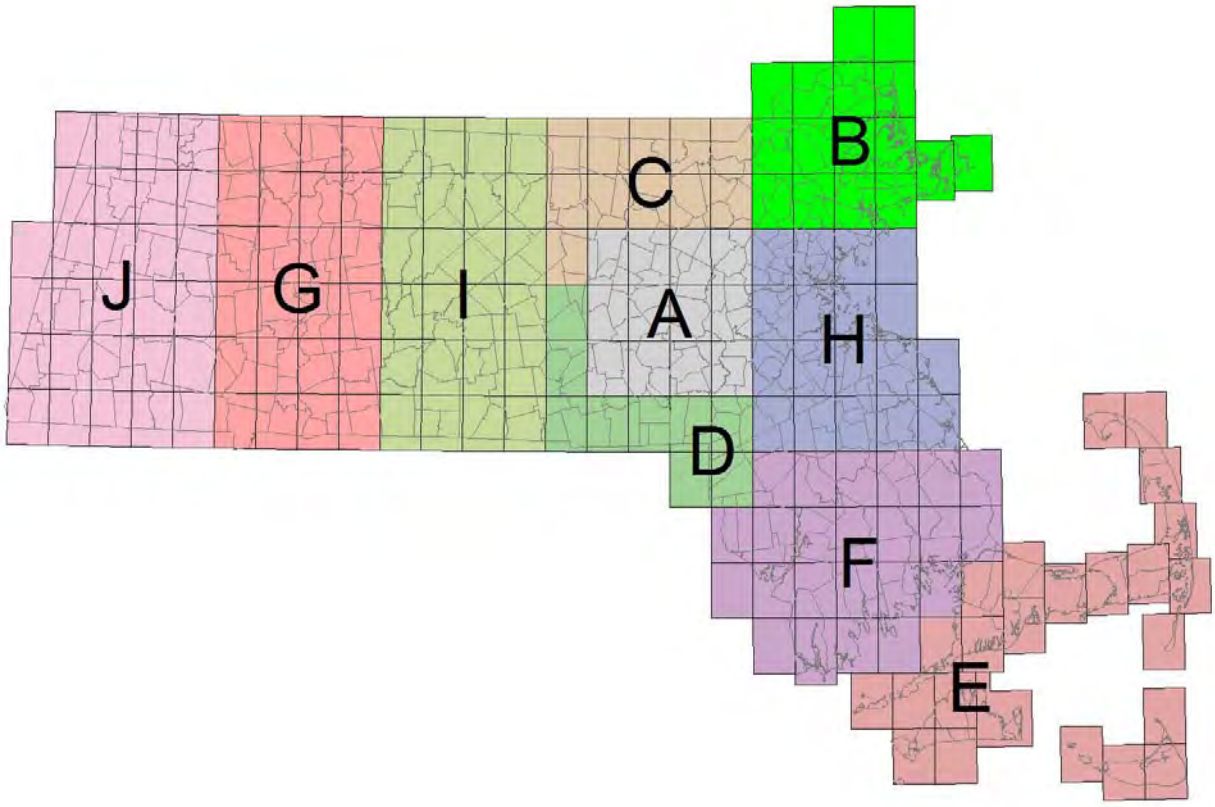


Figure 5. Compilation areas in Massachusetts.

This map was compiled in several steps: 1) Paper copies of the published surficial geologic maps for six quadrangles were scanned and georeferenced by MassGIS. 2) The Office of the Massachusetts State Geologist vectorized the georeferenced images in order to digitally retain the original line work of the published maps (Mabee and others, 2004). 3) Digital geologic map units were compiled and grouped into thirteen basic units in four broader categories: *Postglacial deposits* including artificial fill, floodplain alluvium, swamp deposits, salt marsh deposits, beach and dune deposits, and early postglacial regressive deposits; *glacial stratified deposits* including coarse-grained and fine-grained deposits, *glacial till* including thin till, thick till (drumlins), and end moraine deposits: and *bedrock areas* including outcrops and areas of shallow bedrock). The distribution of glacial stratified deposits beneath adjacent overlying postglacial deposits and water bodies was inferred by the compilers. 4) The same basic units for ten unpublished quadrangles were compiled and digitized from scanned field maps by U.S. Geological Survey personnel. 5) The 16 individual quadrangles were joined and edge-matched in order to form a seamless geologic map. Discrepancies along quadrangle boundaries were resolved, and thick till areas were added by the compilers in quadrangles where this unit was not previously mapped.

All geologic mapping was completed at 1:24,000-scale; however the browse graphic is presented at 1:50,000-scale with shaded relief base. The 1:24,000-scale, 10-ft contour interval topographic base maps used for this mapping effort are included as part of the digital data package in the GIS\24k_basemaps folder. The GIS\shapes folder included with this report contains 4 ARCGIS shapefiles which are geologic units that cover the entire map area, and are intended for use at quadrangle scale; the shapefiles can be clipped by quadrangle or town boundaries. Unlike conventional geologic maps, the digital mapping is arranged in layers according to superposition. The till-bedrock shapefile should be placed on the bottom, and overlain by the stratified deposits shapefile; these materials are shown everywhere that they occur including beneath postglacial deposits, such as swamp deposits, floodplain alluvium, and water bodies. The early_postglacial and postglacial shapefiles should be placed on top because these materials overlie the other two layers. Instructions for using the digital files are included in the README file and metadata.

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Appendix

Sources of Data by 7.5-Minute Quadrangle

Exeter
Map units were reproduced from Goldsmith (2001)

Hampton
Map units were reproduced from Koteff, Carl, Gephart, G. D., and Schaefer, J.P. (1989)

Salem Depot
Stone, B.D., 1982, Unpublished field map

Haverhill
Stone, B.D., 1982, Unpublished field map

Newburyport West
Stone, B.D., 1982, Unpublished field map

Newburyport East
Stone, B.D., 1982, Unpublished field map

Lawrence
Map units were reproduced from Castle (1958); Glacial Stratified Deposits in this quadrangle include deposits of glacial Lake Methuen, and other glaciofluvial and glaciolacustrine deposits. Fine-grained glacial stratified deposits at land surface include lake-bottom deposits of glacial Lake Methuen (unit Qml of Castle, 1958); the fine-grained unit has been extended beneath adjacent water bodies and postglacial deposits on this map. Deposits mapped as morainal ice-contact deposits (unit Qmi of Castle, 1958) have been included here as coarse stratified deposits. Thick till areas were reproduced from the drumlin till unit (Qgd of Castle, 1958); other areas of thick till were inferred from photographic image and topographic analysis.

South Groveland
Stone, B.D., 1982, Unpublished field maps

Georgetown
Map units were reproduced from Cuppels (1969); Glacial Stratified Deposits in this quadrangle include glaciofluvial, glaciolacustrine, and glaciomarine deposits. Fine-grained glacial stratified deposits at land surface include parts of marine and estuarine deposits (unit Qm of Cuppels, 1969); the fine-grained unit has been extended beneath adjacent water bodies and postglacial deposits on this map. Thick till areas shown on this map were inferred from photographic image and topographic analysis and drumlin symbols shown by Cuppels (1969).

Ipswich
Map units were reproduced from Sammel (1963); Glacial Stratified Deposits in this quadrangle include glaciofluvial, glaciolacustrine, and glaciomarine deposits. Fine-grained glacial stratified deposits at land surface include marine and estuarine clay deposits (unit Qmc of Sammel, 1963); this unit has been extended beneath adjacent water bodies and postglacial deposits on this map. Thick till areas were reproduced from the drumlin till unit (Qd of Sammel, 1963); other areas of thick till were inferred from photographic image and topographic analysis.

Wilmington
Map units were reproduced from Castle (1959); Glacial Stratified Deposits in this quadrangle include glaciofluvial and glaciolacustrine deposits. Thick till areas were reproduced from the drumlin till unit (Qgd of Castle, 1959); other areas of thick till were inferred from photographic image and topographic analysis.

Reading
Map units were reproduced from Oldale (1962); Glacial Stratified Deposits in this quadrangle include glaciofluvial and glaciolacustrine deposits. Fine-grained glacial stratified deposits at land surface include glacial lake deposits (unit Ql of Oldale, 1962); the fine-grained unit has been extended beneath adjacent water bodies and postglacial deposits on this map. Thick till areas were reproduced from the drumlin till unit (Qgd of Oldale, 1962) and other areas of thick till were inferred form photographic image and topographic analysis\.

Salem
Map units were reproduced from Oldale (1964); Glacial Stratified Deposits in this quadrangle include glaciofluvial, glaciolacustrine, and glaciomarine deposits. Fine-grained glacial stratified deposits at land surface include marine clay deposits (unit Qmd of Oldale, 1964); the fine-grained unit has been extended beneath adjacent water bodies and postglacial deposits on this map.

Marblehead North
Map units were reproduced from Carnevale, 1979.

Gloucester
Stone, B.D., 1982, Unpublished field maps

Rockport
Stone, B.D., 1982, Unpublished field maps

Attachment C

Phase 1 Environmental Site Assessment (ESA)

NEW AMESBURY ELEMENTARY SCHOOL
SUBSURFACE EXPLORATION DATA
023000

PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA)

For

Charles C. Cashman Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts 01913

Prepared for:

DiNisco Design, Inc.
99 Chauncy Street
Boston, Massachusetts 02111

Prepared by:

Environmental & Construction Management Services, Inc.
288 Grove Street #391
Braintree, Massachusetts 02184
(617) 338-2121

September 13, 2018

ECMS Project No. 1009.073

This report has been prepared for the exclusive use of DiNisco Design and their client the City of Amesbury, Massachusetts. Environmental & Construction Management Services, Inc. acknowledges that DiNisco Design and the City of Amesbury may rely on this report. Photocopying of this document by parties other than those designated by DiNisco Design and the City of Amesbury, or use of this document for purposes other than intended, is prohibited without the prior written consent of Environmental & Construction Management Services, Inc

Environmental & Construction
Management Services, Inc.

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Appendix C Resumes of Competent Environmental Professional
Appendix D Assessor's Property Field Card
Appendix E Environmental Data Resources, Inc. (EDR) Database Report dated August 17, 2018
Appendix F Amesbury Fire Department and Board of Health FOIA Letter
Appendix G EDR Vapor Encroachment report dated September 11, 2018
Appendix H Site Photographs

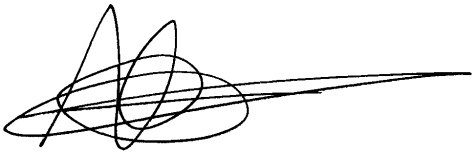
CERTIFICATION OF RESULTS

The assessment was conducted on behalf of and for the exclusive use of *DiNisco Design* and their client, the *City of Amesbury, Massachusetts* and all its successors and assigns, solely for use in an environmental evaluation of the Site. This report and the findings contained herein shall not, in whole or in part, be disseminated or conveyed to any other party, nor used by any other party, in whole or in part, other than *DiNisco Design* or the *City of Amesbury* and all its successors and assigns, without the prior written consent of *Environmental & Construction Management Services, Inc. (ECMS).*

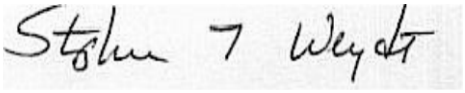
ECMS professional services have been performed, our findings obtained, and our recommendations prepared by an environmental professional in accordance with the U. S. Environmental Protection Agency's (EPA) All Appropriate Inquiry (AAI) Rule and customary principles and practices in the fields of environmental science and engineering. This warranty is in lieu of all other warranties either expressed or implied. *ECMS* is not responsible for the independent conclusions, opinions or recommendations made by others based on the records review, site inspection, field exploration, and laboratory test data presented in this report.

Respectfully submitted this 13th day of September 2018.

For ***Environmental & Construction Management Services, Inc.*** by



Kevin J. Kavanaugh, L.S.P., CHMM
Principal Environmental Engineer



Stephen T. Weydt
Principal Environmental Scientist

EXECUTIVE SUMMARY

Environmental & Construction Management Services, Inc. (ECMS) has performed a Phase I Environmental Site Assessment (ESA) for the Amesbury Elementary (AE) School property located at 193 Lions Mouth Road in Amesbury, Massachusetts (herein after referred to as the Site). This assessment was performed to evaluate the likelihood of a release and/or threat of release of oil and/or hazardous materials at the Site pursuant to the Massachusetts General Law, Chapter 21E (MGL Chapter 21E) and the Massachusetts Contingency Plan (MCP) 310 CMR 40.0000.

The site assessment work described in this report was conducted for *DiNisco Design, Inc. (DiNisco)* between August 15 and September 13, 2018 in accordance with *ECMS'* proposal EC18-024 dated April 13, 2018. This work was performed in conformance with the scope and limitations of the most recent ASTM Standard Practice for Environmental Site Assessment: Phase I Environmental Site Assessment Process Document E-1527-13 and EPA's All Appropriate Inquiry (AAI) Final Rule (effective as of November 1, 2006).

The purpose of the investigation was to identify possible conditions that would be indicative of releases of oil and/or hazardous materials and threatened releases of oil and/or hazardous materials on, at, in or to the Site. The investigation included inspection of the Site and the exterior of adjacent properties, interviews with Site staff and regulatory officials, review of appropriate Federal, State, and local historical and environmental records. This assessment revealed the following:

Findings

A *recognized environmental condition (REC)* refers to the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: due to release to the environment; under conditions indicative of a release to the environment; or under conditions that pose a material threat of a future release to the environment.

- *ECMS* did not identify any recognized environmental conditions during the course of this assessment.

A *controlled recognized environmental condition (CREC)* refers to a REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls. The following was identified during the course of this assessment:

- *ECMS* did not identify any controlled recognized environmental conditions during the course of this assessment.

A *historical recognized environmental condition (HREC)* refers to a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls. The following was identified during the course of this assessment:

- *ECMS* did not identify any historical recognized environmental conditions during the course of this assessment.

An *environmental issue* refers to environmental concerns identified by *ECMS*, which do not qualify as RECs; however, warrant further discussion.

- *ECMS* did not identify any environmental issue during the course of this assessment.

Conclusions, Opinions and Recommendations

This assessment has not revealed evidence of recognized environmental conditions and environmental issues in connection with the subject property. *ECMS* recommends no further actions.

1.0 PURPOSE AND SCOPE OF WORK

1.1 Purpose

This report provides the results of a Phase I Environmental Site Assessment (ESA) performed for the Cashman Elementary School property located at 193 Lions Mouth Road in Amesbury, Massachusetts 01913. This assessment was conducted to identify possible conditions that would be indicative of releases of oil and/or hazardous materials and threatened releases of oil and/or hazardous materials on, at, in or to the Site.

In conducting this assessment, *ECMS* followed the E1527-13 American Society for Testing and Materials (ASTM) document entitled "Standard Practices for Environmental Site Assessments: Phase I Environmental Site Assessment Process" for commercial real estate, as well as the All Appropriate Inquires (AAI) Final Rule of November 1, 2005. Any exceptions to, or deletions from, this practice are described in Section 1.4 of the report.

The primary purpose of this assessment was to identify *recognized environmental conditions (REC)* in connection with the subject property. ASTM defines *recognized environmental conditions* as the presence or likely presence of hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or material threat of a release into structures on the property or into the ground, groundwater, or surface water of the property. The purpose of this practice is to define good commercial and customary practice for conducting an environmental site assessment of a parcel of commercial real estate with respect to the range of contaminants within the scope of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 U.S.C. 9601) and petroleum products. As such, this practice is intended to permit a user to satisfy one of the requirements to qualify for the innocent landowner, contiguous property owner, or *bonafide* prospective purchaser limitations on CERCLA liability. The practice constitutes "all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice" as defined at 42 U.S.C.

The practice constitutes "all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice" as defined at 42 U.S.C. 9601(35)(B).

As part of the AAI Final Rule, Phase I ESAs must be conducted by or under the supervision of a qualified environmental professional. The AAI Final Rule defines an environmental professional as someone who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding conditions indicative of releases or threatened releases on, at, in, or to a property, sufficient to meet the objectives and

performance factors of the rule. We declare that, to the best of our professional knowledge and belief, we meet the definition of environmental professional as defined in §312.10 of 40 CFR 312. We have specific qualifications based on education, training and experience to assess the nature, history, and setting of the subject property. We have developed and performed all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

1.2 Scope of Work

In accordance with the above referenced agreement, *ECMS'* Scope of Work for this Phase I Environmental Site Assessment included the following:

- Site inspection and interviews of knowledgeable key site personnel to document the current and past land use and operations from building types and uses; the location and status of underground and aboveground storage tanks, visual evidence of subsurface or surface contamination, such as areas of visibly distressed vegetation and soil staining; types, quantities, and locations of oil or hazardous materials, including polychlorinated biphenyls (PCBs); and wastes generated, stored or disposed of on or from the Site.

- Review of all available current and historical records to establish the history of the Site and nearby properties for approximately the past 100 years using available federal, state, municipal, private and insurance rate maps; aerial photographs, lists of previous owners or operators or city atlases. A review of title records was not included as part of this investigation.

- Research of technical information concerning the local geologic and hydrologic conditions to determine the likely impact of any actual or potential release on the Site or from neighboring properties and nearby potential environmental receptors such as drinking water supplies, surface water bodies, catch basins and/or detention ponds.

- Review of files held by federal, state and local environmental regulatory agencies for records of past disposal practices; accidental releases, regulatory compliance history, fires, explosions, or other accidents, the status of any current operating or discharge permits; and status of any existing storage tanks.

- Prepare written report for the Site to include site location plan, and pertinent maps, discussions of the Site location and description, site and vicinity history, inspection results, geology and hydrology, and a summary of the environmental regulatory files reviewed.

1.3 Special Terms and Conditions

The site assessment work described in this report was conducted for *DiNisco Design* between August 15 and September 13, 2018 in accordance with *ECMS'* proposal number EC18-024 dated April 13, 2018.

1.4 Limitations and Exceptions of Assessment

The investigation was based on information sources cited in Appendix A, which included Federal, State and local regulatory agencies and Site contacts; observations of the Site and readily observable portions of adjacent properties from public right-of-ways; review of an electronic database search report; review of Local Agency database information; and a review of available historical records. Qualifications/Limitations to this report are presented in Appendix B.

It is the opinion of *ECMS* that no data gaps were identified in the information reviewed and/or obtained during this investigation that would adversely affect the ability of the environmental professional to identify conditions indicative of releases or threatened releases of hazardous substances on, at, in or to the Site.

1.5 User Reliance

This report has been prepared for, and can be relied upon by *DiNisco Design and the City of Amesbury.* Reliance or photocopying of this document by parties other than those designated above or use of this document for purposes other than intended, is prohibited without the prior written consent of *ECMS*.

1.6 Qualifications of Environmental Personnel

In accordance with the requirements of ASTM Standard E1527-13, resumes detailing the relevant experience and qualifications of the Environmental Professionals performing this Phase I Environmental Site Assessment. Resumes are included in Appendix C entitled Qualifications/Limitations.

2.0 PROPERTY DESCRIPTION

2.1 Location and Legal Description of the Site

The Site is an irregularly-shaped 35.32-acre parcel of land located at 193 Lions Mouth Road in Amesbury, Essex County, Massachusetts 01913. According to the City of Amesbury Assessor, the property is listed as parcel 50/6. The Site is occupied by the Charles C. Cashman Elementary School and associated athletic fields, playground, parking lots and landscaped areas. Refer to Figure 2 entitled Lot Location Plan.

The Site is depicted on the 7.5 x 15-minute U.S.G.S. topographic quadrangle for Newburyport, Massachusetts dated 1987. The Universal Transverse Mercator (UTM) coordinates of the Site within zone 19 are approximately 4,746,558 meters north latitude and 340,818.9 meters east longitude or 42° 51' 26.06'' north latitude and 70° 56' 54.07'' west longitude. Elevation at the site is approximately 105 feet above mean sea level (amsl). Figure 1 includes both a Site Locus Plan (a section of the USGS Newburyport Quadrangle) and a Street Location Map of the Site. The Site and surrounding properties are shown on Figure 2, Lot Location Plan attached to this report.

2.2 Site and Vicinity Characteristics

The Site is currently occupied by the City of Amesbury Cashman Elementary School housing grades Pre-kindergarten through 4 (approximately 458 children). The Site is located within OSC – Open Space Conservancy. The school building is surrounded by a driveway and associated paved parking lots, a playground area and grass athletic field. Woodsom Farm to the west, and is accessed from Lions Mouth Road to the South. The north edge of the site is steeply sloping forested hill with an intermittent steam at the base. The Site is surrounded with pockets of densely settled residential neighborhoods.

No existing commercial printing facilities, gasoline filling/service stations, industrial properties or fuel depots were identified in the immediate vicinity of the subject site. The past uses of these surrounding properties do not pose recognized environmental concerns to the Site.

2.3 Descriptions of Structures, Roads, Other Improvements on the Site

The 2-story school building is 61,472 gross square feet (GSF). The building is constructed of masonry block with brick veneer on slab on grade construction.

Assessor Office records indicate that the main Site building construction was completed in 1975. The school building is currently heated by natural gas and heated through forced air ducts. The roof is asphalt and on the roof are several HVAC units. Records indicate, the building is and always has been heated by natural gas. A copy of the Assessor Property Card is attached as Appendix D.

The nearest surface water bodies to the Site is Lake Gardner that is located approximately 2,500 feet to the north-northeast. According to the City of Amesbury Health Department, there are no know public or private potable water supply wells in the vicinity of the Site.

The City of Amesbury obtains its drinking water from its watershed area that encompasses about 55 square miles; most of which reside in New Hampshire. Tuxbury Pond feeds the Powow River, which the treatment plant draws from. Lake

Attitash and Meadowbrook also supplement the water source seasonally and in times of drought. All of Amesbury's wastewater empties into their municipal sewer system. The wastewater treatment facility is located at 19 Merrimac Street.

The site is currently supplied with natural gas and serviced by the municipal water and sewer systems.

The existing school building has a sewage ejector system that was observed along the entrance driveway area south of the school.

2.4 Site Ownership

According to City of Amesbury Assessor's records, the subject site is owned by the City of Amesbury as of December 30, 1971 (Book 5833, Page 124).

A Title Search was not supplied to *ECMS*, and therefore additional ownership information was not available.

2.5 Environmental Liens

ECMS did not conduct a review of title records for the Site, therefore, it is not known if there are environmental liens at the Site. However, according to the Environmental Data Resources, Inc. (EDR) database search report dated August 17, 2018, the Site is not currently listed by the Massachusetts Department of Environmental Protection (MassDEP) as a Disposal Site with a Class A-3, Class A-4, Class B-2, or Class B-3 Response Action Outcome (RAO) Statement in accordance with the Massachusetts Contingency Plan (MCP) 310 CMR 40.1000. Therefore, there are no Activity & Use Limitations (AUL's) currently in force at the site.

2.6 Current Uses of the Site

The Site is currently utilized as the City of Amesbury Cashman Elementary School for grades Pre-K through Grade 4.

2.7 Current Uses of Surrounding Properties

The Site is located within an area primarily used for single-family residential homes, farmland and undeveloped wooded vacant land. There were no visual indications observed during *ECMS* visual inspection of nearby or abutting properties of conditions that would indicate a release or threat of release of oil and/or hazardous substances on, at, in, or to the Site.

2.8 Past Uses of the Site and Vicinity

Historical information was obtained from a review of the historical topographs (1932, 1934, 1943, 1944, 1947, 1950, 1956, 1952, 1968, 1973, 1979, 1971, 1985, 1987 and 2012), historical aerial photos (1953, 1960, 1966, 1973, 1978, 1986, 1992, 1998, 2006, 2009, 2012 and 2016), City Directory (1961, 1965, 1968, 1973, 1977, 1982, 1987, 1992, 1995, 2000, 2005, 2010 and 2014). Refer to Appendix A for copies of the above historic documents.

The historical aerial photo from 1978 shows the school building. Prior to construction of the school building, the Site land area was undeveloped and appears to be farmland as depicted in the aerial photographs from 1953 through 1973.

Properties surrounding the Site to the north, south, east and west were developed with sporadic residential properties and some may have been farmland.

The past uses of these surrounding properties do not pose recognized environmental concerns to the Site.

2.9 Summary of Previous Environmental Reports

No copies of any previous reports were provided to *ECMS.*

3.0 RECORDS REVIEW

ECMS utilized the results of an on-line computer environmental database search of facilities in the vicinity listed by agencies for various reasons. Table 1 presents the databases reviewed and the number of properties identified within the specified search distance with respect to the Site. The search distances specified by the ASTM were the minimum distances used during our search. The EDR database search report dated August 17, 2018 is contained in Appendix E.

3.1 U.S. Environmental Protection Agency (EPA)

<u>CERCLIS and NPL</u>

The EPA tracks sites to be investigated or that are currently being investigated for the threatened or actual release of hazardous substances to the environment. This system is under the jurisdiction of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, also known as Superfund. The CERCLA Information System (CERCLIS) database indicates if a site has been or is being considered for designation on the National Priorities List (NPL). The NPL is the list of abandoned and/or uncontrolled hazardous waste sites identified for priority action under Superfund. To be placed on the NPL, a property must

exceed a hazard ranking evaluation, pose a significant threat to health and the environment, and require remedial action. The EPA also tracks the NPL sites that have been delisted from the NPL where no further response is appropriate.

The Site is not listed as either a current or delisted NPL facility or CERCLIS facility. There are no current or delisted NPL facilities within one mile of the Site and no CERCLIS facilities listed within one-half mile of the Site.

NFRAP (No Further Remedial Action Plan)

The EPA maintains a database of archived CERCLA sites where assessment has been completed and a determination has been made that the location is not judged to be a potential NPL property.

The Site is not listed on the NFRAP and there are no NFRAP listed properties located within one-half mile of the Site.

Resource Conservation and Recovery Act (RCRA)

The RCRA TSD list includes any operation that transports, stores or disposes of hazardous waste and which must obtain a hazardous waste identification number or transporter permit. *ECMS* review of the RCRIS Transporters database indicated that the Site was not listed as a RCRA TSD of hazardous waste and there are no RCRA TSD listed facilities located within one-half mile of the Site.

The RCRA COR ACT is a database maintained for management and inventory of RCRA generators, transporters, treaters, storers and disposers of hazardous materials. *ECMS* review of the RCRA COR ACT database indicated that the Site was not listed as a RCRA COR ACT facility and there are no RCRA COR ACT listed facilities located within one-mile of the Site.

The RCRA Generators list includes any operation that generates hazardous waste and which much obtain a hazardous waste generator identification number. The Site is not identified as a RCRA generator. No RCRA generators are located within one-quarter mile of the Site.

TABLE I
FEDERAL AND STATE ENVIRONMENTAL SOURCES

Standard Environmental Sources	Search Distance	Number of Sites	Location With Respect to the Site (miles)				
			Site	0.0-0.25	0.25-0.5	0.5-0.75	0.75-1.0
NPL Sites List	1.0 mile	0	No	0	0	0	0
NPL Delisted Sites List	0.5 mile	0	No	0	0	NA	NA
CERCLIS List	0.5 mile	0	No	0	0	NA	NA
NFRAP	0.5 mile	0	No	0	0	NA	NA
RCRA TSD List	0.5 mile	0	No	0	0	NA	NA
RCRA Generators List (LQG & SQG)	0.25 mile	0	No	0	NA	NA	NA
RCRA Cor Act	1.0 mile	0	No	0	0	0	0
Federal IC/EC	0.5 mile	0	No	0	0	NA	NA
ERNS List	0.25 mile	0	No	0	NA	NA	NA
Tribal Lands	1.0 mile	0	No	0	0	0	0
MassDEP/Tribal Sites List (CERCLA equiv.)	1.0 mile	22	No	0	0	0	22
MassDEP/Tribal LUST List	0.5 mile	0	No	0	0	NA	NA
MassDEP/Tribal LAST List	0.5 mile	0	No	0	0	NA	NA
MassDEP Spills List	0.25 mile	0	No	0	NA	NA	NA
MassDEP/Tribal Landfill/Solid Waste Disposal Sites List (active & inactive)	0.5 mile	0	No	0	0	NA	NA
MassDEP/Tribal Registered UST/AST List	0.25 mile	0	No	0	NA	NA	NA
MassDEP/Tribal IC	0.25 mile	0	No	0	NA	NA	NA
MassDEP/Tribal Brownfields	0.5 mile	0	No	0	0	NA	NA

NA = Not Applicable

Emergency Response Notification System (ERNS)

The EPA and National Response Center (NRC) Emergency Response Notification System (ERNS) is a list of hazardous material spills. The Site is not listed on the ERNS list and there were no ERNS listed facilities located within a 0.125-mile radius of the Site.

Federal Industrial and Engineering Controls

The federal listing of industrial and engineering controls is the EPA's Brownfield Management System, a database designed to assist EPA in collecting, tracking and updating information as well as reporting on the major activities and accomplishments of the various Brownfield grant programs. Sites listed on this database are Superfund sites that have either engineering or institutional controls in operation. The Site is not listed as having either industrial or engineering controls in operation and there were no properties identified within one-half mile of the Site with industrial or engineering controls in operation.

U. S. EPA Facility Index System (FINDS) List

The Site is identified on the U. S. EPA Facility Index System (FINDS) list. FINDS is an index of identification numbers associated with a property or facility that the EPA has investigated or has been made aware of in conjunction with various regulatory programs. The program identified with the Site is the National Center for Education Statistics (NCES) a primary federal database for collecting and analyzing data related to education in the United States and other nations.

3.2 Massachusetts Department of Environmental Protection (MassDEP)/ Tribal Lands

MassDEP/Tribal Sites List

The MassDEP/Tribal Sites list contains the names of facilities and/or locations within the state of Massachusetts, which have reported releases of contaminants from petroleum storage systems. This report is maintained by the MassDEP. The Site does not appear on the MassDEP Sites List.

The database identified 22 MassDEP Sites listings within a one-mile radius of the subject Site. All of the 22 listed Sites are at a distance greater than ½ mile from the Site and given the distances none are not expected to present conditions indicative of a release or threat of release to the Site.

MassDEP/Tribal Spills List

The Site does not appear on the MassDEP Spills List. No spill of oil and/or hazardous materials was documented in MassDEP records within a 0.25-mile radius of the Site.

MassDEP Leaking Underground Storage Tank (UST) List

The MassDEP maintains this database of releases of oil or hazardous materials from USTs. The Site does not appear on the LUST List. Four (4) MassDEP LUST listed properties were documented in MassDEP records at properties within a one-half mile radius of the Site. All of these four (4) properties are located at distances greater than ¼-mile from the Site therefore, these releases are not expected to present conditions indicative of a release or threat of release to the Site.

3.3 State of Massachusetts/Tribal Registered Underground Storage Tanks (RUST) List

This database, maintained by the State of Massachusetts Fire Marshall, registers locations with either USTs or aboveground storage tanks (ASTs). The Site does not appear on the RUST list. There were no properties within a 0.25-mile radius of the Site identified on the RUST list.

3.4 Municipal and Local Authorities

Information related to environmental responses at the Site was requested from City of Amesbury municipal offices.

Amesbury Prevention Fire Department

Records relative to underground storage tanks and flammables were requested from the City of Amesbury Fire Department. Discussions with Chris with the Amesbury Fire Department revealed that no records were found for this location. A copy of Amesbury Fire Department FOIA Letter is attached in Appendix F of this report.

Amesbury Clerk's Office

Records relative to underground storage tanks and flammables were requested from the City of Amesbury Clerk's Office. No records were on file for the subject site.

Amesbury Health Department

The City of Amesbury Health Department had nothing on file for the property at 193 Lions Mouth Road pertaining to oil and/or hazardous materials. A copy of Amesbury Health Department FOIA Letter is attached in Appendix F of this report.

Amesbury Engineering Department

The Amesbury Engineering Department did not have information pertaining to the use, storage or release of oil or hazardous materials at the Site.

Amesbury Conservation Commission

Records at the Amesbury Conservation Commission indicate that there is no Wetland Resource Areas under the Massachusetts Wetlands Protection Act, and the Amesbury Wetlands Protection Bylaw present at the subject site.

3.5 State/Tribal Solid Waste Landfills

The Site does not appear on the Solid Waste Landfill list. There were no properties listed on the Solid Waste Landfill list within a one-half mile radius of the Site.

3.6 Other Identified Potential Nearby Properties

A review of the EDR US Hist Auto Stat list, as provided by EDR, has revealed that there are no EDR US Hist Auto Stat sites within approximately 0.25 miles of the target property.

3.7 Unmapped Sites

There are 5 non-geocoded (unmapped) facilities listed in the EDR report. When possible, the properties within 500 feet of the Site were located during *ECMS'* Site reconnaissance. No identifiable unmapped facilities representing conditions indicative of releases of oil and/or hazardous substances or potential releases of oil and/or hazardous substances on, at, in or to the Site were identified during this investigation.

3.8 Tier 1 Vapor Encroachment Screening

ECMS performed a Tier 1 Vapor Encroachment Screening in compliance with ASTM E 2600-10 "ASTM Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions" as amended. The purpose of the Tier 1 Vapor Encroachment Screening is to conduct an initial screen to determine if a Vapor Encroachment Condition (VEC) exists in connection with the Site. A VEC is defined as the presence or likely presence of chemical of concern vapors in the

subsurface of the Site caused by the release of vapors from contaminated soil or groundwater either on or near the Site.

ECMS reviewed standard environmental record sources to identify if there are known or suspected sources of contamination within the area of concern. According to ASTM E 2600-10, the area of concern is defined by the approximate minimum search distance which is based upon the chemical of concern (i.e., petroleum hydrocarbons vs. non-petroleum hydrocarbons) and the location of a known or suspected source of contamination with respect to the Site.

According to ASTM E 2600-10 8.2.1 "The area of concern is one third of a mile around the Site, unless the use of a shorter distance is appropriate". In addition, according to ASTM E 2600-10 8.3.1, "The approximate minimum search distance may be expanded or reduced in the up-gradient, down-gradient, and/or cross-gradient directions by the environmental professional conducting the Vapor Encroachment Screening based upon experience in the local area." Given that there were no properties of concern for vapor release to the Site nearby, the minimum search distances were not expanded or reduced. Unless otherwise stated, groundwater flow/gradient is approximated based on surface topography. Based no presence of a potential for oil and or hazardous materials on the site, there does not exist a potential environmental concern with respect to a VEC for this property.

ECMS was not provided information from the user, current landowner or key site manager regarding specialized knowledge or experience or commonly known or reasonably ascertainable information within the local community about the Site that is material to the assessment of a VEC in connection with the Site.

Refer to Appendix G, Environmental Data Resources, Inc. (EDR) Vapor Encroachment report dated September 11, 2018.

4.0 INFORMATION FROM THE SITE RECONNAISSANCE

On August 21, 2018, Mr. Kevin J. Kavanaugh, LSP, CHMM, Principal Environmental Engineer for *ECMS* visited the Site. Mr. Kavanaugh was accompanied during the reconnaissance by Mr. Norman Fredette, head of maintenance for the Cashman Elementary School. Mr. Fredette is considered to be an individual most likely to be knowledgeable about the current and past uses of the property, particularly with regard to current and past uses of hazardous substances on the property. The site reconnaissance was documented with photographs, attached as Appendix H of this report.

The reconnaissance was conducted to observe any condition indicative of the release or threat of release of oil or hazardous substances on, at, in or to the Site. Observations made during the Site visit are summarized below.

4.1 Hazardous Materials Storage and Disposal

Typical cleaning supplies are stored in the building. According to Mr. Fredette, all cleaning supplies are "Green", thus are not considered to be hazardous in nature. The cleaners are organized and labeled. Other hazardous materials observed included paint cans, toner cartridges and miscellaneous cleaners used in general maintenance of the school building. Materials were generally labeled and stored neatly.

4.2 Solid Waste Disposal

Solid waste and recycling are collected in dumpsters located in the parking area to the west of the Site building. *Mello Disposal* of Groveland, Massachusetts collects the solid waste twice per week and recycling once per week.

No areas that were apparently filled by non-natural causes suggesting trash or other solid waste disposal. No mounds or depressions suggesting trash or other solid waste disposal were visually or physically observed at the site during the visit.

4.3 Storage Tanks

According to the EDR report database there are no underground storage tanks (USTs) located on the Site.

No obvious visual evidence (vent pipes, fill pipes, fire pumps or emergency generators, etc.) of USTs was observed during the *ECMS* site reconnaissance performed on August 21, 2018.

One (1) aboveground storage tank (AST) was observed to be on the Site. This tank was a diesel fuel tank associated with and that lies beneath the emergency generator unit that is located north of the school building and south of the athletic fields. No leakage from this AST was observed on August 21, 2018. The emergency generator is enclosed by a locked chain link fence.

4.4 Polychlorinated Biphenyls (PCBs)

PCBs were commonly used as insulating and cooling fluids in electrical equipment, including transformers, ballasts and capacitors as well as in hydraulic fluids such as elevator equipment.

The fluorescent light fixtures appeared in good condition. All ballasts should be inspected and discarded of in accordance with federal, state and regional requirements.

One (1) pad mounted transformer was observed at the Site. It was located along the northwestern corner of the building next to the emergency generator and also located within the chain link fenced area. No notation could be found indicating the presence of potential PCBs within the transformer but there was no evidence of any hydraulic oil leakage or staining on the crushed stone.

One (1) elevator hydraulic system was inspected by *ECMS*. There was a small stain observed on the floor of the elevator equipment room but appeared to be de minimus and there was no evidence of any hydraulic oil leakage from any of the observed equipment. Inspection of the elevator piston was not made.

No investigation to the presence of PCBs in building materials was conducted.

4.5 Electromagnetic Fields (EMFs)

Although epidemiological evidence is not conclusive, there is an increasing awareness and interest in monitoring magnetic radiation produced by power lines, transformers, and electronically driven devices.

There are no overhead high voltage transmission lines, microwave towers, or antennas located on the subject Site.

4.6 Groundwater Wells

No groundwater wells were observed during the Site reconnaissance.

4.7 Landfills, Pits, Sumps

The Underground Injection Control (UIC) program protects drinking water by regulating discharges to the ground via injection wells such as dry wells, septic systems tied to industrial processes, and other subsurface leaching systems. Pursuant to UIC regulations (310 CMR 27.00), where the potential exists for pollutants to enter an injection well (e.g. by means of a floor drain) and the presence of the pollutants causes or may cause a violation of any Massachusetts Drinking Water Regulation or adversely affects or may adversely affect public health, the use of the well is prohibited. With the exception of discharges authorized under the Department's Ground Water Discharge Permit program, the Department considers this prohibition to include the use of any injection well at facilities which have in the past or currently use, store, or otherwise manage hazardous materials and/or wastes as defined in 310 CMR 30.000 and 310 CMR 40.0000. This Notice is not applicable to any facility where the floor drain is connected to a Municipal Sewer System.

At the time of the Site reconnaissance, *ECMS* personnel did not observe any evidence of landfills or pits at the Site.

4.8 Dry Cleaning Operations

The Site is not currently the location of a drycleaner and historical records reviewed did not indicate that a dry cleaner has ever existed at this location.

4.9 Chlorofluorocarbons as Coolants (CFCs)

There are no central cooling units at the Site. Only three (3) window mounted units were observed and thus CFCs do not pose a significant environmental concern to this site.

4.10 Hydrology and Geology of the Site Vicinity

The Site-specific hydrology and geology cannot be known without conducting subsurface investigations at the Site. However, the bedrock in the area consists of granitic rocks and metamorphic schists. During the last glacial maximum, the glaciers cut into the bedrock carving out a portion which then began to fill with various sediments. When the glacier retreated, it left behind a small layer of glacial till as well as small ponds that deposited fine sands and silts on top of the tills.

Depth to groundwater at the Site is not known. However, based on a review of the local topography and nearby surface water features, it is likely greater than 5 feet below ground surface. Direction of groundwater flow is not known. Based on local topography and nearby surface water features, groundwater flow direction is likely southwesterly.

The Site lies at an approximate elevation of approximately 105 feet above mean sea level (amsl). The Site lot is primarily relatively flat but does slope gently to the west where the grassed field and playground area are behind the school building.

According to information in the *Massachusetts Natural Heritage Atlas* (October 2006 edition), no certified vernal pools, priority habitats of rare species or estimated habitats of rare wildlife were identified at the Site or within a 500-foot radius of the Site. Refer to Figure 3 for a map of Priority Habitats of Rare Species and Figure 4 for a Map of Estimated Habitats of Rare Wildlife and Certified Vernal Pools

The nearest surface water body is Lake Gardner that is located approximately 2,500 feet to the northeast. There are no known private potable water supply wells in the vicinity of the Site. Water and sewer service for the Site is provided by the City of Amesbury.

According to a MassGIS Map, the site is located not within a Zone II, Interim Wellhead Protection Area (IWPA) or a Sole Source Aquifer. Refer to MassDEP Priority Resources (21E) Map attached as Figure 6 to this report.

Based on current Site use, no impact to environmental receptors is predicted.

5.0 ADDITIONAL ENVIRONMENTAL CONSIDERATIONS

Section 12 of the ASTM Standard E 1527 discusses "Non-Scope Considerations" outside the scope of "appropriate inquiry" as defined by their ESA standard practice. That is, certain environmental issues or considerations may be present on-Site that may lead to contamination of the property or nearby properties, but are not included in the CERCLA definition of hazardous substances nor otherwise present CERCLA liability.

5.1 Radon

Radon is a colorless, odorless gas produced by the radioactive decay of uranium. The most common sources of radon are igneous and metamorphic rocks, containing uranium (e.g., pitchblende), granite, shale and phosphate, as well as soils/sediments derived from such "parent materials." Radon may also be found in soils contaminated with certain industrial wastes (e.g., uranium or phosphate mine tailings) or in earth-derived building products that contain such industrial wastes (bricks or concrete-containing phosphate slag).

An assessment for radon was not performed as part of the assessment.

The United States Environmental Protection Agency (EPA) Radon Zone for Essex County has a median radon concentration of 2.8 pCi/L and 36% of sites with concentrations of radon greater than the EPA recommended threshold of 4 pCi/L.

Site specific testing for radon would be necessary to determine that actual level at the Site.

5.2 Lead –Based Paint

No documentation relative to lead-based paints (LBP) was reviewed for this assessment. Whereas the school building was constructed before 1979, lead-based paint may be present within the Site building.

5.3 Asbestos Containing Materials (ACMs)

No previous survey information was available for review. Whereas the school building constructed before 1980, the presence of asbestos-containing material (ACM) may pose a recognized environmental condition to the Site.

5.4 Floodplain Management

Based on a review of the National Flood Insurance Program Flood Insurance Rate Map (FIRM), Community Map 25009C0102F dated July 6, 2016, the Site and surrounding area lies within an area classified as Zone X Other Flood Areas, an area determined to be outside the 0.2% annual chance floodplain. Refer to National

Flood Insurance Program Flood Insurance Rate Map (FIRM), Community Map attached as Figure 7 to this report.

5.5 Coastal Barrier Resources

The Site is not located within an area considered to be a Coastal Barrier Resource.

5.6 Coastal Zone Management

The Site is not located within an area designated as a Coastal Zone.

5.7 Sole Source Aquifers

The Site is not located within an area classified as a Sole Source Aquifer.

5.8 Airport Clear Zones

The Site is not located within an Airport Clear Zone.

5.0 FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The purpose of the investigation was to identify possible conditions that would be indicative of releases of oil and/or hazardous materials and threatened releases of oil and/or hazardous materials on, at, in or to the Site. The investigation included inspection of the Site and the exterior of adjacent properties, interviews with Site staff and regulatory officials, review of appropriate Federal, State, and local historical and environmental records. This assessment revealed the following:

Findings

A *recognized environmental condition (REC)* refers to the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: due to release to the environment; under conditions indicative of a release to the environment; or under conditions that pose a material threat of a future release to the environment.

- *ECMS* did not identify any recognized environmental conditions during the course of this assessment.

A *controlled recognized environmental condition (CREC)* refers to a REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls. The following was identified during the course of this assessment:

- *ECMS* did not identify any controlled recognized environmental conditions during the course of this assessment.

A *historical recognized environmental condition (HREC)* refers to a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls. The following was identified during the course of this assessment:

- *ECMS* did not identify any historical recognized environmental conditions during the course of this assessment.

An *environmental issue* refers to environmental concerns identified by *ECMS*, which do not qualify as RECs; however, warrant further discussion.

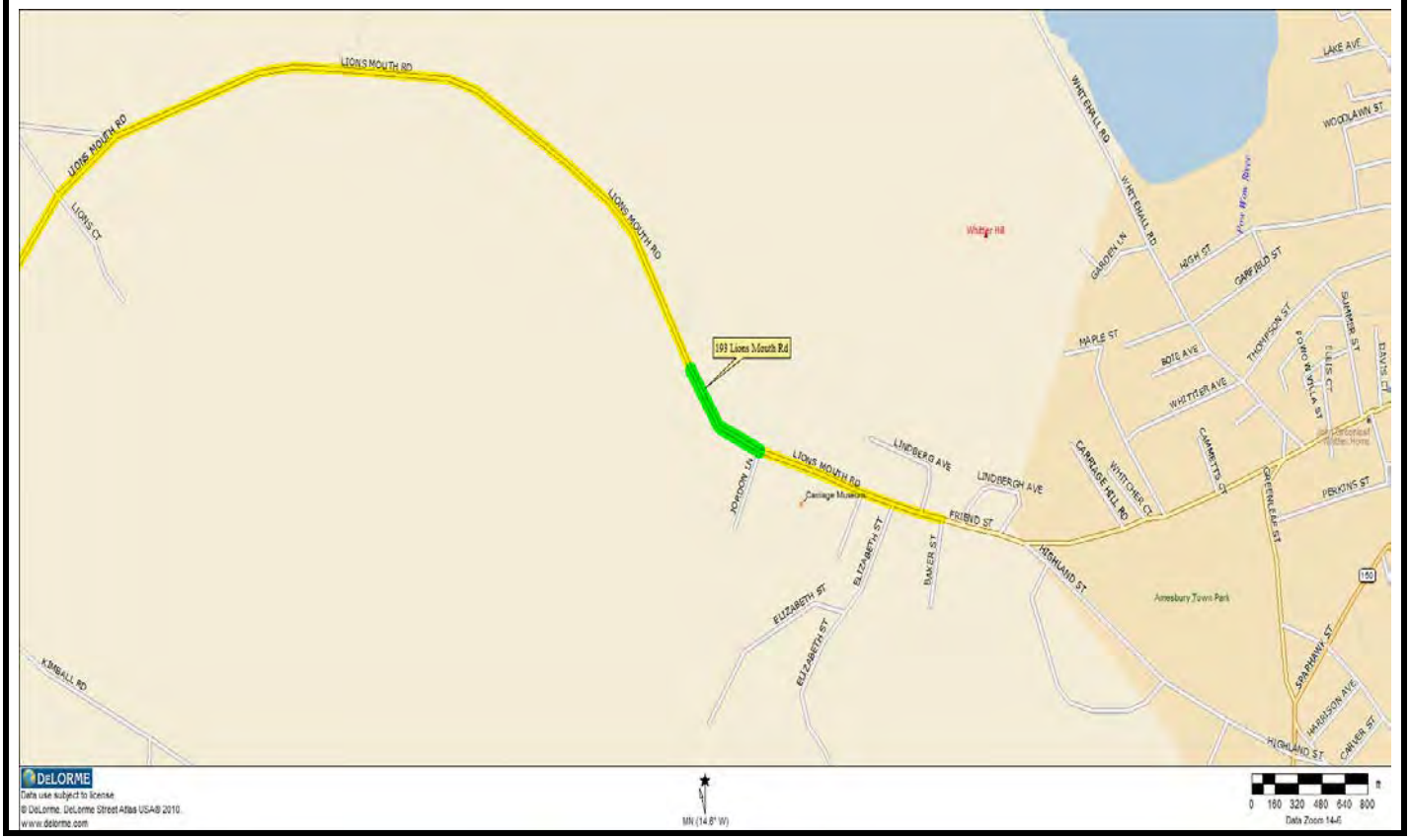
- *ECMS* did not identify any environmental issue during the course of this assessment.

Conclusions and Recommendations

This assessment has not revealed evidence of recognized environmental conditions and environmental issues in connection with the subject property. *ECMS* recommends no further actions.

FIGURES





Cashman Elementary School **193 Lions Mouth Road** **Amesbury, Massachusetts** **01913**	**Environmental & Construction Management Services, Inc.**	**Project No.** 1009.073	**Figure 1**
		Site Locus / Street Location Plan	
		Drawn By: KJK	**Date:** 8/24/18

N

CITY OF AMESBURY, MASS.

Assessor Maps

LEGEND

- Parcel Line
- Building Footprints
- Prior Parcel Line with Common Ownership
- 5 Condo Unit Number
- Right of Way
- Map Index
- Town Boundaries
- Easements
- Hydrographic Features
- Streams
- Wetlands

Exempt Lands

- Federal
- State
- Municipal
- Private

N

SCALE: 1" = 100'

100 0 100 200 300 400

NOTE:
THE AREAS, BOUNDARIES, AND DIMENSIONS SHOWN ON THIS TAX MAP ARE DERIVED FROM AERIAL PHOTOGRAPHS, GROUND SURVEYS, AND RECORDED PLANS, MAPS, DEEDS, AND WILLS, AND ARE INTENDED TO BE USED FOR PROPERTY ASSESSMENT PURPOSES ONLY AND NOT FOR CONVEYANCE.

MAP REVISION DATE		
As of January 1, 2018		

Data Sources: The data for this map was supplied by the Merrimack Valley Planning Commission, the Town of Amesbury and the Executive Office of Environmental Affairs/MassGIS.

Merrimack Valley Planning Commission
plan • develop • promote

J:\ArcGIS\Amesbury\AmesburyAssessorMap_24x36.mxd

INDEX

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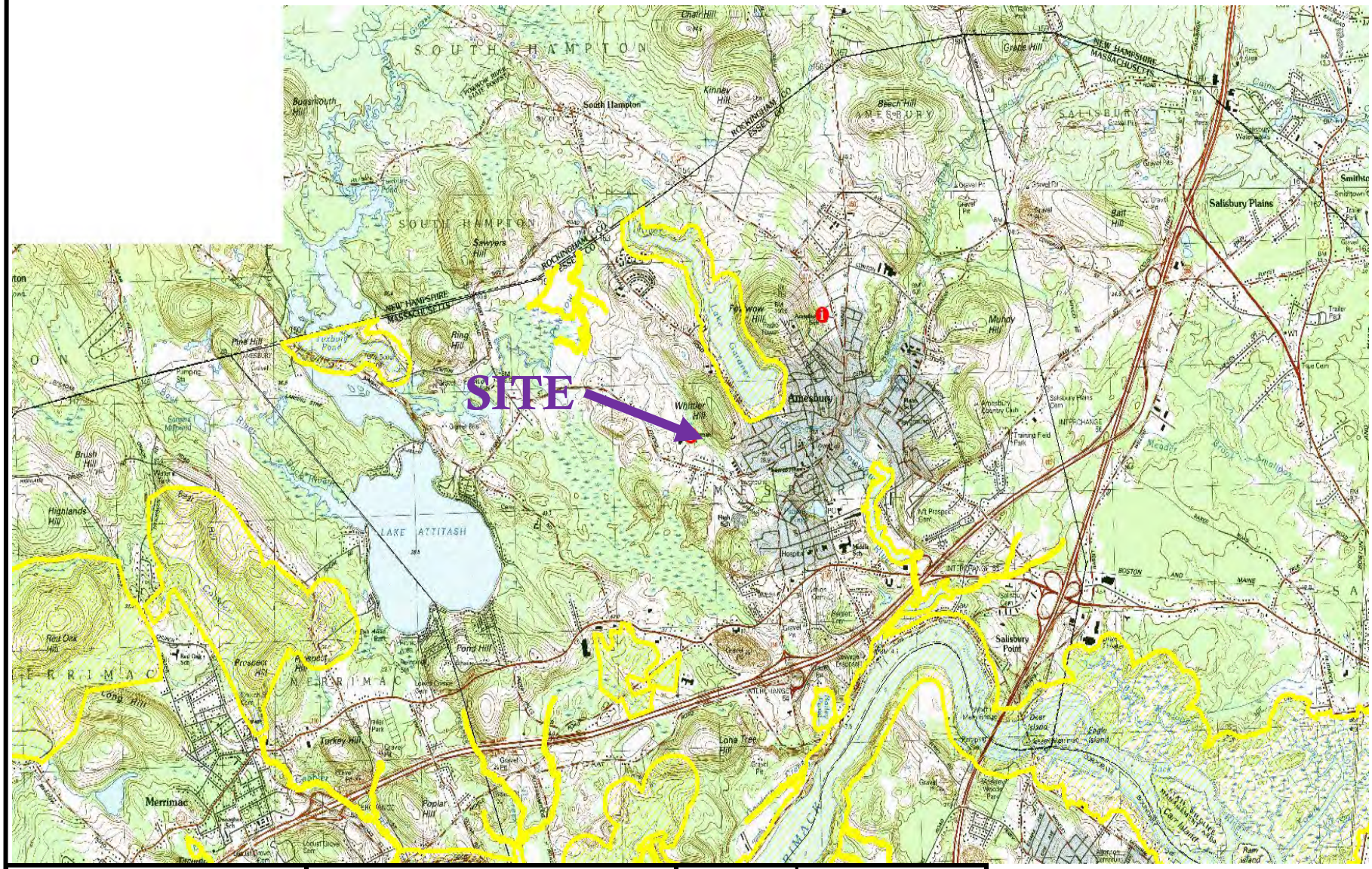
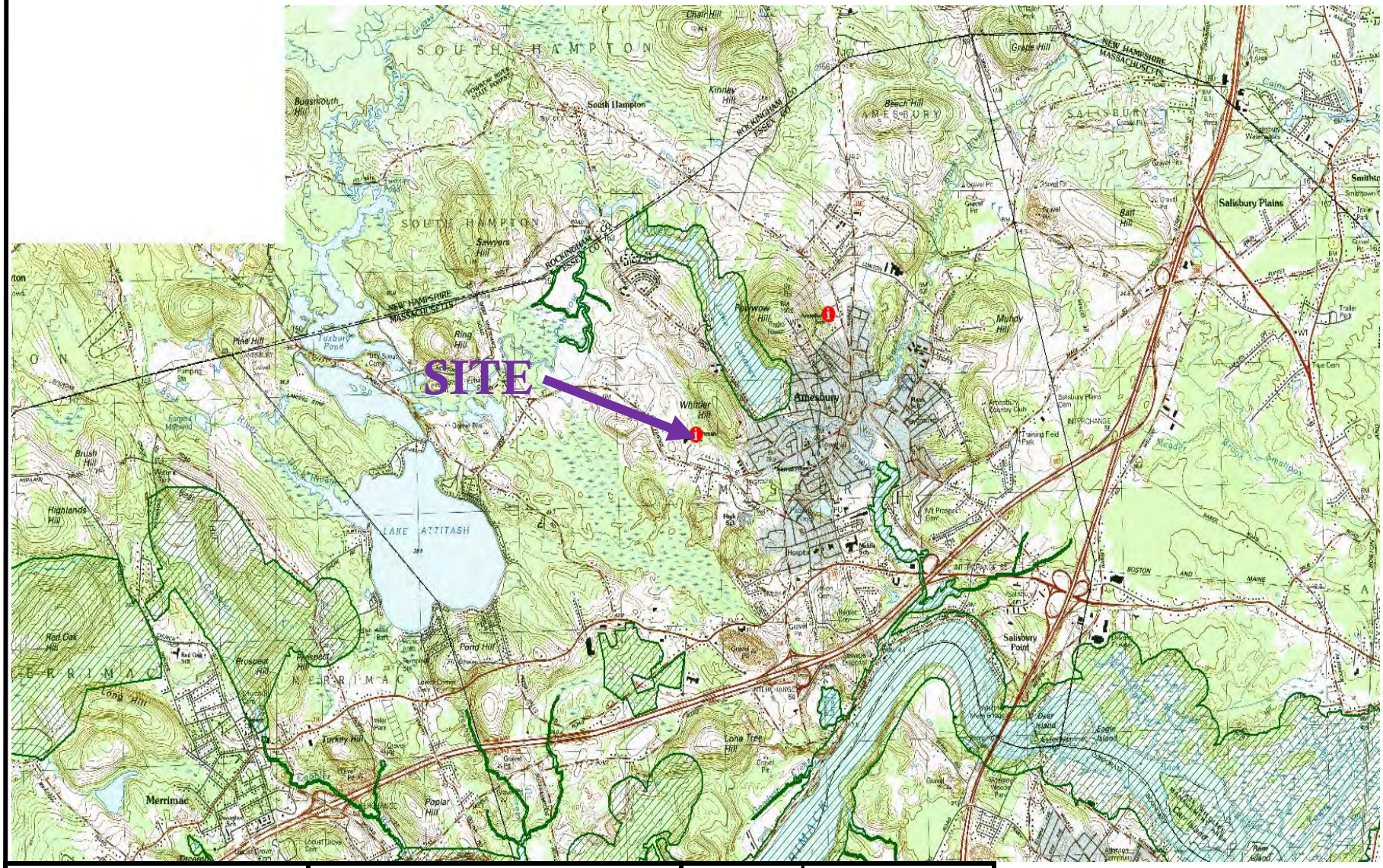


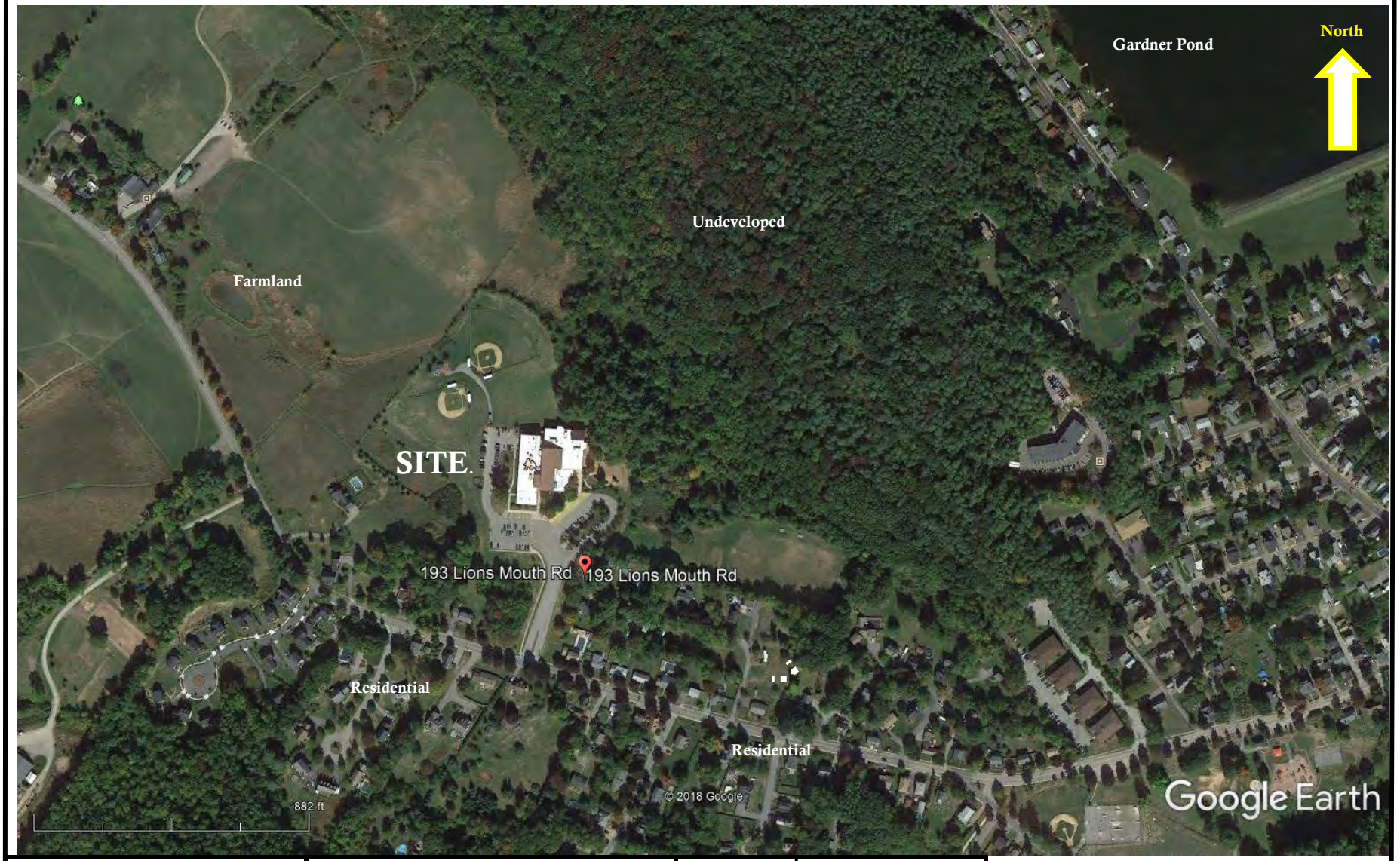
Cashman Elementary School **193 Lions Mouth Road** **Amesbury, Massachusetts** **01913**	**Environmental & Construction Management Services, Inc.**	**Project No.** 1009.073	**Figure 3**
		Priority Habitats of Rare Species Plan	
		Drawn By: KJK	**Date:** 8/23/18



Cashman Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts
01913

Environmental & Construction Management Services, Inc.

Project No. 1009.073	**Figure 4**
Map of Estimated Habitats of Rare Wildlife and Certified Vernal Pools	
Drawn By: KJK	**Date:** 8/23/18



Cashman Elementary School **193 Lions Mouth Road** **Amesbury, Massachusetts** **01913**	**Environmental & Construction Management Services, Inc.**	**Project No.** 1009.073	**Figure 5**
		Aerial Photograph Site Location Plan	
		Drawn By: KJK	**Date:** 8/24/2018

MassDEP - Bureau of Waste Site Cleanup

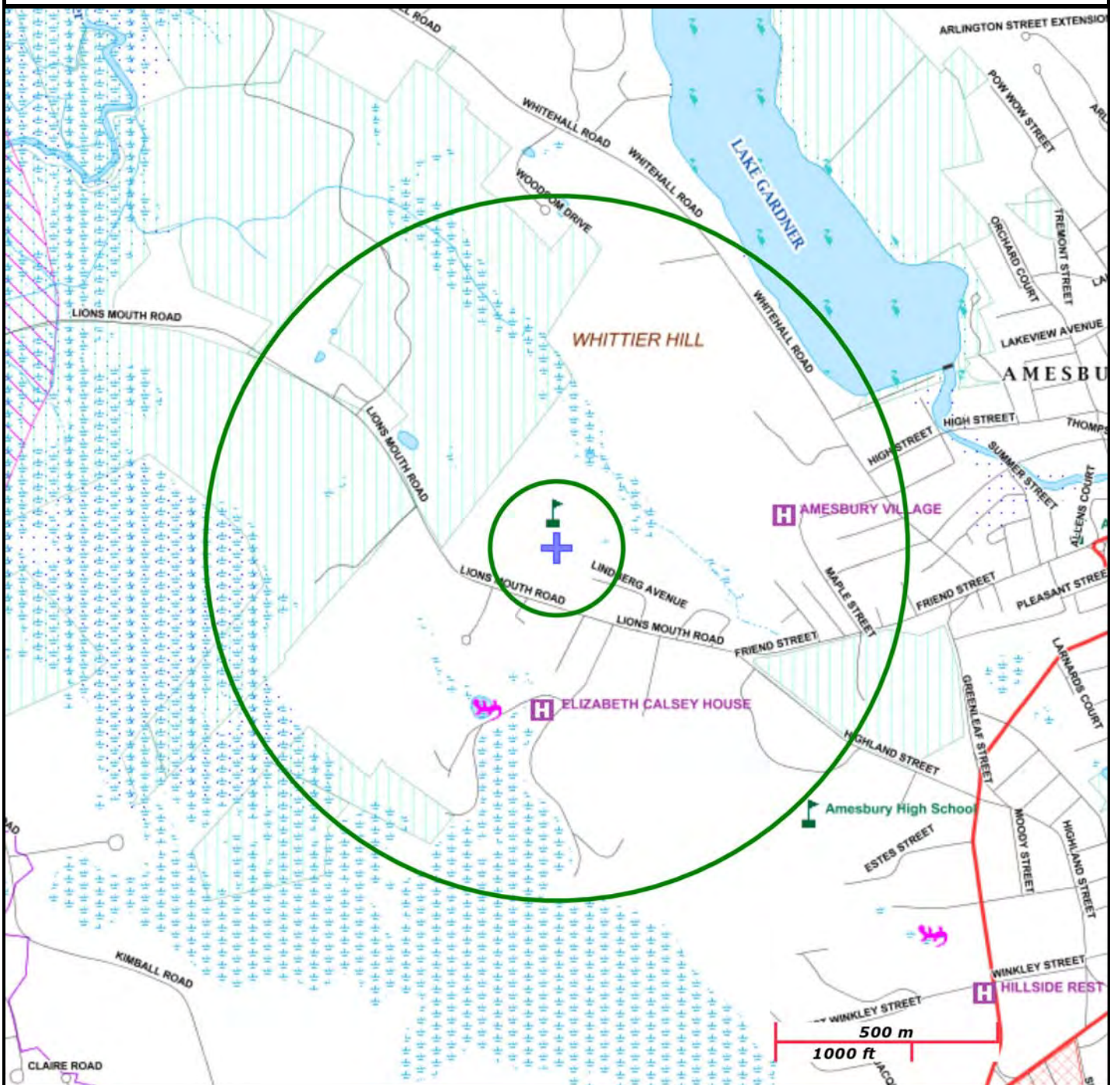
Phase 1 Site Assessment Map: 500 feet & 0.5 Mile Radii

Site Information:
CAHSMAN ELEMENTARY SCHOOL
193 LIONS MOUTH ROAD AMESBURY, MA

NAD83 UTM Meters:
4746679mN , 340744mE (Zone: 19)
September 13, 2018

The information shown is the best available at the date of printing. However, it may be incomplete. The responsible party and LSP are ultimately responsible for ascertaining the true conditions surrounding the site. Metadata for data layers shown on this map can be found at: http://www.mass.gov/mgis/.

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection



Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail

Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct

Basins: Major, PWS; Streams: Perennial, Intermittent, Man Made Shore, Dam

Aquifers: Medium Yield, High Yield, EPA Sole Source

Non Potential Drinking Water Source Area: Medium, High (Yield)

PWS Protection Areas: Zone II, IWPA, Zone A

Hydrography: Open Water, PWS Reservoir, Tidal Flat

Wetlands: Freshwater, Saltwater, Cranberry Bog

FEMA 100yr Floodplain; Protected Open Space; ACEC

Est. Rare Wetland Wildlife Hab; Vernal Pool: Cert., Potential

Solid Waste Landfill; PWS: Com.GW,SW, Emerg., Non-Com.

National Flood Hazard Layer FIRMette

FEMA

42°51'31.27"N

70°57'17.71"W



70°56'40.25"W

42°51'4.90"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Legend

FIGURE 7

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/13/2018 at 3:39:51 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



Cashman Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts
01913

Environmental & Construction Management Services, Inc.

Project No. 1009.073	**Figure 8**
Site Plan	
Drawn By: KJK	**Date:** 8/23/18

APPENDIX A

INFORMATION/RESEARCH SOURCES, INFORMATION & HISTORICAL DOCUMENTATION

RESEARCH/INFORMATION SOURCES

Environmental Data Resources, Inc. (EDR) Radius Report with GeoCheck for Target Property in Amesbury, Massachusetts, August 17, 2018.

EDR City Directory Image Reports dated 1961, 1965, 1968, 1973, 1977, 1982, 1987, 1992, 1995, 2000, 2005, 2010 and 2014 for Target Property in Amesbury, Massachusetts, August 17, 2018.

EDR Certified Sanborn Map Report for Target Property in Amesbury, Massachusetts, August 17, 2018.

EDR Historical Aerial Photographs dated 1953, 1960, 1966, 1973, 1978, 1986, 1992, 1998, 2006, 2009, 2012 and 2016 for Target Property in Amesbury, Massachusetts, August 17, 2018.

EDR Historical Topographs dated 1932, 1934, 1943, 1944, 1947, 1950, 1956, 1952, 1968, 1973, 1979, 1971, 1985, 1987 and 2012 for Target Property in Amesbury, Massachusetts, August 17, 2018.

City of Amesbury Assessor's Office records.

City of Amesbury Health Department file review on August 21, 2018.

City of Amesbury Fire Department, Fire Prevention records reviewed on August 21, 2018.

City of Amesbury Clerk's Office on August 21, 2018, no pertinent files.

City of Amesbury Public Works and Engineering Department on August 21, 2018, no pertinent files.

Zen, E-an (1983) Bedrock Geology Map of Massachusetts, compiled by Richard Goldsmith, Nicholas M. Ratcliffe, Peter Robinson, and Rolfe S. Stanley and assisted by Norman L. Hatch, Jr., Andrew F. Shride, Elaine G.A. Weed, and David R. Wones, prepared in cooperation with the Commonwealth of Massachusetts, Department of Public Works, and Joseph A. Sinnott, State Geologist, scale 1:250,000.

Cashman Elementary School
193 Lions Mouth Rd
Amesbury, MA 01913

Inquiry Number: 5397483.4
August 17, 2018

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

08/17/18

Site Name:	Client Name:
Cashman Elementary School	ECMS, Inc.
193 Lions Mouth Rd	288 Grove Street #391
Amesbury, MA 01913	Braintree, MA 02184
EDR Inquiry # 5397483.4	Contact: Kevin Kavanaugh

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by ECMS, Inc. were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:		*Coordinates:*	
P.O.#	1009.073	**Latitude:**	42.857239 42° 51' 26" North
Project:	DiNisco/Cashman Elem Schoo	**Longitude:**	-70.948354 -70° 56' 54" West
		UTM Zone:	Zone 19 North
		UTM X Meters:	340823.36
		UTM Y Meters:	4746802.83
		Elevation:	105.18' above sea level

Maps Provided:

2012	1944
1987	1943
1985	1934
1979	1932
1968, 1973	1894
1952	1890
1950, 1952	
1947	

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Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2012 Source Sheets



Exeter
2012
7.5-minute, 24000



Newburyport West
2012
7.5-minute, 24000

1987 Source Sheets



Newburyport
1987
7.5-minute, 25000
Aerial Photo Revised 1978



Exeter
1987
7.5-minute, 25000
Aerial Photo Revised 1978

1985 Source Sheets



Newburyport
1985
7.5-minute, 25000
Aerial Photo Revised 1978



Exeter
1985
7.5-minute, 25000
Aerial Photo Revised 1978

1979 Source Sheets



Newburyport West
1979
7.5-minute, 24000
Aerial Photo Revised 1977

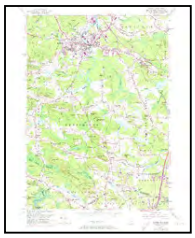
Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1968, 1973 Source Sheets



Newburyport West
1968
7.5-minute, 24000
Aerial Photo Revised 1966



Exeter
1973
7.5-minute, 24000
Aerial Photo Revised 1973

1952 Source Sheets



Newburyport West
1952
7.5-minute, 31680

1950, 1952 Source Sheets



Exeter
1950
7.5-minute, 24000
Aerial Photo Revised 1943

1947 Source Sheets



NEWBURYPORT WEST
1947
7.5-minute, 25000

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1944 Source Sheets



Newburyport West
1944
7.5-minute, 31680

1943 Source Sheets



Cape Ann
1943
30-minute, 125000

1934 Source Sheets



Exeter
1934
15-minute, 62500



Newburyport
1934
15-minute, 62500

1932 Source Sheets



Newburyport
1932
15-minute, 48000

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1894 Source Sheets



Newburyport
1894
15-minute, 62500

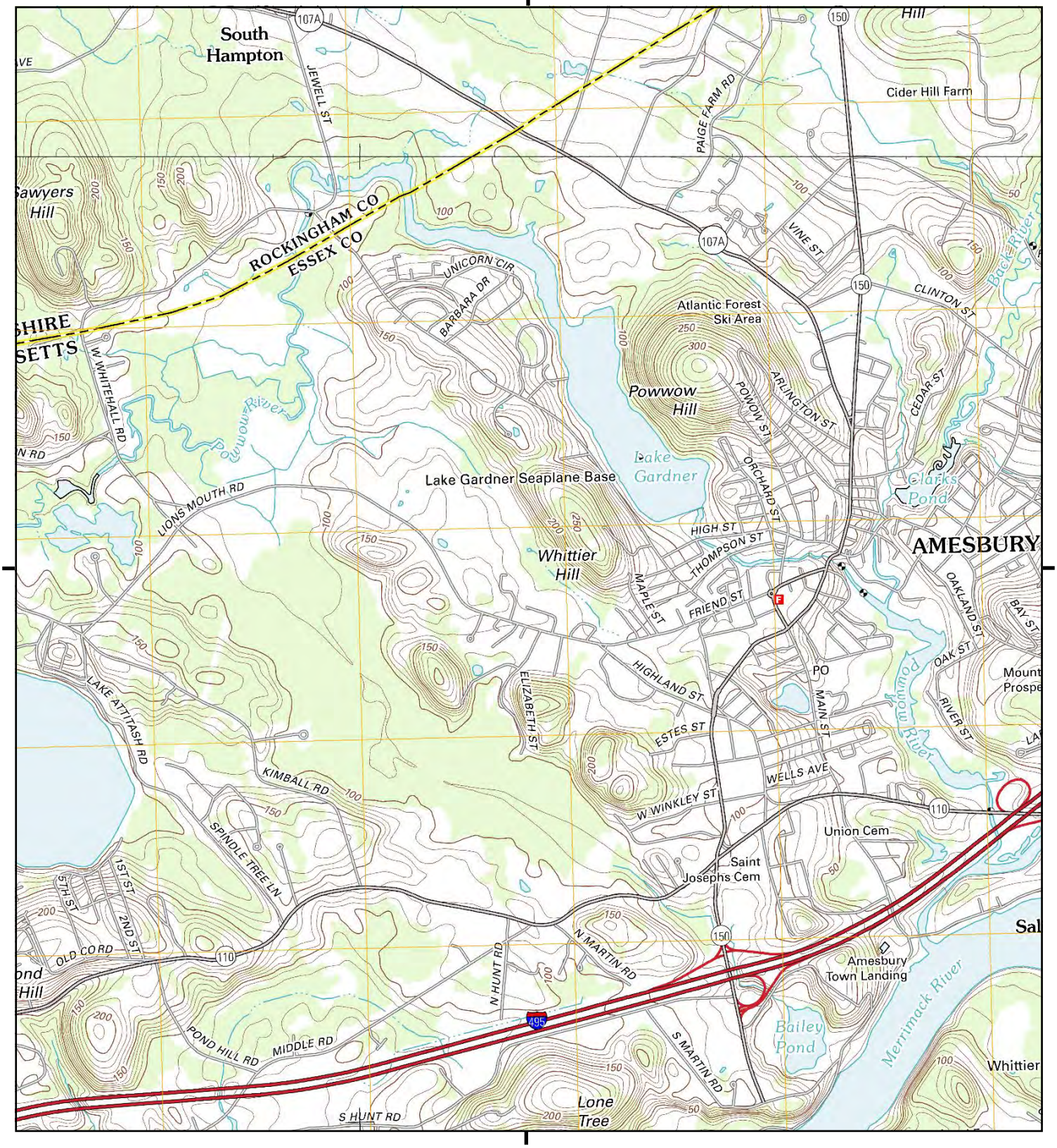
1890 Source Sheets



Newburyport
1890
15-minute, 62500

Historical Topo Map

2012



This report includes information from the following map sheet(s).

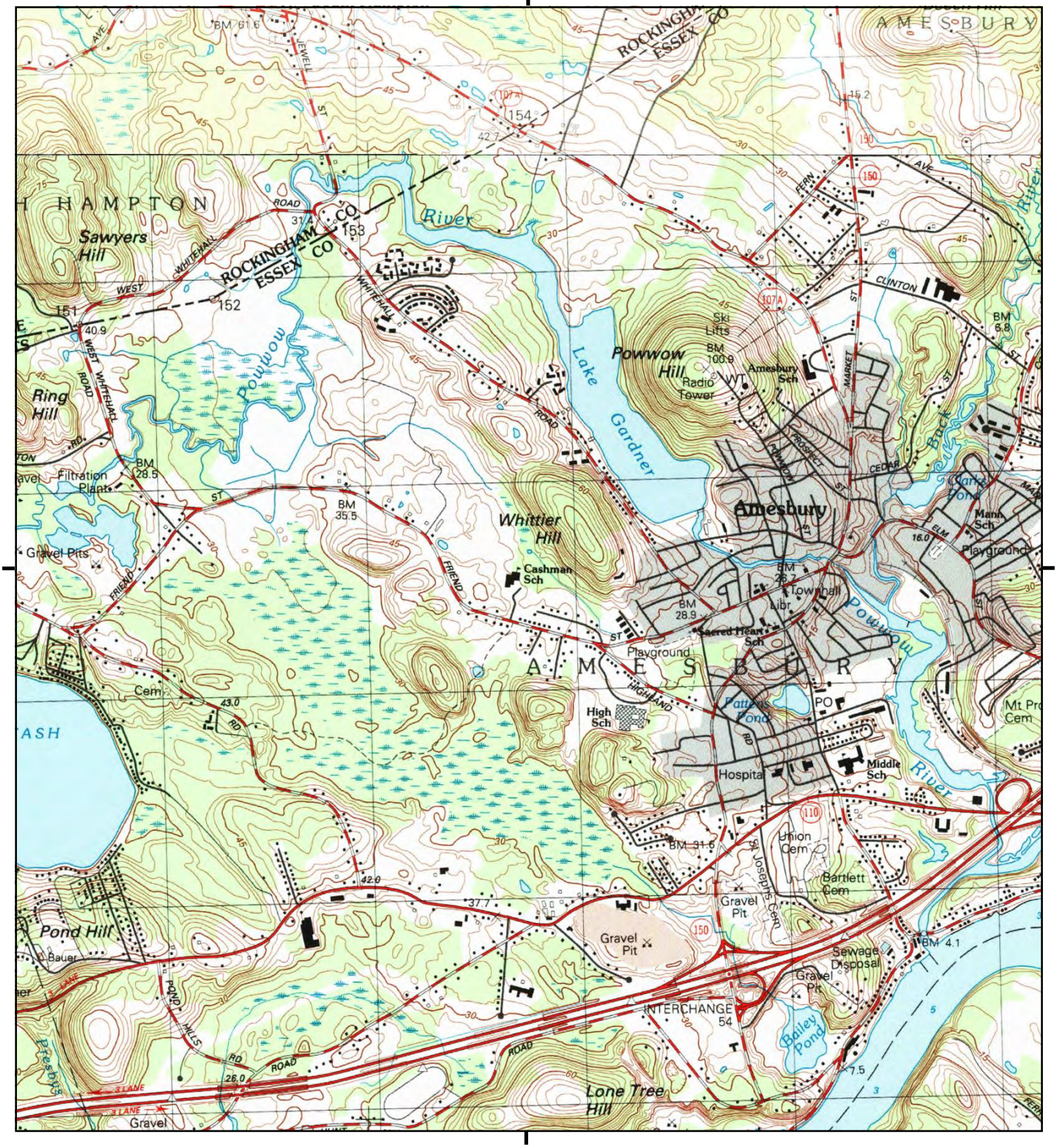
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Newburyport West, 2012, 7.5-minute
N, Exeter, 2012, 7.5-minute

SITE NAME: Cashman Elementary School
ADDRESS: 193 Lions Mouth Rd
Amesbury, MA 01913
CLIENT: ECMS, Inc.

N



This report includes information from the following map sheet(s).

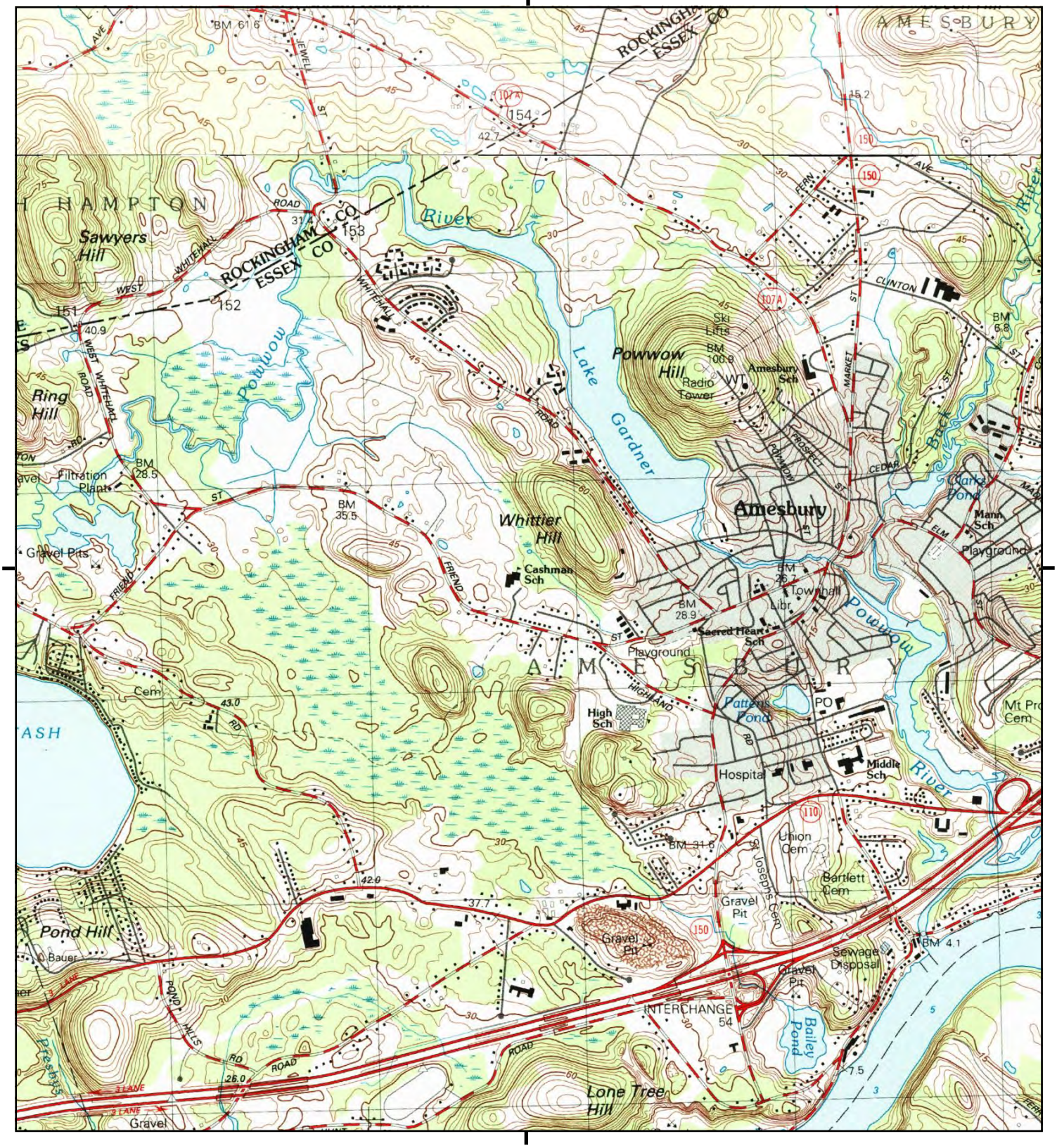
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Newburyport, 1987, 7.5-minute
NE, Exeter, 1987, 7.5-minute

SITE NAME: Cashman Elementary School
ADDRESS: 193 Lions Mouth Rd
Amesbury, MA 01913
CLIENT: ECMS, Inc.

N



This report includes information from the following map sheet(s).

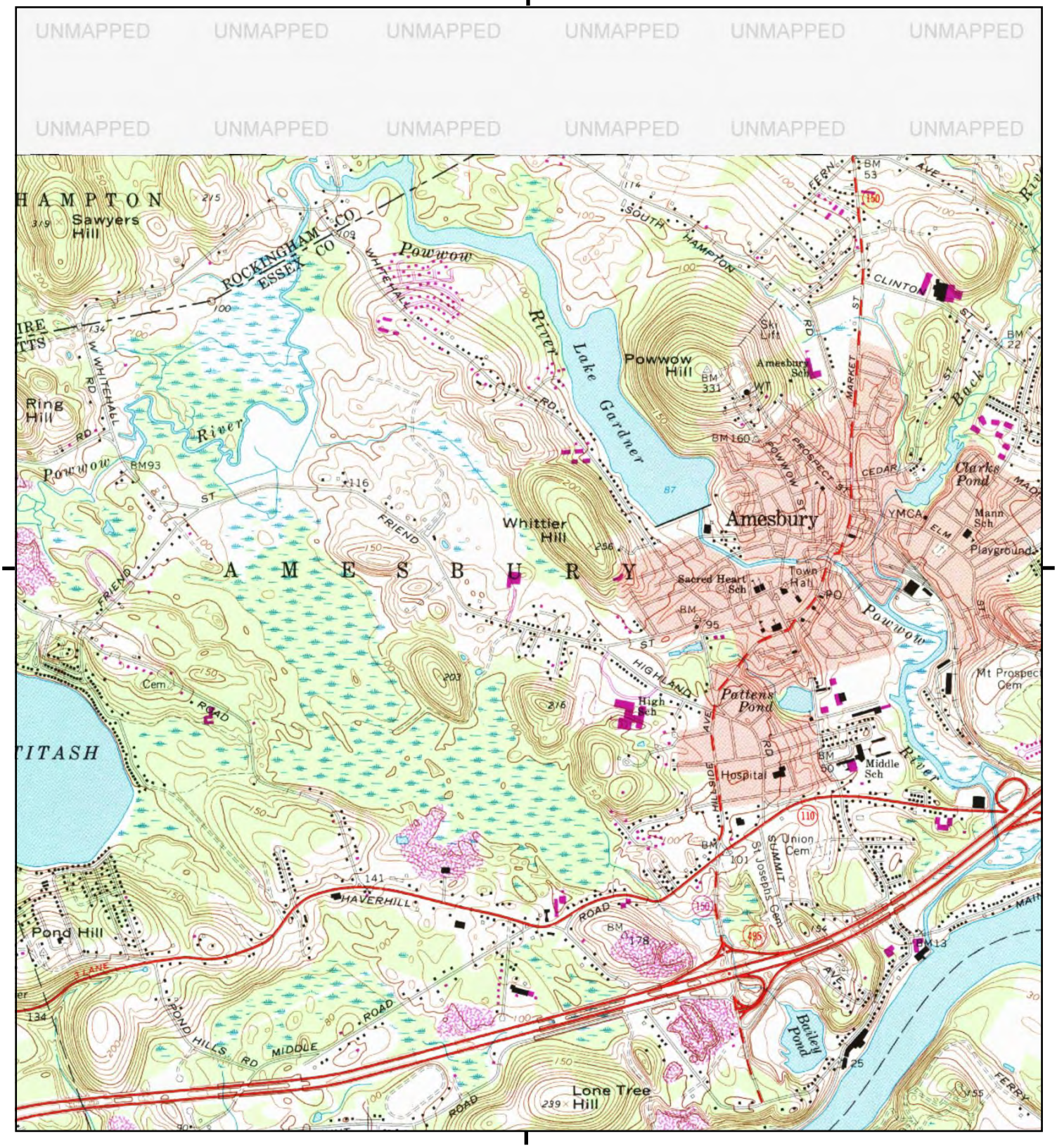
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Newburyport, 1985, 7.5-minute
NE, Exeter, 1985, 7.5-minute

SITE NAME: Cashman Elementary School
ADDRESS: 193 Lions Mouth Rd
Amesbury, MA 01913
CLIENT: ECMS, Inc.

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

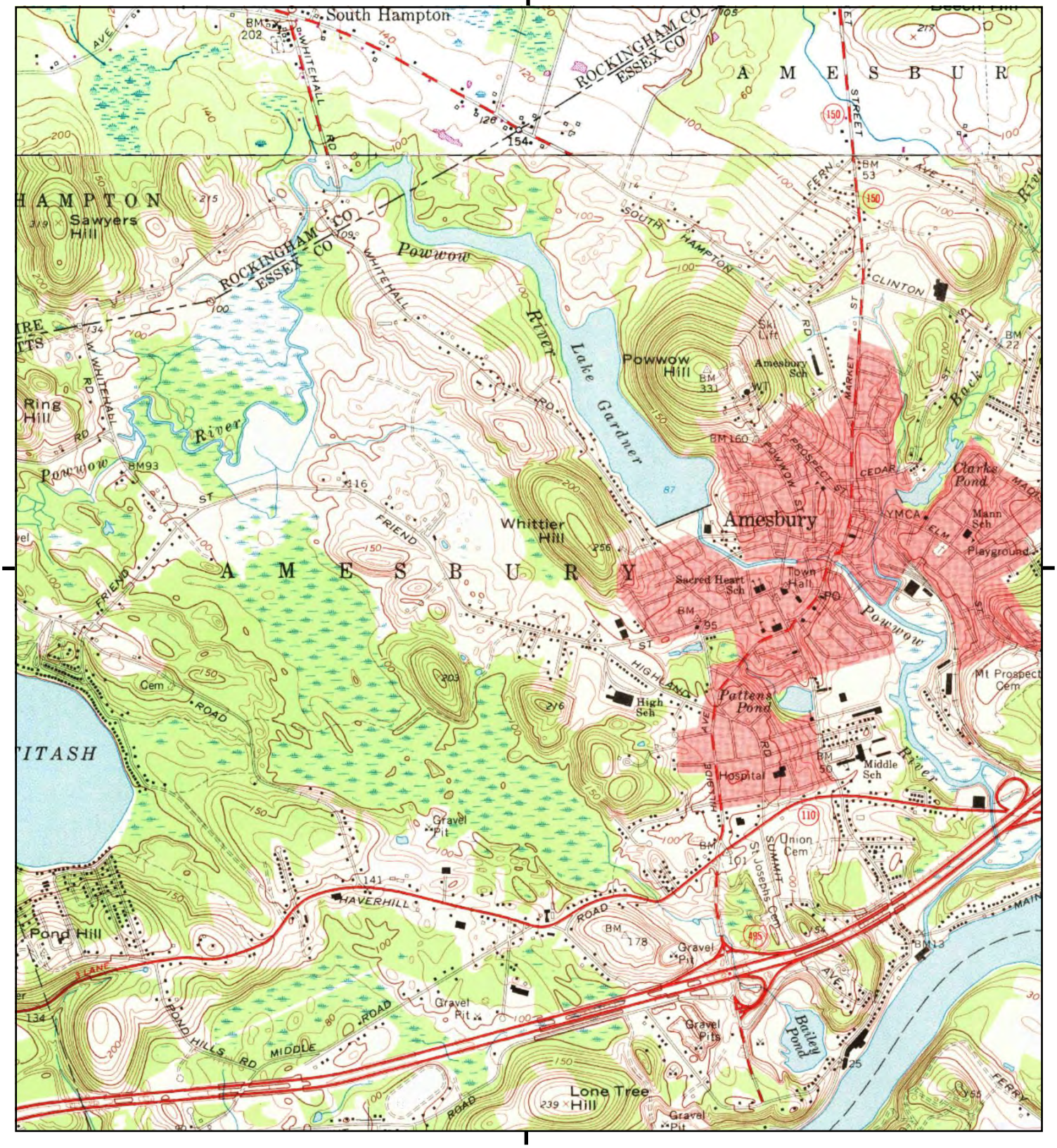
TP, Newburyport West, 1979, 7.5-minute

SITE NAME: Cashman Elementary School
ADDRESS: 193 Lions Mouth Rd
Amesbury, MA 01913
CLIENT: ECMS, Inc.

N

Historical Topo Map

1968, 1973



This report includes information from the following map sheet(s).

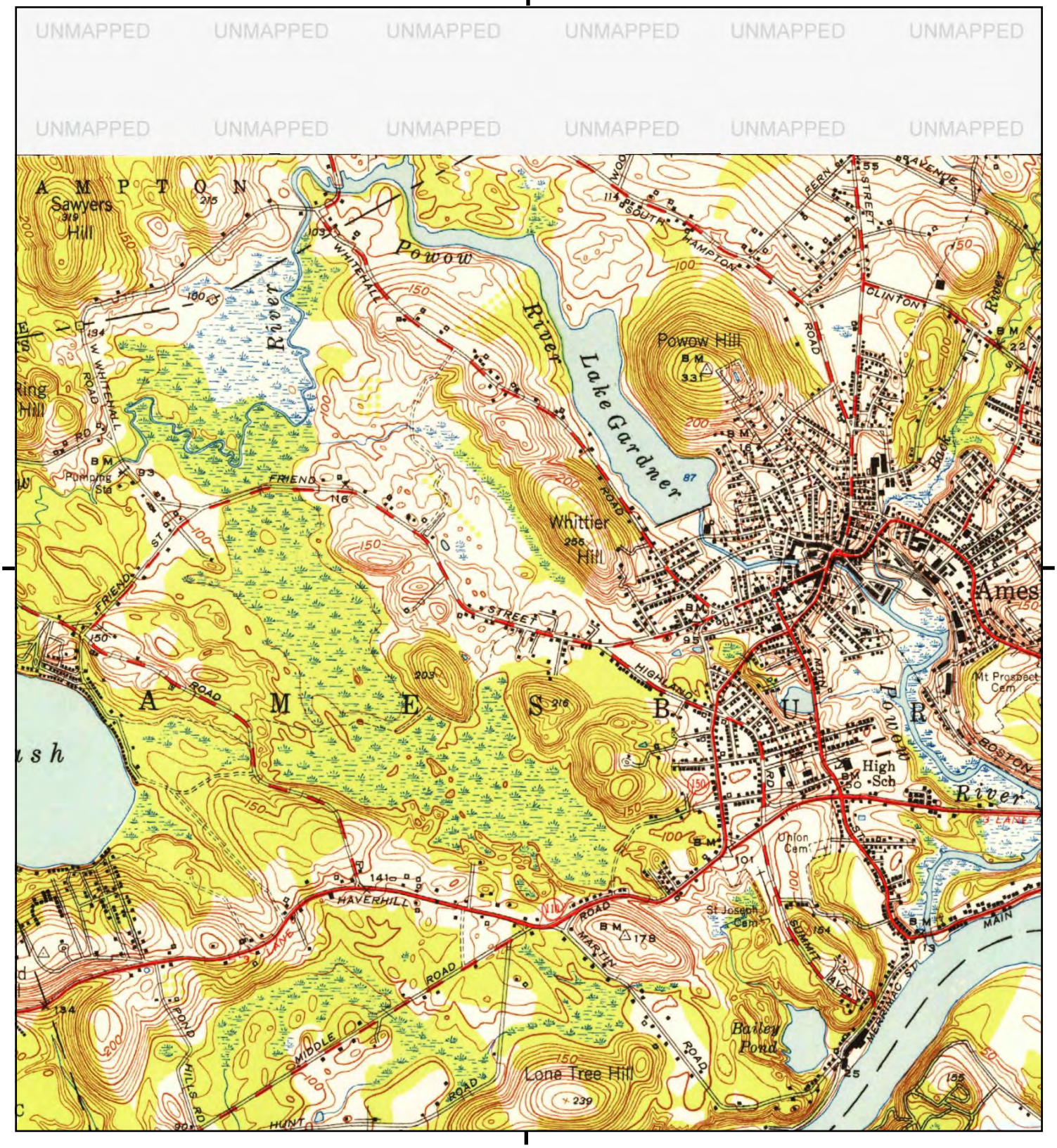
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Newburyport West, 1968, 7.5-minute
N, Exeter, 1973, 7.5-minute

SITE NAME: Cashman Elementary School
ADDRESS: 193 Lions Mouth Rd
Amesbury, MA 01913
CLIENT: ECMS, Inc.

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

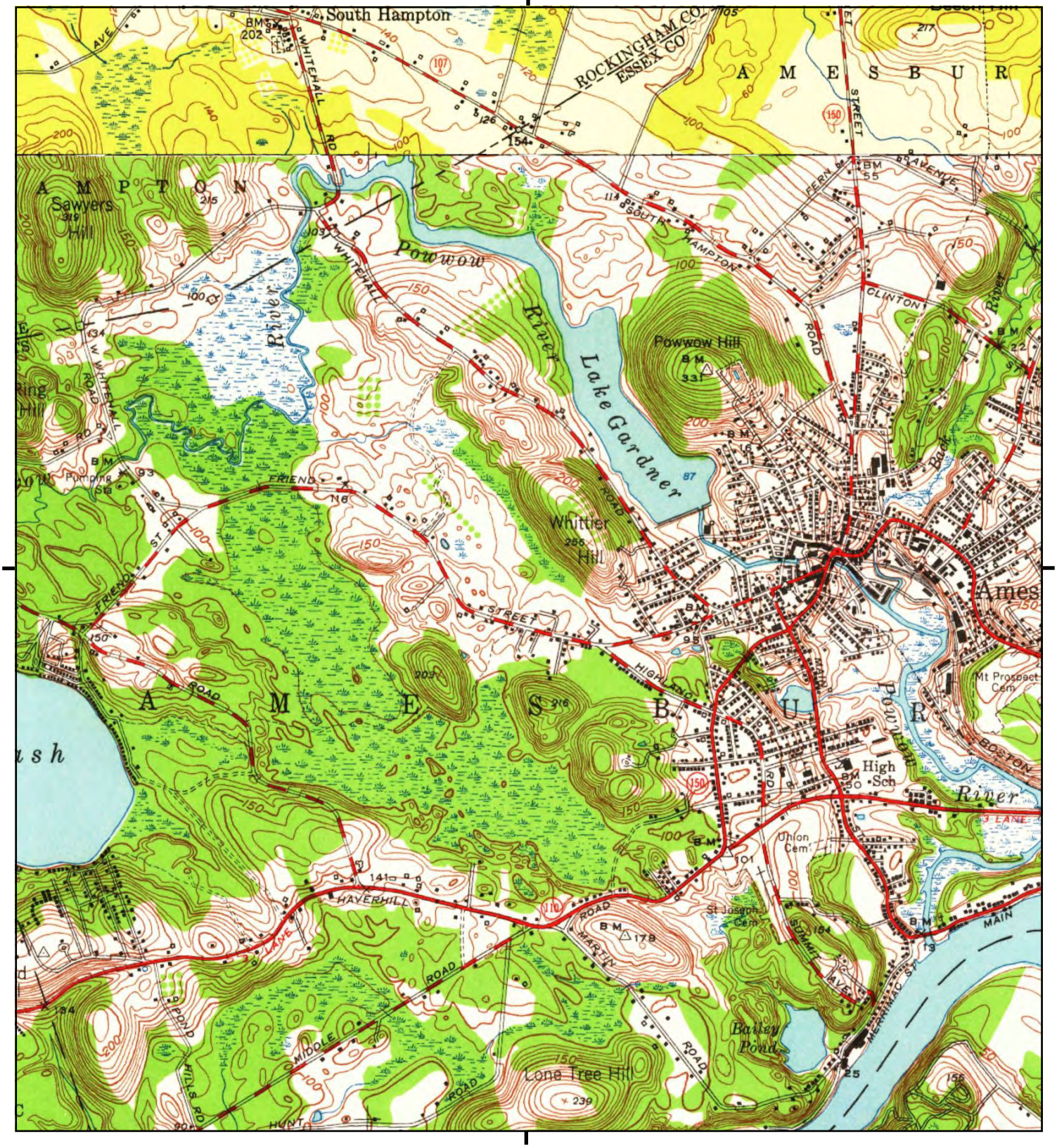
TP, Newburyport West, 1952, 7.5-minute

SITE NAME: Cashman Elementary School
ADDRESS: 193 Lions Mouth Rd
Amesbury, MA 01913
CLIENT: ECMS, Inc.

N

Historical Topo Map

1950, 1952



This report includes information from the following map sheet(s).

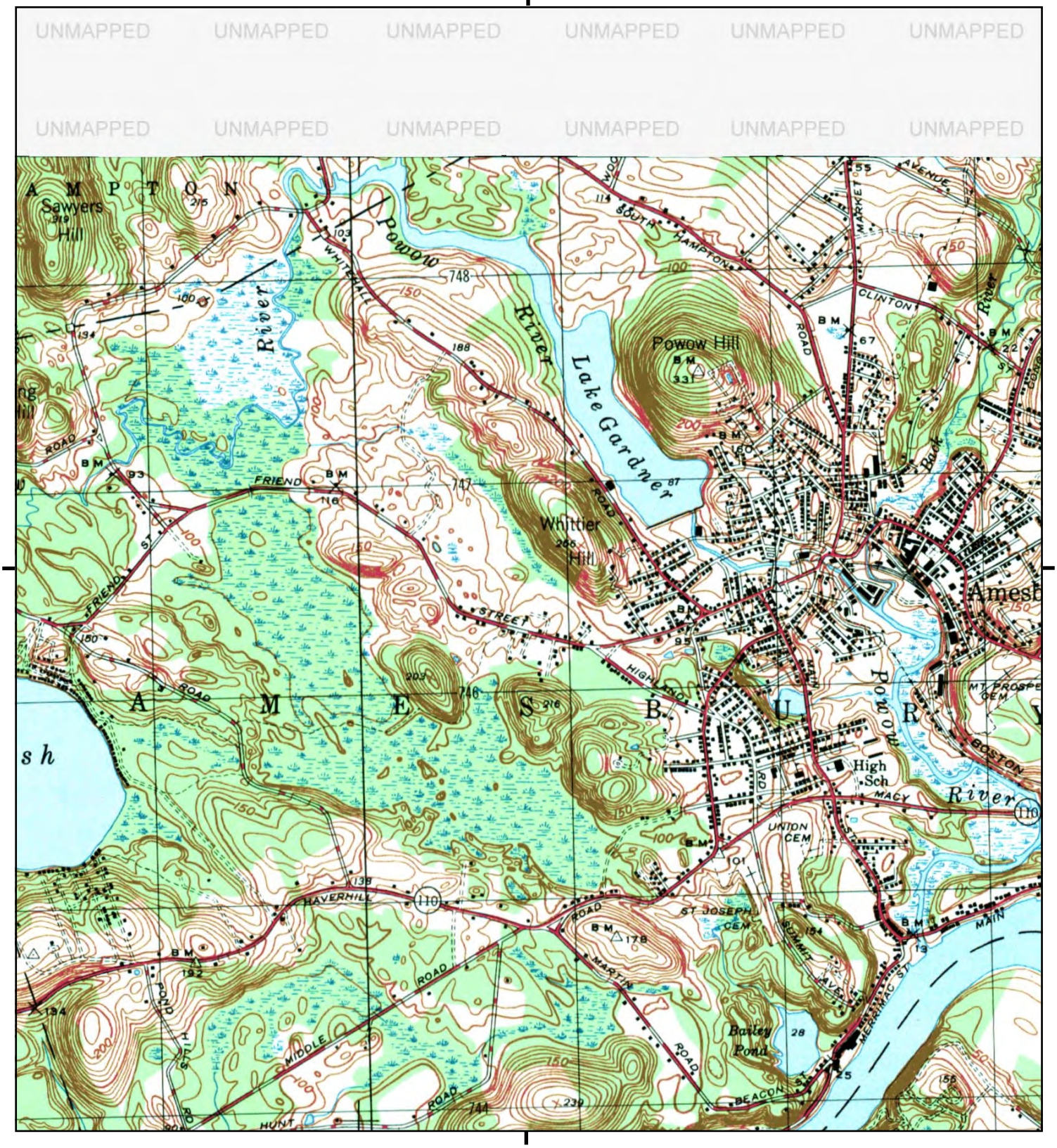
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Newburyport West, 1952, 7.5-minute
N, Exeter, 1950, 7.5-minute

SITE NAME: Cashman Elementary School
ADDRESS: 193 Lions Mouth Rd
Amesbury, MA 01913
CLIENT: ECMS, Inc.

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, NEWBURYPORT WEST, 1947, 7.5-minute

SITE NAME: Cashman Elementary School
ADDRESS: 193 Lions Mouth Rd
Amesbury, MA 01913
CLIENT: ECMS, Inc.

N



This report includes information from the following map sheet(s).

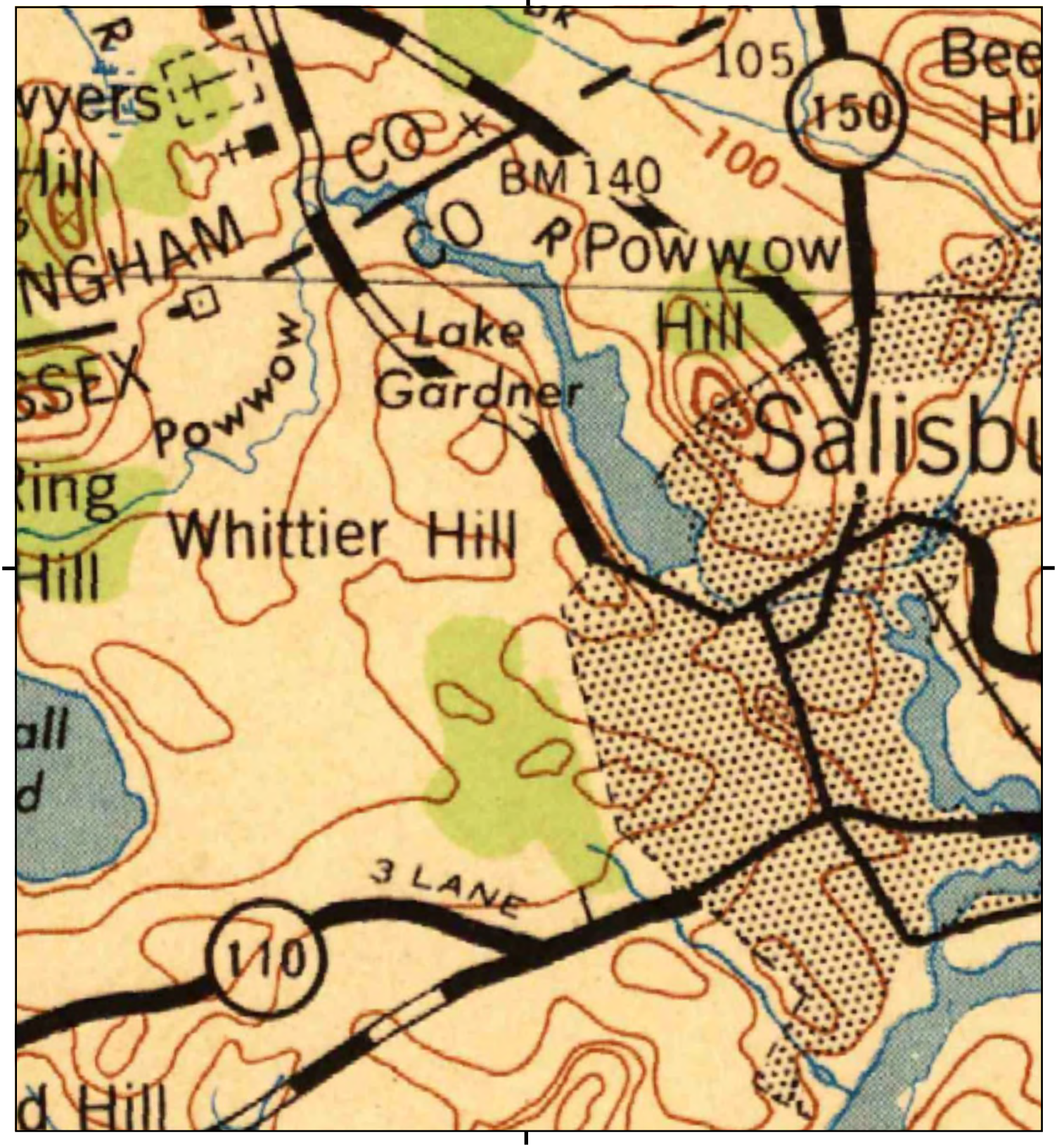
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Newburyport West, 1944, 7.5-minute

SITE NAME: Cashman Elementary School
ADDRESS: 193 Lions Mouth Rd
Amesbury, MA 01913
CLIENT: ECMS, Inc.

N



This report includes information from the following map sheet(s).

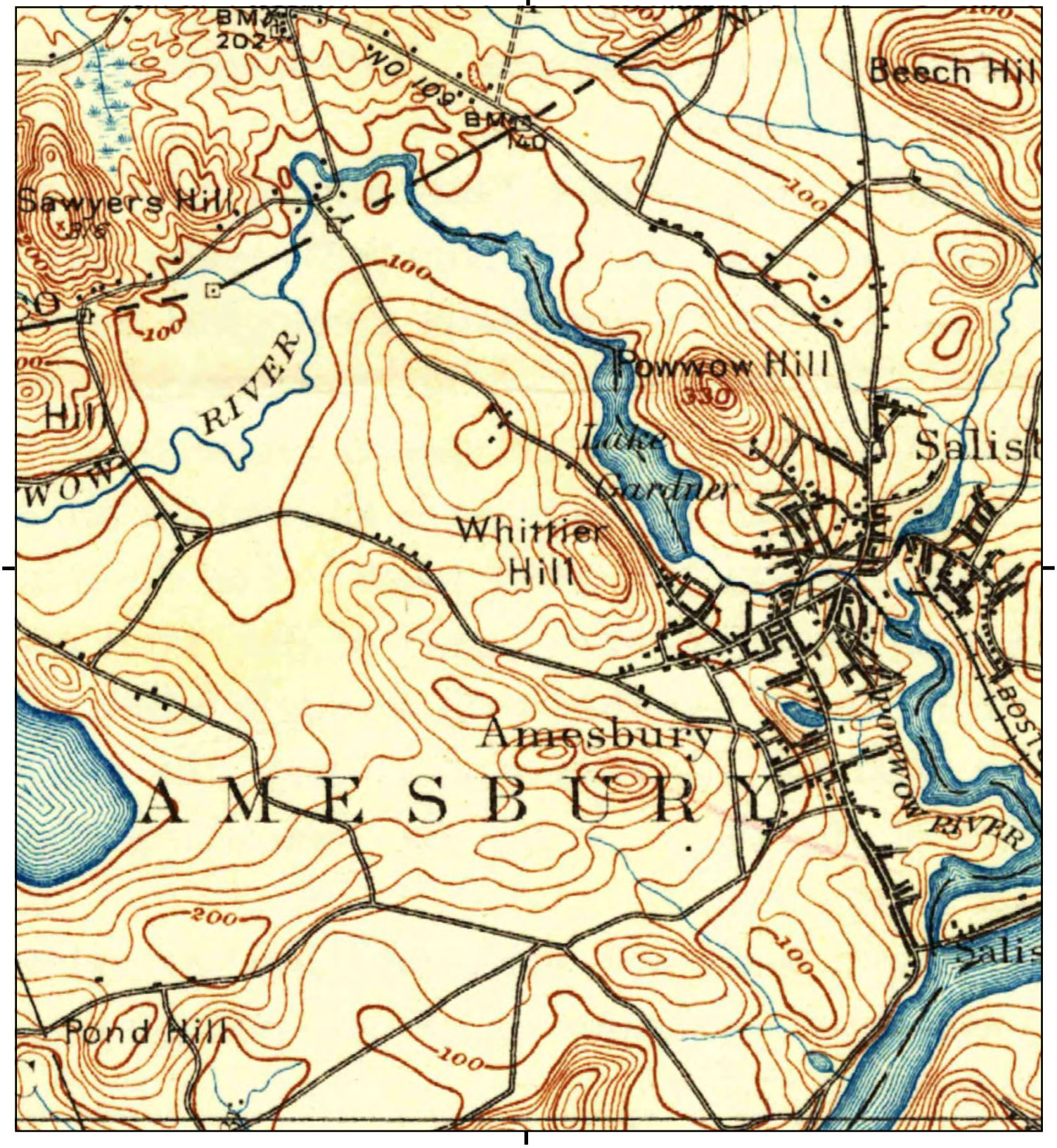
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Cape Ann, 1943, 30-minute

SITE NAME: Cashman Elementary School
ADDRESS: 193 Lions Mouth Rd
Amesbury, MA 01913
CLIENT: ECMS, Inc.

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Exeter, 1934, 15-minute
TP, Newburyport, 1934, 15-minute

SITE NAME: Cashman Elementary School
ADDRESS: 193 Lions Mouth Rd
Amesbury, MA 01913
CLIENT: ECMS, Inc.

N



This report includes information from the following map sheet(s).

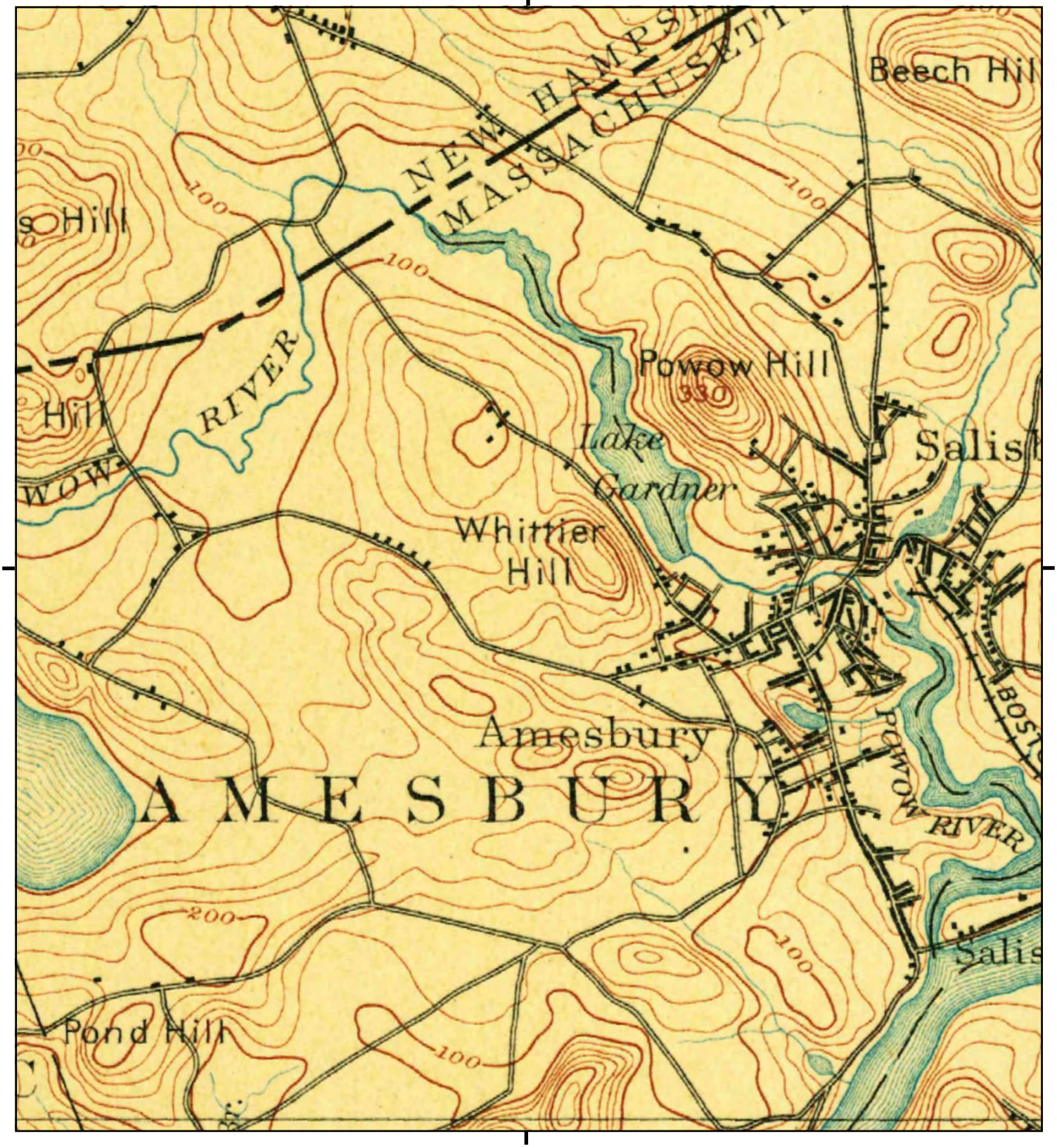
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Newburyport, 1932, 15-minute

SITE NAME: Cashman Elementary School
ADDRESS: 193 Lions Mouth Rd
Amesbury, MA 01913
CLIENT: ECMS, Inc.

N



This report includes information from the following map sheet(s).

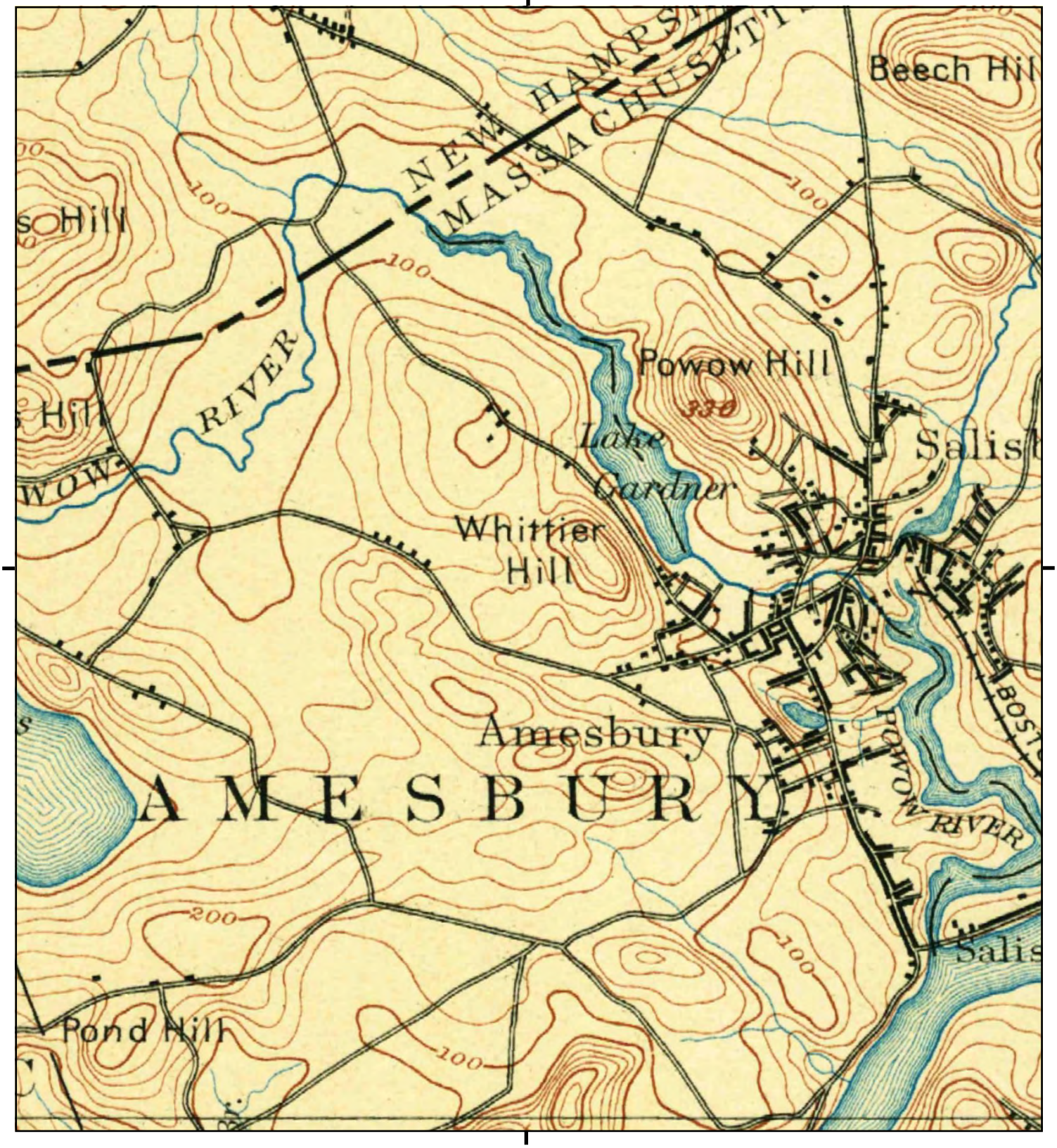
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Newburyport, 1894, 15-minute

SITE NAME: Cashman Elementary School
ADDRESS: 193 Lions Mouth Rd
Amesbury, MA 01913
CLIENT: ECMS, Inc.

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Newburyport, 1890, 15-minute

SITE NAME: Cashman Elementary School
ADDRESS: 193 Lions Mouth Rd
Amesbury, MA 01913
CLIENT: ECMS, Inc.

N

Cashman Elementary School

193 Lions Mouth Rd

Amesbury, MA 01913

Inquiry Number: 5397483.8

August 17, 2018

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

08/17/18

Site Name:

Cashman Elementary School
193 Lions Mouth Rd
Amesbury, MA 01913
EDR Inquiry # 5397483.8

Client Name:

ECMS, Inc.
288 Grove Street #391
Braintree, MA 02184
Contact: Kevin Kavanaugh

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2016	1"=500'	Flight Year: 2016	USDA/NAIP
2012	1"=500'	Flight Year: 2012	USDA/NAIP
2009	1"=500'	Flight Year: 2009	USDA/NAIP
2006	1"=500'	Flight Year: 2006	USDA/NAIP
1998	1"=500'	Acquisition Date: April 11, 1998	USGS/DOQQ
1992	1"=500'	Flight Date: April 29, 1992	USGS
1986	1"=500'	Flight Date: April 01, 1986	USDA
1978	1"=500'	Flight Date: January 23, 1978	USGS
1973	1"=500'	Flight Date: April 16, 1973	USGS
1966	1"=500'	Flight Date: April 15, 1966	USGS
1960	1"=500'	Flight Date: May 01, 1960	USGS
1953	1"=500'	Flight Date: May 03, 1953	USGS
1938	1"=500'	Flight Date: November 01, 1938	USGS

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INQUIRY #: 5397483.8
YEAR: 2016
= 500'
N
EDR


INQUIRY #: 5397483.8
YEAR: 2012
= 500'
N
EDR


INQUIRY #: 5397483.8
YEAR: 2009
= 500'
N
EDR


INQUIRY #: 5397483.8
YEAR: 2006
= 500'
N
EDR


INQUIRY #: 5397483.8
YEAR: 1998
= 500'
N
EDR


INQUIRY #: 5397483.8
YEAR: 1992
= 500'
N
EDR


INQUIRY #: 5397483.8
YEAR: 1986
= 500'
N
EDR



INQUIRY #: 5397483.8

YEAR: 1978

= 500'

N

EDR



INQUIRY #: 5397483.8

YEAR: 1973

= 500'

N

EDR



INQUIRY #: 5397483.8

YEAR: 1966

= 500'

N

EDR



INQUIRY #: 5397483.8

YEAR: 1960

= 500'

N

EDR


INQUIRY #: 5397483.8
YEAR: 1953
= 500'
N
EDR


INQUIRY #: 5397483.8
YEAR: 1938
= 500'
N
EDR

Cashman Elementary School
193 Lions Mouth Rd
Amesbury, MA 01913

Inquiry Number: 5397483.5
August 20, 2018

The EDR-City Directory Image Report

Environmental Data Resources Inc
6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION

Executive Summary

Findings

City Directory Images

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Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available city directory data at 5 year intervals.

RECORD SOURCES

EDR's Digital Archive combines historical directory listings from sources such as Cole Information and Dun & Bradstreet. These standard sources of property information complement and enhance each other to provide a more comprehensive report.

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Data by
infoUSA®
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RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

Year	Target Street	Cross Street	Source
2014	☑	☑	EDR Digital Archive
2010	☑	☑	EDR Digital Archive
2005	☑	☑	EDR Digital Archive
2000	☑	☑	EDR Digital Archive
1995	☑	☑	EDR Digital Archive
1992	☑	☑	EDR Digital Archive
1987	☑	☑	Polk's City Directory
1982	☑	☑	Polk's City Directory
1977	☑	☑	Polk's City Directory
1973	☑	☑	Polk's City Directory
1968	☑	☑	Polk's City Directory
1965	☑	☑	Polk's City Directory
1961	☑	☑	Polk's City Directory

FINDINGS

TARGET PROPERTY STREET

193 Lions Mouth Rd
Amesbury, MA 01913

Year	*CD Image*	*Source*

LIONS MOUTH RD

2014	pg A2	EDR Digital Archive
2010	pg A4	EDR Digital Archive
2005	pg A6	EDR Digital Archive
2000	pg A8	EDR Digital Archive
1995	pg A10	EDR Digital Archive
1992	pg A12	EDR Digital Archive
1987	pg A15	Polk's City Directory
1982	pg A18	Polk's City Directory
1977	pg A21	Polk's City Directory
1973	pg A24	Polk's City Directory
1968	pg A27	Polk's City Directory
1968	pg A28	Polk's City Directory
1965	pg A30	Polk's City Directory
1965	pg A31	Polk's City Directory
1961	pg A33	Polk's City Directory
1961	pg A34	Polk's City Directory

FINDINGS

CROSS STREETS

Year	*CD Image*	*Source*
FRIEND ST		
2014	pg. A1	EDR Digital Archive
2010	pg. A3	EDR Digital Archive
2005	pg. A5	EDR Digital Archive
2000	pg. A7	EDR Digital Archive
1995	pg. A9	EDR Digital Archive
1992	pg. A11	EDR Digital Archive
1987	pg. A13	Polk's City Directory
1987	pg. A14	Polk's City Directory
1982	pg. A16	Polk's City Directory
1982	pg. A17	Polk's City Directory
1977	pg. A19	Polk's City Directory
1977	pg. A20	Polk's City Directory
1973	pg. A22	Polk's City Directory
1973	pg. A23	Polk's City Directory
1968	pg. A25	Polk's City Directory
1968	pg. A26	Polk's City Directory
1965	pg. A29	Polk's City Directory
1961	pg. A32	Polk's City Directory

City Directory Images

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

FRIEND ST 2014

109	KEYSTONE STATE PRO BASEBALL
114	SKIP JTRAS MEM SCHLARSHIP FUND
118	JUTRAS EV & SONS
	JUTRAS NORMAN
120	AMESBURY SOC FRIENDS QUAKERS
177	THURLOW, RICHARD S
182	ARSENAULT, MICHAEL C
183	DREW, SCOTT R

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

LIONS MOUTH RD 2014

156	M S LANE REPAIR
175	MATTISON, RICHARD M
	SIEGFRIED, JOHN E
177	LEBLANC, NORMAN J
178	DENSO SALES CALIFORNIA INC
	WHITLOW, NATHANIEL R
179	LARNARD, ELIZABETH T
180	CORDINER, JAMES
	CRAVEIRO, LISA M
	GELINEAU, CHRISTOPHER
	WILSON, STAN
181	GANNON, WILLIAM F
182	HASDAY, I
183	OCCUPANT UNKNOWN,
184	MORAN, BRIAN W
185	SAWYER, JOHN M
187	GAGNE, TIMOTHY T
189	ROBINSON, EDWARD L
191	DODIER, GEORGE R
192	LOCKE, COURTNEY
193	AMESBURY SCHOOL DISTRICT
195	KYRIOS, THEODORE E
196	MCPARTAND, PAUL
	MCPARTLAND, PAUL J
197	EDE, MICHELLEM M
	GERMANOWSKI, GLEN
	PALAZZOLO, JOSEPH
198	HAWES, ETHAN J
201	APONAS, ALFRED S
202	BARTOSIK, ROSS J
204	DIERING DIRECT INC
	DIERING, TIMOTHY J
212	CERNY HERBERT
223	AMESBURY WEB DESIGN
227	LUCIER TRUST
235	KENDRA PIKE OSGOOD
271	CHALLENGE ENGINEERING INC
272	GOLOSI LLC

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

FRIEND ST 2010

103	WAYNES TRUCKING
106	BOWMAN TRUCKING INC
109	KEYSTONE STATE PRO BASEBALL
	OPENING DAY PARTNERS LLC
	SOUTHERN MD BASBAL CLB LLC
118	JUTRAS EV & SONS
	JUTRAS NORMAN
120	AMESBURY SOC FRIENDS QUAKERS
129	DIRAGO VALORI S
	JUST JESSICA
	OCEAN VIEW LANDSCAPING
133	VINTAGE PAINTING
171	STONE ROBERTA E
177	THURLOW, RICHARD S

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

LIONS MOUTH RD 2010

156 M S LANE REPAIR
166 KRISTAN S HOUSE DAYCARE
175 MATTISON, RICHARD M
SIEGFRIED, JOHN E
177 LEBLANC, NORMAN J
178 DENSO SALES CALIFORNIA INC
WHITLOW, MONICA Y
179 LARNARD, ELIZABETH T
180 GELINEAU, CHRISTOPHER
SAWYER, TEPSIE V
182 ARSENAULT, MICHAEL C
183 DREW, SCOTT R
184 MORAN, BRIAN W
185 SAWYER, JOHN M
187 GAGNE, TIMOTHY T
189 SEMPLE, BARBARA V
191 DODIER, GEORGE R
192 EVANS, HOLLY
RAPHANELLA, GINA
193 AMESBURY SCHOOL DISTRICT
195 KYRIOS, THEORDORE E
196 MCPARTLAND, KATHERINE A
197 CHASE, JOHN M
EDE, CHERYLL
GERMANOWSKI, MARTHA J
198 HAWES, ETHAN J
200 WOOD, CRYSTAL A
201 APONAS, C M
202 BARTOSIK, ROSS
223 AMESBURY WEB DESIGN
227 LUCIER TRUST
271 CHALLENGE ENGINEERING INC
272 GOLOSI LLC
NEXT CATERING

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

FRIEND ST 2005

103	WAYNES TRUCKING
109	KEYSTONE STATE PRO BASEBALL
118	JUTRAS NORMAN
120	JUMP START YOUTH CONNECTION
129	DIRAGO VALORI S
177	THURLOW, RICHARD S
180	CALLAHAN, JEANNE M
182	ARSENAULT, MICHAEL C
183	DREW, SCOTT R
185	SAWYER, DIANE M
191	DODIER, GEORGE R

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

LIONS MOUTH RD 2005

156	M S LANE REPAIR
171	TERRYS FLOWER SHOP
177	LEBLANC, NORMAN J
178	DENSO SALES CALIFORNIA INC
	WHITLOW, MONICA Y
179	LARNARD, ELIZABETH M
180	DAMON, BETHANY L
181	GANNON, WILLIAM
182	SHAHEEN, JOHN J
184	MORAN, BRIAN W
185	SAWYER, JOHN M
187	GAGNE, TIMOTHY T
189	SEMPLE, JAMES E
191	DODIER, KEVIN G
192	PELLETIER, NORMAN R
193	AMESBURY TOWN OF
195	KYRIOS, THEORDORE E
197	EDE, CHERYLL
	JEAN, MARTHA J
198	BUCKLEY, PAUL A
200	MEADER, CRYSTAL
201	APONAS, C M
202	ARSENAULT, PETER H
227	LUCIER TRUST
262	CARRIAGE TOWN CHLD PROGRAMS
271	CHALLENGE ENGINEERING INC
277	CROWLEY JAMES ELECTRICAL

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

FRIEND ST 2000

103	WAYNES TRUCKING
118	JUTRAS NORMAN
120	COMMUNITY ACTION INC
180	CALLAHAN, JEANNE M
	VANHOOK, B
182	ARSENAULT, MICHAEL C
183	DREW, SCOTT R
184	MORAN, BRIAN
185	SAWYER, JOHN M
189	SEMPLE, JAMES
191	DODIER, GEORGE

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

LIONS MOUTH RD 2000

175	EATON, HERBERT
177	LEBLANC, NORMAN
	THURLOW, RICHARD
178	DENSO SALES CALIFORNIA INC
179	LARNARD, RAYMOND
192	RANDALL, PAT L
193	AMESBURY TOWN OF
	KYRIOS, THERESA G
197	EDE, MARY J
	GERMANOWSKI, MARTHA J
	JEAN, MARTHA
198	CURRIER, JAMES
201	SNOW, LUCINDA H
202	STEWART, IAN J
261	GP WORKSHOP
271	CHALLENGE ENGINEERING INC

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

FRIEND ST 1995

103	WAYNES TRUCKING
116	JUTRAS NORMAN
120	COMMUNITY ACTION INC
137	FIRST IMPRESSIONS
177	LEBLANC, NORMAN
	THURLOW, RICHARD & MARIANNE
178	FARMER, MICHAEL & GAIL
180	CALLAHAN, ROBT J
181	FRANCOEUR, LOUIS L
182	ARSENAULT, MICHAEL C
183	DREW, SCOTT R & PATRICIA J
191	PUORRO, M

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

LIONS MOUTH RD 1995

175	EATON, HERBERT
179	LARNARD, ELIZABETH & RAYMOND
	LARNARD, RAYMOND
184	MORAN, CHERYL & BRIAN
185	SAWYER, JOHN M
189	MORRILL, LOUISE
192	RANDALL, PAT L
194	BAKER, EDDIE B
197	GERMANOWSKI, MARTHA
202	WARREN, L J
227	WOODSOM FARM TRUST
271	CHALLENGE ENGINEERING

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

FRIEND ST 1992

103	WAYNES TRUCKING
116	HIGHLAND LIMOUSINE SERVIC
118	JUTRAS E V & SON
137	FIRST IMPRESSIONS
158	OUELLET BUSINESS FORMS
171	STONE ROBERTA E
177	LEBLANC, NORMAN
	THURLOW, RICHARD & MARIANNE
178	FARMER, MICHAEL & GAIL
180	CALLAHAN, ROBT J
181	FRANCOEUR, LOUIS L
182	ARSENAULT, MICHAEL C
183	DREW, SCOTT R & PATRICIA J
191	PUORRO, M

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

LIONS MOUTH RD 1992

175	EATON, HERBERT
179	LARNARD, DONALD J & JO
	LARNARD, ELIZABETH & RAYMOND
	LARNARD, RAYMOND
180	MURRAY, ROBT & PAMELA
185	SAWYER, JOHN M
189	MORRILL, RAYMOND
192	RANDALL, PAT L
	SMITH, GORDON & ROBERTA H
194	CANNS, RONALD
227	WOODSOM FARM TRUST
271	CHALLENGE ENG

Target Street	Cross Street	Source
-	✓	Polk's City Directory

FRIEND ST 1987

HIGHLAND ST BEGINS
153 No Return
156★Myhal Joel genl contr ◎
388-2070
157 Shute Wm F ◎ 388-0036
LINDBERGH AV BEGINS
158 Ouellet J M Gerard ◎
388-1771
160 Francoeur Rita D Mrs ◎
388-1933
Francoeur Carol 388-2556
162 Laine Wm R ◎ 388-0823
Rear Ackley Laurence E Jr ◎
388-2291
170 Yelle Herman E ◎ 388-1327
BAKER ST BEGINS
171 Lil Red Country Store gro
388-0370
173 Hodge Cath E Mrs ◎
388-0686
LINDBERGH AV BEGINS
174★Young Dale T ◎ 388-4739
175 Rock Marilyn A ◎ 388-1377
177 Le Blanc Norman J ◎
388-2009
Rear Wilkins Ellis E ◎
Rear★Thurlow Richd S ◎
388-9033
ELIZABETH ST BEGINS
178 Farmer Michl P ◎ 388-3881
179 Lavoie Robert W ◎ 388-1766
180★Callahan Robt J ◎ 388-1226
★Rooney Shawn W 388-3930
181 Francoeur Louis L ◎
388-9260
182 Arsenault Michl C ◎
388-3292
MONCRIEF ST BEGINS

Target Street	Cross Street	Source
-	✓	Polk's City Directory

FRIEND ST 1987

FRIEND ST (A)–Contd

183 Drew Scott R ◎ 388-0012
184 La Pointe Gabrielle C Mrs ◎ 388-9510
185 Sawyer John M ◎ 388-2316
186 Rawson Diana L 388-0546
187 Thornell Dorothy M Mrs ◎ 388-0782
188★Sawyer Harold W Jr ◎ 388-5396
190★Melia Lena D Mrs ◎ 388-3612
191 Dodier Geo R Jr ◎ 388-3982
Cashman Chas C Elementary Sch 388-4407
192 Randall John ◎ 388-1686
194 Currier James ◎ 388-6032
201 Aponos Constance S ◎ 388-9014
202 No Return
Woodsom Ethel M Mrs ◎
No Return
Ryan James
206 Rice Margt S ◎ 388-1420
No Return
Woodsom Farm milk 388-1732
Santoro Anna W Mrs 388-0147
Woodsom Geo J ◎ 388-0893
225 Hojaboom Lawrence A 388-2088
227 Lucier Harry J ◎ 388-9486
229 Woodsom James A ◎ 388-1732
No Return
Bilodeau John ◎
NEWTON RD BEGINS

Target Street	Cross Street	Source
✓	-	Polk's City Directory

LIONS MOUTH RD 1987

LIONS MOUTH RD (AMESBURY)–FROM END OF FRIEND ST AT NEWTON TO KIMBALL RD

ZIP CODE 01913

261★Davis Paul W ◎ 388-1427
262★Woodsom Donna L ◎
388-5411
263★Davis Clifton L ◎ 388-2026
264★Miller Walter R ◎ 388-1631
265 Meow Motel cat boarding
388-1722
★Cobb Roy N ◎ 388-1722
266★Fournier Philip N ◎
388-3269
268★Perreault Alphonse G ◎
388-1923
269★Kolosey Henry J ◎ 388-1421
270★Forget Mae E ◎ 388-9039
271★Bartley Danl L ◎ 388-0956
272★Leavitt Chas A ◎ 388-1549
273★Perreault Louis P ◎
388-1350
274★Davis Howard K ◎ 388-4850
275★Billings Howard O ◎
388-0838
276★Roy Robt E ◎ 388-0554
277★Howes Robt P 388-3959
278★Ross John A ◎ 388-9375
279★Munroe Paul D ◎ 388-2040
281★Bryant Edw W ◎ 388-5188
283 No Return
285★Provencher Lawr J ◎
388-4368
287★Perkins Thos E ◎ 388-0252
289 Perkins Steven B (Addl Sp)
290★Chapman Michl W ◎
388-3504
292★Greeley Carmen T ◎
388-4634

Target Street	Cross Street	Source
-	✓	Polk's City Directory

FRIEND ST 1982

HIGHLAND ST BEGINS
153 Greaney Wm F ◎ 388-2985
156 Deboisbriand Agnes C Mrs ◎ 388-9553
157 Shute Wm F ◎ 388-0036
158 Ouellet J M Gerard ◎ 388-1771
160 Lanseigne Roland L 388-0329
Francoeur Rita D Mrs ◎ 388-1933
162 Eaton Judythe A Mrs ◎ 388-1892
166 Ackley Laurence E Jr ◎ 388-2291
LINDBERGH AV BEGINS
BAKER ST BEGINS
170 Yelle Herman E ◎ 388-1327
171 Al's Variety Store 388-0370
173 Hodge Cath E ◎ 388-0686
Hodge Doris E ◎ 388-0686
Vacant
175 Rock Audra Mrs 388-1377
177a Le Blanc Norman J ◎ 388-2009
Rear Wilkins Ellis E ◎
178★Aldrich Brian 388-5185
179 Lavoie Raymond G ◎ 388-2949
Dollen Edw J ◎ 388-1868
Dollen Chester ◎ 388-0966
180 No Return
ELIZABETH ST BEGINS
181 Francoeur Louis L ◎ 388-9260
182 Arsenault Michl C ◎ 388-3292
183 Drew Scott R ◎ 388-0012

Target Street	Cross Street	Source
-	✓	Polk's City Directory

FRIEND ST 1982

FRIEND ST (A)—Contd
184 La Pointe Robt F ◎ 388-9510
Sawyer Abbie C Mrs ◎ 388-0546
MONCRIEF ST BEGINS
185 Sawyer John M ◎ 388-2316
Sawyer Harold W Jr ◎ 388-3389
187 No Return
189 Morrill Raymond ◎ 388-2704
191★Dodier Geo Jr ◎ 388-3982
192 Perry Christopher L 388-2162
Randall John ◎ 388-1686
★Aponos Constance S ◎ 388-9014
Woodsom Ethel M Mrs ◎
Perreault Alphonse G ◎ 388-1923
Surprenant Constance E ◎
Crowley Terrence M ◎ 388-0994
Vacant
★Rice Margt S
Bourque Arth E ◎ 388-2448
Woodsom Farm milk
Santoro Anna W Mrs 388-0147
Woodsom Geo J ◎ 388-0893
Hojaboom Lawrence A 388-2088
Lucier Harry J ◎ 388-9486
Woodsom James A ◎ 388-1732
Walsh James ◎ 388-3531
Meow Motel cats boarded 388-1722
Cobb Roy N ◎ 388-1722
Perreault Paul J ◎ 388-0536
Fournier Philip N ◎ 388-3269
Kolosey Henry J ◎ 388-1421
Bartley Danl L ◎ 388-0956
Perreault Louis P ◎ 388-1350
Forget Mae E Mrs ◎ 388-9039
Attitash Specialty woodworking 388-2041
Billings Howard O ◎ 388-0838
Roy Robt E ◎ 388-0554
Ross John A ◎ 388-9375
Clarke Helena A Mrs ◎ 388-0409
Provencher Lawrence J ◎ 388-4368
Perkins Thos E ◎ 388-0252
Chapman Michl W 388-3504
Bilodeau John ◎
Davis Clifton L ◎ 388-2026
Cashman Charles C
Elementary School 388-4407
NEWTON RD BEGINS
KIMBALL RD ENDS
TUXBURY SQUARE
LAKE ATTITASH DIST

17

FROST CORNER (AMESBURY)—FROM 165 CONGRESS AT SALISBURY LINE

ZIP CODE 01913

17

FRUIT PL (AMESBURY) FROM 53 MARKET

ZIP CODE 01913
2 Quinn John F ◎ 388-9504
Quinn Ronald J 388-2231
9½ Worthen Edw P 388-3970
10★Cottey Nancy
10½★Collins Cande
Boucher Gerald
O'Neil Marjorie J
12 Perreault Alf 388-4096
Brickett David P
14 Savoie Maurice O ◎ 388-2901

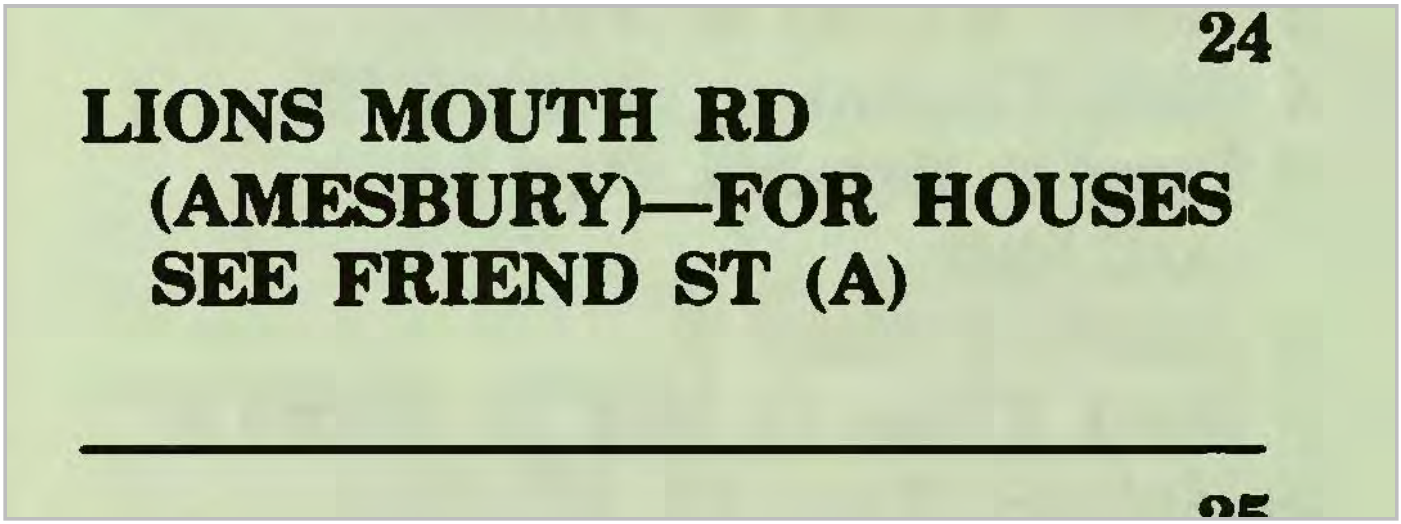
14

FRUIT ST —FROM 24 PROSPECT TO 96 HIGH

ZIP CODE 01950
1★Elmeer Gordon 462-7230
1½ Eagan
3 Sweet Peter S ◎ 465-5875
4★Roy James C ◎ 462-9488
Innerfield Robt D 456-0670
5 Murphy Edw P ◎ 465-8508
6 Fenders Henry G Jr ◎ 462-4568
7 Apartments
1 Devoe Marjorie
2 Oswald Barbara
3 Pelsue Thos
4 Higgins K
5 Mullen Myrna K 465-8117
8 Thayer R Bruce III 465-8117
9 Barclay Fred B 465-0237
10 Vacant
11 No Return
12 Damon Albert H Jr ◎

Target Street	Cross Street	Source
✓	-	Polk's City Directory

LIONS MOUTH RD 1982



Target Street	Cross Street	Source
-	✓	Polk's City Directory

FRIEND ST 1977

Amesbury Park

HIGHLAND ST BEGINS

153 Greaney Wm F ◎ 388-2985

156 Deboisbriand Agnes C Mrs ◎ 388-9553

157 Morse Donald L ◎ 388-2055

158 Ouellet J M Gerard ◎ 388-1771

160 Lanseigne Roland L 388-0329

Francoeur Rita D Mrs ◎ 388-1933

162 Eaton James E Jr ◎ 388-1892

166 Ackley Laurence E Jr ◎ 388-2291

LINDBERGH AV BEGINS

170 Yelle Herman E ◎ 388-1327

171 Al's Variety Store 388-0370

173 Hodge Cath E nurse ◎ 388-0686

Hodge Doris E ◎ 388-0686

Vacant

175 Gendreau Alene A Mrs

177a Leblanc Norman ◎ 388-2009

Rear Wilkins Ellis E ◎

Morrill Edith Mrs ◎ 388-2612

178 Gray Lester ◎ 388-4785

179 Lavoie Raymond ◎ 388-2949

Rear Gunning Alice ◎ 388-9033

APPENDIX B

QUALIFICATIONS/LIMITATIONS

QUALIFICATIONS/LIMITATIONS

Environmental & Construction Management Services, Inc. (ECMS) professional services have been performed, our findings obtained, and our recommendations prepared in accordance with customary principles and practices in the fields of environmental science and engineering. This warranty is in lieu of all other warranties either expressed or implied. *ECMS* is not responsible for the independent conclusions, opinions or recommendations made by others based on the records review, site inspection, field exploration, and laboratory test data presented in this report.

Factual information regarding on-site business operations, conditions, and historical data provided to *ECMS* is assumed to be correct and complete. *ECMS* assumes no responsibility for hidden or latent conditions or misrepresentation by the property owner, its representatives, public information officials or any authority consulted in connection with the compilation of this report.

The findings set forth in the attached Site assessment report are strictly limited in time and scope to the date of the evaluation(s). The conclusions presented in the Report are based solely on the services described therein, and not on scientific tasks or procedures beyond the scope of agreed upon services or the time and budgeting restraints imposed by the client.

The purpose of this report was to assess the physical characteristics of the subject Site with respect to the presence in the environment of hazardous material or oil. No specific attempt was made to check on the compliance of present or past owners or operators or of the Site with Federal, State or local laws and regulations, environmental, or otherwise.

Partial findings of this investigation are based on data provided by others. No warranty is expressed or implied with the usage of such data. Much of the information provided in this report is based upon personal interviews and research of all available documents, records and maps held by the appropriate government and private agencies. This is subject to the limitations of historical documentation, availability and accuracy of pertinent records, and the personal recollection of those persons contacted by *ECMS* personnel. *ECMS* is not a professional title insurance firm and makes no guarantee, explicit or implied that the listing, which was reviewed, represented a comprehensive delineation of past Site ownership or tenancy for legal purposes.

Observations were made of the Site and of structures on the Site as indicated within the Report. Where access to portions of the Site or to structures on the Site was unavailable or limited, *ECMS* is unable to render an opinion as to the presence of hazardous material or oil, or to the presence if indirect evidence relating to hazardous material or oil, in that portion of the Site or structure. In addition, *ECMS* renders no opinion as to the presence of hazardous material or oil, where direct observation of the interior walls, floor, or ceiling of a structure on a Site was obstructed by objects or coverings on or over these surfaces.

The initial site investigation took into account the natural and man-made features of the Site, including any unusual or suspect phenomenon. These factors combined with the Site's geology, hydrology, topography, and past and present land uses served as a basis for choosing a methodology and location for subsurface exploration as well as ground water and subsurface sampling, if done. The subsurface data, if provided, is meant as a representative overview of the Site.

The conclusions and recommendations contained in this report may be based in part upon various types of chemical data and are contingent upon their validity. As indicated within the Report, some

of these data are preliminary "screening" level data, and should be confirmed with quantitative analyses if more specific information is necessary. It should be noted that variations in the types and concentrations of contaminants and variations in their flow paths may occur due to seasonal water table fluctuations, past disposal practices, the passage of time, and other factors. Should additional data or variations of current data become available in the future, these data should be reviewed, and the conclusions and recommendations presented herein modified accordingly.

Chemical analyses may have been performed for specific parameters during the course of this Site assessment, as described in the text. However, it should be noted that additional chemical constituents not searched for during the current study might be present in soil and/or ground water at the Site.

APPENDIX C

RESUMES OF COMPETENT ENVIRONMENTAL PROFESSIONAL

KEVIN J. KAVANAUGH, L.S.P., CHMM

Principal Environmental Engineer

Kevin has over 33 years of engineering/hydrogeological consulting, environmental site assessment and site remediation experience. In addition to his fiscal and marketing duties as a Principal Environmental Engineer and Chief Executive Officer (CEO) at *Environmental & Construction Management Services, Inc.* (*ECMS*), he oversees the environmental staff, coordinates business and professional development of staff, provides technical QA/QC, and offers specialized corporate technical support in accordance with state and federal regulatory agencies.

Prior to co-founding *ECMS*, Kevin was the National Accounts Director for Hygienetics Environmental Services, Inc. (Hygienetics) in Boston, Massachusetts. As the National Account Director he managed the nationwide environmental due diligence and consulting services for Hygienetics National Accounts including GE Capital Real Estate, Archon Group LP, Finova Realty Capital, American General Realty Advisors, Metropolitan Life Insurance and State Teachers Retirement System of Ohio for all of Hygienetics 14 Offices throughout the Continental United States.

Kevin is a Massachusetts Licensed Site Professional (LSP) since May 1994 and Certified Hazardous Materials Manager (CHMM) since 1998 with extensive experience with preparation and submission of every aspect of the Massachusetts Contingency Plan (MCP) 310 CMR 40.0000 including; Phase I through Phase V reports, Downgradient Property Status (DPS), Activity and Use Limitations (AULs), Method 1 and 3 Risk Characterizations, Class A, B and C Response Action Outcome (RAO) and Permanent Solutions, Numerical Site Ranking, Immediate Response Action (IRA) Plans and Release Abatement Measure (RAM) Plans, status and completion reports, Tier I Permit Applications, Major Permit Modifications and vapor intrusion assessments. He also provided LSP technical report review and provided cost estimates for various lending institutions, insurance companies, law offices and other property acquisition/development corporations. In addition to his extensive experience in Massachusetts, he has personally performed either environmental site assessments and/or site remediation in New Hampshire, Georgia, Rhode Island, New Jersey, Texas, Kansas, California, Florida, Michigan and Pennsylvania.

Prior to joining Hygienetics in 1996, Kevin worked as a Site Operation's Manager/Senior Environmental Engineer responsible for all technical and business activities for a 13-person branch office for Groundwater & Environmental Services, Inc. (a full-service environmental consulting/remediation firm).

Some of his accomplishments include:

Technical Specialties:

Phase I and II Environmental Site Assessments

Soil and Groundwater Investigations

Risk-Based Closure Assessments

UST Management/Closure

Soil and Groundwater Remediation

Education:

B.S., Civil Engineering, University of Maine at Orono, 1985

Certifications:

Massachusetts Licensed Site Professional (LSP) License No. 7610

Certified Hazardous Materials Manager (CHMM) License No. 9287

OSHA Standard 29 CFR 1920 and SARA Section 126(d) (HAZWOPER)

Professional Affiliations:

Massachusetts Licensed Site Professionals Association (LSPA)

KEVIN J. KAVANAUGH, L.S.P., CHMM

Principal Environmental Engineer

- National Account Director as the primary contact for the Hygienetics National Account's Program. A partial client list includes: GE Capital Real Estate, Archon Group LP, Finova Realty Capital, American General Realty Advisors, Storage USA, Metropolitan Life Insurance and State Teachers Retirement System of Ohio.

- Performed and/or supervised the performance of over 1,200 due diligence environmental assessment reports throughout the country. A partial list of local and nationwide client includes: Princeton Properties Management, Jones Lang LaSalle, John Hancock, Trammell Crow Company, Starwood Lodging, Equitable Real Estate, Northwestern Mutual Life Insurance, Insignia/ESG, Cornerstone Properties, Equity Office Properties, Prudential Real Estate and Marriott/Claris Corporation.

- Supervised a technical staff of 13 and was New England Regional Account Manager for a $1 million/year major oil corporation client.

- Designed or redesigned and directed the installation of over 50 remedial treatment systems including dual phase extraction (high vacuum extraction), soil vacuum extraction, air sparging and product/ groundwater recovery and treatment.

- Developed New England regional LSP risk-based closure program for existing client base.

- Performed all phases of environmental project development and management including: groundwater modeling, hydrogeologic studies, physical and chemical interpretation of field data, preparation and review of initial and complex site assessments, and remedial action reports in accordance with MGL21E, MCP, RCRA and other regulations.

- Performed other technical activities including a variety of pilot tests (aquifer, hydraulic conductivity, vacuum extraction and air sparging), the preparing of Wetlands Notice of Intents, air and groundwater discharge permitting and supervision of UST removals/closures.

- Directed the operation and maintenance of over 125 active soil and groundwater organic contamination recovery and treatment systems. Remedial treatment systems included soil vacuum extraction, air sparging, UV peroxidation, hydrogen peroxide Injection and product/groundwater recovery and treatment.

- Completed over 300 MCP Method 1, Method 2 and Method 3 Risk Characterizations and Class A, B and C Response Action Outcomes (RAOs)/Permanent Solutions (regulatory site closures).

- Managed and completed a 40 property real estate due diligence Phase I ESA nationwide portfolio for a large National Account Real Estate Client in an expedited timeframe.

Technical Specialties:

Phase I and II Environmental Site Assessments

Soil and Groundwater Investigations

Risk-Based Closure Assessments

UST Management/Closure

Soil and Groundwater Remediation

Education:

B.S., Civil Engineering, University of Maine at Orono, 1985

Certifications:

Massachusetts Licensed Site Professional (LSP) License No. 7610

Certified Hazardous Materials Manager (CHMM) License No. 9287

OSHA Standard 29 CFR 1920 and SARA Section 126(d) (HAZWOPER)

Professional Affiliations:

Massachusetts Licensed Site Professionals Association (LSPA)

The Commonwealth of Massachusetts

BOARD OF REGISTRATION OF HAZARDOUS WASTE SITE CLEANUP PROFESSIONALS

This is to Certify That

Kevin J. Kavanaugh

has been duly registered by this Board as a qualified Licensed Site Professional, as provided by the laws of the Commonwealth.



Boston, Massachusetts **August 18, 2017**

Chairperson of the Board

7610 **July 30, 2020**

License Number *Expiration Date*

APPENDIX D

ASSESSOR'S PROPERTY FIELD CARD

193 LIONS MOUTH RD

Location	193 LIONS MOUTH RD	**Mblu**	50/ / 6/ /
Acct#		**Owner**	AMESBURY CITY OF
Assessment	$8,061,100	**PID**	4685
Building Count	1		

Current Value

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$6,545,400	$1,515,700	$8,061,100

Owner of Record

Owner	AMESBURY CITY OF	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	TOWN HALL AMESBURY, MA 01913	**Book & Page**	05833/0124
		Sale Date	12/30/1971

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
AMESBURY CITY OF	$0		05833/0124	12/30/1971

Building Information

Building 1 : Section 1

Year Built:	1975
Living Area:	61,320
Replacement Cost:	$9,437,102
Building Percent Good:	65
Replacement Cost Less Depreciation:	$6,134,100

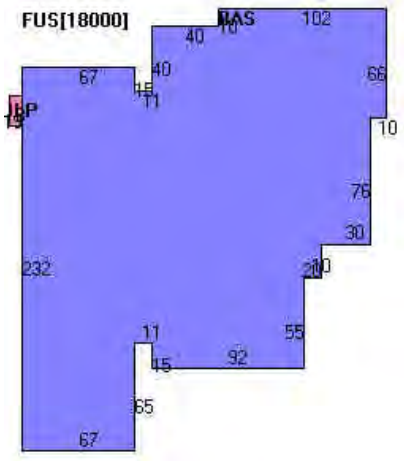
Building Attributes	
Field	**Description**
STYLE	High School
MODEL	Commercial
Grade	Average +10
Stories:	2
Occupancy	2
Exterior Wall 1	Brick/Masonry
Exterior Wall 2	
Roof Structure	Gable/Hip
Roof Cover	Asph/F Gls/Cmp
Interior Wall 1	Drywall/Sheet
Interior Wall 2	Minim/Masonry
Interior Floor 1	Vinyl/Asphalt
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Forced Air-Duc
AC Type	None
Bldg Use	PUB-SCHOOL
Total Rooms	
Total Bedrms	00
Total Baths	2
1st Floor Use:	9033
Heat/AC	NONE
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	SUS-CEIL & WL
Rooms/Prtns	AVERAGE
Wall Height	14
% Comn Wall	0

Building Photo



(http://images.vgsi.com/photos/AmesburyMAPhotos//\00\01\57/55.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	43,320	43,320
FUS	Upper Story, Finished	18,000	18,000
ULP	Loading Platform, Unfinished	152	0
		61,472	61,320

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
SPR2	WET CONCEALED	56760 S.F.	$129,100	1
ELV2	COMM/AVG	4 UNIT	$104,000	1

Land

Land Use

Use Code	9340
Description	Education C
Zone	OSC
Neighborhood	0200
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	35.32
Frontage	180
Depth	1200
Assessed Value	$1,515,700

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV1	PAV ASPH			74574 S.F.	$138,000	1
LT1	LIGHTS INC 1			7 UNITS	$2,400	1
LT2	LIGHTS INC 2			2 UNITS	$1,100	1
	BLEACHR			1	$1,000	1
CAB2	W/PLUMB			576 S.F.	$16,100	1
LT12	LIGHTS SOD 4			4 UNITS	$13,300	1
WDDK	WOOD DECK			559 S.F.	$6,000	1
SGN1	SIGN 1 SIDE			16 SF+HT	$300	1

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193 LIONS MOUTH RD

Location	193 LIONS MOUTH RD	**Mblu**	50/ / 42/ /
Acct#		**Owner**	AMESBURY CITY OF
Assessment	$172,700	**PID**	5531
Building Count	1		

Current Value

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$31,100	$141,600	$172,700

Owner of Record

Owner	AMESBURY CITY OF	**Sale Price**	$0
Co-Owner	CASHMAN SCHOOL-ELEMENTARY	**Certificate**	
Address	TOWN HALL AMESBURY, MA 01913	**Book & Page**	05843/0244
		Sale Date	02/15/1972

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
AMESBURY CITY OF	$0		05843/0244	02/15/1972

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0
Building Percent Good:
Replacement Cost Less Depreciation: $0

Building Attributes	
Field	**Description**
Style	Vacant Land
Model	
Grade:	
Stories:	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Bath Style:	
Kitchen Style:	

Building Photo



(http://images.vgsi.com/photos/AmesburyMAPhotos//default.jpg)

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	9300
Description	Town V
Zone	R20
Neighborhood	
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	0.86
Frontage	110
Depth	325
Assessed Value	$141,600

Outbuildings

Outbuildings — **Legend**

Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
PAV1	PAV ASPH			10112 S.F.	$28,100	1
LT5	LIGHTS MER 1			4 UNITS	$3,000	1

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193 LIONS MOUTH RD

Location	193 LIONS MOUTH RD	**Mblu**	50/ / 16/ /
Acct#		**Owner**	AMESBURY CITY OF
Assessment	$105,800	**PID**	5504
Building Count	1		

Current Value

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$0	$105,800	$105,800

Owner of Record

Owner	AMESBURY CITY OF	**Sale Price**	$0
Co-Owner	CASHMAN SCHOOL-ELEMENTARY	**Certificate**	
Address	TOWN HALL AMESBURY, MA 01913	**Book & Page**	05833/0124
		Sale Date	12/30/1971

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
AMESBURY CITY OF	$0		05833/0124	12/30/1971

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0
Building Percent Good:
Replacement Cost Less Depreciation: $0

Building Attributes	
Field	**Description**
Style	Vacant Land
Model	
Grade:	
Stories:	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Bath Style:	
Kitchen Style:	

Building Photo



(http://images.vgsi.com/photos/AmesburyMAPhotos//default.jpg)

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	9300
Description	Town V
Zone	R20
Neighborhood	
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	0.23
Frontage	100
Depth	100
Assessed Value	$105,800

Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

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APPENDIX E

ENVIRONMENTAL DATA RESOURCES, INC. (EDR) DATABASE REPORT

Cashman Elementary School
193 Lions Mouth Rd
Amesbury, MA 01913

Inquiry Number: 5397483.2s
August 17, 2018

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

193 LIONS MOUTH RD
AMESBURY, MA 01913

COORDINATES

Latitude (North):	42.8572390 - 42° 51' 26.06''
Longitude (West):	70.9483540 - 70° 56' 54.07''
Universal Tranverse Mercator:	Zone 19
UTM X (Meters):	340818.9
UTM Y (Meters):	4746588.0
Elevation:	105 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5644860 NEWBURYPORT WEST, MA
Version Date:	2012

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20140712
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
193 LIONS MOUTH RD
AMESBURY, MA 01913

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
1	WOODSOM FARMS TRUST	LIONS MOUTH RD	UST, Financial Assurance	Higher	1091, 0.207, SSE
2	NO LOCATION AID	91 HIGH ST	SHWS, RELEASE, HW GEN	Lower	2898, 0.549, East
3	PROPERTY	99 FRIEND STREET	SHWS, RELEASE	Lower	3161, 0.599, East
4	AT 12 GREENLEAF ST (	12 GREENLEAF STREET	SHWS	Lower	3235, 0.613, ESE
5	MICHAUDS GARAGE	96-98 FRIEND STREET	SHWS, RELEASE	Lower	3360, 0.636, East
6	GOODWIN CREEK MARINA	14 PLEASANT STREET	SHWS, LUST, RELEASE	Lower	3772, 0.714, ESE
A7	FLOSMAN, JOSEPH	8-10 SCHOOL ST	SHWS, RELEASE, ENF	Lower	3965, 0.751, East
A8	SPACE AGE CLEANERS	6 SCHOOL ST	SHWS, RELEASE, ASBESTOS, ENF	Lower	3966, 0.751, East
B9	FMR TRADER ALLENS TR	21 POND VIEW AVE	SHWS, LUST, RELEASE, ENF	Lower	4027, 0.763, East
B10	NO LOCATION AID	19 POND ST	SHWS, INST CONTROL, RELEASE	Lower	4040, 0.765, East
11	NO LOCATION AID	36 HIGH ST	SHWS, LUST, RELEASE, ENF	Lower	4205, 0.796, East
C12	37 FRIEND STREET REA	37 FRIEND ST	SHWS, RELEASE, ENF	Lower	4224, 0.800, East
C13	TEDS TEXACO FMR	46-50 52-54 FRIEND S	SHWS, RELEASE	Lower	4237, 0.802, East
14	NO LOCATION AID	21 HILLSIDE AVE	SHWS, RELEASE	Lower	4345, 0.823, SE
15	NO LOCATION AID	36 MAIN ST	SHWS, INST CONTROL, RELEASE	Lower	4764, 0.902, East
16	MILL YARD SITE	MAIN ST HIGH ST	SHWS, RELEASE	Lower	4903, 0.929, East
17	PROPERTY	194 MAIN ST	SHWS, RELEASE, ASBESTOS	Lower	4921, 0.932, ESE
18	REID S FOUNDRY	MILL STREET EXT	SHWS, RELEASE	Lower	4933, 0.934, East
D19	NO LOCATION AID	33 MILL STREET	SHWS, BROWNFIELDS, RELEASE, ENF	Lower	4999, 0.947, East
20	HILLSIDE NO 66 SUBST	9 ALENCLAIR DR	SHWS, RELEASE	Lower	5007, 0.948, SSE
21	NO LOCATION AID	5-29 WATER STREET	SHWS, LUST, RELEASE	Lower	5041, 0.955, East
D22	ABUTTING SUBSTATION	MILL ST	SHWS, INST CONTROL, RELEASE	Lower	5055, 0.957, East
23	TRADER ALLEN TRUCK S	RTE 150 EXETER RD	SHWS, RELEASE	Lower	5123, 0.970, East

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY ---------- Federal Facility Site Information listing
SEMS ---------- Superfund Enterprise Management System

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE ---------- Superfund Enterprise Management System Archive

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

LUCIS ---------- Land Use Control Information System
US ENG CONTROLS ---------- Engineering Controls Sites List

US INST CONTROL ---------- Sites with Institutional Controls

Federal ERNS list

ERNS ---------- Emergency Response Notification System

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ---------- Solid Waste Facility Database/Transfer Stations

State and tribal leaking storage tank lists

LAST ---------- Leaking Aboveground Storage Tank Sites
LUST ---------- Leaking Underground Storage Tank Listing
INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

FEMA UST ---------- Underground Storage Tank Listing
AST ---------- Aboveground Storage Tank Database
INDIAN UST ---------- Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries

INST CONTROL ---------- Sites With Activity and Use Limitation

State and tribal voluntary cleanup sites

INDIAN VCP ---------- Voluntary Cleanup Priority Listing

State and tribal Brownfields sites

BROWNFIELDS ---------- Completed Brownfields Covenants Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---------- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

INDIAN ODI ---------- Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9 ---------- Torres Martinez Reservation Illegal Dump Site Locations
ODI ---------- Open Dump Inventory
IHS OPEN DUMPS ---------- Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL ---------- Delisted National Clandestine Laboratory Register
US CDL ---------- National Clandestine Laboratory Register

Local Land Records

LIENS ---------- Liens Information Listing

LIENS 2 ---------- CERCLA Lien Information

Records of Emergency Release Reports

HMIRS ---------- Hazardous Materials Information Reporting System
SPILLS ---------- Historical Spill List
RELEASE ---------- Reportable Releases Database
SPILLS 90 ---------- SPILLS 90 data from FirstSearch
SPILLS 80 ---------- SPILLS 80 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR ---------- RCRA - Non Generators / No Longer Regulated
FUDS ---------- Formerly Used Defense Sites
DOD ---------- Department of Defense Sites
SCRD DRYCLEANERS ---------- State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR ---------- Financial Assurance Information
EPA WATCH LIST ---------- EPA WATCH LIST
2020 COR ACTION ---------- 2020 Corrective Action Program List
TSCA ---------- Toxic Substances Control Act
TRIS ---------- Toxic Chemical Release Inventory System
SSTS ---------- Section 7 Tracking Systems
ROD ---------- Records Of Decision
RMP ---------- Risk Management Plans
RAATS ---------- RCRA Administrative Action Tracking System
PRP ---------- Potentially Responsible Parties
PADS ---------- PCB Activity Database System
ICIS ---------- Integrated Compliance Information System
FTTS ---------- FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS ---------- Material Licensing Tracking System
COAL ASH DOE ---------- Steam-Electric Plant Operation Data
COAL ASH EPA ---------- Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER ---------- PCB Transformer Registration Database
RADINFO ---------- Radiation Information Database
HIST FTTS ---------- FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS ---------- Incident and Accident Data
CONSENT ---------- Superfund (CERCLA) Consent Decrees
INDIAN RESERV ---------- Indian Reservations
FUSRAP ---------- Formerly Utilized Sites Remedial Action Program
UMTRA ---------- Uranium Mill Tailings Sites
LEAD SMELTERS ---------- Lead Smelter Sites
US AIRS ---------- Aerometric Information Retrieval System Facility Subsystem
US MINES ---------- Mines Master Index File
ABANDONED MINES ---------- Abandoned Mines
FINDS ---------- Facility Index System/Facility Registry System
UXO ---------- Unexploded Ordnance Sites
DOCKET HWC ---------- Hazardous Waste Compliance Docket Listing
ECHO ---------- Enforcement & Compliance History Information
FUELS PROGRAM ---------- EPA Fuels Program Registered Listing
AIRS ---------- Permitted Facilities Listing
ASBESTOS ---------- ASBESTOS
DRYCLEANERS ---------- Regulated Drycleaning Facilities
ENF ---------- Enforcement Action Cases
Financial Assurance ---------- Financial Assurance Information Listing

GWDP ---------- Ground Water Discharge Permits
HW GEN ---------- List of Massachusetts Hazardous Waste Generators
MERCURY ---------- Mercury Product Recyling Drop-Off Locations Listing
NPDES ---------- NPDES Permit Listing
TIER 2 ---------- Tier 2 Information Listing
TSD ---------- TSD Facility

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP ---------- EDR Proprietary Manufactured Gas Plants
EDR Hist Auto ---------- EDR Exclusive Historical Auto Stations
EDR Hist Cleaner ---------- EDR Exclusive Historical Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS ---------- Recovered Government Archive State Hazardous Waste Facilities List
RGA LUST ---------- Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

State- and tribal - equivalent CERCLIS

SHWS: Contains information on releases of oil and hazardous materials that have been reported to DEP.

A review of the SHWS list, as provided by EDR, and dated 04/18/2018 has revealed that there are 22 SHWS sites within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
NO LOCATION AID	***91 HIGH ST***	***E 1/2 - 1 (0.549 mi.)***	***2***	***9***
Release Tracking Number / Current Status: 3-0020490 / RAO				
PROPERTY	***99 FRIEND STREET***	***E 1/2 - 1 (0.599 mi.)***	***3***	***12***
Release Tracking Number / Current Status: 3-0031813 / PSNC				
AT 12 GREENLEAF ST (	12 GREENLEAF STREET	ESE 1/2 - 1 (0.613 mi.)	4	17

Release Tracking Number / Current Status: 3-0034813 / UNCLSS

MICHAUDS GARAGE	***96-98 FRIEND STREET***	***E 1/2 - 1 (0.636 mi.)***	***5***	***18***
Release Tracking Number / Current Status: 3-0031607 / RAO				
GOODWIN CREEK MARINA	***14 PLEASANT STREET***	***ESE 1/2 - 1 (0.714 mi.)***	***6***	***20***
Release Tracking Number / Current Status: 3-0033647 / PSNC				
FLOSMAN, JOSEPH	***8-10 SCHOOL ST***	***E 1/2 - 1 (0.751 mi.)***	***A7***	***26***
Release Tracking Number / Current Status: 3-0026999 / TIER1D				
SPACE AGE CLEANERS	***6 SCHOOL ST***	***E 1/2 - 1 (0.751 mi.)***	***A8***	***45***
Release Tracking Number / Current Status: 3-0026060 / TIERII				
FMR TRADER ALLENS TR	***21 POND VIEW AVE***	***E 1/2 - 1 (0.763 mi.)***	***B9***	***59***
Release Tracking Number / Current Status: 3-0025880 / TIERII				
Release Tracking Number / Current Status: 3-0025667 / TIERII				
Release Tracking Number / Current Status: 3-0030391 / RAO				
NO LOCATION AID	***19 POND ST***	***E 1/2 - 1 (0.765 mi.)***	***B10***	***79***
Release Tracking Number / Current Status: 3-0022389 / RAO				
Release Tracking Number / Current Status: 3-0020783 / RAO				
NO LOCATION AID	***36 HIGH ST***	***E 1/2 - 1 (0.796 mi.)***	***11***	***86***
Release Tracking Number / Current Status: 3-0021511 / RAO				
37 FRIEND STREET REA	***37 FRIEND ST***	***E 1/2 - 1 (0.800 mi.)***	***C12***	***96***
Release Tracking Number / Current Status: 3-0002855 / RAO				
TEDS TEXACO FMR	***46-50 52-54 FRIEND S***	***E 1/2 - 1 (0.802 mi.)***	***C13***	***98***
Release Tracking Number / Current Status: 3-0001792 / RAO				
NO LOCATION AID	***21 HILLSIDE AVE***	***SE 1/2 - 1 (0.823 mi.)***	***14***	***99***
Release Tracking Number / Current Status: 3-0011936 / RAO				
NO LOCATION AID	***36 MAIN ST***	***E 1/2 - 1 (0.902 mi.)***	***15***	***102***
Release Tracking Number / Current Status: 3-0013943 / RAO				
MILL YARD SITE	***MAIN ST HIGH ST***	***E 1/2 - 1 (0.929 mi.)***	***16***	***106***
Release Tracking Number / Current Status: 3-0000200 / DEPNFA				
PROPERTY	***194 MAIN ST***	***ESE 1/2 - 1 (0.932 mi.)***	***17***	***108***
Release Tracking Number / Current Status: 3-0002068 / RAO				
REID S FOUNDRY	***MILL STREET EXT***	***E 1/2 - 1 (0.934 mi.)***	***18***	***110***
Release Tracking Number / Current Status: 3-0000513 / DEPNFA				
NO LOCATION AID	***33 MILL STREET***	***E 1/2 - 1 (0.947 mi.)***	***D19***	***112***
Release Tracking Number / Current Status: 3-0029912 / TIERII				
Release Tracking Number / Current Status: 3-0030292 / RAONR				
HILLSIDE NO 66 SUBST	***9 ALENCLAIR DR***	***SSE 1/2 - 1 (0.948 mi.)***	***20***	***126***
Release Tracking Number / Current Status: 3-0029867 / PSC				
NO LOCATION AID	***5-29 WATER STREET***	***E 1/2 - 1 (0.955 mi.)***	***21***	***129***
Release Tracking Number / Current Status: 3-0032310 / URAM				
ABUTTING SUBSTATION	***MILL ST***	***E 1/2 - 1 (0.957 mi.)***	***D22***	***137***
Release Tracking Number / Current Status: 3-0014817 / RAO				
TRADER ALLEN TRUCK S	***RTE 150 EXETER RD***	***E 1/2 - 1 (0.970 mi.)***	***23***	***142***
Release Tracking Number / Current Status: 3-0001604 / RAO				

State and tribal registered storage tank lists

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of Environmental Protection's Summary Listing of all the Tanks Registered in the State of Massachusetts.

A review of the UST list, as provided by EDR, and dated 04/18/2018 has revealed that there is 1 UST site within approximately 0.25 miles of the target property.

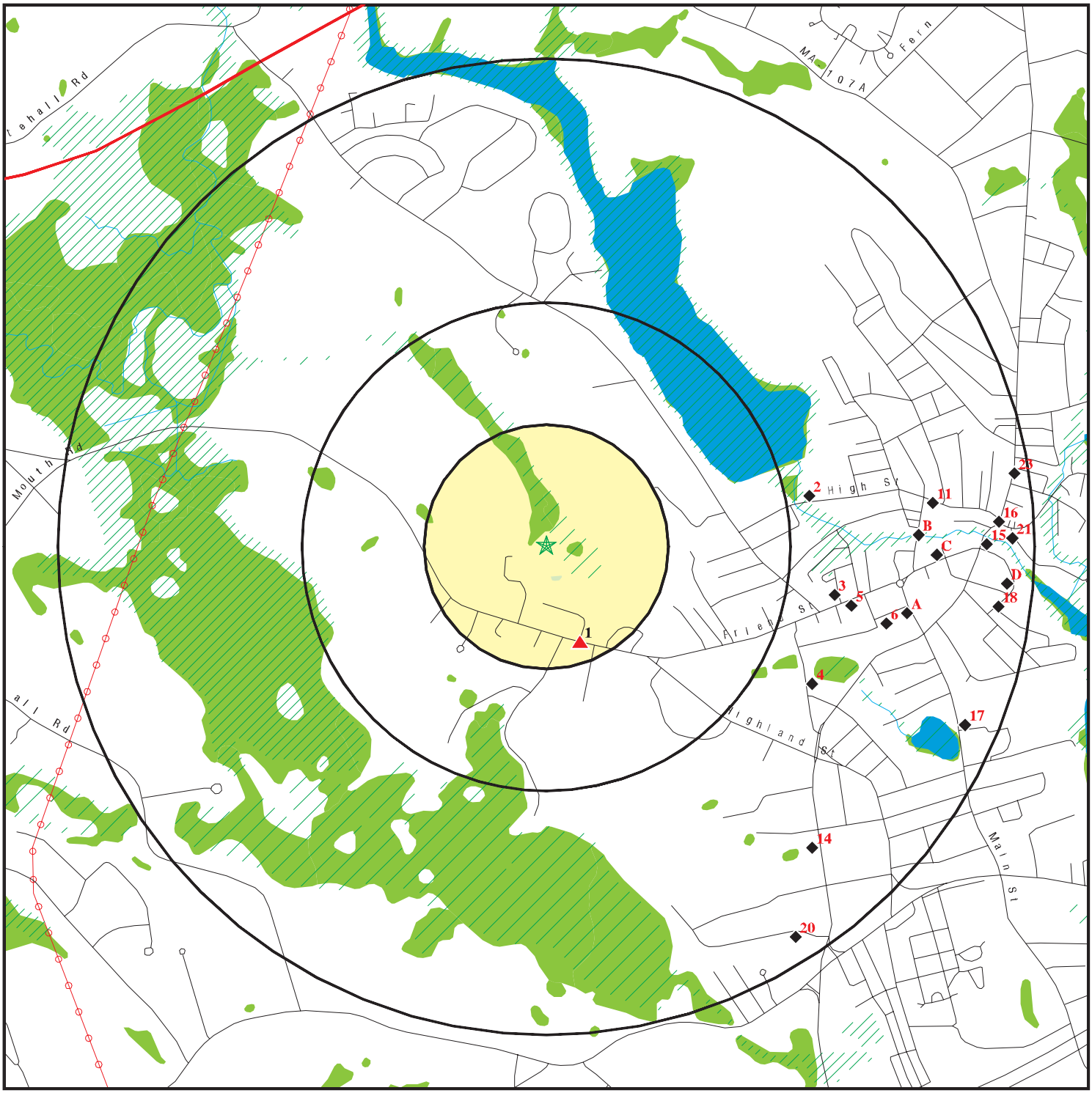
Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
WOODSOM FARMS TRUST	***LIONS MOUTH RD***	***SSE 1/8 - 1/4 (0.207 mi.)***	***1***	***8***
Tank Status: Tank Removed				
Facility Id: 143				

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 5 records.

Site Name	Database(s)
HILLSIDE SUBSTATION	SHWS, RELEASE
TOWN PARK	SHWS, RELEASE
MAIN STREET - EAST OF I-95 OVERPAS	SHWS, RELEASE
KEYSPAN ENERGY DELIVERY OF NEW ENG	SHWS, RELEASE, ENF
NO LOCATION AID	SHWS, RELEASE

OVERVIEW MAP - 5397483.2S



0 1/4 1/2 1 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- County Boundary
- Power transmission lines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Upgradient Area
- Areas of Critical Environmental Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Cashman Elementary School ADDRESS: 193 Lions Mouth Rd Amesbury MA 01913 LAT/LONG: 42.857239 / 70.948354	CLIENT: ECMS, Inc. CONTACT: Kevin Kavanaugh INQUIRY #: 5397483.2s DATE: August 17, 2018 1:47 pm

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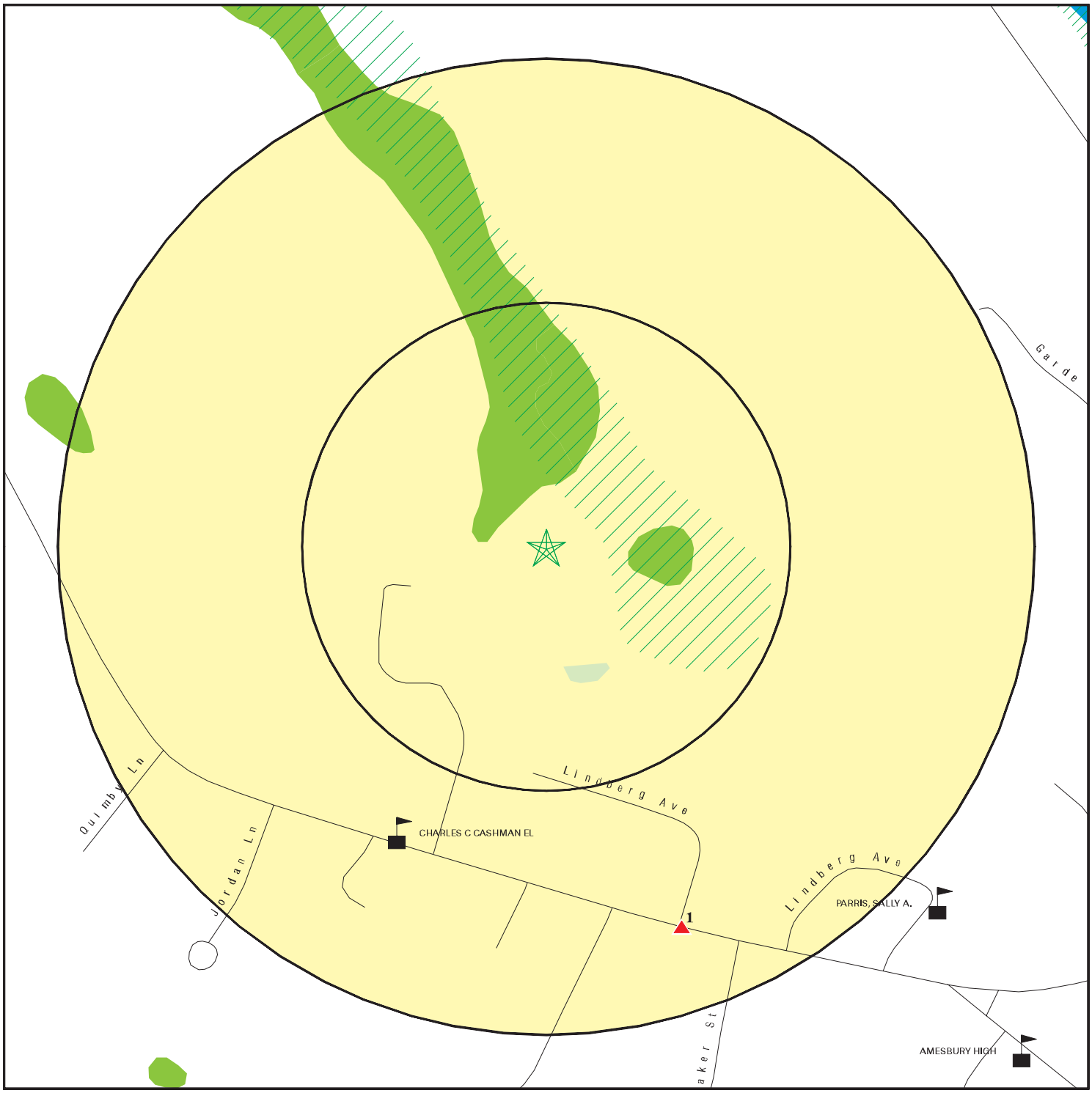
DETAIL MAP - 5397483.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Areas of Critical Environmental Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Cashman Elementary School	CLIENT: ECMS, Inc.
ADDRESS: 193 Lions Mouth Rd Amesbury MA 01913	CONTACT: Kevin Kavanaugh
LAT/LONG: 42.857239 / 70.948354	INQUIRY #: 5397483.2s DATE: August 17, 2018 1:49 pm

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
State- and tribal - equivalent CERCLIS								
SHWS	1.000		0	0	0	22	NR	22
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LAST	0.500		0	0	0	NR	NR	0
LUST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
UST	0.250		0	1	NR	NR	NR	1
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
INST CONTROL	0.500		0	0	0	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	TP		NR	NR	NR	NR	NR	0
US CDL	TP		NR	NR	NR	NR	NR	0
Local Land Records								
LIENS	TP		NR	NR	NR	NR	NR	0
LIENS 2	TP		NR	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
SPILLS	TP		NR	NR	NR	NR	NR	0
RELEASE	TP		NR	NR	NR	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0
SPILLS 80	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
TSCA	TP		NR	NR	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.250		0	0	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
DOCKET HWC	TP		NR	NR	NR	NR	NR	0
ECHO	TP		NR	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
AIRS	TP		NR	NR	NR	NR	NR	0
ASBESTOS	TP		NR	NR	NR	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
ENF	TP		NR	NR	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
GWDP	TP		NR	NR	NR	NR	NR	0
HW GEN	0.250		0	0	NR	NR	NR	0
MERCURY	0.500		0	0	0	NR	NR	0
NPDES	TP		NR	NR	NR	NR	NR	0
TIER 2	TP		NR	NR	NR	NR	NR	0
TSD	0.500		0	0	0	NR	NR	0

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
RGA LUST	TP		NR	NR	NR	NR	NR	0
- Totals --		0	0	1	0	22	0	23

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

1
SSE
1/8-1/4
0.207 mi.
1091 ft.

WOODSOM FARMS TRUST
LIONS MOUTH RD
AMESBURY, MA 01913

UST
Financial Assurance

U003530771
N/A

Relative:
Higher

Actual:
120 ft.

UST:

Facility:

Facility ID:	143
Owner Id:	7657
Owner:	WOODSOM FARMS TRUST
Owner Address:	LIONS MOUTH RD
Owner City,St,Zip:	AMESBURY, MA 01913
Telephone:	Not reported
Description:	Farm
Facility address 2:	Not reported
Owner address 2:	Not reported
Latitude:	42.85442
Longitude:	-70.94699
Contact name:	Not reported
Contact address1:	Not reported
Contact address2:	Not reported
Contact city:	Not reported
Contact state:	Not reported
Contact zip:	Not reported
Contact email:	Not reported
Update:	2009-02-09 00:00:00
Update by:	Not reported
Fac status:	CLOSED

Tank ID:	1
Tank Status:	**Tank Removed**
Status Date:	03/29/1990
Date Installed:	04/07/1973
Capacity:	2000
Contents:	Gasoline
Tank Usage:	Not reported
Tank Leak Detection:	Not reported
Pipe Leak Detection:	Not reported
Latitude:	Not reported
Longitude:	Not reported
Tank construct:	Not reported
Pipe construct:	Not reported
Ptype:	Not reported
Number of compartment:	Not reported
Pipe install date:	Not reported
Pipe leak install date:	Not reported
Submersible sump:	N
Submersible sump install date:	Not reported
Turbine sump:	N
Turbine sump sensor:	N
Intermediate sump:	N
Intermediate sump sensor:	N
Spill bucket installed date:	Not reported
Spill bucket sensor:	N
Overfill protect install:	Not reported
Overfill protect type:	Not reported
Automatic line leak detect:	Not reported

WOODSOM FARMS TRUST (Continued) **U003530771**

Tank corrosion type: Not reported
Leak corrosion type: Not reported

MA Financial Assurance 2:
Facility Id: 143
Description: Farm
Work Phone: (617) 388-0293

---

2 **NO LOCATION AID** **SHWS** **S104942007**
East **91 HIGH ST** **RELEASE** **N/A**
1/2-1 **AMESBURY, MA 01913** **HW GEN**
0.549 mi.
2898 ft.

Relative:
Lower

Actual:
79 ft.

SHWS:
Release Tracking Number/Current Status: 3-0020490 / RAO
Release Town: AMESBURY
Notification Date: 03/01/2001
Category: 120 DY
Associated ID: Not reported
Current Status: **Response Action Outcome**
Status Date: 03/01/2001
Phase: Not reported
Response Action Outcome: B1 - Remedial actions have not been conducted because a level of No Significant Risk exists.
Oil Or Haz Material: Hazardous Material

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: TETRACHLOROETHYLENE
Quantity: 1.3 milligrams per kilogram

Actions:
Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 3/1/2001
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 3/1/2001
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 3/1/2001
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 6/19/2001
Response Action Outcome: Remedial actions have not been conducted because a level of No

NO LOCATION AID (Continued) **S104942007**

Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: Level III - Comprehensive Audit
Action Date: 6/22/2009
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: An activity type that is related to an Audit
Action Status: NOA
Action Date: 6/22/2009
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: Level III - Comprehensive Audit
Action Date: 8/21/2009
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: An activity type that is related to an Audit
Action Status: NAFNVD
Action Date: 8/21/2009
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: RLFA
Action Status: FLDRAN
Action Date: 8/5/2009
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Release:
Release Tracking Number/Current Status: 3-0020490 / RAO
Primary ID: Not reported
Official City: AMESBURY
Notification: 03/01/2001
Category: 120 DY
Status Date: 03/01/2001
Phase: Not reported
Response Action Outcome: B1 - Remedial actions have not been conducted because a level of No Significant Risk exists.
Oil / Haz Material Type: Hazardous Material

Click here to access the MA DEP site for this facility:

Actions:
Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 3/1/2001
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received

NO LOCATION AID (Continued) **S104942007**

Action Date: 3/1/2001
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 3/1/2001
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 6/19/2001
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: Level III - Comprehensive Audit
Action Date: 6/22/2009
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: An activity type that is related to an Audit
Action Status: NOA
Action Date: 6/22/2009
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: Level III - Comprehensive Audit
Action Date: 8/21/2009
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: An activity type that is related to an Audit
Action Status: NAFNVD
Action Date: 8/21/2009
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: RLFA
Action Status: FLDRAN
Action Date: 8/5/2009
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Chemicals:
Chemical: TETRACHLOROETHYLENE
Quantity: 1.3 milligrams per kilogram

HW GEN:
EPA Id: MV9783887159
RCRA Generator Status: VSQG
State Generator Status: Not reported

EPA Id: MV9783887113

NO LOCATION AID (Continued) **S104942007**

RCRA Generator Status: Not reported
State Generator Status: VQG-MA

---

3 **PROPERTY** **SHWS** **S114965503**
East **99 FRIEND STREET** **RELEASE** **N/A**
1/2-1 **AMESBURY, MA 01913**
0.599 mi.
3161 ft.

Relative:
Lower

Actual:
85 ft.

SHWS:

Release Tracking Number/Current Status:	3-0031813 / PSNC
Release Town:	AMESBURY
Notification Date:	10/15/2013
Category:	120 DY
Associated ID:	Not reported
Current Status:	**PSNC**
Status Date:	07/30/2014
Phase:	Not reported
Response Action Outcome:	-
Oil Or Haz Material:	Oil and Hazardous Material
Location Type:	RESIDNTIAL
Source:	UNKNOWN

Click here to access the MA DEP site for this facility:

Chemicals:

Chemical:	BENZO(A)PYRENE
Quantity:	8.12 milligrams per kilogram
Chemical:	TPH
Quantity:	1509 milligrams per kilogram
Chemical:	BENZO(B)FLOURANTHENE
Quantity:	9.93 milligrams per kilogram
Chemical:	LEAD
Quantity:	1150 milligrams per kilogram
Chemical:	PHENANTHRENE
Quantity:	20.07 milligrams per kilogram
Chemical:	BENZO(A)ANTHRACENE
Quantity:	9.98 milligrams per kilogram
Chemical:	DIBENZO(A,H)ANTHRACENE
Quantity:	1.78 milligrams per kilogram

Actions:

Action Type:	Release Disposition
Action Status:	Reportable Release under MGL 21E
Action Date:	10/15/2013
Response Action Outcome:	Not reported
Action Type:	RNFE
Action Status:	Transmittal, Notice, or Notification Received
Action Date:	10/15/2013
Response Action Outcome:	Not reported
Action Type:	RNF
Action Status:	Reportable Release under MGL 21E
Action Date:	10/15/2013
Response Action Outcome:	Not reported

PROPERTY (Continued) **S114965503**

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 10/17/2013
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Written Plan Received
Action Date: 10/30/2013
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Level I - Technical Screen Audit
Action Date: 10/31/2013
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 11/1/2013
Response Action Outcome: Not reported

Action Type: BOL
Action Status: SHPFAC
Action Date: 11/19/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: SHPFAC
Action Date: 11/20/2014
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Fee Received - FMCRA Use Only
Action Date: 11/7/2013
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Modified Revised or Updated Plan Received
Action Date: 4/18/2014
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Status or Interim Report Received
Action Date: 4/18/2014
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Level I - Technical Screen Audit
Action Date: 4/25/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 4/30/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received

PROPERTY (Continued) **S114965503**

Action Date: 5/6/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: NOTSHP
Action Date: 5/6/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 6/16/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: NOTSHP
Action Date: 6/16/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 6/2/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 6/24/2014
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Completion Statement Received
Action Date: 7/30/2014
Response Action Outcome: Not reported

Action Type: Response Action Outcome - RAO
Action Status: PSNRCD
Action Date: 7/30/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: SHPFAC
Action Date: 7/7/2014
Response Action Outcome: Not reported

Action Type: Response Action Outcome - RAO
Action Status: Fee Received - FMCRA Use Only
Action Date: 8/7/2014
Response Action Outcome: Not reported

Release:
Release Tracking Number/Current Status: 3-0031813 / PSNC
Primary ID: Not reported
Official City: AMESBURY
Notification: 10/15/2013
Category: 120 DY
Status Date: 07/30/2014
Phase: Not reported

PROPERTY (Continued) **S114965503**

Response Action Outcome: -
Oil / Haz Material Type: Oil and Hazardous Material

Click here to access the MA DEP site for this facility:

Actions:
Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 10/15/2013
Response Action Outcome: Not reported

Action Type: RNFE
Action Status: Transmittal, Notice, or Notification Received
Action Date: 10/15/2013
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 10/15/2013
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 10/17/2013
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Written Plan Received
Action Date: 10/30/2013
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Level I - Technical Screen Audit
Action Date: 10/31/2013
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 11/1/2013
Response Action Outcome: Not reported

Action Type: BOL
Action Status: SHPFAC
Action Date: 11/19/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: SHPFAC
Action Date: 11/20/2014
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Fee Received - FMCRA Use Only
Action Date: 11/7/2013
Response Action Outcome: Not reported

Action Type: Release Abatement Measure

PROPERTY (Continued) **S114965503**

Action Status: Modified Revised or Updated Plan Received
Action Date: 4/18/2014
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Status or Interim Report Received
Action Date: 4/18/2014
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Level I - Technical Screen Audit
Action Date: 4/25/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 4/30/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 5/6/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: NOTSHP
Action Date: 5/6/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 6/16/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: NOTSHP
Action Date: 6/16/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 6/2/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 6/24/2014
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Completion Statement Received
Action Date: 7/30/2014
Response Action Outcome: Not reported

Action Type: Response Action Outcome - RAO
Action Status: PSNRCD
Action Date: 7/30/2014

PROPERTY (Continued) **S114965503**

Response Action Outcome: Not reported

Action Type: BOL
Action Status: SHPFAC
Action Date: 7/7/2014
Response Action Outcome: Not reported

Action Type: Response Action Outcome - RAO
Action Status: Fee Received - FMCRA Use Only
Action Date: 8/7/2014
Response Action Outcome: Not reported

Chemicals:
Chemical: BENZO(A)PYRENE
Quantity: 8.12 milligrams per kilogram
Chemical: TPH
Quantity: 1509 milligrams per kilogram
Chemical: BENZO(B)FLOURANTHENE
Quantity: 9.93 milligrams per kilogram
Chemical: LEAD
Quantity: 1150 milligrams per kilogram
Chemical: PHENANTHRENE
Quantity: 20.07 milligrams per kilogram
Chemical: BENZO(A)ANTHRACENE
Quantity: 9.98 milligrams per kilogram
Chemical: DIBENZO(A,H)ANTHRACENE
Quantity: 1.78 milligrams per kilogram
Location Type: RESIDNTIAL
Source: UNKNOWN

---

4 **AT 12 GREENLEAF ST (PRIVATE PROPERTY)** **SHWS** **S122423099**
ESE **12 GREENLEAF STREET** **N/A**
1/2-1 **AMESBURY, MA 01913**
0.613 mi.
3235 ft.

Relative:
Lower

Actual:
76 ft.

SHWS:
Release Tracking Number/Current Status: 3-0034813 / UNCLSS
Release Town: AMESBURY
Notification Date: 03/10/2018
Category: TWO HR
Associated ID: Not reported
Current Status: **Unclassified**
Status Date: 03/10/2018
Phase: Not reported
Response Action Outcome: -
Oil Or Haz Material: Not reported
Location Type: PRIVPROP
Source: TRANSFORM

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: MODF
Quantity: 26 gallons

AT 12 GREENLEAF ST (PRIVATE PROPERTY) (Continued) **S122423099**

Actions:

Action Type:	Release Disposition
Action Status:	Reportable Release under MGL 21E
Action Date:	3/10/2018
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Oral Approval of Plan or Action
Action Date:	3/10/2018
Response Action Outcome:	Not reported
Action Type:	A Notice sent to a Potentially Responsible Party (PRP)
Action Status:	A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date:	4/3/2018
Response Action Outcome:	Not reported

5
East
1/2-1
0.636 mi.
3360 ft.

MICHAUDS GARAGE **SHWS** **S113805115**
96-98 FRIEND STREET **RELEASE** **N/A**
AMESBURY, MA 01913

Relative:
Lower

Actual:
84 ft.

SHWS:

Release Tracking Number/Current Status:	3-0031607 / RAO
Release Town:	AMESBURY
Notification Date:	06/20/2013
Category:	120 DY
Associated ID:	Not reported
Current Status:	**Response Action Outcome**
Status Date:	08/23/2013
Phase:	PHASE II
Response Action Outcome:	B1 - Remedial actions have not been conducted because a level of No Significant Risk exists.
Oil Or Haz Material:	Hazardous Material
Source:	UNKNOWN

Click here to access the MA DEP site for this facility:

Chemicals:

Chemical:	LEAD
Quantity:	0.43 milligrams per liter

Actions:

Action Type:	Response Action Outcome - RAO
Action Status:	Level I - Technical Screen Audit
Action Date:	1/10/2014
Response Action Outcome:	Remedial actions have not been conducted because a level of No Significant Risk exists.
Action Type:	RNFE
Action Status:	Transmittal, Notice, or Notification Received
Action Date:	6/20/2013
Response Action Outcome:	Remedial actions have not been conducted because a level of No Significant Risk exists.

MICHAUDS GARAGE (Continued) **S113805115**

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 6/20/2013
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 6/20/2013
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 7/11/2013
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 8/23/2013
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 8/23/2013
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Release:
Release Tracking Number/Current Status: 3-0031607 / RAO
Primary ID: Not reported
Official City: AMESBURY
Notification: 06/20/2013
Category: 120 DY
Status Date: 08/23/2013
Phase: PHASE II
Response Action Outcome: B1 - Remedial actions have not been conducted because a level of No Significant Risk exists.
Oil / Haz Material Type: Hazardous Material

Click here to access the MA DEP site for this facility:

Actions:
Action Type: Response Action Outcome - RAO
Action Status: Level I - Technical Screen Audit
Action Date: 1/10/2014
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: RNFE
Action Status: Transmittal, Notice, or Notification Received
Action Date: 6/20/2013
Response Action Outcome: Remedial actions have not been conducted because a level of No

MICHAUDS GARAGE (Continued) **S113805115**

Significant Risk exists.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 6/20/2013
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 6/20/2013
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 7/11/2013
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 8/23/2013
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 8/23/2013
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Chemicals:
Chemical: LEAD
Quantity: 0.43 milligrams per liter
Source: UNKNOWN

6
ESE
1/2-1
0.714 mi.
3772 ft.

GOODWIN CREEK MARINA **SHWS S118947397**
14 PLEASANT STREET **LUST N/A**
AMESBURY, MA 01913 **RELEASE**

Relative:
Lower

Actual:
90 ft.

SHWS:
Release Tracking Number/Current Status: 3-0033647 / PSNC
Release Town: AMESBURY
Notification Date: 06/28/2016
Category: 72 HR
Associated ID: Not reported
Current Status: **PSNC**
Status Date: 08/22/2016
Phase: Not reported
Response Action Outcome: -
Oil Or Haz Material: Oil
Location Type: COMMERCIAL
Source: UST
Source: TANK

GOODWIN CREEK MARINA (Continued) **S118947397**

Source: USTPIPE

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: GASOLINE
Quantity: 2700 parts per million

Actions:
Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 6/28/2016
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 6/28/2016
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 7/21/2016
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of a Modified Plan
Action Date: 7/6/2016
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 7/6/2016
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 7/7/2016
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 8/10/2016
Response Action Outcome: Not reported

Action Type: RNFE
Action Status: Transmittal, Notice, or Notification Received
Action Date: 8/10/2016
Response Action Outcome: Not reported

Action Type: BOL
Action Status: SHPFAC
Action Date: 8/22/2016
Response Action Outcome: Not reported

Action Type: Response Action Outcome - RAO
Action Status: PSNRCD

GOODWIN CREEK MARINA (Continued) **S118947397**

Action Date: 8/22/2016
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Completion Statement Received
Action Date: 8/22/2016
Response Action Outcome: Not reported

LUST:

Facility:
Release Tracking Number/Current Status: 3-0033647 / PSNC
Status Date: 08/22/2016
Source Type: USTPIPE
Release Town: AMESBURY
Notification Date: 06/28/2016
Category: 72 HR
Associated ID: Not reported
Phase: Not reported
Response Action Outcome: -
Oil Or Haz Material: Oil

Location Type: COMMERCIAL
Source: UST
Source: TANK
Source: USTPIPE

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: GASOLINE
Quantity: 2700 parts per million

Actions:
Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 6/28/2016
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 6/28/2016
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 7/21/2016
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of a Modified Plan
Action Date: 7/6/2016
Response Action Outcome: Not reported

GOODWIN CREEK MARINA (Continued) **S118947397**

Action Type: RLFA
Action Status: FOLOFF
Action Date: 7/6/2016
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 7/7/2016
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 8/10/2016
Response Action Outcome: Not reported

Action Type: RNFE
Action Status: Transmittal, Notice, or Notification Received
Action Date: 8/10/2016
Response Action Outcome: Not reported

Action Type: BOL
Action Status: SHPFAC
Action Date: 8/22/2016
Response Action Outcome: Not reported

Action Type: Response Action Outcome - RAO
Action Status: PSNRCD
Action Date: 8/22/2016
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Completion Statement Received
Action Date: 8/22/2016
Response Action Outcome: Not reported

Facility:
Release Tracking Number/Current Status: 3-0033647 / PSNC
Status Date: 08/22/2016
Source Type: UST
Release Town: AMESBURY
Notification Date: 06/28/2016
Category: 72 HR
Associated ID: Not reported
Phase: Not reported
Response Action Outcome: -
Oil Or Haz Material: Oil

Location Type: COMMERCIAL
Source: UST
Source: TANK
Source: USTPIPE

Click here to access the MA DEP site for this facility:

GOODWIN CREEK MARINA (Continued) **S118947397**

Chemicals:
Chemical: GASOLINE
Quantity: 2700 parts per million

Actions:
Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 6/28/2016
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 6/28/2016
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 7/21/2016
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of a Modified Plan
Action Date: 7/6/2016
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 7/6/2016
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 7/7/2016
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 8/10/2016
Response Action Outcome: Not reported

Action Type: RNFE
Action Status: Transmittal, Notice, or Notification Received
Action Date: 8/10/2016
Response Action Outcome: Not reported

Action Type: BOL
Action Status: SHPFAC
Action Date: 8/22/2016
Response Action Outcome: Not reported

Action Type: Response Action Outcome - RAO
Action Status: PSNRCD
Action Date: 8/22/2016
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Completion Statement Received

GOODWIN CREEK MARINA (Continued) **S118947397**

Action Date: 8/22/2016
Response Action Outcome: Not reported

Release:
Release Tracking Number/Current Status: 3-0033647 / PSNC
Primary ID: Not reported
Official City: AMESBURY
Notification: 06/28/2016
Category: 72 HR
Status Date: 08/22/2016
Phase: Not reported
Response Action Outcome: -
Oil / Haz Material Type: Oil

Click here to access the MA DEP site for this facility:

Actions:
Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 6/28/2016
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 6/28/2016
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 7/21/2016
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of a Modified Plan
Action Date: 7/6/2016
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 7/6/2016
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 7/7/2016
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 8/10/2016
Response Action Outcome: Not reported

Action Type: RNFE
Action Status: Transmittal, Notice, or Notification Received
Action Date: 8/10/2016

GOODWIN CREEK MARINA (Continued) **S118947397**

Response Action Outcome: Not reported

Action Type: BOL
Action Status: SHPFAC
Action Date: 8/22/2016
Response Action Outcome: Not reported

Action Type: Response Action Outcome - RAO
Action Status: PSNRCD
Action Date: 8/22/2016
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Completion Statement Received
Action Date: 8/22/2016
Response Action Outcome: Not reported

Chemicals:
Chemical: GASOLINE
Quantity: 2700 parts per million
Location Type: COMMERCIAL
Source: UST
Source: TANK
Source: USTPIPE

A7 **FLOSMAN, JOSEPH** **SHWS** **S107391019**
East **8-10 SCHOOL ST** **RELEASE** **N/A**
1/2-1 **AMESBURY, MA 01913** **ENF**
0.751 mi.
3965 ft. **Site 1 of 2 in cluster A**

Relative:
Lower

Actual:
85 ft.

SHWS:
Release Tracking Number/Current Status: 3-0026999 / TIER1D
Release Town: AMESBURY
Notification Date: 06/18/2007
Category: TWO HR
Associated ID: Not reported
Current Status: **Tier 1D, a release where the responsible party fails to provide a required submittal to DEP by a specified deadline.**
Status Date: 06/25/2008
Phase: Not reported
Response Action Outcome: -
Oil Or Haz Material: Hazardous Material
Location Type: COMMERCIAL
Location Type: RESIDNTIAL
Source: FORMER
Source: CLEANERS
Source: DRY

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: PERCHLOROETHYLENE
Quantity: 14.2 parts per billion
Chemical: CHLOROFORM
Quantity: 2.7 parts per billion

FLOSMAN, JOSEPH (Continued) **S107391019**

Chemical: PCE
Quantity: 23.2 UG/M3

Actions:

Action Type: Compliance and Enforcement Action
Action Status: NORA
Action Date: 1/15/2010
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FLDRAN
Action Date: 10/17/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 10/18/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: Action Status or AUL Terminated
Action Date: 10/19/2010
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 10/6/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 11/6/2009
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 12/20/2012
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 2/14/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 2/27/2009
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: ALSENT
Action Date: 4/14/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 4/26/2010
Response Action Outcome: Not reported

FLOSMAN, JOSEPH (Continued) **S107391019**

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 4/28/2008
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 4/28/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 5/4/2011
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 6/18/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 6/18/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 6/2/2011
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of a Modified Plan
Action Date: 6/25/2007
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 6/25/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 6/3/2010
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 7/13/2015
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 7/17/2017
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued

FLOSMAN, JOSEPH (Continued) **S107391019**

Action Date: 7/3/2007
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 7/3/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Written Plan Received
Action Date: 7/30/2007
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 7/30/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Imminent Hazard Evaluation Received
Action Date: 7/30/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 7/5/2013
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: REFOTH
Action Date: 8/1/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 8/15/2016
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 8/20/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Written Approval of Plan
Action Date: 8/20/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 8/22/2013
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 8/28/2012
Response Action Outcome: Not reported

FLOSMAN, JOSEPH (Continued) **S107391019**

Action Type:	FTLI
Action Status:	APPREC
Action Date:	8/6/2014
Response Action Outcome:	Not reported
Action Type:	FTLI
Action Status:	APPACC
Action Date:	9/12/2014
Response Action Outcome:	Not reported
Action Type:	FTLI
Action Status:	APPACC
Action Date:	9/13/2017
Response Action Outcome:	Not reported
Action Type:	FTLI
Action Status:	APPACC
Action Date:	9/16/2016
Response Action Outcome:	Not reported
Action Type:	FTLI
Action Status:	APPACC
Action Date:	9/22/2015
Response Action Outcome:	Not reported
Action Type:	RLFA
Action Status:	FOLOFF
Action Date:	9/25/2014
Response Action Outcome:	Not reported
Action Type:	Compliance and Enforcement Action
Action Status:	Notice of Non-Compliance Issued
Action Date:	9/8/2008
Response Action Outcome:	Not reported

Release Tracking Number/Current Status:	3-0026999 / TIER1D
Release Town:	AMESBURY
Notification Date:	06/18/2007
Category:	TWO HR
Associated ID:	Not reported
Current Status:	**Tier 1D, a release where the responsible party fails to provide a required submittal to DEP by a specified deadline.**
Status Date:	06/25/2008
Phase:	Not reported
Response Action Outcome:	-
Oil Or Haz Material:	Hazardous Material
Location Type:	COMMERCIAL
Location Type:	RESIDNTIAL
Source:	FORMER
Source:	CLEANERS
Source:	DRY

Click here to access the MA DEP site for this facility:

FLOSMAN, JOSEPH (Continued) **S107391019**

Chemicals:
- Chemical: PERCHLOROETHYLENE
- Quantity: 14.2 parts per billion
- Chemical: CHLOROFORM
- Quantity: 2.7 parts per billion
- Chemical: PCE
- Quantity: 23.2 UG/M3

Actions:
- Action Type: Compliance and Enforcement Action
- Action Status: NORA
- Action Date: 1/15/2010
- Response Action Outcome: Not reported

- Action Type: RLFA
- Action Status: FLDRAN
- Action Date: 10/17/2007
- Response Action Outcome: Not reported

- Action Type: Immediate Response Action
- Action Status: Status or Interim Report Received
- Action Date: 10/18/2007
- Response Action Outcome: Not reported

- Action Type: FTLI
- Action Status: Action Status or AUL Terminated
- Action Date: 10/19/2010
- Response Action Outcome: Not reported

- Action Type: FTLI
- Action Status: APPREC
- Action Date: 10/6/2008
- Response Action Outcome: Not reported

- Action Type: FTLI
- Action Status: APPACC
- Action Date: 11/6/2009
- Response Action Outcome: Not reported

- Action Type: FTLI
- Action Status: APPACC
- Action Date: 12/20/2012
- Response Action Outcome: Not reported

- Action Type: Compliance and Enforcement Action
- Action Status: Interim Deadline Letter Issued
- Action Date: 2/14/2008
- Response Action Outcome: Not reported

- Action Type: FTLI
- Action Status: APPREC
- Action Date: 2/27/2009
- Response Action Outcome: Not reported

- Action Type: A Notice sent to a Potentially Responsible Party (PRP)
- Action Status: ALSENT
- Action Date: 4/14/2008

FLOSMAN, JOSEPH (Continued) **S107391019**

Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 4/26/2010
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 4/28/2008
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 4/28/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 5/4/2011
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 6/18/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 6/18/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 6/2/2011
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of a Modified Plan
Action Date: 6/25/2007
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 6/25/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 6/3/2010
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 7/13/2015
Response Action Outcome: Not reported

FLOSMAN, JOSEPH (Continued) **S107391019**

Action Type: FTLI
Action Status: APPREC
Action Date: 7/17/2017
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 7/3/2007
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 7/3/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Written Plan Received
Action Date: 7/30/2007
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 7/30/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Imminent Hazard Evaluation Received
Action Date: 7/30/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 7/5/2013
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: REFOTH
Action Date: 8/1/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 8/15/2016
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 8/20/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Written Approval of Plan
Action Date: 8/20/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC

FLOSMAN, JOSEPH (Continued) **S107391019**

Action Date:	8/22/2013
Response Action Outcome:	Not reported
Action Type:	FTLI
Action Status:	APPREC
Action Date:	8/28/2012
Response Action Outcome:	Not reported
Action Type:	FTLI
Action Status:	APPREC
Action Date:	8/6/2014
Response Action Outcome:	Not reported
Action Type:	FTLI
Action Status:	APPACC
Action Date:	9/12/2014
Response Action Outcome:	Not reported
Action Type:	FTLI
Action Status:	APPACC
Action Date:	9/13/2017
Response Action Outcome:	Not reported
Action Type:	FTLI
Action Status:	APPACC
Action Date:	9/16/2016
Response Action Outcome:	Not reported
Action Type:	FTLI
Action Status:	APPACC
Action Date:	9/22/2015
Response Action Outcome:	Not reported
Action Type:	RLFA
Action Status:	FOLOFF
Action Date:	9/25/2014
Response Action Outcome:	Not reported
Action Type:	Compliance and Enforcement Action
Action Status:	Notice of Non-Compliance Issued
Action Date:	9/8/2008
Response Action Outcome:	Not reported
Release Tracking Number/Current Status:	3-0026999 / TIER1D
Release Town:	AMESBURY
Notification Date:	06/18/2007
Category:	TWO HR
Associated ID:	Not reported
Current Status:	**Tier 1D, a release where the responsible party fails to provide a required submittal to DEP by a specified deadline.**
Status Date:	06/25/2008
Phase:	Not reported
Response Action Outcome:	-
Oil Or Haz Material:	Hazardous Material
Location Type:	COMMERCIAL
Location Type:	RESIDNTIAL

FLOSMAN, JOSEPH (Continued) **S107391019**

Source: FORMER
Source: CLEANERS
Source: DRY

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: PERCHLOROETHYLENE
Quantity: 14.2 parts per billion
Chemical: CHLOROFORM
Quantity: 2.7 parts per billion
Chemical: PCE
Quantity: 23.2 UG/M3

Actions:
Action Type: Compliance and Enforcement Action
Action Status: NORA
Action Date: 1/15/2010
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FLDRAN
Action Date: 10/17/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 10/18/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: Action Status or AUL Terminated
Action Date: 10/19/2010
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 10/6/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 11/6/2009
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 12/20/2012
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 2/14/2008
Response Action Outcome: Not reported

Action Type: FTLI

FLOSMAN, JOSEPH (Continued) **S107391019**

Action Status: APPREC
Action Date: 2/27/2009
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: ALSENT
Action Date: 4/14/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 4/26/2010
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 4/28/2008
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 4/28/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 5/4/2011
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 6/18/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 6/18/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 6/2/2011
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of a Modified Plan
Action Date: 6/25/2007
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 6/25/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 6/3/2010

FLOSMAN, JOSEPH (Continued) **S107391019**

Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 7/13/2015
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 7/17/2017
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 7/3/2007
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 7/3/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Written Plan Received
Action Date: 7/30/2007
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 7/30/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Imminent Hazard Evaluation Received
Action Date: 7/30/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 7/5/2013
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: REFOTH
Action Date: 8/1/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 8/15/2016
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 8/20/2007
Response Action Outcome: Not reported

FLOSMAN, JOSEPH (Continued) **S107391019**

Action Type: Immediate Response Action
Action Status: Written Approval of Plan
Action Date: 8/20/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 8/22/2013
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 8/28/2012
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 8/6/2014
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 9/12/2014
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 9/13/2017
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 9/16/2016
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 9/22/2015
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 9/25/2014
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Notice of Non-Compliance Issued
Action Date: 9/8/2008
Response Action Outcome: Not reported

Release:
Release Tracking Number/Current Status: 3-0026999 / TIER1D
Primary ID: Not reported
Official City: AMESBURY
Notification: 06/18/2007
Category: TWO HR

FLOSMAN, JOSEPH (Continued) **S107391019**

Status Date: 06/25/2008
Phase: Not reported
Response Action Outcome: -
Oil / Haz Material Type: Hazardous Material

Click here to access the MA DEP site for this facility:

Actions:

Action Type: Compliance and Enforcement Action
Action Status: NORA
Action Date: 1/15/2010
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FLDRAN
Action Date: 10/17/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 10/18/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: Action Status or AUL Terminated
Action Date: 10/19/2010
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 10/6/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 11/6/2009
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 12/20/2012
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 2/14/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 2/27/2009
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: ALSENT
Action Date: 4/14/2008
Response Action Outcome: Not reported

FLOSMAN, JOSEPH (Continued) **S107391019**

Action Type: FTLI
Action Status: APPREC
Action Date: 4/26/2010
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 4/28/2008
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 4/28/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 5/4/2011
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 6/18/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 6/18/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 6/2/2011
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of a Modified Plan
Action Date: 6/25/2007
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 6/25/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 6/3/2010
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 7/13/2015
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC

FLOSMAN, JOSEPH (Continued) **S107391019**

Action Date: 7/17/2017
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 7/3/2007
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 7/3/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Written Plan Received
Action Date: 7/30/2007
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 7/30/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Imminent Hazard Evaluation Received
Action Date: 7/30/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 7/5/2013
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: REFOTH
Action Date: 8/1/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 8/15/2016
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 8/20/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Written Approval of Plan
Action Date: 8/20/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 8/22/2013
Response Action Outcome: Not reported

FLOSMAN, JOSEPH (Continued) **S107391019**

Action Type: FTLI
Action Status: APPREC
Action Date: 8/28/2012
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 8/6/2014
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 9/12/2014
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 9/13/2017
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 9/16/2016
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 9/22/2015
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 9/25/2014
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Notice of Non-Compliance Issued
Action Date: 9/8/2008
Response Action Outcome: Not reported

Chemicals:
Chemical: PERCHLOROETHYLENE
Quantity: 14.2 parts per billion
Chemical: CHLOROFORM
Quantity: 2.7 parts per billion
Chemical: PCE
Quantity: 23.2 UG/M3
Location Type: COMMERCIAL
Location Type: RESIDNTIAL
Source: FORMER
Source: CLEANERS
Source: DRY

ENFORCEMENT:
Region: NERO
DEP Region: NERO

FLOSMAN, JOSEPH (Continued) **S107391019**

DEP Program:	3R
DEP Bureau:	BWSC
Program:	Not reported
Program Id:	3-0026999
High Or Low Level Enforcement:	LLE
FMF #:	Not reported
Comptroller Billing Name:	Not reported
Town Where Violation Occurred:	Not reported
Date Executed:	07/03/2007
ENF #:	Not reported
Document Type:	IDL
AG Ref (Y/N):	Not reported
Doc Archived (Y/N):	Not reported
EJ Community (Y/N):	Not reported
Regional Comment:	Not reported
Final Payment Due Date:	Not reported
ACOP $:	Not reported
PAN $:	Not reported
EMS (Y/N):	Not reported
EMS$:	Not reported
SEP (Y/N):	Not reported
SEP $:	Not reported
Demand $:	Not reported
Suspended $:	Not reported
Ownership:	Individually Owned

Region:	NERO
DEP Region:	NERO
DEP Program:	3R
DEP Bureau:	BWSC
Program:	Not reported
Program Id:	3-0026999
High Or Low Level Enforcement:	LLE
FMF #:	Not reported
Comptroller Billing Name:	Not reported
Town Where Violation Occurred:	Not reported
Date Executed:	08/20/2007
ENF #:	Not reported
Document Type:	IDL
AG Ref (Y/N):	Not reported
Doc Archived (Y/N):	Not reported
EJ Community (Y/N):	Not reported
Regional Comment:	Not reported
Final Payment Due Date:	Not reported
ACOP $:	Not reported
PAN $:	Not reported
EMS (Y/N):	Not reported
EMS$:	Not reported
SEP (Y/N):	Not reported
SEP $:	Not reported
Demand $:	Not reported
Suspended $:	Not reported
Ownership:	Individually Owned

Region:	NERO
DEP Region:	NERO
DEP Program:	3R

FLOSMAN, JOSEPH (Continued) **S107391019**

DEP Bureau:	BWSC
Program:	Not reported
Program Id:	3-0026999
High Or Low Level Enforcement:	LLE
FMF #:	Not reported
Comptroller Billing Name:	Not reported
Town Where Violation Occurred:	Not reported
Date Executed:	02/14/2008
ENF #:	Not reported
Document Type:	IDL
AG Ref (Y/N):	Not reported
Doc Archived (Y/N):	Not reported
EJ Community (Y/N):	Not reported
Regional Comment:	Not reported
Final Payment Due Date:	Not reported
ACOP $:	Not reported
PAN $:	Not reported
EMS (Y/N):	Not reported
EMS$:	Not reported
SEP (Y/N):	Not reported
SEP $:	Not reported
Demand $:	Not reported
Suspended $:	Not reported
Ownership:	Individually Owned

Region:	NERO
DEP Region:	NERO
DEP Program:	3R
DEP Bureau:	BWSC
Program:	Not reported
Program Id:	3-0026999
High Or Low Level Enforcement:	LLE
FMF #:	Not reported
Comptroller Billing Name:	Not reported
Town Where Violation Occurred:	Not reported
Date Executed:	09/08/2008
ENF #:	NON-NE-08-3R035
Document Type:	NON
AG Ref (Y/N):	Not reported
Doc Archived (Y/N):	Not reported
EJ Community (Y/N):	Not reported
Regional Comment:	Not reported
Final Payment Due Date:	Not reported
ACOP $:	Not reported
PAN $:	Not reported
EMS (Y/N):	Not reported
EMS$:	Not reported
SEP (Y/N):	Not reported
SEP $:	Not reported
Demand $:	Not reported
Suspended $:	Not reported
Ownership:	Individually Owned

A8
East
1/2-1
0.751 mi.
3966 ft.

SPACE AGE CLEANERS
6 SCHOOL ST
AMESBURY, MA 01913

Site 2 of 2 in cluster A

SHWS **S108034618**
RELEASE **N/A**
ASBESTOS
ENF

Relative:
Lower

Actual:
85 ft.

SHWS:

Release Tracking Number/Current Status:	3-0026060 / TIERII
Release Town:	AMESBURY
Notification Date:	07/17/2006
Category:	120 DY
Associated ID:	Not reported
Current Status:	**Tier II, A site/release receiving a total NRS score of less than 350, unless the site meets any of the Tier 1 Inclusionary Criteria (see above). Permits are not required at Tier 2 sites/releases and response actions may be performed under the supervision of an LSP without prior DEP approval. All pre-1993 transition sites that have accepted waivers are categorically Tier 2 sites.**
Status Date:	07/24/2007
Phase:	PHASE II
Response Action Outcome:	-
Oil Or Haz Material:	Hazardous Material
Source:	UNKNOWN

Click here to access the MA DEP site for this facility:

Chemicals:

Chemical:	1,2-DICHLOROETHENE
Quantity:	6.6 milligrams per kilogram
Chemical:	1,2,4-TRIMETHYLBENZENE
Quantity:	490 milligrams per kilogram
Chemical:	NAPHTHALENE
Quantity:	130 milligrams per kilogram
Chemical:	TETRACHLOROETHYLENE
Quantity:	1800 milligrams per kilogram
Chemical:	CARBON TETRACHLORIDE
Quantity:	18 micrograms per liter
Chemical:	TRICHLOROETHENE
Quantity:	4.5 micrograms per liter

Actions:

Action Type:	Compliance and Enforcement Action
Action Status:	NORA
Action Date:	1/15/2010
Response Action Outcome:	Not reported
Action Type:	Compliance and Enforcement Action
Action Status:	RFI
Action Date:	10/12/2007
Response Action Outcome:	Not reported
Action Type:	Compliance and Enforcement Action
Action Status:	Interim Deadline Letter Issued
Action Date:	10/12/2007
Response Action Outcome:	Not reported
Action Type:	FTLI
Action Status:	Action Status or AUL Terminated

SPACE AGE CLEANERS (Continued) **S108034618**

Action Date: 10/19/2010
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 10/6/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 11/6/2009
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 12/20/2012
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Modified Revised or Updated Plan Received
Action Date: 12/24/2007
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Status or Interim Report Received
Action Date: 12/24/2007
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: RMRINI
Action Date: 12/24/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 2/27/2009
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Written Plan Received
Action Date: 3/15/2007
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Fee Received - FMCRA Use Only
Action Date: 4/10/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 4/26/2010
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 4/28/2008
Response Action Outcome: Not reported

SPACE AGE CLEANERS (Continued) **S108034618**

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 4/28/2008
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 5/11/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 5/4/2011
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 6/2/2011
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 6/3/2010
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: ALSENT
Action Date: 6/7/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 7/13/2015
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 7/17/2006
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 7/17/2006
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 7/17/2017
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 7/21/2006
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Transmittal, Notice, or Notification Received

SPACE AGE CLEANERS (Continued) **S108034618**

Action Date: 7/24/2007
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Tier 2 Classification
Action Date: 7/24/2007
Response Action Outcome: Not reported

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 7/24/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 7/5/2013
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Legal Notice Published
Action Date: 8/1/2007
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: REFOTH
Action Date: 8/1/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 8/15/2016
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Modified Revised or Updated Plan Received
Action Date: 8/17/2007
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Status or Interim Report Received
Action Date: 8/17/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 8/22/2013
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 8/28/2012
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 8/6/2014
Response Action Outcome: Not reported

SPACE AGE CLEANERS (Continued) **S108034618**

Action Type: FTLI
Action Status: APPACC
Action Date: 9/12/2014
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 9/13/2017
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 9/16/2016
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 9/22/2015
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 9/25/2014
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Notice of Non-Compliance Issued
Action Date: 9/8/2008
Response Action Outcome: Not reported

Release:
Release Tracking Number/Current Status: 3-0026060 / TIERII
Primary ID: Not reported
Official City: AMESBURY
Notification: 07/17/2006
Category: 120 DY
Status Date: 07/24/2007
Phase: PHASE II
Response Action Outcome: -
Oil / Haz Material Type: Hazardous Material

Click here to access the MA DEP site for this facility:

Actions:
Action Type: Compliance and Enforcement Action
Action Status: NORA
Action Date: 1/15/2010
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: RFI
Action Date: 10/12/2007
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action

SPACE AGE CLEANERS (Continued) **S108034618**

Action Status: Interim Deadline Letter Issued
Action Date: 10/12/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: Action Status or AUL Terminated
Action Date: 10/19/2010
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 10/6/2008
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 11/6/2009
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 12/20/2012
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Modified Revised or Updated Plan Received
Action Date: 12/24/2007
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Status or Interim Report Received
Action Date: 12/24/2007
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: RMRINI
Action Date: 12/24/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 2/27/2009
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Written Plan Received
Action Date: 3/15/2007
Response Action Outcome: Not reported

Action Type: Release Abatement Measure
Action Status: Fee Received - FMCRA Use Only
Action Date: 4/10/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 4/26/2010

SPACE AGE CLEANERS (Continued) **S108034618**

Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 4/28/2008
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 4/28/2008
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Interim Deadline Letter Issued
Action Date: 5/11/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 5/4/2011
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 6/2/2011
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 6/3/2010
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: ALSENT
Action Date: 6/7/2007
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 7/13/2015
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 7/17/2006
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 7/17/2006
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 7/17/2017
Response Action Outcome: Not reported

SPACE AGE CLEANERS (Continued) **S108034618**

Action Type:	A Notice sent to a Potentially Responsible Party (PRP)
Action Status:	A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date:	7/21/2006
Response Action Outcome:	Not reported
Action Type:	Tier Classification
Action Status:	Transmittal, Notice, or Notification Received
Action Date:	7/24/2007
Response Action Outcome:	Not reported
Action Type:	Tier Classification
Action Status:	Tier 2 Classification
Action Date:	7/24/2007
Response Action Outcome:	Not reported
Action Type:	Phase 1
Action Status:	Completion Statement Received
Action Date:	7/24/2007
Response Action Outcome:	Not reported
Action Type:	FTLI
Action Status:	APPREC
Action Date:	7/5/2013
Response Action Outcome:	Not reported
Action Type:	Tier Classification
Action Status:	Legal Notice Published
Action Date:	8/1/2007
Response Action Outcome:	Not reported
Action Type:	Compliance and Enforcement Action
Action Status:	REFOTH
Action Date:	8/1/2008
Response Action Outcome:	Not reported
Action Type:	FTLI
Action Status:	APPREC
Action Date:	8/15/2016
Response Action Outcome:	Not reported
Action Type:	Release Abatement Measure
Action Status:	Modified Revised or Updated Plan Received
Action Date:	8/17/2007
Response Action Outcome:	Not reported
Action Type:	Release Abatement Measure
Action Status:	Status or Interim Report Received
Action Date:	8/17/2007
Response Action Outcome:	Not reported
Action Type:	FTLI
Action Status:	APPACC
Action Date:	8/22/2013
Response Action Outcome:	Not reported
Action Type:	FTLI
Action Status:	APPREC

SPACE AGE CLEANERS (Continued) **S108034618**

Action Date: 8/28/2012
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 8/6/2014
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 9/12/2014
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 9/13/2017
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 9/16/2016
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 9/22/2015
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 9/25/2014
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Notice of Non-Compliance Issued
Action Date: 9/8/2008
Response Action Outcome: Not reported

Chemicals:
Chemical: 1,2-DICHLOROETHENE
Quantity: 6.6 milligrams per kilogram
Chemical: 1,2,4-TRIMETHYLBENZENE
Quantity: 490 milligrams per kilogram
Chemical: NAPHTHALENE
Quantity: 130 milligrams per kilogram
Chemical: TETRACHLOROETHYLENE
Quantity: 1800 milligrams per kilogram
Chemical: CARBON TETRACHLORIDE
Quantity: 18 micrograms per liter
Chemical: TRICHLOROETHENE
Quantity: 4.5 micrograms per liter
Source: UNKNOWN

ASBESTOS:
Notification: 100228188
DEP Region: NE

SPACE AGE CLEANERS (Continued) **S108034618**

Notifiers Name:	ENCORE CONTRACTING SERVICES INC
Start Date:	09/17/2015
End Date:	09/23/2015
Date Entered:	04/09/2015
Entry Date:	09/04/2015
Quantity Materical Removed SF:	80
Quantity Material Removed LF:	Not reported
Project Description:	OTHER ROOF FLASHING
AR Tracking ID:	Not reported
Super Lic Number:	Not reported
Monitor Lic Number:	Not reported
Lab Lic Number:	Not reported
Year:	Not reported
Sticker Number:	Not reported
Form Type:	Not reported
Fee Status:	Not reported
Facility Phone:	Not reported
Sub Town:	Not reported
Worksite:	Not reported
Occupied:	Not reported
Contractor:	Not reported
Contract Type:	Not reported
Hours:	Not reported
Project Type:	Not reported
Abatement Process:	Not reported
Location:	Not reported
Decon Process:	Not reported
Disposal Methods:	Not reported
Facility Usage:	Not reported
Waiver Given:	Not reported
DEP Waiver Number:	Not reported
DLWD Waiver Number:	Not reported
Small Owner Occ:	Not reported
Owner Name:	Not reported
Owner Address:	Not reported
Owner City:	Not reported
Owner State:	Not reported
On Site Manager Name:	Not reported
On Site Manager Phone:	Not reported
Ins Comp:	Not reported
Policy Number:	Not reported
EXP Date:	Not reported
Facility Size:	Not reported
Transporter Name:	Not reported
Transporter Address:	Not reported
Transporter City:	Not reported
Transporter State:	Not reported
Final Site:	Not reported
Certified Name:	Not reported
Cert Sign Date:	Not reported
Certified Company:	Not reported
Certified Phone:	Not reported
Entered_by:	Not reported
Notification:	100228188R1
DEP Region:	NE
Notifiers Name:	ENCORE CONTRACTING SERVICES INC

SPACE AGE CLEANERS (Continued) **S108034618**

Start Date:	09/17/2015
End Date:	09/23/2015
Date Entered:	17/09/2015
Entry Date:	09/17/2015
Quantity Materical Removed SF:	80
Quantity Material Removed LF:	Not reported
Project Description:	OTHER ROOF FLASHING
AR Tracking ID:	Not reported
Super Lic Number:	Not reported
Monitor Lic Number:	Not reported
Lab Lic Number:	Not reported
Year:	Not reported
Sticker Number:	Not reported
Form Type:	Not reported
Fee Status:	Not reported
Facility Phone:	Not reported
Sub Town:	Not reported
Worksite:	Not reported
Occupied:	Not reported
Contractor:	Not reported
Contract Type:	Not reported
Hours:	Not reported
Project Type:	Not reported
Abatement Process:	Not reported
Location:	Not reported
Decon Process:	Not reported
Disposal Methods:	Not reported
Facility Usage:	Not reported
Waiver Given:	Not reported
DEP Waiver Number:	Not reported
DLWD Waiver Number:	Not reported
Small Owner Occ:	Not reported
Owner Name:	Not reported
Owner Address:	Not reported
Owner City:	Not reported
Owner State:	Not reported
On Site Manager Name:	Not reported
On Site Manager Phone:	Not reported
Ins Comp:	Not reported
Policy Number:	Not reported
EXP Date:	Not reported
Facility Size:	Not reported
Transporter Name:	Not reported
Transporter Address:	Not reported
Transporter City:	Not reported
Transporter State:	Not reported
Final Site:	Not reported
Certified Name:	Not reported
Cert Sign Date:	Not reported
Certified Company:	Not reported
Certified Phone:	Not reported
Entered_by:	Not reported
Notification:	100228188R2
DEP Region:	NE
Notifiers Name:	ENCORE CONTRACTING SERVICES INC
Start Date:	09/17/2015

SPACE AGE CLEANERS (Continued) **S108034618**

End Date:	09/23/2015
Date Entered:	21/09/2015
Entry Date:	09/21/2015
Quantity Materical Removed SF:	80
Quantity Material Removed LF:	Not reported
Project Description:	OTHER ROOF FLASHING
AR Tracking ID:	Not reported
Super Lic Number:	Not reported
Monitor Lic Number:	Not reported
Lab Lic Number:	Not reported
Year:	Not reported
Sticker Number:	Not reported
Form Type:	Not reported
Fee Status:	Not reported
Facility Phone:	Not reported
Sub Town:	Not reported
Worksite:	Not reported
Occupied:	Not reported
Contractor:	Not reported
Contract Type:	Not reported
Hours:	Not reported
Project Type:	Not reported
Abatement Process:	Not reported
Location:	Not reported
Decon Process:	Not reported
Disposal Methods:	Not reported
Facility Usage:	Not reported
Waiver Given:	Not reported
DEP Waiver Number:	Not reported
DLWD Waiver Number:	Not reported
Small Owner Occ:	Not reported
Owner Name:	Not reported
Owner Address:	Not reported
Owner City:	Not reported
Owner State:	Not reported
On Site Manager Name:	Not reported
On Site Manager Phone:	Not reported
Ins Comp:	Not reported
Policy Number:	Not reported
EXP Date:	Not reported
Facility Size:	Not reported
Transporter Name:	Not reported
Transporter Address:	Not reported
Transporter City:	Not reported
Transporter State:	Not reported
Final Site:	Not reported
Certified Name:	Not reported
Cert Sign Date:	Not reported
Certified Company:	Not reported
Certified Phone:	Not reported
Entered_by:	Not reported
Notification:	100029823
DEP Region:	NE
Notifiers Name:	YANKEE ENVIRONMENTAL SERVICES INC
Start Date:	03/28/2006
End Date:	03/28/2006

SPACE AGE CLEANERS (Continued) **S108034618**

Date Entered:	14/03/2006
Entry Date:	03/14/2006
Quantity Materical Removed SF:	60
Quantity Material Removed LF:	50
Project Description:	Blr,Spr,Insl
AR Tracking ID:	Not reported
Super Lic Number:	Not reported
Monitor Lic Number:	Not reported
Lab Lic Number:	Not reported
Year:	Not reported
Sticker Number:	Not reported
Form Type:	Not reported
Fee Status:	Not reported
Facility Phone:	Not reported
Sub Town:	Not reported
Worksite:	Not reported
Occupied:	Not reported
Contractor:	Not reported
Contract Type:	Not reported
Hours:	Not reported
Project Type:	Not reported
Abatement Process:	Not reported
Location:	Not reported
Decon Process:	Not reported
Disposal Methods:	Not reported
Facility Usage:	Not reported
Waiver Given:	Not reported
DEP Waiver Number:	Not reported
DLWD Waiver Number:	Not reported
Small Owner Occ:	Not reported
Owner Name:	Not reported
Owner Address:	Not reported
Owner City:	Not reported
Owner State:	Not reported
On Site Manager Name:	Not reported
On Site Manager Phone:	Not reported
Ins Comp:	Not reported
Policy Number:	Not reported
EXP Date:	Not reported
Facility Size:	Not reported
Transporter Name:	Not reported
Transporter Address:	Not reported
Transporter City:	Not reported
Transporter State:	Not reported
Final Site:	Not reported
Certified Name:	Not reported
Cert Sign Date:	Not reported
Certified Company:	Not reported
Certified Phone:	Not reported
Entered_by:	Not reported

ENFORCEMENT:

Region:	NERO
DEP Region:	NERO
DEP Program:	3R
DEP Bureau:	BWSC
Program:	Not reported

SPACE AGE CLEANERS (Continued) **S108034618**

Program Id:	3-0026060
High Or Low Level Enforcement:	LLE
FMF #:	Not reported
Comptroller Billing Name:	Not reported
Town Where Violation Occurred:	Not reported
Date Executed:	10/12/2007
ENF #:	Not reported
Document Type:	IDL
AG Ref (Y/N):	Not reported
Doc Archived (Y/N):	Not reported
EJ Community (Y/N):	Not reported
Regional Comment:	Not reported
Final Payment Due Date:	Not reported
ACOP $:	Not reported
PAN $:	Not reported
EMS (Y/N):	Not reported
EMS$:	Not reported
SEP (Y/N):	Not reported
SEP $:	Not reported
Demand $:	Not reported
Suspended $:	Not reported
Ownership:	Individually Owned

Region:	NERO
DEP Region:	NERO
DEP Program:	3R
DEP Bureau:	BWSC
Program:	Not reported
Program Id:	3-0026060
High Or Low Level Enforcement:	LLE
FMF #:	Not reported
Comptroller Billing Name:	Not reported
Town Where Violation Occurred:	Not reported
Date Executed:	05/11/2007
ENF #:	Not reported
Document Type:	IDL
AG Ref (Y/N):	Not reported
Doc Archived (Y/N):	Not reported
EJ Community (Y/N):	Not reported
Regional Comment:	Not reported
Final Payment Due Date:	Not reported
ACOP $:	Not reported
PAN $:	Not reported
EMS (Y/N):	Not reported
EMS$:	Not reported
SEP (Y/N):	Not reported
SEP $:	Not reported
Demand $:	Not reported
Suspended $:	Not reported
Ownership:	Commercially Owned

B9 **FMR TRADER ALLENS TRUCK STOP** **SHWS** **S107678071**
East **21 POND VIEW AVE** **LUST** **N/A**
1/2-1 **AMESBURY, MA 01913** **RELEASE**
0.763 mi. **ENF**
4027 ft. **Site 1 of 2 in cluster B**

Relative:
Lower

Actual:
80 ft.

SHWS:

Release Tracking Number/Current Status:	3-0025880 / TIERII
Release Town:	AMESBURY
Notification Date:	05/12/2006
Category:	72 HR
Associated ID:	Not reported
Current Status:	**Tier II, A site/release receiving a total NRS score of less than 350, unless the site meets any of the Tier 1 Inclusionary Criteria (see above). Permits are not required at Tier 2 sites/releases and response actions may be performed under the supervision of an LSP without prior DEP approval. All pre-1993 transition sites that have accepted waivers are categorically Tier 2 sites.**
Status Date:	05/14/2007
Phase:	PHASE II
Response Action Outcome:	-
Oil Or Haz Material:	Oil
Location Type:	COMMERCIAL
Source:	LINE
Source:	USTOTHER
Source:	UST
Source:	UNKNOWN
Source:	TANK

Click here to access the MA DEP site for this facility:

Chemicals:

Chemical:	DIESEL FUEL
Quantity:	224 parts per million
Chemical:	DIESEL FUEL
Quantity:	244 parts per million

Actions:

Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	1/31/2007
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	10/4/2013
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Level I - Technical Screen Audit
Action Date:	11/7/2013
Response Action Outcome:	Not reported
Action Type:	RNF
Action Status:	Reportable Release under MGL 21E
Action Date:	4/2/2007
Response Action Outcome:	Not reported

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 4/4/2014
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: ALSENT
Action Date: 4/9/2007
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 5/12/2006
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 5/12/2006
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 5/12/2006
Response Action Outcome: Not reported

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 5/14/2007
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Tier 2 Classification
Action Date: 5/14/2007
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Transmittal, Notice, or Notification Received
Action Date: 5/14/2007
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 6/20/2006
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 7/12/2006
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Written Plan Received
Action Date: 7/12/2006
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Action Date: 7/12/2007
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Notice of Non-Compliance Issued
Action Date: 8/23/2007
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Notice of Non-Compliance Issued
Action Date: 8/5/2013
Response Action Outcome: Not reported

Release Tracking Number/Current Status: 3-0025880 / TIERII
Release Town: AMESBURY
Notification Date: 05/12/2006
Category: 72 HR
Associated ID: Not reported
Current Status: **Tier II, A site/release receiving a total NRS score of less than 350, unless the site meets any of the Tier 1 Inclusionary Criteria (see above). Permits are not required at Tier 2 sites/releases and response actions may be performed under the supervision of an LSP without prior DEP approval. All pre-1993 transition sites that have accepted waivers are categorically Tier 2 sites.**
Status Date: 05/14/2007
Phase: PHASE II
Response Action Outcome: -
Oil Or Haz Material: Oil
Location Type: COMMERCIAL
Source: LINE
Source: USTOTHER
Source: UST
Source: UNKNOWN
Source: TANK

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: DIESEL FUEL
Quantity: 224 parts per million
Chemical: DIESEL FUEL
Quantity: 244 parts per million

Actions:
Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 1/31/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 10/4/2013
Response Action Outcome: Not reported

Action Type: Immediate Response Action

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Action Status: Level I - Technical Screen Audit
Action Date: 11/7/2013
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 4/2/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 4/4/2014
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: ALSENT
Action Date: 4/9/2007
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 5/12/2006
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 5/12/2006
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 5/12/2006
Response Action Outcome: Not reported

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 5/14/2007
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Tier 2 Classification
Action Date: 5/14/2007
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Transmittal, Notice, or Notification Received
Action Date: 5/14/2007
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 6/20/2006
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 7/12/2006

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Written Plan Received
Action Date: 7/12/2006
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 7/12/2007
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Notice of Non-Compliance Issued
Action Date: 8/23/2007
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Notice of Non-Compliance Issued
Action Date: 8/5/2013
Response Action Outcome: Not reported

Release Tracking Number/Current Status: 3-0025880 / TIERII
Release Town: AMESBURY
Notification Date: 05/12/2006
Category: 72 HR
Associated ID: Not reported
Current Status: **Tier II, A site/release receiving a total NRS score of less than 350, unless the site meets any of the Tier 1 Inclusionary Criteria (see above). Permits are not required at Tier 2 sites/releases and response actions may be performed under the supervision of an LSP without prior DEP approval. All pre-1993 transition sites that have accepted waivers are categorically Tier 2 sites.**
Status Date: 05/14/2007
Phase: PHASE II
Response Action Outcome: -
Oil Or Haz Material: Oil
Location Type: COMMERCIAL
Source: LINE
Source: USTOTHER
Source: UST
Source: UNKNOWN
Source: TANK

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: DIESEL FUEL
Quantity: 224 parts per million
Chemical: DIESEL FUEL
Quantity: 244 parts per million

Actions:
Action Type: Immediate Response Action
Action Status: Status or Interim Report Received

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Action Date:	1/31/2007
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	10/4/2013
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Level I - Technical Screen Audit
Action Date:	11/7/2013
Response Action Outcome:	Not reported
Action Type:	RNF
Action Status:	Reportable Release under MGL 21E
Action Date:	4/2/2007
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	4/4/2014
Response Action Outcome:	Not reported
Action Type:	A Notice sent to a Potentially Responsible Party (PRP)
Action Status:	ALSENT
Action Date:	4/9/2007
Response Action Outcome:	Not reported
Action Type:	Release Disposition
Action Status:	Reportable Release under MGL 21E
Action Date:	5/12/2006
Response Action Outcome:	Not reported
Action Type:	RLFA
Action Status:	FOLOFF
Action Date:	5/12/2006
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Oral Approval of Plan or Action
Action Date:	5/12/2006
Response Action Outcome:	Not reported
Action Type:	Phase 1
Action Status:	Completion Statement Received
Action Date:	5/14/2007
Response Action Outcome:	Not reported
Action Type:	Tier Classification
Action Status:	Tier 2 Classification
Action Date:	5/14/2007
Response Action Outcome:	Not reported
Action Type:	Tier Classification
Action Status:	Transmittal, Notice, or Notification Received
Action Date:	5/14/2007
Response Action Outcome:	Not reported

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Action Type:	A Notice sent to a Potentially Responsible Party (PRP)
Action Status:	A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date:	6/20/2006
Response Action Outcome:	Not reported

Action Type:	RNF
Action Status:	Reportable Release under MGL 21E
Action Date:	7/12/2006
Response Action Outcome:	Not reported

Action Type:	Immediate Response Action
Action Status:	Written Plan Received
Action Date:	7/12/2006
Response Action Outcome:	Not reported

Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	7/12/2007
Response Action Outcome:	Not reported

Action Type:	Compliance and Enforcement Action
Action Status:	Notice of Non-Compliance Issued
Action Date:	8/23/2007
Response Action Outcome:	Not reported

Action Type:	Compliance and Enforcement Action
Action Status:	Notice of Non-Compliance Issued
Action Date:	8/5/2013
Response Action Outcome:	Not reported

Release Tracking Number/Current Status:	3-0025667 / TIERII
Release Town:	AMESBURY
Notification Date:	02/09/2006
Category:	120 DY
Associated ID:	Not reported
Current Status:	**Tier II, A site/release receiving a total NRS score of less than 350, unless the site meets any of the Tier 1 Inclusionary Criteria (see above). Permits are not required at Tier 2 sites/releases and response actions may be performed under the supervision of an LSP without prior DEP approval. All pre-1993 transition sites that have accepted waivers are categorically Tier 2 sites.**
Status Date:	02/09/2007
Phase:	PHASE II
Response Action Outcome:	-
Oil Or Haz Material:	Oil and Hazardous Material

Click here to access the MA DEP site for this facility:

Chemicals:

Chemical:	2-BUTANONE
Quantity:	0.79 milligrams per kilogram
Chemical:	METHYLENE CHLORIDE
Quantity:	0.44 milligrams per kilogram
Chemical:	NICKEL
Quantity:	125 micrograms per liter

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Chemical:	BENZO[A]ANTHRACENE
Quantity:	0.81 milligrams per kilogram
Chemical:	HEXACHLOROBUTADIENE
Quantity:	3 micrograms per liter
Chemical:	AROCLOR 1260
Quantity:	0.76 micrograms per liter
Chemical:	BENZO[A]PYRENE
Quantity:	0.81 milligrams per kilogram
Chemical:	ARSENIC
Quantity:	664 micrograms per liter
Chemical:	C9 THRU C10 AROMATIC HYDROCARBONS
Quantity:	180 milligrams per kilogram
Chemical:	BERYLLIUM
Quantity:	0.78 milligrams per kilogram
Chemical:	BENZO[B]FLUORANTHENE
Quantity:	0.84 milligrams per kilogram

Actions:

Action Type:	Phase 2
Action Status:	Scope of Work Received
Action Date:	1/26/2010
Response Action Outcome:	Not reported
Action Type:	Release Disposition
Action Status:	Reportable Release under MGL 21E
Action Date:	2/9/2006
Response Action Outcome:	Not reported
Action Type:	RNF
Action Status:	Reportable Release under MGL 21E
Action Date:	2/9/2006
Response Action Outcome:	Not reported
Action Type:	Tier Classification
Action Status:	Tier 2 Classification
Action Date:	2/9/2007
Response Action Outcome:	Not reported
Action Type:	Phase 1
Action Status:	Completion Statement Received
Action Date:	2/9/2007
Response Action Outcome:	Not reported
Action Type:	Tier Classification
Action Status:	Transmittal, Notice, or Notification Received
Action Date:	2/9/2007
Response Action Outcome:	Not reported

Release Tracking Number/Current Status:	3-0030391 / RAO
Release Town:	AMESBURY
Notification Date:	10/14/2011
Category:	120 DY
Associated ID:	Not reported
Current Status:	**Response Action Outcome**
Status Date:	11/14/2011
Phase:	Not reported
Response Action Outcome:	B1 - Remedial actions have not been conducted because a level of No

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Significant Risk exists.
Oil Or Haz Material: Hazardous Material

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: ARSENIC
Quantity: 20.5 milligrams per kilogram
Chemical: TOTAL CHROMIUM
Quantity: 58.9 milligrams per kilogram

Actions:
Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 10/14/2011
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 10/14/2011
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: RNFE
Action Status: Transmittal, Notice, or Notification Received
Action Date: 10/14/2011
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 11/14/2011
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: Level I - Technical Screen Audit
Action Date: 7/12/2012
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

LUST:

Facility:
Release Tracking Number/Current Status: 3-0025885 / TIERII
Status Date: 05/14/2007
Source Type: UST
Release Town: AMESBURY
Notification Date: 05/15/2006
Category: 72 HR
Associated ID: Not reported
Phase: PHASE II
Response Action Outcome: -
Oil Or Haz Material: Oil

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Location Type: COMMERCIAL
Source: UST

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: GASOLINE
Quantity: 767 parts per million

Actions:
Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 1/31/2007
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 4/2/2007
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: ALSENT
Action Date: 4/9/2007
Response Action Outcome: Not reported

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 5/14/2007
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Tier 2 Classification
Action Date: 5/14/2007
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Transmittal, Notice, or Notification Received
Action Date: 5/14/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 5/15/2006
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 5/15/2006
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Written Plan Received
Action Date: 7/12/2006
Response Action Outcome: Not reported

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Action Type:	RNF
Action Status:	Reportable Release under MGL 21E
Action Date:	7/12/2006
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	7/12/2007
Response Action Outcome:	Not reported
Action Type:	A Notice sent to a Potentially Responsible Party (PRP)
Action Status:	A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date:	7/14/2006
Response Action Outcome:	Not reported
Action Type:	Compliance and Enforcement Action
Action Status:	Notice of Non-Compliance Issued
Action Date:	8/23/2007
Response Action Outcome:	Not reported

Facility:

Release Tracking Number/Current Status:	3-0025880 / TIERII
Status Date:	05/14/2007
Source Type:	UST
Release Town:	AMESBURY
Notification Date:	05/12/2006
Category:	72 HR
Associated ID:	Not reported
Phase:	PHASE II
Response Action Outcome:	-
Oil Or Haz Material:	Oil
Location Type:	COMMERCIAL
Source:	LINE
Source:	USTOTHER
Source:	UST
Source:	UNKNOWN
Source:	TANK

Click here to access the MA DEP site for this facility:

Chemicals:

Chemical:	DIESEL FUEL
Quantity:	224 parts per million
Chemical:	DIESEL FUEL
Quantity:	244 parts per million

Actions:

Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	1/31/2007
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Action Status: Status or Interim Report Received
Action Date: 10/4/2013
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Level I - Technical Screen Audit
Action Date: 11/7/2013
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 4/2/2007
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 4/4/2014
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: ALSENT
Action Date: 4/9/2007
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 5/12/2006
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 5/12/2006
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 5/12/2006
Response Action Outcome: Not reported

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 5/14/2007
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Tier 2 Classification
Action Date: 5/14/2007
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Transmittal, Notice, or Notification Received
Action Date: 5/14/2007
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 6/20/2006

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 7/12/2006
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Written Plan Received
Action Date: 7/12/2006
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 7/12/2007
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Notice of Non-Compliance Issued
Action Date: 8/23/2007
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Notice of Non-Compliance Issued
Action Date: 8/5/2013
Response Action Outcome: Not reported

Facility:
Release Tracking Number/Current Status: 3-0025880 / TIERII
Status Date: 05/14/2007
Source Type: USTOTHER
Release Town: AMESBURY
Notification Date: 05/12/2006
Category: 72 HR
Associated ID: Not reported
Phase: PHASE II
Response Action Outcome: -
Oil Or Haz Material: Oil

Location Type: COMMERCIAL
Source: LINE
Source: USTOTHER
Source: UST
Source: UNKNOWN
Source: TANK

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: DIESEL FUEL
Quantity: 224 parts per million
Chemical: DIESEL FUEL
Quantity: 244 parts per million

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Actions:

Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	1/31/2007
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	10/4/2013
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Level I - Technical Screen Audit
Action Date:	11/7/2013
Response Action Outcome:	Not reported
Action Type:	RNF
Action Status:	Reportable Release under MGL 21E
Action Date:	4/2/2007
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	4/4/2014
Response Action Outcome:	Not reported
Action Type:	A Notice sent to a Potentially Responsible Party (PRP)
Action Status:	ALSENT
Action Date:	4/9/2007
Response Action Outcome:	Not reported
Action Type:	Release Disposition
Action Status:	Reportable Release under MGL 21E
Action Date:	5/12/2006
Response Action Outcome:	Not reported
Action Type:	RLFA
Action Status:	FOLOFF
Action Date:	5/12/2006
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Oral Approval of Plan or Action
Action Date:	5/12/2006
Response Action Outcome:	Not reported
Action Type:	Phase 1
Action Status:	Completion Statement Received
Action Date:	5/14/2007
Response Action Outcome:	Not reported
Action Type:	Tier Classification
Action Status:	Tier 2 Classification
Action Date:	5/14/2007
Response Action Outcome:	Not reported
Action Type:	Tier Classification

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Action Status: Transmittal, Notice, or Notification Received
Action Date: 5/14/2007
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 6/20/2006
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 7/12/2006
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Written Plan Received
Action Date: 7/12/2006
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 7/12/2007
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Notice of Non-Compliance Issued
Action Date: 8/23/2007
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Notice of Non-Compliance Issued
Action Date: 8/5/2013
Response Action Outcome: Not reported

Release:
Release Tracking Number/Current Status: 3-0025667 / TIERII
Primary ID: Not reported
Official City: AMESBURY
Notification: 02/09/2006
Category: 120 DY
Status Date: 02/09/2007
Phase: PHASE II
Response Action Outcome: -
Oil / Haz Material Type: Oil and Hazardous Material

Click here to access the MA DEP site for this facility:

Actions:
Action Type: Phase 2
Action Status: Scope of Work Received
Action Date: 1/26/2010
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Action Date: 2/9/2006
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 2/9/2006
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Tier 2 Classification
Action Date: 2/9/2007
Response Action Outcome: Not reported

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 2/9/2007
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Transmittal, Notice, or Notification Received
Action Date: 2/9/2007
Response Action Outcome: Not reported

Chemicals:
Chemical: 2-BUTANONE
Quantity: 0.79 milligrams per kilogram
Chemical: METHYLENE CHLORIDE
Quantity: 0.44 milligrams per kilogram
Chemical: NICKEL
Quantity: 125 micrograms per liter
Chemical: BENZO[A]ANTHRACENE
Quantity: 0.81 milligrams per kilogram
Chemical: HEXACHLOROBUTADIENE
Quantity: 3 micrograms per liter
Chemical: AROCLOR 1260
Quantity: 0.76 micrograms per liter
Chemical: BENZO[A]PYRENE
Quantity: 0.81 milligrams per kilogram
Chemical: ARSENIC
Quantity: 664 micrograms per liter
Chemical: C9 THRU C10 AROMATIC HYDROCARBONS
Quantity: 180 milligrams per kilogram
Chemical: BERYLLIUM
Quantity: 0.78 milligrams per kilogram
Chemical: BENZO[B]FLUORANTHENE
Quantity: 0.84 milligrams per kilogram

Release Tracking Number/Current Status: 3-0025880 / TIERII
Primary ID: Not reported
Official City: AMESBURY
Notification: 05/12/2006
Category: 72 HR
Status Date: 05/14/2007
Phase: PHASE II
Response Action Outcome: -
Oil / Haz Material Type: Oil

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Click here to access the MA DEP site for this facility:

Actions:

Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	1/31/2007
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	10/4/2013
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Level I - Technical Screen Audit
Action Date:	11/7/2013
Response Action Outcome:	Not reported
Action Type:	RNF
Action Status:	Reportable Release under MGL 21E
Action Date:	4/2/2007
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	4/4/2014
Response Action Outcome:	Not reported
Action Type:	A Notice sent to a Potentially Responsible Party (PRP)
Action Status:	ALSENT
Action Date:	4/9/2007
Response Action Outcome:	Not reported
Action Type:	Release Disposition
Action Status:	Reportable Release under MGL 21E
Action Date:	5/12/2006
Response Action Outcome:	Not reported
Action Type:	RLFA
Action Status:	FOLOFF
Action Date:	5/12/2006
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Oral Approval of Plan or Action
Action Date:	5/12/2006
Response Action Outcome:	Not reported
Action Type:	Phase 1
Action Status:	Completion Statement Received
Action Date:	5/14/2007
Response Action Outcome:	Not reported
Action Type:	Tier Classification
Action Status:	Tier 2 Classification
Action Date:	5/14/2007
Response Action Outcome:	Not reported

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Action Type: Tier Classification
Action Status: Transmittal, Notice, or Notification Received
Action Date: 5/14/2007
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 6/20/2006
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 7/12/2006
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Written Plan Received
Action Date: 7/12/2006
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 7/12/2007
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Notice of Non-Compliance Issued
Action Date: 8/23/2007
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Notice of Non-Compliance Issued
Action Date: 8/5/2013
Response Action Outcome: Not reported

Chemicals:
Chemical: DIESEL FUEL
Quantity: 224 parts per million
Chemical: DIESEL FUEL
Quantity: 244 parts per million
Location Type: COMMERCIAL
Source: LINE
Source: USTOTHER
Source: UST
Source: UNKNOWN
Source: TANK

Release Tracking Number/Current Status: 3-0025885 / TIERII
Primary ID: Not reported
Official City: AMESBURY
Notification: 05/15/2006
Category: 72 HR
Status Date: 05/14/2007
Phase: PHASE II
Response Action Outcome: -
Oil / Haz Material Type: Oil

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Click here to access the MA DEP site for this facility:

Actions:

Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	1/31/2007
Response Action Outcome:	Not reported
Action Type:	RNF
Action Status:	Reportable Release under MGL 21E
Action Date:	4/2/2007
Response Action Outcome:	Not reported
Action Type:	A Notice sent to a Potentially Responsible Party (PRP)
Action Status:	ALSENT
Action Date:	4/9/2007
Response Action Outcome:	Not reported
Action Type:	Phase 1
Action Status:	Completion Statement Received
Action Date:	5/14/2007
Response Action Outcome:	Not reported
Action Type:	Tier Classification
Action Status:	Tier 2 Classification
Action Date:	5/14/2007
Response Action Outcome:	Not reported
Action Type:	Tier Classification
Action Status:	Transmittal, Notice, or Notification Received
Action Date:	5/14/2007
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Oral Approval of Plan or Action
Action Date:	5/15/2006
Response Action Outcome:	Not reported
Action Type:	Release Disposition
Action Status:	Reportable Release under MGL 21E
Action Date:	5/15/2006
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Written Plan Received
Action Date:	7/12/2006
Response Action Outcome:	Not reported
Action Type:	RNF
Action Status:	Reportable Release under MGL 21E
Action Date:	7/12/2006
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	7/12/2007
Response Action Outcome:	Not reported

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 7/14/2006
Response Action Outcome: Not reported

Action Type: Compliance and Enforcement Action
Action Status: Notice of Non-Compliance Issued
Action Date: 8/23/2007
Response Action Outcome: Not reported

Chemicals:
Chemical: GASOLINE
Quantity: 767 parts per million
Location Type: COMMERCIAL
Source: UST

Release Tracking Number/Current Status: 3-0030391 / RAO
Primary ID: Not reported
Official City: AMESBURY
Notification: 10/14/2011
Category: 120 DY
Status Date: 11/14/2011
Phase: Not reported
Response Action Outcome: B1 - Remedial actions have not been conducted because a level of No Significant Risk exists.
Oil / Haz Material Type: Hazardous Material

Click here to access the MA DEP site for this facility:

Actions:
Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 10/14/2011
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 10/14/2011
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: RNFE
Action Status: Transmittal, Notice, or Notification Received
Action Date: 10/14/2011
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 11/14/2011
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: Level I - Technical Screen Audit

FMR TRADER ALLENS TRUCK STOP (Continued) **S107678071**

Action Date: 7/12/2012
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Chemicals:
Chemical: ARSENIC
Quantity: 20.5 milligrams per kilogram
Chemical: TOTAL CHROMIUM
Quantity: 58.9 milligrams per kilogram

ENFORCEMENT:
Region: NERO
DEP Region: NERO
DEP Program: 3A
DEP Bureau: BWSC
Program: BWSC
Program Id: 3-0025880
High Or Low Level Enforcement: LLE
FMF #: Not reported
Comptroller Billing Name: Not reported
Town Where Violation Occurred: Amesbury
Date Executed: 08/05/2013
ENF #: NON-NE-13-3A032
Document Type: NON
AG Ref (Y/N): Not reported
Doc Archived (Y/N): Not reported
EJ Community (Y/N): Y
Regional Comment: Not reported
Final Payment Due Date: Not reported
ACOP $: Not reported
PAN $: Not reported
EMS (Y/N): Not reported
EMS$: Not reported
SEP (Y/N): Not reported
SEP $: Not reported
Demand $: Not reported
Suspended $: Not reported
Ownership: Municipally Owned

B10 **NO LOCATION AID** **SHWS** **S105735947**
East **19 POND ST** **INST CONTROL** **N/A**
1/2-1 **AMESBURY, MA 01913** **RELEASE**
0.765 mi.
4040 ft. **Site 2 of 2 in cluster B**

Relative:
Lower

Actual:
79 ft.

SHWS:
Release Tracking Number/Current Status: 3-0022389 / RAO
Release Town: AMESBURY
Notification Date: 12/13/2002
Category: TWO HR
Associated ID: Not reported
Current Status: **Response Action Outcome**
Status Date: 11/13/2003
Phase: Not reported
Response Action Outcome: A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Oil Or Haz Material: Hazardous Material

NO LOCATION AID (Continued) **S105735947**

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: ASBESTOS
Quantity: Not reported

Actions:
Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 11/13/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Response Action Outcome - RAO
Action Status: Fee Received - FMCRA Use Only
Action Date: 11/13/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Immediate Response Action
Action Status: Completion Statement Received
Action Date: 12/11/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 12/13/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 12/13/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Immediate Response Action
Action Status: Written Plan Received
Action Date: 12/13/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 4/22/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Release Tracking Number/Current Status: 3-0020783 / RAO
Release Town: AMESBURY
Notification Date: 05/07/2001
Category: 120 DY
Associated ID: Not reported

NO LOCATION AID (Continued) **S105735947**

Current Status: **Response Action Outcome**
Status Date: 03/13/2002
Phase: PHASE II
Response Action Outcome: A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Oil Or Haz Material: Oil and Hazardous Material

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: LEAD
Quantity: 2040 milligrams per kilogram
Chemical: C11 THRU C22 AROMATIC HYDROCARBONS
Quantity: 222 milligrams per kilogram

Actions:
Action Type: Activity and Use Limitation
Action Status: Legal Notice Published
Action Date: 10/24/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Activity and Use Limitation
Action Status: Action Status or AUL Terminated
Action Date: 10/31/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Response Action Outcome - RAO
Action Status: Revised Statement or Transmittal Received
Action Date: 10/31/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Activity and Use Limitation
Action Status: Confirmatory AUL received
Action Date: 2/17/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Activity and Use Limitation
Action Status: Legal Notice Published
Action Date: 2/19/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 3/13/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Activity and Use Limitation
Action Status: Transmittal, Notice, or Notification Received
Action Date: 3/13/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced

NO LOCATION AID (Continued) **S105735947**

to background or a threat of release has been eliminated.

Action Type: Activity and Use Limitation
Action Status: Legal Notice Published
Action Date: 3/14/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Response Action Outcome - RAO
Action Status: Fee Received - FMCRA Use Only
Action Date: 4/2/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 5/7/2001
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 5/7/2001
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 8/24/2001
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 9/5/2001
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

INST CONTROL:
Release Tracking Number: 3-0020783
Action Type: AUL
Action Stat: CONFRM
Action Date: 02/17/2004
Response Action Outcome: A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Release Tracking Number: 3-0020783
Action Type: AUL
Action Stat: LEGNOT
Action Date: 02/19/2004
Response Action Outcome: A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Release Tracking Number: 3-0020783
Action Type: AUL
Action Stat: LEGNOT

NO LOCATION AID (Continued) **S105735947**

Action Date: 03/14/2002
Response Action Outcome: A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Release Tracking Number: 3-0020783
Action Type: AUL
Action Stat: LEGNOT
Action Date: 10/24/2003
Response Action Outcome: A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Release Tracking Number: 3-0020783
Action Type: AUL
Action Stat: RECPT
Action Date: 03/13/2002
Response Action Outcome: A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Release Tracking Number: 3-0020783
Action Type: AUL
Action Stat: TERMIN
Action Date: 10/31/2003
Response Action Outcome: A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Release:
Release Tracking Number/Current Status: 3-0020783 / RAO
Primary ID: Not reported
Official City: AMESBURY
Notification: 05/07/2001
Category: 120 DY
Status Date: 03/13/2002
Phase: PHASE II
Response Action Outcome: A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Oil / Haz Material Type: Oil and Hazardous Material

Click here to access the MA DEP site for this facility:

Actions:
Action Type: Activity and Use Limitation
Action Status: Legal Notice Published
Action Date: 10/24/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Activity and Use Limitation
Action Status: Action Status or AUL Terminated
Action Date: 10/31/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Response Action Outcome - RAO
Action Status: Revised Statement or Transmittal Received
Action Date: 10/31/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced

NO LOCATION AID (Continued) **S105735947**

to background or a threat of release has been eliminated.

Action Type: Activity and Use Limitation
Action Status: Confirmatory AUL received
Action Date: 2/17/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Activity and Use Limitation
Action Status: Legal Notice Published
Action Date: 2/19/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 3/13/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Activity and Use Limitation
Action Status: Transmittal, Notice, or Notification Received
Action Date: 3/13/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Activity and Use Limitation
Action Status: Legal Notice Published
Action Date: 3/14/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Response Action Outcome - RAO
Action Status: Fee Received - FMCRA Use Only
Action Date: 4/2/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 5/7/2001
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 5/7/2001
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 8/24/2001
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)

NO LOCATION AID (Continued) **S105735947**

Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 9/5/2001
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Chemicals:
Chemical: LEAD
Quantity: 2040 milligrams per kilogram
Chemical: C11 THRU C22 AROMATIC HYDROCARBONS
Quantity: 222 milligrams per kilogram

Release Tracking Number/Current Status: 3-0022389 / RAO
Primary ID: Not reported
Official City: AMESBURY
Notification: 12/13/2002
Category: TWO HR
Status Date: 11/13/2003
Phase: Not reported
Response Action Outcome: A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Oil / Haz Material Type: Hazardous Material

Click here to access the MA DEP site for this facility:

Actions:
Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 11/13/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Response Action Outcome - RAO
Action Status: Fee Received - FMCRA Use Only
Action Date: 11/13/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Immediate Response Action
Action Status: Completion Statement Received
Action Date: 12/11/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 12/13/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 12/13/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Immediate Response Action

NO LOCATION AID (Continued) **S105735947**

Action Status: Written Plan Received
Action Date: 12/13/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 4/22/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Chemicals:
Chemical: ASBESTOS
Quantity: Not reported

11
East
1/2-1
0.796 mi.
4205 ft.

NO LOCATION AID **SHWS** **S105309432**
36 HIGH ST **LUST** **N/A**
AMESBURY, MA 01913 **RELEASE**
ENF

Relative:
Lower

Actual:
85 ft.

SHWS:
Release Tracking Number/Current Status: 3-0021511 / RAO
Release Town: AMESBURY
Notification Date: 02/21/2002
Category: 120 DY
Associated ID: Not reported
Current Status: **Response Action Outcome**
Status Date: 11/13/2003
Phase: PHASE II
Response Action Outcome: A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Oil Or Haz Material: Hazardous Material

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: LEAD
Quantity: 17000 milligrams per kilogram

Actions:
Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 11/13/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Release Abatement Measure
Action Status: Status or Interim Report Received
Action Date: 12/11/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Release Abatement Measure
Action Status: Completion Statement Received
Action Date: 12/11/2003

NO LOCATION AID (Continued) **S105309432**

Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 2/21/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 2/21/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 2/28/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Tier Classification
Action Status: Transmittal, Notice, or Notification Received
Action Date: 2/28/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Tier Classification
Action Status: Tier 2 Classification
Action Date: 2/28/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Tier Classification
Action Status: Legal Notice Published
Action Date: 3/17/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 3/26/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Release Abatement Measure
Action Status: Written Plan Received
Action Date: 6/2/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

LUST:

Facility:
Release Tracking Number/Current Status: 3-0023731 / RAO
Status Date: 09/08/2009

NO LOCATION AID (Continued) **S105309432**

Source Type:	UST
Release Town:	AMESBURY
Notification Date:	04/02/2004
Category:	72 HR
Associated ID:	Not reported
Phase:	PHASE III
Response Action Outcome:	A2 - A permanent solution has been achieved. Contamination has not been reduced to background.
Oil Or Haz Material:	Oil and Hazardous Material
Location Type:	COMMERCIAL
Source:	UST

Click here to access the MA DEP site for this facility:

Chemicals:

Chemical:	PID
Quantity:	400 parts per million
Chemical:	XYLENES
Quantity:	12.3 milligrams per liter
Chemical:	HEATING OIL
Quantity:	400 parts per million
Chemical:	TOLUENE
Quantity:	15 milligrams per liter

Actions:

Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	1/29/2008
Response Action Outcome:	A permanent solution has been achieved. Contamination has not been reduced to background.
Action Type:	Immediate Response Action
Action Status:	Completion Statement Received
Action Date:	1/29/2009
Response Action Outcome:	A permanent solution has been achieved. Contamination has not been reduced to background.
Action Type:	Immediate Response Action
Action Status:	Status or Interim Report Received
Action Date:	1/29/2009
Response Action Outcome:	A permanent solution has been achieved. Contamination has not been reduced to background.
Action Type:	Phase 2
Action Status:	Completion Statement Received
Action Date:	1/29/2009
Response Action Outcome:	A permanent solution has been achieved. Contamination has not been reduced to background.
Action Type:	Compliance and Enforcement Action
Action Status:	ACO
Action Date:	1/3/2008
Response Action Outcome:	A permanent solution has been achieved. Contamination has not been reduced to background.

NO LOCATION AID (Continued) **S105309432**

Action Type: Immediate Response Action
Action Status: Level I - Technical Screen Audit
Action Date: 1/30/2008
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 12/6/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Tier Classification
Action Status: Transmittal, Notice, or Notification Received
Action Date: 4/11/2005
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 4/11/2005
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Tier Classification
Action Status: Tier 2 Classification
Action Date: 4/11/2005
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Oral Approval of a Modified Plan
Action Date: 4/12/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 4/2/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 4/2/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Tier Classification
Action Status: Legal Notice Published
Action Date: 4/20/2005
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Level I - Technical Screen Audit
Action Date: 4/28/2009

NO LOCATION AID (Continued) **S105309432**

Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 4/29/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Oral Approval of a Modified Plan
Action Date: 4/6/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Response Action Outcome - RAO
Action Status: Level I - Technical Screen Audit
Action Date: 6/14/2010
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Written Plan Received
Action Date: 6/8/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 6/8/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 7/30/2008
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 8/4/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Level I - Technical Screen Audit
Action Date: 8/4/2008
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 9/8/2009
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

NO LOCATION AID (Continued) **S105309432**

Release:

Release Tracking Number/Current Status:	3-0021511 / RAO
Primary ID:	Not reported
Official City:	AMESBURY
Notification:	02/21/2002
Category:	120 DY
Status Date:	11/13/2003
Phase:	PHASE II
Response Action Outcome:	A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Oil / Haz Material Type:	Hazardous Material

Click here to access the MA DEP site for this facility:

Actions:

Action Type:	Response Action Outcome - RAO
Action Status:	RAO Statement Received
Action Date:	11/13/2003
Response Action Outcome:	A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Action Type:	Release Abatement Measure
Action Status:	Status or Interim Report Received
Action Date:	12/11/2003
Response Action Outcome:	A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Action Type:	Release Abatement Measure
Action Status:	Completion Statement Received
Action Date:	12/11/2003
Response Action Outcome:	A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Action Type:	Release Disposition
Action Status:	Reportable Release under MGL 21E
Action Date:	2/21/2002
Response Action Outcome:	A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Action Type:	RNF
Action Status:	Reportable Release under MGL 21E
Action Date:	2/21/2002
Response Action Outcome:	A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Action Type:	Phase 1
Action Status:	Completion Statement Received
Action Date:	2/28/2003
Response Action Outcome:	A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Action Type:	Tier Classification
Action Status:	Transmittal, Notice, or Notification Received
Action Date:	2/28/2003
Response Action Outcome:	A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

NO LOCATION AID (Continued) **S105309432**

Action Type: Tier Classification
Action Status: Tier 2 Classification
Action Date: 2/28/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Tier Classification
Action Status: Legal Notice Published
Action Date: 3/17/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 3/26/2002
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Release Abatement Measure
Action Status: Written Plan Received
Action Date: 6/2/2003
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Chemicals:
Chemical: LEAD
Quantity: 17000 milligrams per kilogram

Release Tracking Number/Current Status: 3-0023731 / RAO
Primary ID: Not reported
Official City: AMESBURY
Notification: 04/02/2004
Category: 72 HR
Status Date: 09/08/2009
Phase: PHASE III
Response Action Outcome: A2 - A permanent solution has been achieved. Contamination has not been reduced to background.
Oil / Haz Material Type: Oil and Hazardous Material

Click here to access the MA DEP site for this facility:

Actions:
Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 1/29/2008
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Completion Statement Received
Action Date: 1/29/2009
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received

NO LOCATION AID (Continued) **S105309432**

Action Date: 1/29/2009
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Phase 2
Action Status: Completion Statement Received
Action Date: 1/29/2009
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Compliance and Enforcement Action
Action Status: ACO
Action Date: 1/3/2008
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Level I - Technical Screen Audit
Action Date: 1/30/2008
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 12/6/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Tier Classification
Action Status: Transmittal, Notice, or Notification Received
Action Date: 4/11/2005
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 4/11/2005
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Tier Classification
Action Status: Tier 2 Classification
Action Date: 4/11/2005
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Oral Approval of a Modified Plan
Action Date: 4/12/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 4/2/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

NO LOCATION AID (Continued) **S105309432**

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 4/2/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Tier Classification
Action Status: Legal Notice Published
Action Date: 4/20/2005
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Level I - Technical Screen Audit
Action Date: 4/28/2009
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 4/29/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Oral Approval of a Modified Plan
Action Date: 4/6/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Response Action Outcome - RAO
Action Status: Level I - Technical Screen Audit
Action Date: 6/14/2010
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Written Plan Received
Action Date: 6/8/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 6/8/2004
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 7/30/2008
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Status or Interim Report Received
Action Date: 8/4/2004

NO LOCATION AID (Continued) **S105309432**

Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Immediate Response Action
Action Status: Level I - Technical Screen Audit
Action Date: 8/4/2008
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 9/8/2009
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Chemicals:
Chemical: PID
Quantity: 400 parts per million
Chemical: XYLENES
Quantity: 12.3 milligrams per liter
Chemical: HEATING OIL
Quantity: 400 parts per million
Chemical: TOLUENE
Quantity: 15 milligrams per liter
Location Type: COMMERCIAL
Source: UST

ENFORCEMENT:
Region: NERO
DEP Region: NERO
DEP Program: 3A
DEP Bureau: BWSC
Program: BWSC
Program Id: 3-0023731
High Or Low Level Enforcement: HLE
FMF #: Not reported
Comptroller Billing Name: Not reported
Town Where Violation Occurred: Not reported
Date Executed: 01/03/2008
ENF #: ACO-NE-07-3A039
Document Type: ACO
AG Ref (Y/N): Not reported
Doc Archived (Y/N): Not reported
EJ Community (Y/N): Not reported
Regional Comment: Not reported
Final Payment Due Date: Not reported
ACOP $: Not reported
PAN $: Not reported
EMS (Y/N): Not reported
EMS$: Not reported
SEP (Y/N): Not reported
SEP $: Not reported
Demand $: Not reported
Suspended $: Not reported
Ownership: Municipally Owned

C12 **37 FRIEND STREET REALTY TRUST** **SHWS** **S100828047**
East **37 FRIEND ST** **RELEASE** **N/A**
1/2-1 **AMESBURY, MA 01913** **ENF**
0.800 mi.
4224 ft. **Site 1 of 2 in cluster C**

Relative:
Lower

Actual:
81 ft.

SHWS:

Release Tracking Number/Current Status:	3-0002855 / RAO
Release Town:	AMESBURY
Notification Date:	01/15/1990
Category:	NONE
Associated ID:	Not reported
Current Status:	**Response Action Outcome**
Status Date:	04/26/2006
Phase:	PHASE II
Response Action Outcome:	A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Oil Or Haz Material:	Oil
Location Type:	COMMERCIAL
Source:	DRYWELL

Click here to access the MA DEP site for this facility:

Chemicals:

Chemical:	VOCS
Quantity:	Not reported

Actions:

Action Type:	Release Disposition
Action Status:	Valid Transition Site
Action Date:	1/15/1990
Response Action Outcome:	A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Action Type:	A Notice sent to a Potentially Responsible Party (PRP)
Action Status:	A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date:	1/19/2005
Response Action Outcome:	A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Action Type:	RLFA
Action Status:	FOLOFF
Action Date:	1/25/2005
Response Action Outcome:	A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Action Type:	Compliance and Enforcement Action
Action Status:	Notice of Non-Compliance Issued
Action Date:	1/26/2006
Response Action Outcome:	A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Action Type:	Response Action Outcome - RAO
Action Status:	RAO Statement Received
Action Date:	4/26/2006
Response Action Outcome:	A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

37 FRIEND STREET REALTY TRUST (Continued) **S100828047**

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 4/26/2006
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Release:
Release Tracking Number/Current Status: 3-0002855 / RAO
Primary ID: Not reported
Official City: AMESBURY
Notification: 01/15/1990
Category: NONE
Status Date: 04/26/2006
Phase: PHASE II
Response Action Outcome: A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Oil / Haz Material Type: Oil

Click here to access the MA DEP site for this facility:

Actions:
Action Type: Release Disposition
Action Status: Valid Transition Site
Action Date: 1/15/1990
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 1/19/2005
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: RLFA
Action Status: FOLOFF
Action Date: 1/25/2005
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Compliance and Enforcement Action
Action Status: Notice of Non-Compliance Issued
Action Date: 1/26/2006
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 4/26/2006
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 4/26/2006
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced

37 FRIEND STREET REALTY TRUST (Continued) **S100828047**

to background or a threat of release has been eliminated.

Chemicals:
Chemical: VOCS
Quantity: Not reported
Location Type: COMMERCIAL
Source: DRYWELL

ENFORCEMENT:
Region: NERO
DEP Region: NERO
DEP Program: 3R
DEP Bureau: BWSC
Program: Not reported
Program Id: 3-0002855
High Or Low Level Enforcement: LLE
FMF #: Not reported
Comptroller Billing Name: Not reported
Town Where Violation Occurred: Not reported
Date Executed: 01/26/2006
ENF #: NON-NE-05-3R095
Document Type: NON
AG Ref (Y/N): Not reported
Doc Archived (Y/N): Not reported
EJ Community (Y/N): Not reported
Regional Comment: Not reported
Final Payment Due Date: Not reported
ACOP $: Not reported
PAN $: Not reported
EMS (Y/N): Not reported
EMS$: Not reported
SEP (Y/N): Not reported
SEP $: Not reported
Demand $: Not reported
Suspended $: Not reported
Ownership: Commercially Owned

C13 **TEDS TEXACO FMR** **SHWS** **S105199424**
East **46-50 52-54 FRIEND ST** **RELEASE** **N/A**
1/2-1 **AMESBURY, MA 01913**
0.802 mi.
4237 ft. **Site 2 of 2 in cluster C**

Relative: **Lower**
Actual: **81 ft.**

SHWS:
Release Tracking Number/Current Status: 3-0001792 / RAO
Release Town: AMESBURY
Notification Date: 01/15/1989
Category: NONE
Associated ID: Not reported
Current Status: **Response Action Outcome**
Status Date: 08/11/1997
Phase: Not reported
Response Action Outcome: -
Oil Or Haz Material: Not reported

Click here to access the MA DEP site for this facility:

TEDS TEXACO FMR (Continued) **S105199424**

Chemicals:
Chemical: UNKNOWN
Quantity: Not reported

Actions:
Action Type: Release Disposition
Action Status: Valid Transition Site
Action Date: 1/15/1989
Response Action Outcome: Not reported

Action Type: TREGS
Action Status: RAOEQ
Action Date: 8/11/1997
Response Action Outcome: Not reported

Release:
Release Tracking Number/Current Status: 3-0001792 / RAO
Primary ID: Not reported
Official City: AMESBURY
Notification: 01/15/1989
Category: NONE
Status Date: 08/11/1997
Phase: Not reported
Response Action Outcome: -
Oil / Haz Material Type: Not reported

Click here to access the MA DEP site for this facility:

Actions:
Action Type: Release Disposition
Action Status: Valid Transition Site
Action Date: 1/15/1989
Response Action Outcome: Not reported

Action Type: TREGS
Action Status: RAOEQ
Action Date: 8/11/1997
Response Action Outcome: Not reported

Chemicals:
Chemical: UNKNOWN
Quantity: Not reported

14
SE
1/2-1
0.823 mi.
4345 ft.

NO LOCATION AID **SHWS S102086283**
21 HILLSIDE AVE **RELEASE N/A**
AMESBURY, MA 01913

Relative: Lower
Actual: 102 ft.

SHWS:
Release Tracking Number/Current Status: 3-0011936 / RAO
Release Town: AMESBURY
Notification Date: 12/08/1994
Category: TWO HR
Associated ID: Not reported

NO LOCATION AID (Continued) **S102086283**

Current Status: **Response Action Outcome**
Status Date: 02/08/1995
Phase: Not reported
Response Action Outcome: A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Oil Or Haz Material: Oil
Location Type: RESIDNTIAL
Source: PIPE

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: #2 FUEL OIL
Quantity: Not reported
Chemical: #2 FUEL OIL
Quantity: 10 gallons

Actions:
Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 12/14/1994
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: RLFA
Action Status: FOLOFF
Action Date: 12/14/1994
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 12/16/1994
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 12/8/1994
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 12/8/1994
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 2/8/1995
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: RNF
Action Status: Reportable Release under MGL 21E

NO LOCATION AID (Continued) **S102086283**

Action Date: 2/8/1995
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Release:
Release Tracking Number/Current Status: 3-0011936 / RAO
Primary ID: Not reported
Official City: AMESBURY
Notification: 12/08/1994
Category: TWO HR
Status Date: 02/08/1995
Phase: Not reported
Response Action Outcome: A1 - A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.
Oil / Haz Material Type: Oil

Click here to access the MA DEP site for this facility:

Actions:
Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 12/14/1994
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: RLFA
Action Status: FOLOFF
Action Date: 12/14/1994
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 12/16/1994
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 12/8/1994
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 12/8/1994
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 2/8/1995
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

NO LOCATION AID (Continued) **S102086283**

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 2/8/1995
Response Action Outcome: A permanent solution has been achieved. Contamination has been reduced to background or a threat of release has been eliminated.

Chemicals:
Chemical: #2 FUEL OIL
Quantity: Not reported
Chemical: #2 FUEL OIL
Quantity: 10 gallons
Location Type: RESIDNTIAL
Source: PIPE

---

15 East 1/2-1 0.902 mi. 4764 ft. **NO LOCATION AID** **SHWS S102087712**
36 MAIN ST **INST CONTROL N/A**
AMESBURY, MA 01913 **RELEASE**

Relative: Lower
Actual: 51 ft.

SHWS:
Release Tracking Number/Current Status: 3-0013943 / RAO
Release Town: AMESBURY
Notification Date: 06/25/1996
Category: 120 DY
Associated ID: Not reported
Current Status: **Response Action Outcome**
Status Date: 06/25/1997
Phase: Not reported
Response Action Outcome: B1 - Remedial actions have not been conducted because a level of No Significant Risk exists.
Oil Or Haz Material: Oil and Hazardous Material

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: ARSENIC
Quantity: 30 milligrams per kilogram
Chemical: OIL
Quantity: 3300 milligrams per kilogram

Actions:
Action Type: Response Action Outcome - RAO
Action Status: Level I - Technical Screen Audit
Action Date: 1/11/2002
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: An activity type that is related to an Audit
Action Status: NOA
Action Date: 5/10/1999
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: Level II - Audit Inspection

NO LOCATION AID (Continued) **S102087712**

Action Date: 5/27/2004
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: An activity type that is related to an Audit
Action Status: Audit Follow-up Completion Statement Received
Action Date: 6/11/2002
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Activity and Use Limitation
Action Status: Amendment Received or Issued
Action Date: 6/11/2002
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Activity and Use Limitation
Action Status: Action Status or AUL Terminated
Action Date: 6/14/2004
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: Revised Statement or Transmittal Received
Action Date: 6/14/2004
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 6/25/1996
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 6/25/1996
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Activity and Use Limitation
Action Status: Transmittal, Notice, or Notification Received
Action Date: 6/25/1997
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 6/25/1997
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: Fee Received - FMCRA Use Only
Action Date: 6/27/1997
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

NO LOCATION AID (Continued) **S102087712**

Action Type: Activity and Use Limitation
Action Status: Legal Notice Published
Action Date: 6/9/2004
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: An activity type that is related to an Audit
Action Status: NAFNVD
Action Date: 7/28/2004
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 7/29/1996
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

INST CONTROL:
Release Tracking Number: 3-0013943
Action Type: AUL
Action Stat: AMEND
Action Date: 06/11/2002
Response Action Outcome: B1 - Remedial actions have not been conducted because a level of No Significant Risk exists.

Release Tracking Number: 3-0013943
Action Type: AUL
Action Stat: LEGNOT
Action Date: 06/09/2004
Response Action Outcome: B1 - Remedial actions have not been conducted because a level of No Significant Risk exists.

Release Tracking Number: 3-0013943
Action Type: AUL
Action Stat: RECPT
Action Date: 06/25/1997
Response Action Outcome: B1 - Remedial actions have not been conducted because a level of No Significant Risk exists.

Release Tracking Number: 3-0013943
Action Type: AUL
Action Stat: TERMIN
Action Date: 06/14/2004
Response Action Outcome: B1 - Remedial actions have not been conducted because a level of No Significant Risk exists.

Release:
Release Tracking Number/Current Status: 3-0013943 / RAO
Primary ID: Not reported
Official City: AMESBURY
Notification: 06/25/1996
Category: 120 DY
Status Date: 06/25/1997
Phase: Not reported

NO LOCATION AID (Continued) **S102087712**

Response Action Outcome: B1 - Remedial actions have not been conducted because a level of No Significant Risk exists.
Oil / Haz Material Type: Oil and Hazardous Material

Click here to access the MA DEP site for this facility:

Actions:

Action Type: Response Action Outcome - RAO
Action Status: Level I - Technical Screen Audit
Action Date: 1/11/2002
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: An activity type that is related to an Audit
Action Status: NOA
Action Date: 5/10/1999
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: Level II - Audit Inspection
Action Date: 5/27/2004
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: An activity type that is related to an Audit
Action Status: Audit Follow-up Completion Statement Received
Action Date: 6/11/2002
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Activity and Use Limitation
Action Status: Amendment Received or Issued
Action Date: 6/11/2002
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Activity and Use Limitation
Action Status: Action Status or AUL Terminated
Action Date: 6/14/2004
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: Revised Statement or Transmittal Received
Action Date: 6/14/2004
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 6/25/1996
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E

NO LOCATION AID (Continued) **S102087712**

Action Date: 6/25/1996
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Activity and Use Limitation
Action Status: Transmittal, Notice, or Notification Received
Action Date: 6/25/1997
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 6/25/1997
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Response Action Outcome - RAO
Action Status: Fee Received - FMCRA Use Only
Action Date: 6/27/1997
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: Activity and Use Limitation
Action Status: Legal Notice Published
Action Date: 6/9/2004
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: An activity type that is related to an Audit
Action Status: NAFNVD
Action Date: 7/28/2004
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 7/29/1996
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists.

Chemicals:
Chemical: ARSENIC
Quantity: 30 milligrams per kilogram
Chemical: OIL
Quantity: 3300 milligrams per kilogram

16
East
1/2-1
0.929 mi.
4903 ft.

MILL YARD SITE
MAIN ST HIGH ST
AMESBURY, MA 01913

SHWS **S101856485**
RELEASE **N/A**

Relative:
Lower

Actual:
49 ft.

SHWS:
Release Tracking Number/Current Status: 3-0000200 / DEPNFA
Release Town: AMESBURY
Notification Date: 01/15/1987
Category: NONE

MILL YARD SITE (Continued) **S101856485**

Associated ID: Not reported
Current Status: **No Further Action (DEP Determined)**
Status Date: 07/23/1993
Phase: Not reported
Response Action Outcome: -
Oil Or Haz Material: Not reported

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: UNKNOWN
Quantity: Not reported

Actions:
Action Type: Release Disposition
Action Status: Valid Transition Site
Action Date: 1/15/1987
Response Action Outcome: Not reported

Action Type: TREGS
Action Status: DEPNFA
Action Date: 7/23/1993
Response Action Outcome: Not reported

Action Type: TREGS
Action Status: REMSIT
Action Date: 7/23/1993
Response Action Outcome: Not reported

Release:
Release Tracking Number/Current Status: 3-0000200 / DEPNFA
Primary ID: Not reported
Official City: AMESBURY
Notification: 01/15/1987
Category: NONE
Status Date: 07/23/1993
Phase: Not reported
Response Action Outcome: -
Oil / Haz Material Type: Not reported

Click here to access the MA DEP site for this facility:

Actions:
Action Type: Release Disposition
Action Status: Valid Transition Site
Action Date: 1/15/1987
Response Action Outcome: Not reported

Action Type: TREGS
Action Status: DEPNFA
Action Date: 7/23/1993
Response Action Outcome: Not reported

Action Type: TREGS

MILL YARD SITE (Continued) **S101856485**

Action Status: REMSIT
Action Date: 7/23/1993
Response Action Outcome: Not reported

Chemicals:
Chemical: UNKNOWN
Quantity: Not reported

17
ESE
1/2-1
0.932 mi.
4921 ft.

PROPERTY **SHWS** **S100360532**
194 MAIN ST **RELEASE** **N/A**
AMESBURY, MA 01913 **ASBESTOS**

Relative:
Lower

Actual:
40 ft.

SHWS:
Release Tracking Number/Current Status: 3-0002068 / RAO
Release Town: AMESBURY
Notification Date: 04/15/1989
Category: NONE
Associated ID: Not reported
Current Status: **Response Action Outcome**
Status Date: 08/25/1995
Phase: Not reported
Response Action Outcome: A2 - A permanent solution has been achieved. Contamination has not been reduced to background.
Oil Or Haz Material: Not reported

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: UNKNOWN
Quantity: Not reported

Actions:
Action Type: Release Disposition
Action Status: Valid Transition Site
Action Date: 4/15/1989
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: TREGS
Action Status: LSPNFA
Action Date: 7/8/1994
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 8/25/1995
Response Action Outcome: A permanent solution has been achieved. Contamination has not been reduced to background.

Release:
Release Tracking Number/Current Status: 3-0002068 / RAO
Primary ID: Not reported

PROPERTY (Continued) **S100360532**

Official City:	AMESBURY
Notification:	04/15/1989
Category:	NONE
Status Date:	08/25/1995
Phase:	Not reported
Response Action Outcome:	A2 - A permanent solution has been achieved. Contamination has not been reduced to background.
Oil / Haz Material Type:	Not reported

Click here to access the MA DEP site for this facility:

Actions:

Action Type:	Release Disposition
Action Status:	Valid Transition Site
Action Date:	4/15/1989
Response Action Outcome:	A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type:	TREGS
Action Status:	LSPNFA
Action Date:	7/8/1994
Response Action Outcome:	A permanent solution has been achieved. Contamination has not been reduced to background.

Action Type:	Response Action Outcome - RAO
Action Status:	RAO Statement Received
Action Date:	8/25/1995
Response Action Outcome:	A permanent solution has been achieved. Contamination has not been reduced to background.

Chemicals:

Chemical:	UNKNOWN
Quantity:	Not reported

ASBESTOS:

Notification:	100230006
DEP Region:	NE
Notifiers Name:	S & S ABATEMENT LLC
Start Date:	10/26/2015
End Date:	10/30/2015
Date Entered:	01/10/2015
Entry Date:	10/01/2015
Quantity Materical Removed SF:	4810
Quantity Material Removed LF:	Not reported
Project Description:	OTHER TILE & MASTIC
AR Tracking ID:	Not reported
Super Lic Number:	Not reported
Monitor Lic Number:	Not reported
Lab Lic Number:	Not reported
Year:	Not reported
Sticker Number:	Not reported
Form Type:	Not reported
Fee Status:	Not reported
Facility Phone:	Not reported
Sub Town:	Not reported
Worksite:	Not reported

PROPERTY (Continued) **S100360532**

Occupied:	Not reported
Contractor:	Not reported
Contract Type:	Not reported
Hours:	Not reported
Project Type:	Not reported
Abatement Process:	Not reported
Location:	Not reported
Decon Process:	Not reported
Disposal Methods:	Not reported
Facility Usage:	Not reported
Waiver Given:	Not reported
DEP Waiver Number:	Not reported
DLWD Waiver Number:	Not reported
Small Owner Occ:	Not reported
Owner Name:	Not reported
Owner Address:	Not reported
Owner City:	Not reported
Owner State:	Not reported
On Site Manager Name:	Not reported
On Site Manager Phone:	Not reported
Ins Comp:	Not reported
Policy Number:	Not reported
EXP Date:	Not reported
Facility Size:	Not reported
Transporter Name:	Not reported
Transporter Address:	Not reported
Transporter City:	Not reported
Transporter State:	Not reported
Final Site:	Not reported
Certified Name:	Not reported
Cert Sign Date:	Not reported
Certified Company:	Not reported
Certified Phone:	Not reported
Entered_by:	Not reported

18
East
1/2-1
0.934 mi.
4933 ft.

REID S FOUNDRY
MILL STREET EXT
AMESBURY, MA 01913

SHWS RELEASE **S105199243 N/A**

Relative:
Lower

Actual:
25 ft.

SHWS:

Release Tracking Number/Current Status:	3-0000513 / DEPNFA
Release Town:	AMESBURY
Notification Date:	07/16/1986
Category:	NONE
Associated ID:	Not reported
Current Status:	**No Further Action (DEP Determined)**
Status Date:	07/23/1993
Phase:	Not reported
Response Action Outcome:	-
Oil Or Haz Material:	Not reported

Click here to access the MA DEP site for this facility:

Chemicals:

REID S FOUNDRY (Continued) **S105199243**

Chemical: UNKNOWN
Quantity: Not reported

Actions:
Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 7/16/1986
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Valid Transition Site
Action Date: 7/16/1986
Response Action Outcome: Not reported

Action Type: TREGS
Action Status: DEPNFA
Action Date: 7/23/1993
Response Action Outcome: Not reported

Release:
Release Tracking Number/Current Status: 3-0000513 / DEPNFA
Primary ID: Not reported
Official City: AMESBURY
Notification: 07/16/1986
Category: NONE
Status Date: 07/23/1993
Phase: Not reported
Response Action Outcome: -
Oil / Haz Material Type: Not reported

Click here to access the MA DEP site for this facility:

Actions:
Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 7/16/1986
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Valid Transition Site
Action Date: 7/16/1986
Response Action Outcome: Not reported

Action Type: TREGS
Action Status: DEPNFA
Action Date: 7/23/1993
Response Action Outcome: Not reported

Chemicals:
Chemical: UNKNOWN
Quantity: Not reported

D19 **NO LOCATION AID** **SHWS** **S110822261**
East **33 MILL STREET** **BROWNFIELDS** **N/A**
1/2-1 **AMESBURY, MA 01913** **RELEASE**
0.947 mi. **ENF**
4999 ft. **Site 1 of 2 in cluster D**

Relative: Lower
Actual: 20 ft.

SHWS:

Release Tracking Number/Current Status:	3-0029912 / TIERII
Release Town:	AMESBURY
Notification Date:	03/30/2011
Category:	120 DY
Associated ID:	3-0029912
Current Status:	**Tier II, A site/release receiving a total NRS score of less than 350, unless the site meets any of the Tier 1 Inclusionary Criteria (see above). Permits are not required at Tier 2 sites/releases and response actions may be performed under the supervision of an LSP without prior DEP approval. All pre-1993 transition sites that have accepted waivers are categorically Tier 2 sites.**
Status Date:	12/22/2011
Phase:	PHASE III
Response Action Outcome:	-
Oil Or Haz Material:	Oil and Hazardous Material

Click here to access the MA DEP site for this facility:

Chemicals:

Chemical:	2-METHYLNAPHTHALENE
Quantity:	65.3 milligrams per kilogram
Chemical:	PHENANTHRENE
Quantity:	109 milligrams per kilogram
Chemical:	TOLUENE
Quantity:	233 milligrams per kilogram
Chemical:	ACENAPHTHENE
Quantity:	9.1 milligrams per kilogram
Chemical:	BENZO[B]FLUORANTHENE
Quantity:	17.2 milligrams per kilogram
Chemical:	NAPHTHALENE
Quantity:	1070 milligrams per kilogram
Chemical:	ACENAPHTHYLENE
Quantity:	65.3 milligrams per kilogram
Chemical:	BENZO[A]ANTHRACENE
Quantity:	22.4 milligrams per kilogram
Chemical:	BENZO[A]PYRENE
Quantity:	19.4 milligrams per kilogram
Chemical:	ARSENIC
Quantity:	45.7 milligrams per kilogram
Chemical:	CHROMIUM
Quantity:	41.5 milligrams per kilogram
Chemical:	DIBENZ[A,H]ANTHRACENE
Quantity:	0.894 milligrams per kilogram
Chemical:	TPH
Quantity:	5610 milligrams per kilogram
Chemical:	NICKEL
Quantity:	26.7 milligrams per kilogram
Chemical:	TPH
Quantity:	12.5 milligrams per liter
Chemical:	BENZENE
Quantity:	41.5 milligrams per kilogram

NO LOCATION AID (Continued) **S110822261**

Chemical: 2,4-DIMETHYLPHENOL
Quantity: 3.62 milligrams per kilogram
Chemical: STYRENE
Quantity: 102 milligrams per kilogram
Chemical: LEAD
Quantity: 0.014 milligrams per liter

Actions:

Action Type: Tier Classification
Action Status: RTN Linked to TCLASS Via Tier Classification Submittal
Action Date: 1/25/2012
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Legal Notice Published
Action Date: 1/6/2012
Response Action Outcome: Not reported

Action Type: Phase 3
Action Status: Notice of Delay in Meeting RA Deadline Received
Action Date: 12/17/2013
Response Action Outcome: Not reported

Action Type: Phase 2
Action Status: Notice of Delay in Meeting RA Deadline Received
Action Date: 12/17/2013
Response Action Outcome: Not reported

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 12/22/2011
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Tier 2 Classification
Action Date: 12/22/2011
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Transmittal, Notice, or Notification Received
Action Date: 12/22/2011
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Legal Notice Published
Action Date: 12/27/2011
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 2/22/2016
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 3/10/2015
Response Action Outcome: Not reported

NO LOCATION AID (Continued) **S110822261**

Action Type: FTLI
Action Status: APPREC
Action Date: 3/23/2017
Response Action Outcome: Not reported

Action Type: RNFE
Action Status: Transmittal, Notice, or Notification Received
Action Date: 3/30/2011
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 3/30/2011
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 3/30/2011
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 3/7/2016
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 4/23/2014
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 4/26/2011
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 4/28/2014
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 4/3/2015
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 4/4/2017
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 5/1/2014
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF

NO LOCATION AID (Continued) **S110822261**

Action Date: 7/14/2014
Response Action Outcome: Not reported

Action Type: Phase 2
Action Status: Completion Statement Received
Action Date: 9/26/2016
Response Action Outcome: Not reported

Release Tracking Number/Current Status: 3-0030292 / RAONR
Release Town: AMESBURY
Notification Date: 09/13/2011
Category: TWO HR
Associated ID: Not reported
Current Status: **Response Action Outcome Not Required**
Status Date: 01/25/2012
Phase: Not reported
Response Action Outcome: -
Oil Or Haz Material: Hazardous Material
Location Type: VACANT
Location Type: LOT
Source: HISTORICL

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: ARSENIC
Quantity: 363 milligrams per kilogram

Actions:
Action Type: Immediate Response Action
Action Status: Level I - Technical Screen Audit
Action Date: 1/19/2012
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: RTN Linked to TCLASS Via Tier Classification Submittal
Action Date: 1/25/2012
Response Action Outcome: Not reported

Action Type: RAO Not Required
Action Status: Linked to a Tier Classified Site
Action Date: 1/25/2012
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 1/29/2015
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Legal Notice Published
Action Date: 1/6/2012
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)

NO LOCATION AID (Continued) **S110822261**

Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 10/21/2011
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 10/5/2011
Response Action Outcome: Not reported

Action Type: RNFE
Action Status: Transmittal, Notice, or Notification Received
Action Date: 10/5/2011
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Completion Statement Received
Action Date: 11/8/2011
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FLDD1U
Action Date: 11/8/2011
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Imminent Hazard Evaluation Received
Action Date: 11/8/2011
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Level I - Technical Screen Audit
Action Date: 12/12/2012
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Tier 2 Classification
Action Date: 12/22/2011
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Transmittal, Notice, or Notification Received
Action Date: 12/22/2011
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Legal Notice Published
Action Date: 12/27/2011
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLFLD
Action Date: 12/3/2014
Response Action Outcome: Not reported

Action Type: Immediate Response Action - DEP Lead
Action Status: IRA Assessment Only
Action Date: 12/3/2014

NO LOCATION AID (Continued) **S110822261**

Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Revised Statement or Transmittal Received
Action Date: 2/17/2012
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Imminent Hazard Evaluation Received
Action Date: 2/17/2012
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 2/22/2016
Response Action Outcome: Not reported

Action Type: An activity type that is related to an Audit
Action Status: Notice of Non-compliance related to an Audit
Action Date: 3/20/2014
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Submittal Determined to be Invalid by DEP
Action Date: 3/20/2014
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 3/23/2017
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 3/7/2016
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 4/23/2014
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 4/28/2014
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 4/4/2017
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 5/1/2014
Response Action Outcome: Not reported

NO LOCATION AID (Continued) **S110822261**

Action Type:	RLFA
Action Status:	FOLOFF
Action Date:	6/12/2014
Response Action Outcome:	Not reported
Action Type:	RLFA
Action Status:	FOLOFF
Action Date:	6/9/2014
Response Action Outcome:	Not reported
Action Type:	RLFA
Action Status:	FOLOFF
Action Date:	7/14/2014
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	DEPRET
Action Date:	7/14/2014
Response Action Outcome:	Not reported
Action Type:	An activity type that is related to an Audit
Action Status:	DEPRET
Action Date:	7/14/2014
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action - DEP Lead
Action Status:	IRA Assessment Only
Action Date:	8/19/2014
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action - DEP Lead
Action Status:	Work Started
Action Date:	8/19/2014
Response Action Outcome:	Not reported
Action Type:	RLFA
Action Status:	FLDDO
Action Date:	8/19/2014
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action - DEP Lead
Action Status:	IRA Assessment Only
Action Date:	8/20/2014
Response Action Outcome:	Not reported
Action Type:	RLFA
Action Status:	FLDDO
Action Date:	8/20/2014
Response Action Outcome:	Not reported
Action Type:	Release Disposition
Action Status:	Reportable Release under MGL 21E
Action Date:	9/13/2011
Response Action Outcome:	Not reported
Action Type:	Immediate Response Action
Action Status:	Oral Approval of Plan or Action

NO LOCATION AID (Continued) **S110822261**

Action Date: 9/13/2011
Response Action Outcome: Not reported

BROWNFIELDS 2:
RTN: 3-0029912
RAO Class: Not reported
Other RTNs: 3-0030292
Current Owner: 33 Mill Street Llc
MCP Status: TIER 2
AUL: Not reported
COCs: petroleum, SVOCs, metals, coal tar
Former Use: Manufactured Gas Plant
Current Use: Vacant
Total Acreage: 0.39

Release:
Release Tracking Number/Current Status: 3-0029912 / TIERII
Primary ID: 3-0029912
Official City: AMESBURY
Notification: 03/30/2011
Category: 120 DY
Status Date: 12/22/2011
Phase: PHASE III
Response Action Outcome: -
Oil / Haz Material Type: Oil and Hazardous Material

Click here to access the MA DEP site for this facility:

Actions:
Action Type: Tier Classification
Action Status: RTN Linked to TCLASS Via Tier Classification Submittal
Action Date: 1/25/2012
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Legal Notice Published
Action Date: 1/6/2012
Response Action Outcome: Not reported

Action Type: Phase 3
Action Status: Notice of Delay in Meeting RA Deadline Received
Action Date: 12/17/2013
Response Action Outcome: Not reported

Action Type: Phase 2
Action Status: Notice of Delay in Meeting RA Deadline Received
Action Date: 12/17/2013
Response Action Outcome: Not reported

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 12/22/2011
Response Action Outcome: Not reported

Action Type: Tier Classification

NO LOCATION AID (Continued) **S110822261**

Action Status: Tier 2 Classification
Action Date: 12/22/2011
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Transmittal, Notice, or Notification Received
Action Date: 12/22/2011
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Legal Notice Published
Action Date: 12/27/2011
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 2/22/2016
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 3/10/2015
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 3/23/2017
Response Action Outcome: Not reported

Action Type: RNFE
Action Status: Transmittal, Notice, or Notification Received
Action Date: 3/30/2011
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 3/30/2011
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 3/30/2011
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 3/7/2016
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 4/23/2014
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 4/26/2011

NO LOCATION AID (Continued) **S110822261**

Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 4/28/2014
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 4/3/2015
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 4/4/2017
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 5/1/2014
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 7/14/2014
Response Action Outcome: Not reported

Action Type: Phase 2
Action Status: Completion Statement Received
Action Date: 9/26/2016
Response Action Outcome: Not reported

Chemicals:
Chemical: 2-METHYLNAPHTHALENE
Quantity: 65.3 milligrams per kilogram
Chemical: PHENANTHRENE
Quantity: 109 milligrams per kilogram
Chemical: TOLUENE
Quantity: 233 milligrams per kilogram
Chemical: ACENAPHTHENE
Quantity: 9.1 milligrams per kilogram
Chemical: BENZO[B]FLUORANTHENE
Quantity: 17.2 milligrams per kilogram
Chemical: NAPHTHALENE
Quantity: 1070 milligrams per kilogram
Chemical: ACENAPHTHYLENE
Quantity: 65.3 milligrams per kilogram
Chemical: BENZO[A]ANTHRACENE
Quantity: 22.4 milligrams per kilogram
Chemical: BENZO[A]PYRENE
Quantity: 19.4 milligrams per kilogram
Chemical: ARSENIC
Quantity: 45.7 milligrams per kilogram
Chemical: CHROMIUM
Quantity: 41.5 milligrams per kilogram
Chemical: DIBENZ[A,H]ANTHRACENE
Quantity: 0.894 milligrams per kilogram

NO LOCATION AID (Continued) **S110822261**

Chemical:	TPH
Quantity:	5610 milligrams per kilogram
Chemical:	NICKEL
Quantity:	26.7 milligrams per kilogram
Chemical:	TPH
Quantity:	12.5 milligrams per liter
Chemical:	BENZENE
Quantity:	41.5 milligrams per kilogram
Chemical:	2,4-DIMETHYLPHENOL
Quantity:	3.62 milligrams per kilogram
Chemical:	STYRENE
Quantity:	102 milligrams per kilogram
Chemical:	LEAD
Quantity:	0.014 milligrams per liter

Release Tracking Number/Current Status:	3-0030292 / RAONR
Primary ID:	Not reported
Official City:	AMESBURY
Notification:	09/13/2011
Category:	TWO HR
Status Date:	01/25/2012
Phase:	Not reported
Response Action Outcome:	-
Oil / Haz Material Type:	Hazardous Material

Click here to access the MA DEP site for this facility:

Actions:

Action Type:	Immediate Response Action
Action Status:	Level I - Technical Screen Audit
Action Date:	1/19/2012
Response Action Outcome:	Not reported

Action Type:	Tier Classification
Action Status:	RTN Linked to TCLASS Via Tier Classification Submittal
Action Date:	1/25/2012
Response Action Outcome:	Not reported

Action Type:	RAO Not Required
Action Status:	Linked to a Tier Classified Site
Action Date:	1/25/2012
Response Action Outcome:	Not reported

Action Type:	RLFA
Action Status:	FOLOFF
Action Date:	1/29/2015
Response Action Outcome:	Not reported

Action Type:	Tier Classification
Action Status:	Legal Notice Published
Action Date:	1/6/2012
Response Action Outcome:	Not reported

Action Type:	A Notice sent to a Potentially Responsible Party (PRP)
Action Status:	A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date:	10/21/2011
Response Action Outcome:	Not reported

NO LOCATION AID (Continued) **S110822261**

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 10/5/2011
Response Action Outcome: Not reported

Action Type: RNFE
Action Status: Transmittal, Notice, or Notification Received
Action Date: 10/5/2011
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Completion Statement Received
Action Date: 11/8/2011
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FLDD1U
Action Date: 11/8/2011
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Imminent Hazard Evaluation Received
Action Date: 11/8/2011
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Level I - Technical Screen Audit
Action Date: 12/12/2012
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Tier 2 Classification
Action Date: 12/22/2011
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Transmittal, Notice, or Notification Received
Action Date: 12/22/2011
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Legal Notice Published
Action Date: 12/27/2011
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLFLD
Action Date: 12/3/2014
Response Action Outcome: Not reported

Action Type: Immediate Response Action - DEP Lead
Action Status: IRA Assessment Only
Action Date: 12/3/2014
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Revised Statement or Transmittal Received

NO LOCATION AID (Continued) **S110822261**

Action Date: 2/17/2012
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Imminent Hazard Evaluation Received
Action Date: 2/17/2012
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 2/22/2016
Response Action Outcome: Not reported

Action Type: An activity type that is related to an Audit
Action Status: Notice of Non-compliance related to an Audit
Action Date: 3/20/2014
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Submittal Determined to be Invalid by DEP
Action Date: 3/20/2014
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 3/23/2017
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 3/7/2016
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPREC
Action Date: 4/23/2014
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 4/28/2014
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 4/4/2017
Response Action Outcome: Not reported

Action Type: FTLI
Action Status: APPACC
Action Date: 5/1/2014
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 6/12/2014
Response Action Outcome: Not reported

NO LOCATION AID (Continued) **S110822261**

Action Type: RLFA
Action Status: FOLOFF
Action Date: 6/9/2014
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FOLOFF
Action Date: 7/14/2014
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: DEPRET
Action Date: 7/14/2014
Response Action Outcome: Not reported

Action Type: An activity type that is related to an Audit
Action Status: DEPRET
Action Date: 7/14/2014
Response Action Outcome: Not reported

Action Type: Immediate Response Action - DEP Lead
Action Status: IRA Assessment Only
Action Date: 8/19/2014
Response Action Outcome: Not reported

Action Type: Immediate Response Action - DEP Lead
Action Status: Work Started
Action Date: 8/19/2014
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FLDDO
Action Date: 8/19/2014
Response Action Outcome: Not reported

Action Type: Immediate Response Action - DEP Lead
Action Status: IRA Assessment Only
Action Date: 8/20/2014
Response Action Outcome: Not reported

Action Type: RLFA
Action Status: FLDDO
Action Date: 8/20/2014
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 9/13/2011
Response Action Outcome: Not reported

Action Type: Immediate Response Action
Action Status: Oral Approval of Plan or Action
Action Date: 9/13/2011
Response Action Outcome: Not reported

Chemicals:
Chemical: ARSENIC

NO LOCATION AID (Continued) **S110822261**

Quantity:	363 milligrams per kilogram
Location Type:	VACANT
Location Type:	LOT
Source:	HISTORICL

ENFORCEMENT:

Region:	NERO
DEP Region:	NERO
DEP Program:	3R
DEP Bureau:	BWSC
Program:	BWSC
Program Id:	3-0030292
High Or Low Level Enforcement:	LLE
FMF #:	Not reported
Comptroller Billing Name:	Not reported
Town Where Violation Occurred:	Amesbury
Date Executed:	03/20/2014
ENF #:	NON-NE-14-3R022
Document Type:	NON
AG Ref (Y/N):	Not reported
Doc Archived (Y/N):	Not reported
EJ Community (Y/N):	Y
Regional Comment:	Not reported
Final Payment Due Date:	Not reported
ACOP $:	Not reported
PAN $:	Not reported
EMS (Y/N):	Not reported
EMS$:	Not reported
SEP (Y/N):	Not reported
SEP $:	Not reported
Demand $:	Not reported
Suspended $:	Not reported
Ownership:	Commercially Owned

20
SSE
1/2-1
0.948 mi.
5007 ft.

HILLSIDE NO 66 SUBSTATION **SHWS** **S110822241**
9 ALENCLAIR DR **RELEASE** **N/A**
AMESBURY, MA 01913

Relative:
Lower

Actual:
94 ft.

SHWS:

Release Tracking Number/Current Status:	3-0029867 / PSC
Release Town:	AMESBURY
Notification Date:	03/16/2011
Category:	120 DY
Associated ID:	Not reported
Current Status:	**PSC**
Status Date:	03/17/2016
Phase:	PHASE IV
Response Action Outcome:	-
Oil Or Haz Material:	Oil

Click here to access the MA DEP site for this facility:

Chemicals:

Chemical:	C11 THRU C22 AROMATIC HYDROCARBONS

HILLSIDE NO 66 SUBSTATION (Continued) **S110822241**

Quantity: 3150 milligrams per kilogram
Chemical: C9 THRU C18 ALIPHATIC HYDROCARBONS
Quantity: 7580 milligrams per kilogram
Chemical: C19 THRU C36 ALIPHATIC HYDROCARBONS
Quantity: 11000 milligrams per kilogram

Actions:

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: ALSENT
Action Date: 1/9/2012
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 3/16/2011
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 3/16/2011
Response Action Outcome: Not reported

Action Type: RNFE
Action Status: Transmittal, Notice, or Notification Received
Action Date: 3/16/2011
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Tier 2 Classification
Action Date: 3/16/2012
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Transmittal, Notice, or Notification Received
Action Date: 3/16/2012
Response Action Outcome: Not reported

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 3/16/2012
Response Action Outcome: Not reported

Action Type: Response Action Outcome - RAO
Action Status: PSCRCD
Action Date: 3/17/2016
Response Action Outcome: Not reported

Action Type: Phase 2
Action Status: Completion Statement Received
Action Date: 3/24/2014
Response Action Outcome: Not reported

Action Type: Phase 3
Action Status: Completion Statement Received
Action Date: 3/24/2014
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)

HILLSIDE NO 66 SUBSTATION (Continued) **S110822241**

Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 3/31/2011
Response Action Outcome: Not reported

Release:
Release Tracking Number/Current Status: 3-0029867 / PSC
Primary ID: Not reported
Official City: AMESBURY
Notification: 03/16/2011
Category: 120 DY
Status Date: 03/17/2016
Phase: PHASE IV
Response Action Outcome: -
Oil / Haz Material Type: Oil

Click here to access the MA DEP site for this facility:

Actions:
Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: ALSENT
Action Date: 1/9/2012
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 3/16/2011
Response Action Outcome: Not reported

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 3/16/2011
Response Action Outcome: Not reported

Action Type: RNFE
Action Status: Transmittal, Notice, or Notification Received
Action Date: 3/16/2011
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Tier 2 Classification
Action Date: 3/16/2012
Response Action Outcome: Not reported

Action Type: Tier Classification
Action Status: Transmittal, Notice, or Notification Received
Action Date: 3/16/2012
Response Action Outcome: Not reported

Action Type: Phase 1
Action Status: Completion Statement Received
Action Date: 3/16/2012
Response Action Outcome: Not reported

Action Type: Response Action Outcome - RAO
Action Status: PSCRCD

HILLSIDE NO 66 SUBSTATION (Continued) **S110822241**

Action Date: 3/17/2016
Response Action Outcome: Not reported

Action Type: Phase 2
Action Status: Completion Statement Received
Action Date: 3/24/2014
Response Action Outcome: Not reported

Action Type: Phase 3
Action Status: Completion Statement Received
Action Date: 3/24/2014
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 3/31/2011
Response Action Outcome: Not reported

Chemicals:
Chemical: C11 THRU C22 AROMATIC HYDROCARBONS
Quantity: 3150 milligrams per kilogram
Chemical: C9 THRU C18 ALIPHATIC HYDROCARBONS
Quantity: 7580 milligrams per kilogram
Chemical: C19 THRU C36 ALIPHATIC HYDROCARBONS
Quantity: 11000 milligrams per kilogram

21
East
1/2-1
0.955 mi.
5041 ft.

NO LOCATION AID **SHWS** **S116756067**
5-29 WATER STREET **LUST** **N/A**
AMESBURY, MA 01913 **RELEASE**

Relative:
Lower

Actual:
28 ft.

SHWS:
Release Tracking Number/Current Status: 3-0032310 / URAM
Release Town: AMESBURY
Notification Date: 08/04/2014
Category: 120 DY
Associated ID: Not reported
Current Status: **URAM**
Status Date: 08/11/2014
Phase: Not reported
Response Action Outcome: -
Oil Or Haz Material: Oil and Hazardous Material
Location Type: RIGHTOFWAY
Location Type: ROADWAY
Source: UST
Source: RTN'S
Source: 3-16715
Source: USTOTHER
Source: 3-19634

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: NAPHTHALENE
Quantity: 6.2 milligrams per kilogram

NO LOCATION AID (Continued) **S116756067**

Chemical: C5 THRU C8 ALIPHATIC HYDROCARBONS
Quantity: 660 milligrams per kilogram
Chemical: LEAD
Quantity: 880 milligrams per kilogram

Actions:
Action Type: BOL
Action Status: SHPFAC
Action Date: 10/8/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: SHPTMP
Action Date: 10/8/2014
Response Action Outcome: Not reported

Action Type: Utility-related Abatement Measure
Action Status: Completion Statement Received
Action Date: 12/2/2014
Response Action Outcome: Not reported

Action Type: Utility-related Abatement Measure
Action Status: Notification of URAM Received
Action Date: 8/11/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 8/12/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 8/26/2014
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 8/4/2014
Response Action Outcome: Not reported

Action Type: Utility-related Abatement Measure
Action Status: Notice of Intent to Conduct a URAM
Action Date: 8/4/2014
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: URAMLR
Action Date: 8/7/2014
Response Action Outcome: Not reported

Release Tracking Number/Current Status: 3-0032310 / URAM
Release Town: AMESBURY
Notification Date: 08/04/2014
Category: 120 DY
Associated ID: Not reported
Current Status: **URAM**

NO LOCATION AID (Continued) **S116756067**

Status Date:	08/11/2014
Phase:	Not reported
Response Action Outcome:	-
Oil Or Haz Material:	Oil and Hazardous Material
Location Type:	RIGHTOFWAY
Location Type:	ROADWAY
Source:	UST
Source:	RTN'S
Source:	3-16715
Source:	USTOTHER
Source:	3-19634

Click here to access the MA DEP site for this facility:

Chemicals:

Chemical:	NAPHTHALENE
Quantity:	6.2 milligrams per kilogram
Chemical:	C5 THRU C8 ALIPHATIC HYDROCARBONS
Quantity:	660 milligrams per kilogram
Chemical:	LEAD
Quantity:	880 milligrams per kilogram

Actions:

Action Type:	BOL
Action Status:	SHPFAC
Action Date:	10/8/2014
Response Action Outcome:	Not reported
Action Type:	BOL
Action Status:	SHPTMP
Action Date:	10/8/2014
Response Action Outcome:	Not reported
Action Type:	Utility-related Abatement Measure
Action Status:	Completion Statement Received
Action Date:	12/2/2014
Response Action Outcome:	Not reported
Action Type:	Utility-related Abatement Measure
Action Status:	Notification of URAM Received
Action Date:	8/11/2014
Response Action Outcome:	Not reported
Action Type:	BOL
Action Status:	Transmittal, Notice, or Notification Received
Action Date:	8/12/2014
Response Action Outcome:	Not reported
Action Type:	BOL
Action Status:	Transmittal, Notice, or Notification Received
Action Date:	8/26/2014
Response Action Outcome:	Not reported
Action Type:	Release Disposition
Action Status:	Reportable Release under MGL 21E
Action Date:	8/4/2014

NO LOCATION AID (Continued) **S116756067**

Response Action Outcome: Not reported

Action Type: Utility-related Abatement Measure
Action Status: Notice of Intent to Conduct a URAM
Action Date: 8/4/2014
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: URAMLR
Action Date: 8/7/2014
Response Action Outcome: Not reported

Release Tracking Number/Current Status: 3-0032310 / URAM
Release Town: AMESBURY
Notification Date: 08/04/2014
Category: 120 DY
Associated ID: Not reported
Current Status: **URAM**
Status Date: 08/11/2014
Phase: Not reported
Response Action Outcome: -
Oil Or Haz Material: Oil and Hazardous Material
Location Type: RIGHTOFWAY
Location Type: ROADWAY
Source: UST
Source: RTN'S
Source: 3-16715
Source: USTOTHER
Source: 3-19634

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: NAPHTHALENE
Quantity: 6.2 milligrams per kilogram
Chemical: C5 THRU C8 ALIPHATIC HYDROCARBONS
Quantity: 660 milligrams per kilogram
Chemical: LEAD
Quantity: 880 milligrams per kilogram

Actions:
Action Type: BOL
Action Status: SHPFAC
Action Date: 10/8/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: SHPTMP
Action Date: 10/8/2014
Response Action Outcome: Not reported

Action Type: Utility-related Abatement Measure
Action Status: Completion Statement Received
Action Date: 12/2/2014
Response Action Outcome: Not reported

NO LOCATION AID (Continued) **S116756067**

Action Type: Utility-related Abatement Measure
Action Status: Notification of URAM Received
Action Date: 8/11/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 8/12/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 8/26/2014
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 8/4/2014
Response Action Outcome: Not reported

Action Type: Utility-related Abatement Measure
Action Status: Notice of Intent to Conduct a URAM
Action Date: 8/4/2014
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: URAMLR
Action Date: 8/7/2014
Response Action Outcome: Not reported

LUST:

Facility:
Release Tracking Number/Current Status: 3-0032310 / URAM
Status Date: 08/11/2014
Source Type: UST
Release Town: AMESBURY
Notification Date: 08/04/2014
Category: 120 DY
Associated ID: Not reported
Phase: Not reported
Response Action Outcome: -
Oil Or Haz Material: Oil and Hazardous Material

Location Type: RIGHTOFWAY
Location Type: ROADWAY
Source: UST
Source: RTN'S
Source: 3-16715
Source: USTOTHER
Source: 3-19634

Click here to access the MA DEP site for this facility:

NO LOCATION AID (Continued) **S116756067**

Chemicals:
- Chemical: NAPHTHALENE
- Quantity: 6.2 milligrams per kilogram
- Chemical: C5 THRU C8 ALIPHATIC HYDROCARBONS
- Quantity: 660 milligrams per kilogram
- Chemical: LEAD
- Quantity: 880 milligrams per kilogram

Actions:
- Action Type: BOL
- Action Status: SHPFAC
- Action Date: 10/8/2014
- Response Action Outcome: Not reported

- Action Type: BOL
- Action Status: SHPTMP
- Action Date: 10/8/2014
- Response Action Outcome: Not reported

- Action Type: Utility-related Abatement Measure
- Action Status: Completion Statement Received
- Action Date: 12/2/2014
- Response Action Outcome: Not reported

- Action Type: Utility-related Abatement Measure
- Action Status: Notification of URAM Received
- Action Date: 8/11/2014
- Response Action Outcome: Not reported

- Action Type: BOL
- Action Status: Transmittal, Notice, or Notification Received
- Action Date: 8/12/2014
- Response Action Outcome: Not reported

- Action Type: BOL
- Action Status: Transmittal, Notice, or Notification Received
- Action Date: 8/26/2014
- Response Action Outcome: Not reported

- Action Type: Release Disposition
- Action Status: Reportable Release under MGL 21E
- Action Date: 8/4/2014
- Response Action Outcome: Not reported

- Action Type: Utility-related Abatement Measure
- Action Status: Notice of Intent to Conduct a URAM
- Action Date: 8/4/2014
- Response Action Outcome: Not reported

- Action Type: A Notice sent to a Potentially Responsible Party (PRP)
- Action Status: URAMLR
- Action Date: 8/7/2014
- Response Action Outcome: Not reported

Facility:
- Release Tracking Number/Current Status: 3-0032310 / URAM

NO LOCATION AID (Continued) **S116756067**

Status Date:	08/11/2014
Source Type:	USTOTHER
Release Town:	AMESBURY
Notification Date:	08/04/2014
Category:	120 DY
Associated ID:	Not reported
Phase:	Not reported
Response Action Outcome:	-
Oil Or Haz Material:	Oil and Hazardous Material
Location Type:	RIGHTOFWAY
Location Type:	ROADWAY
Source:	UST
Source:	RTN'S
Source:	3-16715
Source:	USTOTHER
Source:	3-19634

Click here to access the MA DEP site for this facility:

Chemicals:

Chemical:	NAPHTHALENE
Quantity:	6.2 milligrams per kilogram
Chemical:	C5 THRU C8 ALIPHATIC HYDROCARBONS
Quantity:	660 milligrams per kilogram
Chemical:	LEAD
Quantity:	880 milligrams per kilogram

Actions:

Action Type:	BOL
Action Status:	SHPFAC
Action Date:	10/8/2014
Response Action Outcome:	Not reported
Action Type:	BOL
Action Status:	SHPTMP
Action Date:	10/8/2014
Response Action Outcome:	Not reported
Action Type:	Utility-related Abatement Measure
Action Status:	Completion Statement Received
Action Date:	12/2/2014
Response Action Outcome:	Not reported
Action Type:	Utility-related Abatement Measure
Action Status:	Notification of URAM Received
Action Date:	8/11/2014
Response Action Outcome:	Not reported
Action Type:	BOL
Action Status:	Transmittal, Notice, or Notification Received
Action Date:	8/12/2014
Response Action Outcome:	Not reported
Action Type:	BOL

NO LOCATION AID (Continued) **S116756067**

Action Status: Transmittal, Notice, or Notification Received
Action Date: 8/26/2014
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 8/4/2014
Response Action Outcome: Not reported

Action Type: Utility-related Abatement Measure
Action Status: Notice of Intent to Conduct a URAM
Action Date: 8/4/2014
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: URAMLR
Action Date: 8/7/2014
Response Action Outcome: Not reported

Release:
Release Tracking Number/Current Status: 3-0032310 / URAM
Primary ID: Not reported
Official City: AMESBURY
Notification: 08/04/2014
Category: 120 DY
Status Date: 08/11/2014
Phase: Not reported
Response Action Outcome: -
Oil / Haz Material Type: Oil and Hazardous Material

Click here to access the MA DEP site for this facility:

Actions:
Action Type: BOL
Action Status: SHPFAC
Action Date: 10/8/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: SHPTMP
Action Date: 10/8/2014
Response Action Outcome: Not reported

Action Type: Utility-related Abatement Measure
Action Status: Completion Statement Received
Action Date: 12/2/2014
Response Action Outcome: Not reported

Action Type: Utility-related Abatement Measure
Action Status: Notification of URAM Received
Action Date: 8/11/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received

NO LOCATION AID (Continued) **S116756067**

Action Date: 8/12/2014
Response Action Outcome: Not reported

Action Type: BOL
Action Status: Transmittal, Notice, or Notification Received
Action Date: 8/26/2014
Response Action Outcome: Not reported

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 8/4/2014
Response Action Outcome: Not reported

Action Type: Utility-related Abatement Measure
Action Status: Notice of Intent to Conduct a URAM
Action Date: 8/4/2014
Response Action Outcome: Not reported

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: URAMLR
Action Date: 8/7/2014
Response Action Outcome: Not reported

Chemicals:
Chemical: NAPHTHALENE
Quantity: 6.2 milligrams per kilogram
Chemical: C5 THRU C8 ALIPHATIC HYDROCARBONS
Quantity: 660 milligrams per kilogram
Chemical: LEAD
Quantity: 880 milligrams per kilogram
Location Type: RIGHTOFWAY
Location Type: ROADWAY
Source: UST
Source: RTN'S
Source: 3-16715
Source: USTOTHER
Source: 3-19634

D22 **ABUTTING SUBSTATION** **SHWS** **S100828048**
East **MILL ST** **INST CONTROL** **N/A**
1/2-1 **AMESBURY, MA 01913** **RELEASE**
0.957 mi.
5055 ft. **Site 2 of 2 in cluster D**

Relative:
Lower

Actual:
16 ft.

SHWS:
Release Tracking Number/Current Status: 3-0014817 / RAO
Release Town: AMESBURY
Notification Date: 12/26/1996
Category: 120 DY
Associated ID: Not reported
Current Status: **Response Action Outcome**
Status Date: 12/26/1997
Phase: Not reported
Response Action Outcome: B2 - Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.
Oil Or Haz Material: Oil and Hazardous Material

ABUTTING SUBSTATION (Continued) **S100828048**

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: ARSENIC
Quantity: 63 milligrams per kilogram
Chemical: OIL
Quantity: 1000 milligrams per kilogram

Actions:
Action Type: RLFA
Action Status: FLDD1U
Action Date: 11/2/2006
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: Activity and Use Limitation
Action Status: Level II - Audit Inspection
Action Date: 11/2/2006
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: An activity type that is related to an Audit
Action Status: NAFNVD
Action Date: 11/22/2006
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 12/26/1996
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 12/26/1996
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: Activity and Use Limitation
Action Status: Transmittal, Notice, or Notification Received
Action Date: 12/26/1997
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 12/26/1997
Response Action Outcome: Remedial actions have not been conducted because a level of No

ABUTTING SUBSTATION (Continued) **S100828048**

Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: Response Action Outcome - RAO
Action Status: Fee Received - FMCRA Use Only
Action Date: 12/30/1997
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 3/7/1997
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: An activity type that is related to an Audit
Action Status: NOA
Action Date: 7/14/1999
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: Response Action Outcome - RAO
Action Status: Level I - Technical Screen Audit
Action Date: 7/17/2001
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: An activity type that is related to an Audit
Action Status: NAFNVD
Action Date: 7/17/2001
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: RLFA
Action Status: FLDRAN
Action Date: 8/5/1999
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

INST CONTROL:
Release Tracking Number: 3-0014817
Action Type: AUL
Action Stat: RECPT
Action Date: 12/26/1997
Response Action Outcome: B2 - Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Release Tracking Number: 3-0014817
Action Type: AUL

ABUTTING SUBSTATION (Continued) **S100828048**

Action Stat: SNAUDI
Action Date: 11/02/2006
Response Action Outcome: B2 - Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Release:
Release Tracking Number/Current Status: 3-0014817 / RAO
Primary ID: Not reported
Official City: AMESBURY
Notification: 12/26/1996
Category: 120 DY
Status Date: 12/26/1997
Phase: Not reported
Response Action Outcome: B2 - Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.
Oil / Haz Material Type: Oil and Hazardous Material

Click here to access the MA DEP site for this facility:

Actions:
Action Type: RLFA
Action Status: FLDD1U
Action Date: 11/2/2006
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: Activity and Use Limitation
Action Status: Level II - Audit Inspection
Action Date: 11/2/2006
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: An activity type that is related to an Audit
Action Status: NAFNVD
Action Date: 11/22/2006
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: Release Disposition
Action Status: Reportable Release under MGL 21E
Action Date: 12/26/1996
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: RNF
Action Status: Reportable Release under MGL 21E
Action Date: 12/26/1996
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

ABUTTING SUBSTATION (Continued) **S100828048**

Action Type: Activity and Use Limitation
Action Status: Transmittal, Notice, or Notification Received
Action Date: 12/26/1997
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: Response Action Outcome - RAO
Action Status: RAO Statement Received
Action Date: 12/26/1997
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: Response Action Outcome - RAO
Action Status: Fee Received - FMCRA Use Only
Action Date: 12/30/1997
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: A Notice sent to a Potentially Responsible Party (PRP)
Action Status: A MassDEP piece of correspondence was issued (approvals, NORs, etc.
Action Date: 3/7/1997
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: An activity type that is related to an Audit
Action Status: NOA
Action Date: 7/14/1999
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: Response Action Outcome - RAO
Action Status: Level I - Technical Screen Audit
Action Date: 7/17/2001
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: An activity type that is related to an Audit
Action Status: NAFNVD
Action Date: 7/17/2001
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

Action Type: RLFA
Action Status: FLDRAN
Action Date: 8/5/1999
Response Action Outcome: Remedial actions have not been conducted because a level of No Significant Risk exists, but that level is contingent upon one or more AULs that have been implemented.

ABUTTING SUBSTATION (Continued) **S100828048**

Chemicals:
Chemical: ARSENIC
Quantity: 63 milligrams per kilogram
Chemical: OIL
Quantity: 1000 milligrams per kilogram

23
East
1/2-1
0.970 mi.
5123 ft.

TRADER ALLEN TRUCK STOP **SHWS** **U001004131**
RTE 150 EXETER RD **RELEASE** **N/A**
AMESBURY, MA 01913

Relative:
Lower

Actual:
64 ft.

SHWS:
Release Tracking Number/Current Status: 3-0001604 / RAO
Release Town: AMESBURY
Notification Date: 10/15/1988
Category: NONE
Associated ID: Not reported
Current Status: **Response Action Outcome**
Status Date: 08/08/1995
Phase: Not reported
Response Action Outcome: -
Oil Or Haz Material: Not reported

Click here to access the MA DEP site for this facility:

Chemicals:
Chemical: UNKNOWN
Quantity: Not reported

Actions:
Action Type: Release Disposition
Action Status: Valid Transition Site
Action Date: 10/15/1988
Response Action Outcome: Not reported

Action Type: TREGS
Action Status: RAOEQ
Action Date: 8/8/1995
Response Action Outcome: Not reported

Release:
Release Tracking Number/Current Status: 3-0001604 / RAO
Primary ID: Not reported
Official City: AMESBURY
Notification: 10/15/1988
Category: NONE
Status Date: 08/08/1995
Phase: Not reported
Response Action Outcome: -
Oil / Haz Material Type: Not reported

Click here to access the MA DEP site for this facility:

TRADER ALLEN TRUCK STOP (Continued) **U001004131**

Actions:

Action Type:	Release Disposition
Action Status:	Valid Transition Site
Action Date:	10/15/1988
Response Action Outcome:	Not reported

Action Type:	TREGS
Action Status:	RAOEQ
Action Date:	8/8/1995
Response Action Outcome:	Not reported

Chemicals:

Chemical:	UNKNOWN
Quantity:	Not reported

Count: 5 records. ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
AMESBURY	S103811846	HILLSIDE SUBSTATION	ALLENCLAIR DR	01913	SHWS, RELEASE
AMESBURY	S117552808	TOWN PARK	FRIEND STREET	01913	SHWS, RELEASE
AMESBURY	S112288399	MAIN STREET - EAST OF I-95 OVERPAS	MAIN ST	01913	SHWS, RELEASE
AMESBURY	S108962784	KEYSPAN ENERGY DELIVERY OF NEW ENG	WATER ST		SHWS, RELEASE, ENF
AMESBURY	S109029415	NO LOCATION AID	WATER ST	01913	SHWS, RELEASE

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 23

Source: EPA
Telephone: N/A
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 23

Source: EPA
Telephone: N/A
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 23

Source: EPA
Telephone: N/A
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 92

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 07/06/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 05/18/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 23

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 05/18/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 23

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: (888) 372-7341
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: (888) 372-7341
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: (888) 372-7341
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: (888) 372-7341
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/14/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 07/16/2018
Next Scheduled EDR Contact: 11/26/2018
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 02/13/2018
Date Data Arrived at EDR: 02/27/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/29/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 02/13/2018
Date Data Arrived at EDR: 02/27/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/29/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 03/19/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 73

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 06/27/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

SHWS: Site Transition List

Contains information on releases of oil and hazardous materials that have been reported to DEP.

Date of Government Version: 04/18/2018
Date Data Arrived at EDR: 07/11/2018
Date Made Active in Reports: 08/14/2018
Number of Days to Update: 34

Source: Department of Environmental Protection
Telephone: 617-292-5990
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

LF PROFILES: Landfill Profiles Listing

This spreadsheet describes landfills that have actively accepted waste or have closed under MassDEP Solid Waste Regulations first adopted in 1971 (310 CMR 16.00 and 310 CMR 19.00). The list does not include landfills that closed before 1971 (and which never had a MassDEP permit or approval), or for which agency data is incomplete.

Date of Government Version: 07/01/2015
Date Data Arrived at EDR: 10/27/2015
Date Made Active in Reports: 12/14/2015
Number of Days to Update: 48

Source: Department of Environmental Protection
Telephone: 617-292-5868
Last EDR Contact: 07/06/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Varies

SWF/LF: Solid Waste Facility Database/Transfer Stations

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/01/2018
Date Data Arrived at EDR: 07/05/2018
Date Made Active in Reports: 08/14/2018
Number of Days to Update: 40

Source: Department of Environmental Protection
Telephone: 617-292-5989
Last EDR Contact: 07/05/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Annually

State and tribal leaking storage tank lists

LUST: Leaking Underground Storage Tank Listing

Sites within the Leaking Underground Storage Tank Listing that have a UST listed as its source.

Date of Government Version: 04/18/2018
Date Data Arrived at EDR: 07/11/2018
Date Made Active in Reports: 08/14/2018
Number of Days to Update: 34

Source: Department of Environmental Protection
Telephone: 617-292-5990
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Quarterly

LAST: Leaking Aboveground Storage Tank Sites
Sites within the Releases Database that have a AST listed as its source.

Date of Government Version: 04/18/2018
Date Data Arrived at EDR: 07/11/2018
Date Made Active in Reports: 08/14/2018
Number of Days to Update: 34
Source: Department of Environmental Protection
Telephone: 617-292-5500
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Quarterly

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 04/25/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 04/24/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 04/01/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 05/08/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 04/13/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 04/10/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 05/15/2017
Date Data Arrived at EDR: 05/30/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 136
Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Varies

UST: Summary Listing of all the Tanks Registered in the State of Massachusetts
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 04/18/2018
Date Data Arrived at EDR: 05/02/2018
Date Made Active in Reports: 05/23/2018
Number of Days to Update: 21
Source: Department of Fire Services, Office of the Public Safety
Telephone: 617-556-1035
Last EDR Contact: 07/12/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Quarterly

AST: Aboveground Storage Tank Database
Registered Aboveground Storage Tanks.

Date of Government Version: 10/22/2009
Date Data Arrived at EDR: 10/28/2009
Date Made Active in Reports: 11/06/2009
Number of Days to Update: 9
Source: Department of Public Safety
Telephone: 617-556-1035
Last EDR Contact: 07/12/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Quarterly

AST 2: Aboveground Storage Tanks
Aboveground storage tanks

Date of Government Version: 07/18/2018
Date Data Arrived at EDR: 07/24/2018
Date Made Active in Reports: 08/14/2018
Number of Days to Update: 21
Source: Department of Fire Services
Telephone: 978-567-3181
Last EDR Contact: 07/12/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 04/25/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 04/10/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 04/24/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 04/01/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 04/13/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 05/08/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

State and tribal institutional control / engineering control registries

INST CONTROL: Sites With Activity and Use Limitation

Activity and Use Limitations establish limits and conditions on the future use of contaminated property, and therefore allow cleanups to be tailored to these uses.

Date of Government Version: 04/18/2018
Date Data Arrived at EDR: 07/11/2018
Date Made Active in Reports: 08/14/2018
Number of Days to Update: 34

Source: Department of Environmental Protection
Telephone: 617-292-5990
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Quarterly

State and tribal voluntary cleanup sites

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 06/22/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

State and tribal Brownfields sites

BROWNFIELDS 2: Potential Brownfields Listing

A listing of potential brownfields site locations in the state.

Date of Government Version: 05/22/2017
Date Data Arrived at EDR: 08/03/2017
Date Made Active in Reports: 09/22/2017
Number of Days to Update: 50

Source: Department of Environmental Protection
Telephone: 617-556-1007
Last EDR Contact: 05/04/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Varies

BROWNFIELDS: Completed Brownfields Covenants Listing

Under Massachusetts law, M.G.L. c. 21E is the statute that governs the cleanup of releases of oil and/or hazardous material to the environment. The Brownfields Act of 1998 amended M.G.L. c. 21E by establishing significant liability relief and financial incentives to spur the redevelopment of brownfields, while ensuring that the Commonwealth's environmental standards are met. Most brownfields are redeveloped with the benefit of liability protections that operate automatically under M.G.L. c. 21E.

Date of Government Version: 04/05/2017
Date Data Arrived at EDR: 08/03/2017
Date Made Active in Reports: 10/10/2017
Number of Days to Update: 68

Source: Office of the Attorney General
Telephone: 617-963-2423
Last EDR Contact: 05/04/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Annually

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 03/19/2018
Date Data Arrived at EDR: 03/21/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 06/20/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 07/30/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 07/17/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land

A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 08/03/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 02/22/2018
Date Data Arrived at EDR: 03/01/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 71

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 02/22/2018
Date Data Arrived at EDR: 03/01/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 71

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Quarterly

Local Land Records

LIENS: Liens Information Listing

A listing of environmental liens.

Date of Government Version: 03/07/2018
Date Data Arrived at EDR: 03/09/2018
Date Made Active in Reports: 06/21/2018
Number of Days to Update: 104

Source: Department of Environmental Protection
Telephone: 617-292-5628
Last EDR Contact: 05/17/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 30

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 03/26/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 73

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 03/27/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

RELEASE: Reportable Releases

Contains information on all releases of oil and hazardous materials that have been reported to DEP

Date of Government Version: 04/18/2018
Date Data Arrived at EDR: 07/11/2018
Date Made Active in Reports: 08/14/2018
Number of Days to Update: 34

Source: Department of Environmental Protection
Telephone: 617-292-5990
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Quarterly

MA SPILLS: Historical Spill List

The Spills Database was the release notification tracking system for spills that occurred prior to October 1, 1993. This information should be considered to be primarily of historical interest since all of the listed spills have either been cleaned up or assigned new tracking numbers and moved to the Reportable Releases or Sites Transition List databases.

Date of Government Version: 09/30/1993
Date Data Arrived at EDR: 12/03/2003
Date Made Active in Reports: 12/31/2003
Number of Days to Update: 28

Source: Department of Environmental Protection
Telephone: 617-292-5720
Last EDR Contact: 12/03/2003
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 12/11/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/08/2013
Number of Days to Update: 36

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SPILLS 80: SPILLS80 data from FirstSearch

Spills 80 includes those spill and release records available from FirstSearch databases prior to 1990. Typically, they may include chemical, oil and/or hazardous substance spills recorded before 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 80.

Date of Government Version: 03/10/1998
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 03/05/2013
Number of Days to Update: 61

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: (888) 372-7341
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015
Date Data Arrived at EDR: 07/08/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 97

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 05/25/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 05/15/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 87

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 06/27/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 08/03/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 05/08/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 08/10/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 06/21/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 198

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 06/22/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 01/10/2018
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 2

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 05/25/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 30

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 11/02/2017
Date Data Arrived at EDR: 11/17/2017
Date Made Active in Reports: 12/08/2017
Number of Days to Update: 21

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 07/20/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 06/01/2017
Date Data Arrived at EDR: 06/09/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 126

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 07/09/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 08/30/2016
Date Data Arrived at EDR: 09/08/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 43

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 07/23/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 06/07/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 06/04/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 05/24/2017
Date Data Arrived at EDR: 11/30/2017
Date Made Active in Reports: 12/15/2017
Number of Days to Update: 15
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 04/03/2018
Date Data Arrived at EDR: 04/05/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 85
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 07/05/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data
Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42
Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 03/31/2018
Date Data Arrived at EDR: 04/16/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 74

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 07/09/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 09/28/2017
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 12/23/2016
Date Data Arrived at EDR: 12/27/2016
Date Made Active in Reports: 02/17/2017
Number of Days to Update: 52

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 08/01/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 06/23/2017
Date Data Arrived at EDR: 10/11/2017
Date Made Active in Reports: 11/03/2017
Number of Days to Update: 23

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 30

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 05/03/2018
Date Data Arrived at EDR: 05/31/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 29

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 05/31/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 03/08/2018
Date Data Arrived at EDR: 03/13/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 87

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 06/20/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 02/21/2018
Date Data Arrived at EDR: 02/23/2018
Date Made Active in Reports: 03/23/2018
Number of Days to Update: 28

Source: EPA
Telephone: (617) 918-1111
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 10/31/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 73

Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Varies

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 02/25/2018
Date Data Arrived at EDR: 03/17/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 01/04/2018
Date Data Arrived at EDR: 01/19/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 84

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 06/01/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 02/20/2018
Date Data Arrived at EDR: 02/21/2018
Date Made Active in Reports: 03/23/2018
Number of Days to Update: 30

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 05/23/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Quarterly

AIRS: Permitted Facilities Listing
A listing of Air Quality permit applications.

Date of Government Version: 04/13/2018
Date Data Arrived at EDR: 04/17/2018
Date Made Active in Reports: 06/15/2018
Number of Days to Update: 59

Source: Department of Environmental Protection
Telephone: 617-292-5789
Last EDR Contact: 07/12/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Varies

ASBESTOS: Asbestos Notification Listing
Asbestos sites

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/15/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 14

Source: Department of Environmental Protection
Telephone: 617-292-5982
Last EDR Contact: 05/17/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

DRYCLEANERS: Regulated Drycleaning Facilities
A listing of Department of Environmental Protection regulated drycleaning facilities that use perchloroethylene under the Environmental Results Program.

Date of Government Version: 04/18/2018
Date Data Arrived at EDR: 05/04/2018
Date Made Active in Reports: 05/23/2018
Number of Days to Update: 19

Source: Department of Environmental Protection
Telephone: 617-292-5633
Last EDR Contact: 07/25/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Varies

ENFORCEMENT: Enforcement Action Cases
A listing of enforcement action cases tracked by Department of Environmental Protection programs, including Solid Waste and Hazardous Waste.

Date of Government Version: 07/25/2018
Date Data Arrived at EDR: 07/27/2018
Date Made Active in Reports: 08/14/2018
Number of Days to Update: 18

Source: Department of Environmental Quality
Telephone: 617-292-5979
Last EDR Contact: 07/25/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing
Information for hazardous waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 12/01/2010
Date Data Arrived at EDR: 12/23/2010
Date Made Active in Reports: 02/03/2011
Number of Days to Update: 42

Source: Department of Environmental Protection
Telephone: 617-292-5970
Last EDR Contact: 06/07/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

Financial Assurance 2: Financial Assurance Information Listing
A listing of financial assurance information for underground storage tanks. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 10/21/2011
Date Data Arrived at EDR: 10/25/2011
Date Made Active in Reports: 11/18/2011
Number of Days to Update: 24

Source: Office of State Fire Marshal
Telephone: 978-567-3100
Last EDR Contact: 07/12/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Quarterly

Financial Assurance 3: Financial Assurance Information listing

Information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay

Date of Government Version: 01/16/2018
Date Data Arrived at EDR: 04/17/2018
Date Made Active in Reports: 06/15/2018
Number of Days to Update: 59

Source: Department of Environmental Protection
Telephone: 617-292-5970
Last EDR Contact: 07/05/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Varies

GWDP: Ground Water Discharge Permits

The Ground Water Discharge Permits datalayer (formerly known as Groundwater Discharge Points) is a statewide point dataset containing approximate locations of permitted discharges to groundwater.

Date of Government Version: 01/18/2018
Date Data Arrived at EDR: 05/04/2018
Date Made Active in Reports: 05/23/2018
Number of Days to Update: 19

Source: MassGIS
Telephone: 617-556-1150
Last EDR Contact: 08/03/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

HW GEN: List of Massachusetts Hazardous Waste Generators

Permanent generator identification numbers for all Massachusetts generators of hazardous waste and waste oil that have registered with or notified MassDEP of their hazardous waste activities.

Date of Government Version: 06/04/2018
Date Data Arrived at EDR: 06/27/2018
Date Made Active in Reports: 08/14/2018
Number of Days to Update: 48

Source: Department of Environmental Protection
Telephone: 617-292-5500
Last EDR Contact: 06/27/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Semi-Annually

MERCURY: Mercury Product Recyling Drop-Off Locations Listing

A listing of locations, collecting and recycling for mercury-added products. Mercury is toxic to the human nervous system, as well as fish and animals. Mercury can enter the body either through skin absorption or through inhalation of mercury vapors. At room temperature, small beads of mercury will vaporize.

Date of Government Version: 05/07/2018
Date Data Arrived at EDR: 05/25/2018
Date Made Active in Reports: 06/25/2018
Number of Days to Update: 31

Source: Department of Environmental Protection
Telephone: 617-292-5632
Last EDR Contact: 05/17/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

NPDES: NPDES Permit Listing

Listing of treatment plants in Massachusetts that hold permits to discharge to groundwater.

Date of Government Version: 02/12/2018
Date Data Arrived at EDR: 02/14/2018
Date Made Active in Reports: 04/09/2018
Number of Days to Update: 54

Source: Department of Environmental Protection
Telephone: 508-767-2781
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 11/26/2018
Data Release Frequency: Varies

TIER 2: Tier 2 Information Listing

A listing of facilities which store or manufacture hazardous materials and submit a chemical inventory report

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 05/17/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 43

Source: Massachusetts Emergency Management Agency
Telephone: 508-820-2019
Last EDR Contact: 07/12/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Annually

TSD: TSD Facility
List of Licensed Hazardous Waste Treatment, Storage Disposal Facilities (TSDFs) in Massachusetts.

Date of Government Version: 06/04/2018
Date Data Arrived at EDR: 06/29/2018
Date Made Active in Reports: 08/14/2018
Number of Days to Update: 46

Source: Department of Environmental Protection
Telephone: 617-292-5580
Last EDR Contact: 06/25/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations
EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners
EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List

The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environmental Protection in Massachusetts.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/24/2013
Number of Days to Update: 176

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environmental Protection in Massachusetts.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/24/2013
Number of Days to Update: 176

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 01/03/2018
Date Data Arrived at EDR: 02/14/2018
Date Made Active in Reports: 03/22/2018
Number of Days to Update: 36

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 11/26/2018
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 07/13/2018
Date Made Active in Reports: 08/01/2018
Number of Days to Update: 19

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 04/30/2018
Date Data Arrived at EDR: 05/03/2018
Date Made Active in Reports: 06/07/2018
Number of Days to Update: 35

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 08/01/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Quarterly

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 07/25/2017
Date Made Active in Reports: 09/25/2017
Number of Days to Update: 62

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 07/12/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 02/23/2018
Date Made Active in Reports: 04/09/2018
Number of Days to Update: 45

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 05/21/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Annually

VT MANIFEST: Hazardous Waste Manifest Data
Hazardous waste manifest information.

Date of Government Version: 05/16/2018
Date Data Arrived at EDR: 05/23/2018
Date Made Active in Reports: 07/03/2018
Number of Days to Update: 41

Source: Department of Environmental Conservation
Telephone: 802-241-3443
Last EDR Contact: 07/16/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 06/15/2018
Date Made Active in Reports: 07/09/2018
Number of Days to Update: 24

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 06/11/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: PennWell Corporation
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data
Source: PennWell Corporation
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: MassDEP
Telephone: 617-292-5907

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

CASHMAN ELEMENTARY SCHOOL
193 LIONS MOUTH RD
AMESBURY, MA 01913

TARGET PROPERTY COORDINATES

Latitude (North):	42.857239 - 42° 51' 26.06''
Longitude (West):	70.948354 - 70° 56' 54.07''
Universal Tranverse Mercator:	Zone 19
UTM X (Meters):	340818.9
UTM Y (Meters):	4746588.0
Elevation:	105 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5644860 NEWBURYPORT WEST, MA
Version Date:	2012

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

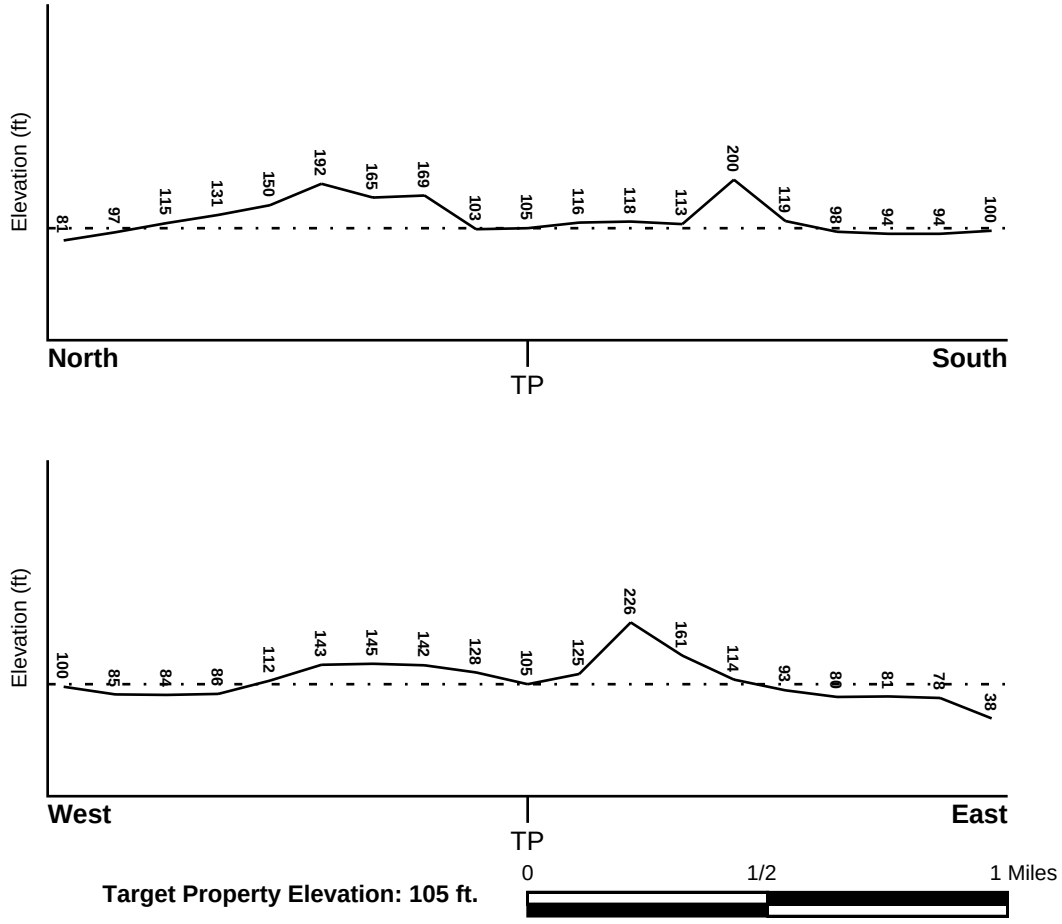
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General SW

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
33015C0602E	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
25009C0106F	FEMA FIRM Flood data
25009C0104F	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
NEWBURYPORT WEST	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

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GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

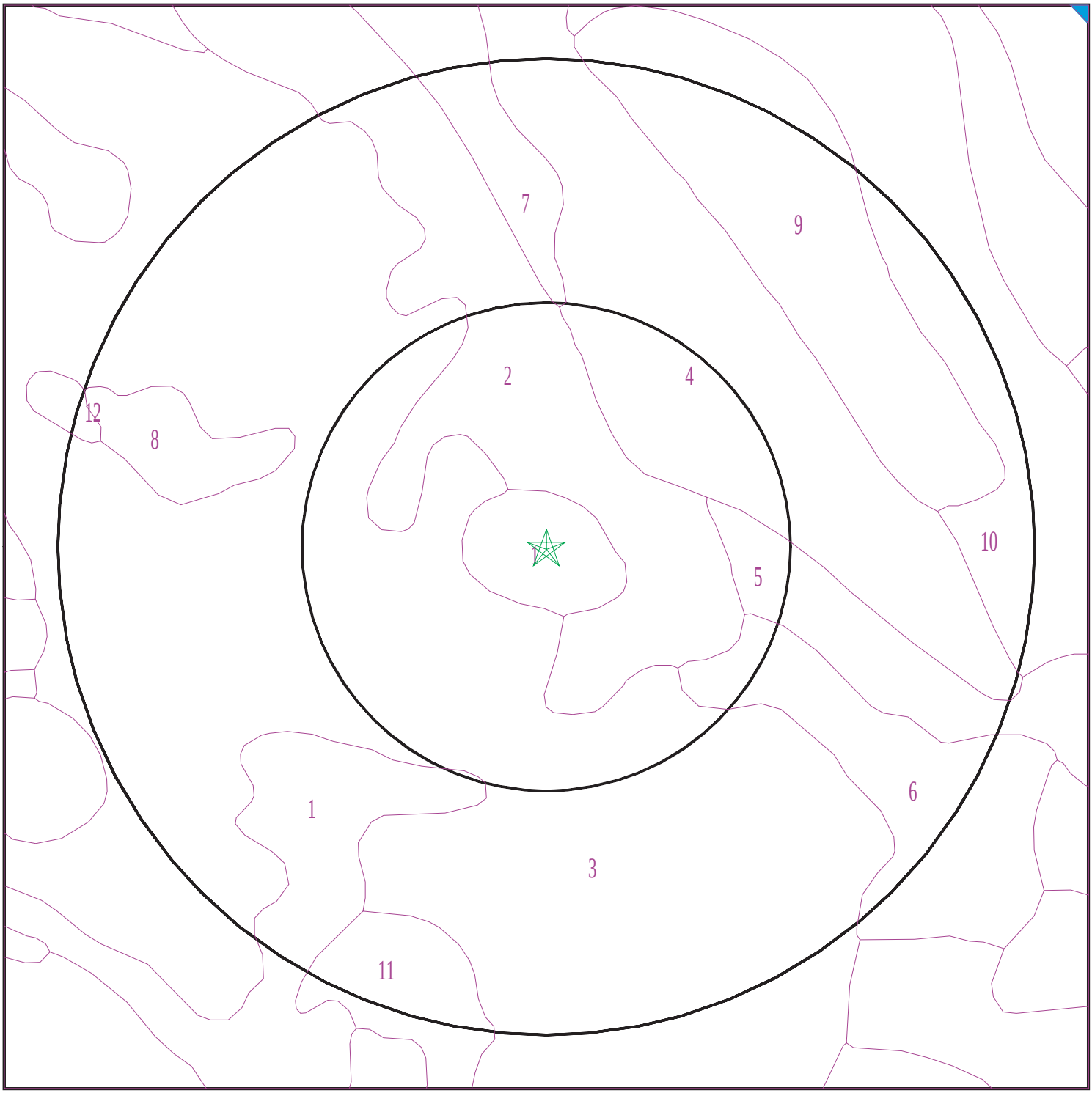
Era:	Paleozoic
System:	Ordovian
Series:	Lower Paleozoic granitic rocks
Code:	Pzg1 *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Plutonic and Intrusive Rocks

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 5397483.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	Cashman Elementary School	CLIENT:	ECMS, Inc.
ADDRESS:	193 Lions Mouth Rd Amesbury MA 01913	CONTACT:	Kevin Kavanaugh
		INQUIRY #:	5397483.2s
LAT/LONG:	42.857239 / 70.948354	DATE:	August 17, 2018 1:50 pm

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DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Charlton

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	3 inches	fine sandy loam	Not reported	Not reported	Max: 42.34 Min: 4.23	Max: 6 Min: 4.5
2	3 inches	27 inches	gravelly fine sandy loam	Not reported	Not reported	Max: 42.34 Min: 4.23	Max: 6 Min: 4.5
3	27 inches	59 inches	gravelly fine sandy loam	Not reported	Not reported	Max: 42.34 Min: 4.23	Max: 6 Min: 4.5

Soil Map ID: 2

Soil Component Name: Leicester

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Poorly drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 23 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	5 inches	fine sandy loam	Not reported	Not reported	Max: 141.14 Min: 4.23	Max: 5.5 Min: 4.5
2	5 inches	27 inches	fine sandy loam	Not reported	Not reported	Max: 141.14 Min: 4.23	Max: 5.5 Min: 4.5
3	27 inches	59 inches	gravelly fine sandy loam	Not reported	Not reported	Max: 141.14 Min: 4.23	Max: 5.5 Min: 4.5

Soil Map ID: 3

Soil Component Name: Charlton

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 75 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	3 inches	fine sandy loam	Not reported	Not reported	Max: 42.34 Min: 4.23	Max: 6 Min: 4.5

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
2	3 inches	27 inches	gravelly fine sandy loam	Not reported	Not reported	Max: 42.34 Min: 4.23	Max: 6 Min: 4.5
3	27 inches	59 inches	gravelly fine sandy loam	Not reported	Not reported	Max: 42.34 Min: 4.23	Max: 6 Min: 4.5

Soil Map ID: 4

Soil Component Name: Paxton

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	3 inches	fine sandy loam	Not reported	Not reported	Max: 1.41 Min: 0	Max: 6 Min: 4.5
2	3 inches	20 inches	fine sandy loam	Not reported	Not reported	Max: 1.41 Min: 0	Max: 6 Min: 4.5
3	20 inches	59 inches	gravelly fine sandy loam	Not reported	Not reported	Max: 1.41 Min: 0	Max: 6 Min: 4.5

Soil Map ID: 5

Soil Component Name: Charlton

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	3 inches	fine sandy loam	Not reported	Not reported	Max: 42.34 Min: 4.23	Max: 6 Min: 4.5
2	3 inches	27 inches	gravelly fine sandy loam	Not reported	Not reported	Max: 42.34 Min: 4.23	Max: 6 Min: 4.5
3	27 inches	59 inches	gravelly fine sandy loam	Not reported	Not reported	Max: 42.34 Min: 4.23	Max: 6 Min: 4.5

Soil Map ID: 6

Soil Component Name: Sutton

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Moderately well drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 75 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	fine sandy loam	Not reported	Not reported	Max: 42.34 Min: 4.23	Max: 6 Min: 4.5

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
2	9 inches	25 inches	fine sandy loam	Not reported	Not reported	Max: 42.34 Min: 4.23	Max: 6 Min: 4.5
3	25 inches	59 inches	gravelly fine sandy loam	Not reported	Not reported	Max: 42.34 Min: 4.23	Max: 6 Min: 4.5

Soil Map ID: 7

Soil Component Name: Woodbridge

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Moderately well drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 68 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	fine sandy loam	Not reported	Not reported	Max: 1.41 Min: 0	Max: 6 Min: 4.5
2	9 inches	25 inches	fine sandy loam	Not reported	Not reported	Max: 1.41 Min: 0	Max: 6 Min: 4.5
3	25 inches	59 inches	fine sandy loam	Not reported	Not reported	Max: 1.41 Min: 0	Max: 6 Min: 4.5

Soil Map ID: 8

Soil Component Name: Ridgebury

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Poorly drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 23 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	fine sandy loam	Not reported	Not reported	Max: 1.41 Min: 0	Max: 6.5 Min: 4.5
2	9 inches	18 inches	fine sandy loam	Not reported	Not reported	Max: 1.41 Min: 0	Max: 6.5 Min: 4.5
3	18 inches	59 inches	fine sandy loam	Not reported	Not reported	Max: 1.41 Min: 0	Max: 6.5 Min: 4.5

Soil Map ID: 9

Soil Component Name: Paxton

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	5 inches	fine sandy loam	Not reported	Not reported	Max: 1.41 Min: 0	Max: 6 Min: 4.5
2	5 inches	20 inches	fine sandy loam	Not reported	Not reported	Max: 1.41 Min: 0	Max: 6 Min: 4.5

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
3	20 inches	59 inches	gravelly fine sandy loam	Not reported	Not reported	Max: 1.41 Min: 0	Max: 6 Min: 4.5

Soil Map ID: 10

Soil Component Name: Paxton

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 68 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	3 inches	fine sandy loam	Not reported	Not reported	Max: 1.41 Min: 0	Max: 6 Min: 4.5
2	3 inches	20 inches	fine sandy loam	Not reported	Not reported	Max: 1.41 Min: 0	Max: 6 Min: 4.5
3	20 inches	59 inches	gravelly fine sandy loam	Not reported	Not reported	Max: 1.41 Min: 0	Max: 6 Min: 4.5

Soil Map ID: 11

Soil Component Name: Sudbury

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Moderately well drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 60 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	3 inches	fine sandy loam	Not reported	Not reported	Max: 141.14 Min: 42.34	Max: 6 Min: 3.6
2	3 inches	20 inches	sandy loam	Not reported	Not reported	Max: 141.14 Min: 42.34	Max: 6 Min: 3.6
3	20 inches	25 inches	loamy sand	Not reported	Not reported	Max: 141.14 Min: 42.34	Max: 6 Min: 3.6
4	25 inches	59 inches	stratified gravel to sand	Not reported	Not reported	Max: 141.14 Min: 42.34	Max: 6 Min: 3.6

Soil Map ID: 12

Soil Component Name: Water

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class:
Hydric Status: Unknown

Corrosion Potential - Uncoated Steel: Not Reported

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

No Layer Information available.

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	USGS40000481020	1/4 - 1/2 Mile West
2	USGS40000481004	1/4 - 1/2 Mile SSE
3	USGS40000481050	1/2 - 1 Mile NNW
4	USGS40000481009	1/2 - 1 Mile WSW
5	USGS40000481025	1/2 - 1 Mile WNW
8	USGS40000480972	1/2 - 1 Mile SSE

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

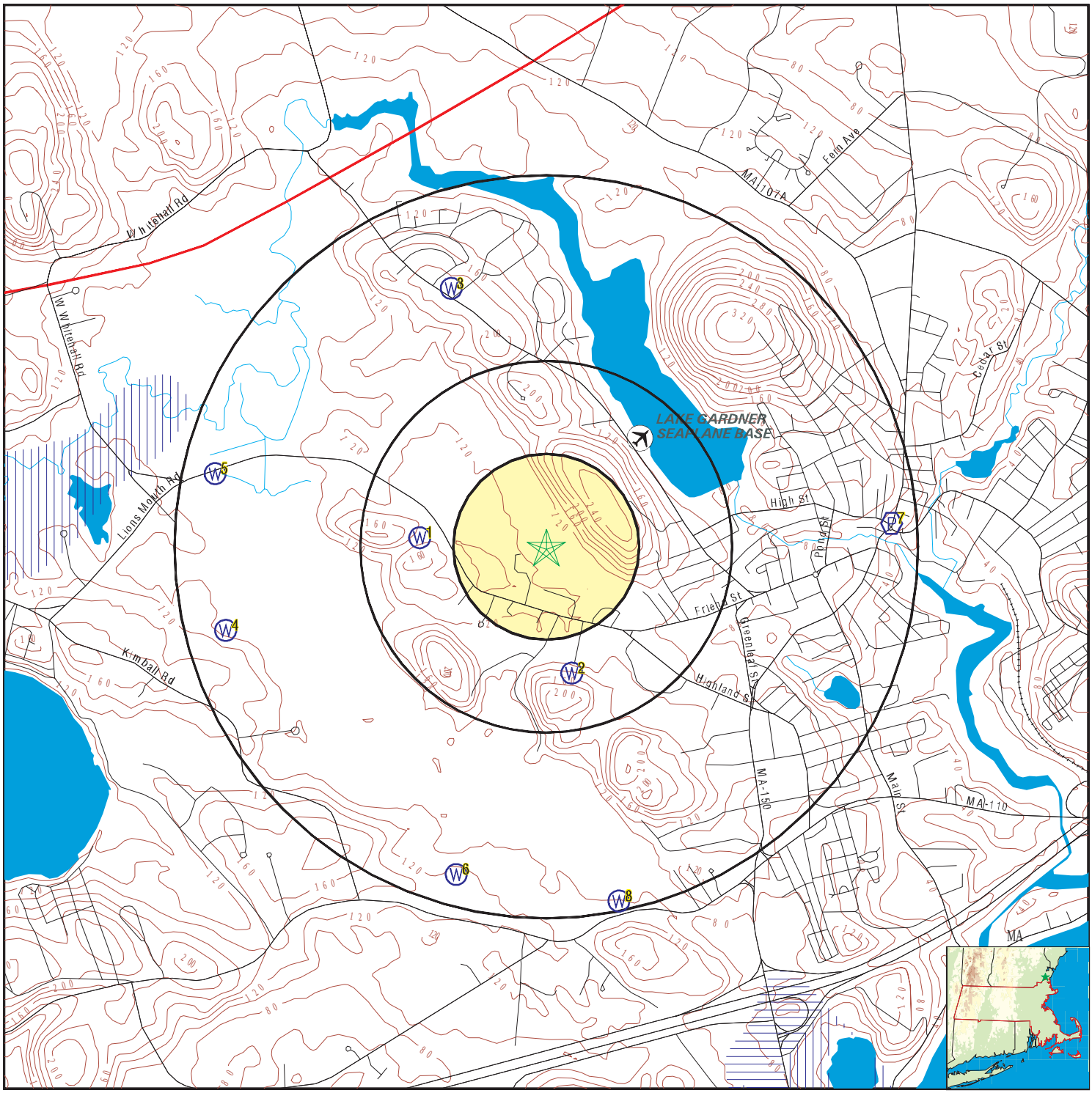
MAP ID	WELL ID	LOCATION FROM TP
7	MA3007004	1/2 - 1 Mile East

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
6	MA8000000001671	1/2 - 1 Mile SSW

PHYSICAL SETTING SOURCE MAP - 5397483.2s



- County Boundary
- Major Roads
- Contour Lines
- Airports
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- Potentially Productive Aquifers
- Not Potentially Productive Aquifers
- DEP Approved Zone IIs
- EPA Designated Sole Src. Aq.

SITE NAME:	Cashman Elementary School	CLIENT:	ECMS, Inc.
ADDRESS:	193 Lions Mouth Rd Amesbury MA 01913	CONTACT:	Kevin Kavanaugh
LAT/LONG:	42.857239 / 70.948354	INQUIRY #:	5397483.2s
		DATE:	August 17, 2018 1:50 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

1
West
1/4 - 1/2 Mile
Higher

FED USGS **USGS40000481020**

Organization ID:	USGS-MA		
Organization Name:	USGS Massachusetts Water Science Center		
Monitor Location:	MA-AHW 19	Type:	Well
Description:	Not Reported	HUC:	01070002
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	1945
Well Depth:	165	Well Depth Units:	ft
Well Hole Depth:	Not Reported	Well Hole Depth Units:	Not Reported

Ground water levels,Number of Measurements:	1	Level reading date:	1963-06-01
Feet below surface:	22.00	Feet to sea level:	Not Reported
Note:	Not Reported		

2
SSE
1/4 - 1/2 Mile
Higher

FED USGS **USGS40000481004**

Organization ID:	USGS-MA		
Organization Name:	USGS Massachusetts Water Science Center		
Monitor Location:	MA-AHW 18	Type:	Well
Description:	Not Reported	HUC:	01070002
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	1920
Well Depth:	14	Well Depth Units:	ft
Well Hole Depth:	Not Reported	Well Hole Depth Units:	Not Reported

Ground water levels,Number of Measurements:	1	Level reading date:	1963-06-01
Feet below surface:	10.00	Feet to sea level:	Not Reported
Note:	Not Reported		

3
NNW
1/2 - 1 Mile
Higher

FED USGS **USGS40000481050**

Organization ID:	USGS-MA		
Organization Name:	USGS Massachusetts Water Science Center		
Monitor Location:	MA-AHW 181	Type:	Well
Description:	Not Reported	HUC:	01070002
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	1960
Well Depth:	13	Well Depth Units:	ft
Well Hole Depth:	Not Reported	Well Hole Depth Units:	Not Reported

Ground water levels,Number of Measurements:	1	Level reading date:	1960-07-01
Feet below surface:	8.00	Feet to sea level:	Not Reported
Note:	Not Reported		

4
WSW **FED USGS** **USGS40000481009**
1/2 - 1 Mile
Lower

Organization ID:	USGS-MA		
Organization Name:	USGS Massachusetts Water Science Center		
Monitor Location:	MA-AHW 182	Type:	Well
Description:	Not Reported	HUC:	01070002
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	1924
Well Depth:	61	Well Depth Units:	ft
Well Hole Depth:	Not Reported	Well Hole Depth Units:	Not Reported

---

5
WNW **FED USGS** **USGS40000481025**
1/2 - 1 Mile
Lower

Organization ID:	USGS-MA		
Organization Name:	USGS Massachusetts Water Science Center		
Monitor Location:	MA-AHA 10	Type:	Well
Description:	Not Reported	HUC:	01070002
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	1963
Well Depth:	56	Well Depth Units:	ft
Well Hole Depth:	Not Reported	Well Hole Depth Units:	Not Reported

Ground water levels,Number of Measurements:	1	Level reading date:	1963-10-01
Feet below surface:	7.00	Feet to sea level:	Not Reported
Note:	Not Reported		

6
SSW **MA WELLS** **MA8000000001671**
1/2 - 1 Mile
Higher

Fid:	1670	Fac name:	MACLELLAN AMESBURY
Address:	91 HAVERHILL RD	Town:	AMESBURY
Region:	3	Rtn:	Not Reported
Hw id:	Not Reported	Sw id:	Not Reported
Sseis id:	0	Npdes id:	Not Reported
Air:	Not Reported	Gwd:	Not Reported
Hwr:	Not Reported	Lqg ma:	Not Reported
Lqg rcra:	Not Reported	Lqtu:	Y
Tsdf:	Not Reported	Swd:	Not Reported
Fac id:	387676	Source id:	Not Reported
Site name:	Not Reported	Latitude:	0
Longitude:	0	Type:	Not Reported

Zii num:	0	Pws id:	Not Reported
Site id:	MA8000000001671		
Objectid:	806	L base:	DOQ
L acc est:	100	L type:	CF
L meth:	PHO	L src 1:	AP_PC
L src 2:	AP_DOQ	L src 3:	Not Reported
Point x:	244706.37664507	Point y:	955014.72438745
Ustid:	0.	L date:	21-NOV-06
L src 1 da:	Not Reported	L src 2 da:	Not Reported
L src 3 da:	Not Reported	Fac id:	387676.

7
East **FRDS PWS** **MA3007004**
1/2 - 1 Mile
Lower

Epa region:	01	State:	MA
Pwsid:	MA3007004	Pwsname:	CAMP KENT
Cityserved:	Not Reported	Stateserved:	MA
Zipserved:	Not Reported	Fipscounty:	25009
Status:	Closed	Retpopsrvd:	25
Pwssvcconn:	1	Psource longname:	Groundwater
Pwstype:	TNCWS	Owner:	Private
Contact:	CAMP KENT	Contactorgname:	Not Reported
Contactphone:	Not Reported	Contactaddress1:	SOUTHAMPTON RD
Contactaddress2:	Not Reported	Contactcity:	AMESBURY
Contactstate:	MA	Contactzip:	019130000
Pwsactivitycode:	I		
PWS ID:	MA3007004	PWS type:	Mailing
PWS name:	CAMP KENT	PWS address:	SOUTHAMPTON ROAD
PWS city:	AMESBURY	PWS state:	MA
PWS zip:	01913	PWS ID:	MA3007004
Activity status:	Active	Date system activated:	9304
Date system deactivated:	Not Reported	Retail population:	00000025
System name:	CAMP KENT	System address:	SOUTHAMPTON ROAD
System city:	AMESBURY	System state:	MA
System zip:	01913		
Population served:	Under 101 Persons	Treatment:	Untreated
Latitude:	425129	Longitude:	0705550

8
SSE **FED USGS** **USGS40000480972**
1/2 - 1 Mile
Lower

Organization ID:	USGS-MA		
Organization Name:	USGS Massachusetts Water Science Center		
Monitor Location:	MA-AHW 29	Type:	Well
Description:	Not Reported	HUC:	01070002
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	1958
Well Depth:	28	Well Depth Units:	ft
Well Hole Depth:	Not Reported	Well Hole Depth Units:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Ground water levels,Number of Measurements:	1	Level reading date:	1958-04-01
Feet below surface:	2.00	Feet to sea level:	Not Reported
Note:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: MA Radon

Radon Test Results

County	% of sites>4 pCi/L	Median
ESSEX	36	2.8

Federal EPA Radon Zone for ESSEX County: 1

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 01913

Number of sites tested: 2

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.200 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	1.900 pCi/L	100%	0%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: MassDEP
Telephone: 617-292-5907

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Massachusetts Geographic Information System (MassGIS) Datalayers
Source: Executive Office of Environmental Affairs

Public Water Supply Database: The Public Water Supply datalayer contains the locations of public community surface and groundwater supply sources and public non-community supply sources as defined in 310 CMR 22.00.

OTHER STATE DATABASE INFORMATION

Areas of Critical Environmental Concern Datalayer: The Areas of Critical Environmental Concern (ACEC) datalayer shows the location of areas that have been designated ACECs by the Secretary of Environmental Affairs. ACEC designation requires greater environmental review of certain kinds of proposed development under state jurisdiction within the ACEC boundaries. The ACEC Program is administered by the Department of Environmental Management (DEM) on behalf of the Secretary of Environmental Affairs. The Massachusetts Coastal Zone Management (MCZM) Office managed the original Coastal ACEC Program from 1978 to 1993, and continues to play a key role in monitoring coastal ACECs. Procedures for ACEC designation and the general policies governing the effects of designation are contained in the ACEC regulations (301 CMR 12.00). The ACEC datalayer has been compiled by MCZM and DEM and includes both coastal and inland areas.

EPA Designated Sole Source Aquifers Datalayer: The Sole Source Aquifer datalayer was compiled by the Department of Environmental Protection (DEP) Division of Water Supply (DWS). Seven Sole Source Aquifers have been designated by the US Environmental Protection Agency (EPA) for Massachusetts. A Sole Source Aquifer (SSA) is an aquifer designated by US EPA as the sole or principal source of drinking water for a given aquifer service area; that is, an aquifer which is needed to supply 50% or more of the drinking water for that area and for which there are no reasonably available alternative sources should that aquifer become contaminated. The aquifers were defined by a EPA hydrogeologist.

Aquifers Datalayer: MassGIS produced an aquifer datalayer composed of 20 individual panels, generally based on the boundaries of the major drainage basins. Areas of high and medium yield were mapped. This datalayer includes polygon attribute coding to help in the identification of areas in which cleanup of hazardous waste sites must meet drinking water standards, as defined in the Massachusetts Contingency Plan (MCP) (310 CMR 40.00000).

Non-Potential Drinking Water Source Areas: Non-Potential Drinking Water Source Areas (NPDWSA) are regulatory in nature, representing one of many considerations used in determining the standards to which ground water must be cleaned in the event of a release of oil or hazardous material. NPDWSAs are not based on existing water quality and do not indicate poor ambient conditions.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

DEP Approved Zone IIs Datalayer: The Department of Environmental Protection (DEP) approved Zone IIs datalayer was compiled by the DEP Division of Water Supply (DWS). The database contains 281 approved Zone IIs statewide. As stated in 310 CMR 22.02, a Zone II is "that area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at safe yield, with no recharge from precipitation.) It is bounded by the groundwater divides which result from pumping the well and by the contact of the aquifer with less permeable materials such as till or bedrock. In some cases, streams or lakes may act as recharge boundaries. In all cases, Zone IIs shall extend up gradient to its point of intersection with prevailing hydrogeologic boundaries (a groundwater flow divide, a contact with till or bedrock, or a recharge boundary)." These data are used in association with the Public Water Supplies datalayer. The following describes certain unique features of this association.

- Any proposed new well which will pump at least 100,000 gallons per day must have a Zone II delineation completed and approved by DEP prior to the well coming on line.
- Additionally, a new source may not be on-line yet, but other, older wells may fall within its Zone II boundary.
- Further, existing wells must have a Zone II delineated as a condition of receiving a water withdrawal permit under the Water Management Act.

RADON

State Database: MA Radon
Source: Department of Health
Telephone: 413-586-7525
Radon Test Results

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

STREET AND ADDRESS INFORMATION

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APPENDIX F

AMESBURY FIRE DEPARTMENT AND AMESBURY BOARD OF HEALTH FIOA LETTERS

Environmental &Construction Management Services, Inc.

288 Grove Street #391
Braintree, Massachusetts 02184

Phone: (617) 338-2121
www.ecmsinc.com

August 16, 2015

Deputy Fire Chief James Nolan
Fire Prevention Office
17 School Street
Amesbury, Massachusetts 01913

RE: Records Review
Amesbury Elementary School and Cashman Elementary School
Amesbury, Massachusetts
***ECMS* Project 1009.073**

Dear Deputy Chief Nolan:

Environmental & Construction Management Services, Inc. (*ECMS*) is currently working for the *City of Amesbury* and its architect *DiNisco Design* with respect to potential two (2) potential sites on which to build a new school.

We would like to request a records review for the Amesbury Elementary School at 20 South Hampton Road and Cashman Elementary School at 193 Lions Mouth Road properties.

Please let me know if a fee is associated with this request, as I will be performing site inspections at both schools on Tuesday August 21st and can drop off a payment and pick up any documentation available.

If you have any questions, please contact me at (617) 338-2121 Ext. 2 (office) or (617) 925-2121 (mobile).

Sincerely,

For ***Environmental & Construction Management Services, Inc.*** by,

Kevin J. Kavanaugh, L.S.P., CHMM
Principal Environmental Engineer

Environmental &Construction Management Services, Inc.

288 Grove Street #391
Braintree, Massachusetts 02184

Phone: (617) 338-2121
www.ecmsinc.com

August 16, 2015

John Morris
Amesbury Health Department
9 School Street
Amesbury, Massachusetts 01913

RE: Records Review
Amesbury Elementary School and Cashman Elementary School
Amesbury, Massachusetts
***ECMS* Project 1009.073**

Dear Mr. Morris:

Environmental & Construction Management Services, Inc. (*ECMS*) is currently working for the *City of Amesbury* and its architect *DiNisco Design* with respect to potential two (2) potential sites on which to build a new school.

We would like to request a records review for the Amesbury Elementary School at 20 South Hampton Road and Cashman Elementary School at 193 Lions Mouth Road properties.

Please let me know if a fee is associated with this request, as I will be performing site inspections at both schools on Tuesday August 21st and can drop off a payment and pick up any documentation available.

If you have any questions, please contact me at (617) 338-2121 Ext. 2 (office) or (617) 925-2121 (mobile).

Sincerely,

For ***Environmental & Construction Management Services, Inc.*** by,

Kevin J. Kavanaugh, L.S.P., CHMM
Principal Environmental Engineer

APPENDIX G

ENVIRONMENTAL DATA RESOURCES, INC. (EDR) VAPOR ENCROACHMENT REPORT DATED SEPTEMBER 11, 2018

Cashman Elementary School
193 Lions Mouth Rd
Amesbury, MA 01913

Inquiry Number: 5397483.2s
September 11, 2018

EDR Vapor Encroachment Screen

Prepared using EDR's Vapor Encroachment Worksheet

EDR® Environmental Data Resources Inc

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Secondary Map	**3**
Map Findings	**4**
Record Sources and Currency	**GR-1**

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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The EDR Vapor Encroachment Worksheet enables EDR's customers to make certain online modifications that effects maps, text and calculations contained in this Report. As a result, maps, text and calculations contained in this Report may have been so modified. EDR has not taken any action to verify any such modifications, and this report and the findings set forth herein must be read in light of this fact. Environmental Data Resources shall not be responsible for any customer's decision to include or not include in any final report any records determined to be within the relevant minimum search distances.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by EDR. The report was designed to assist parties seeking to meet the search requirements of the ASTM Standard Practice for Assessment of Vapor Encroachment into Structures on Property Involved in Real Estate Transactions (E 2600).

STANDARD ENVIRONMENTAL RECORDS	Default Area of Concern (Miles)*	property	1/10	> 1/10
Federal NPL site list	1.0	0	0	0
Federal Delisted NPL site list	1.0	0	0	0
Federal CERCLIS list	0.5	0	0	0
Federal CERCLIS NFRAP site list	0.5	0	0	0
Federal RCRA CORRACTS facilities list	1.0	0	0	0
Federal RCRA non-CORRACTS TSD facilities list	0.5	0	0	0
Federal RCRA generators list	0.25	0	0	0
Federal institutional controls / engineering controls registries	0.5	0	0	0
Federal ERNS list	property	0	-	-
State- and tribal - equivalent NPL	not searched	-	-	-
State- and tribal - equivalent CERCLIS	1.0	0	0	0
State and tribal landfill and/or solid waste disposal site lists	0.5	0	0	0
State and tribal leaking storage tank lists	0.5	0	0	0
State and tribal registered storage tank lists	0.25	0	0	0
State and tribal institutional control / engineering control registries	0.5	0	0	0
State and tribal voluntary cleanup sites	0.5	0	0	0
State and tribal Brownfields sites	0.5	0	0	0

ADDITIONAL ENVIRONMENTAL RECORDS				
Local Brownfield lists	0.5	0	0	0
Local Lists of Landfill / Solid Waste Disposal Sites	0.5	0	0	0
Local Lists of Hazardous waste / Contaminated Sites	property	0	-	-
Local Lists of Registered Storage Tanks	not searched	-	-	-
Local Land Records	property	0	-	-
Records of Emergency Release Reports	property	0	-	-
Other Ascertainable Records	1.0	0	0	0

EDR HIGH RISK HISTORICAL RECORDS				
EDR Exclusive Records	1.0	0	0	0
Exclusive Recovered Govt. Archives	property	0	-	-

EXECUTIVE SUMMARY

EDR RECOVERED GOVERNMENT ARCHIVES

EDR Exclusive Records	1.0	0	0	0
Exclusive Recovered Govt. Archives	property	0	-	-

*The Default Area of Concern may be adjusted by the environmental professional using experience and professional judgement. Each category may include several databases, and each database may have a different distance. A list of individual databases is provided at the back of this report.

EXECUTIVE SUMMARY

TARGET PROPERTY INFORMATION

ADDRESS

CASHMAN ELEMENTARY SCHOOL
193 LIONS MOUTH RD
AMESBURY, MA 01913

COORDINATES

Latitude (North):	42.857239 - 42° 51′ 26.05957″
Longitude (West):	70.948354 - 70° 56′ 54.083862″
Elevation:	105 ft. above sea level

EXECUTIVE SUMMARY

SEARCH RESULTS

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

Name	Address	Dist/Dir	Map ID	Page

Not Reported

ADDITIONAL ENVIRONMENTAL RECORDS

Name	Address	Dist/Dir	Map ID	Page

Not Reported

EDR HIGH RISK HISTORICAL RECORDS

Name	Address	Dist/Dir	Map ID	Page

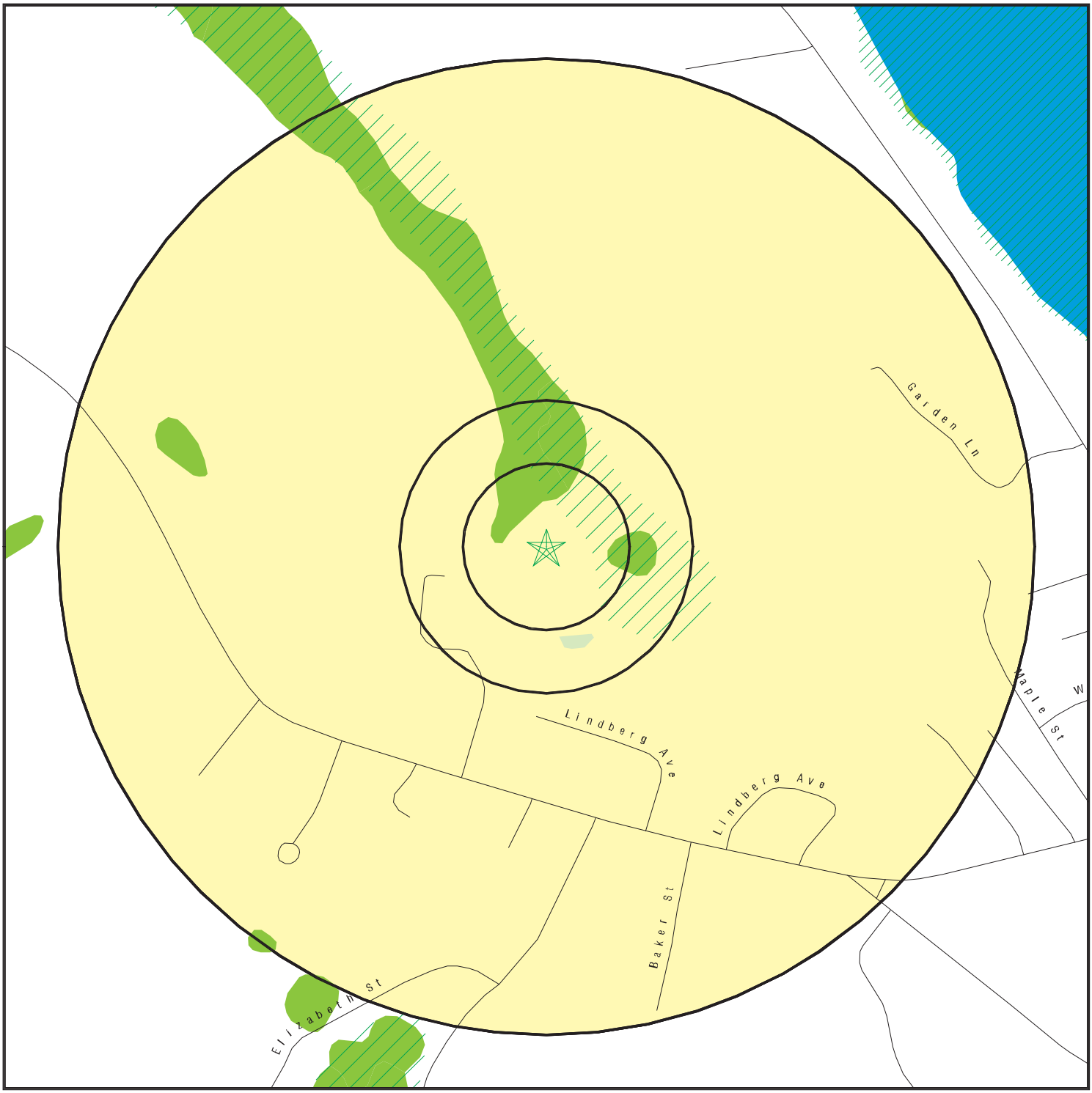
Not Reported

EDR RECOVERED GOVERNMENT ARCHIVES

Name	Address	Dist/Dir	Map ID	Page

Not Reported

PRIMARY MAP - 5397483.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Areas of Critical Environmental Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Cashman Elementary School	CLIENT: ECMS, Inc.
ADDRESS: 193 Lions Mouth Rd Amesbury MA 01913	CONTACT: Kevin Kavanaugh
LAT/LONG: 42.857239 / 70.948354	INQUIRY #: 5397483.2s DATE: August 17, 2018 1:48 pm

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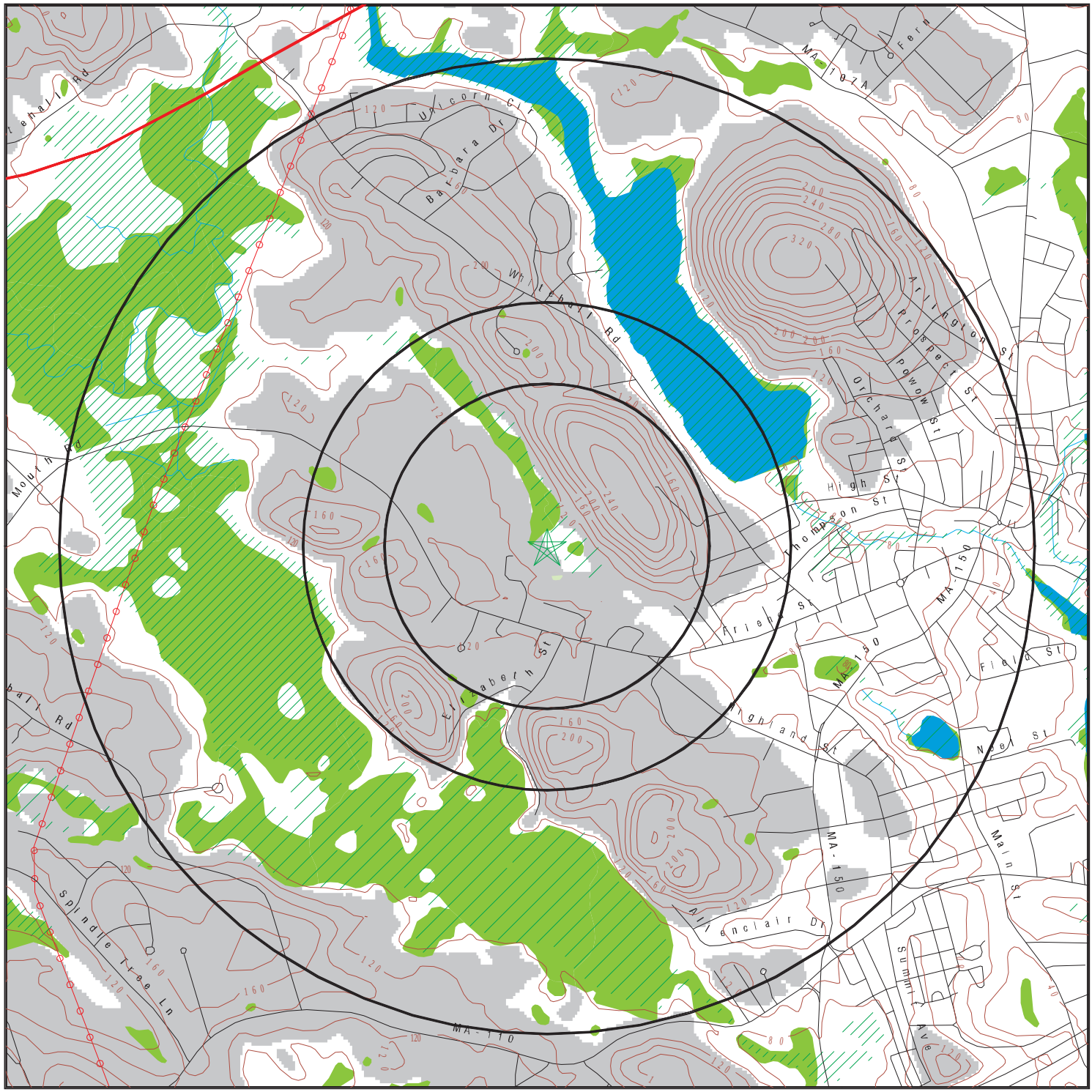
SECONDARY MAP - 5397483.2S



0 1/3 1/2 1 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- County Boundary
- Power transmission lines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Upgradient Area
- Areas of Critical Environmental Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Cashman Elementary School ADDRESS: 193 Lions Mouth Rd Amesbury MA 01913 LAT/LONG: 42.857239 / 70.948354	CLIENT: ECMS, Inc. CONTACT: Kevin Kavanaugh INQUIRY #: 5397483.2s DATE: August 17, 2018 1:46 pm

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MAP FINDINGS

LEGEND

FACILITY NAME **FACILITY ADDRESS, CITY, ST, ZIP**			EDR SITE ID NUMBER
◆ **MAP ID#**	Direction Distance Range Relative Elevation	(Distance feet / miles) Feet Above Sea Level	ASTM 2600 Record Sources found in this report. Each database searched has been assigned to one or more categories. For detailed information about categorization, see the section of the report Records Searched and Currency.

Worksheet:

Comments:

Comments may be added on the online Vapor Encroachment Worksheet.

DATABASE ACRONYM: Applicable categories (A hoverbox with database description).

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
ENVIRONMENTAL RECORDS						
Federal NPL site list						
US	NPL	National Priority List	EPA	05/13/2018	05/30/2018	06/22/2018
US	Proposed NPL	Proposed National Priority List Sites	EPA	05/13/2018	05/30/2018	06/22/2018
US	NPL LIENS	Federal Superfund Liens	EPA	10/15/1991	02/02/1994	03/30/1994
Federal CERCLIS list						
US	SEMS	Superfund Enterprise Management System	EPA	05/18/2018	05/30/2018	06/22/2018
Federal RCRA CORRACTS facilities list						
US	CORRACTS	Corrective Action Report	EPA	03/01/2018	03/28/2018	06/22/2018
Federal RCRA TSD facilities list						
US	RCRA-TSDF	RCRA - Treatment, Storage and Disposal	Environmental Protection Agency	03/01/2018	03/28/2018	06/22/2018
Federal RCRA generators list						
US	RCRA-LQG	RCRA - Large Quantity Generators	Environmental Protection Agency	03/01/2018	03/28/2018	06/22/2018
US	RCRA-SQG	RCRA - Small Quantity Generators	Environmental Protection Agency	03/01/2018	03/28/2018	06/22/2018
US	RCRA-CESQG	RCRA - Conditionally Exempt Small Quantity Generators	Environmental Protection Agency	03/01/2018	03/28/2018	06/22/2018
Federal institutional controls / engineering controls registries						
US	LUCIS	Land Use Control Information System	Department of the Navy	05/14/2018	05/18/2018	07/20/2018
US	US ENG CONTROLS	Engineering Controls Sites List	Environmental Protection Agency	02/13/2018	02/27/2018	05/11/2018
US	US INST CONTROL	Sites with Institutional Controls	Environmental Protection Agency	02/13/2018	02/27/2018	05/11/2018
Federal ERNS list						
US	ERNS	Emergency Response Notification System	National Response Center, United States Coast	03/19/2018	03/27/2018	06/08/2018
State and tribal - equivalent CERCLIS						
MA	SHWS	Site Transition List	Department of Environmental Protection	04/18/2018	07/11/2018	08/14/2018
State and tribal landfill / solid waste disposal						
MA	SWF/LF	Solid Waste Facility Database/Transfer Stations	Department of Environmental Protection	05/01/2018	07/05/2018	08/14/2018
MA	LF PROFILES	Landfill Profiles Listing	Department of Environmental Protection	07/01/2015	10/27/2015	12/14/2015
State and tribal leaking storage tank lists						
MA	LAST	Leaking Aboveground Storage Tank Sites	Department of Environmental Protection	04/18/2018	07/11/2018	08/14/2018
MA	LUST	Leaking Underground Storage Tank Listing	Department of Environmental Protection	04/18/2018	07/11/2018	08/14/2018
US	INDIAN LUST R7	Leaking Underground Storage Tanks on Indian Land	EPA Region 7	04/24/2018	05/18/2018	07/20/2018
US	INDIAN LUST R8	Leaking Underground Storage Tanks on Indian Land	EPA Region 8	04/25/2018	05/18/2018	07/20/2018
US	INDIAN LUST R1	Leaking Underground Storage Tanks on Indian Land	EPA Region 1	04/13/2018	05/18/2018	07/20/2018
US	INDIAN LUST R5	Leaking Underground Storage Tanks on Indian Land	EPA, Region 5	04/12/2018	05/18/2018	07/20/2018
US	INDIAN LUST R10	Leaking Underground Storage Tanks on Indian Land	EPA Region 10	04/12/2018	05/18/2018	07/20/2018
US	INDIAN LUST R6	Leaking Underground Storage Tanks on Indian Land	EPA Region 6	04/01/2018	05/18/2018	07/20/2018
US	INDIAN LUST R4	Leaking Underground Storage Tanks on Indian Land	EPA Region 4	05/08/2018	05/18/2018	07/20/2018

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
US	INDIAN LUST R9	Leaking Underground Storage Tanks on Indian Land	Environmental Protection Agency	04/10/2018	05/18/2018	07/20/2018
State and tribal registered storage tank lists						
MA	UST	Summary Listing of all the Tanks Registered in the State of	Department of Fire Services, Office of the Pu	04/18/2018	05/02/2018	05/23/2018
MA	AST 2	Aboveground Storage Tanks	Department of Fire Services	07/18/2018	07/24/2018	08/14/2018
MA	AST	Aboveground Storage Tank Database	Department of Public Safety	10/22/2009	10/28/2009	11/06/2009
US	INDIAN UST R5	Underground Storage Tanks on Indian Land	EPA Region 5	04/12/2018	05/18/2018	07/20/2018
US	INDIAN UST R6	Underground Storage Tanks on Indian Land	EPA Region 6	04/01/2018	05/18/2018	07/20/2018
US	INDIAN UST R7	Underground Storage Tanks on Indian Land	EPA Region 7	04/24/2018	05/18/2018	07/20/2018
US	INDIAN UST R4	Underground Storage Tanks on Indian Land	EPA Region 4	05/08/2018	05/18/2018	07/20/2018
US	INDIAN UST R10	Underground Storage Tanks on Indian Land	EPA Region 10	04/12/2018	05/18/2018	07/20/2018
US	INDIAN UST R8	Underground Storage Tanks on Indian Land	EPA Region 8	04/25/2018	05/18/2018	07/20/2018
US	INDIAN UST R9	Underground Storage Tanks on Indian Land	EPA Region 9	04/10/2018	05/18/2018	07/20/2018
US	INDIAN UST R1	Underground Storage Tanks on Indian Land	EPA, Region 1	04/13/2018	05/18/2018	07/20/2018
US	FEMA UST	Underground Storage Tank Listing	FEMA	05/15/2017	05/30/2017	10/13/2017
State and tribal institutional control / engineering control registries						
MA	INST CONTROL	Sites With Activity and Use Limitation	Department of Environmental Protection	04/18/2018	07/11/2018	08/14/2018
State and tribal voluntary cleanup sites						
US	INDIAN VCP R7	Voluntary Cleanup Priority Lisitng	EPA, Region 7	03/20/2008	04/22/2008	05/19/2008
US	INDIAN VCP R1	Voluntary Cleanup Priority Listing	EPA, Region 1	07/27/2015	09/29/2015	02/18/2016
State and tribal Brownfields sites						
MA	BROWNFIELDS 2	Potential Brownfields Listing	Department of Environmental Protection	05/22/2017	08/03/2017	09/22/2017
MA	BROWNFIELDS	Completed Brownfields Covenants Listing	Office of the Attorney General	04/05/2017	08/03/2017	10/10/2017
Other Records						
US	CONSENT	Superfund (CERCLA) Consent Decrees	Department of Justice, Consent Decree Library	03/31/2018	04/16/2018	06/29/2018
US	ROD	Records Of Decision	EPA	05/13/2018	05/30/2018	06/29/2018
US	LIENS 2	CERCLA Lien Information	Environmental Protection Agency	05/13/2018	05/30/2018	06/29/2018
US	DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations	EPA, Region 9	01/12/2009	05/07/2009	09/21/2009
US	PCB TRANSFORMER	PCB Transformer Registration Database	Environmental Protection Agency	05/24/2017	11/30/2017	12/15/2017
US	FUSRAP	Formerly Utilized Sites Remedial Action Program	Department of Energy	12/23/2016	12/27/2016	02/17/2017
US	US AIRS MINOR	Air Facility System Data	EPA	10/12/2016	10/26/2016	02/03/2017
US	US FIN ASSUR	Financial Assurance Information	Environmental Protection Agency	03/01/2018	03/27/2018	06/22/2018
US	EPA WATCH LIST	EPA WATCH LIST	Environmental Protection Agency	08/30/2013	03/21/2014	06/17/2014
US	US AIRS (AFS)	Aerometric Information Retrieval System Facility Subsystem (	EPA	10/12/2016	10/26/2016	02/03/2017
US	COAL ASH DOE	Steam-Electric Plant Operation Data	Department of Energy	12/31/2005	08/07/2009	10/22/2009
US	COAL ASH EPA	Coal Combustion Residues Surface Impoundments List	Environmental Protection Agency	07/01/2014	09/10/2014	10/20/2014
US	SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing	Environmental Protection Agency	01/01/2017	02/03/2017	04/07/2017
US	US HIST CDL	National Clandestine Laboratory Register	Drug Enforcement Administration	02/22/2018	03/01/2018	05/11/2018
US	LEAD SMELTER 2	Lead Smelter Sites	American Journal of Public Health	04/05/2001	10/27/2010	12/02/2010
US	LEAD SMELTER 1	Lead Smelter Sites	Environmental Protection Agency	05/13/2018	05/30/2018	06/29/2018
US	2020 COR ACTION	2020 Corrective Action Program List	Environmental Protection Agency	09/30/2017	05/08/2018	07/20/2018
US	Delisted NPL	National Priority List Deletions	EPA	05/13/2018	05/30/2018	06/22/2018
US	SEMS-ARCHIVE	Superfund Enterprise Management System Archive	EPA	05/18/2018	05/30/2018	06/22/2018

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
US	RCRA NonGen / NLR	RCRA - Non Generators / No Longer Regulated	Environmental Protection Agency	03/01/2018	03/28/2018	06/22/2018
US	HMIRS	Hazardous Materials Information Reporting System	U.S. Department of Transportation	03/26/2018	03/27/2018	06/08/2018
US	DOT OPS	Incident and Accident Data	Department of Transporation, Office of Pipeli	07/31/2012	08/07/2012	09/18/2012
US	US CDL	Clandestine Drug Labs	Drug Enforcement Administration	02/22/2018	03/01/2018	05/11/2018
US	US BROWNFIELDS	A Listing of Brownfields Sites	Environmental Protection Agency	03/19/2018	03/21/2018	06/08/2018
US	DOD	Department of Defense Sites	USGS	12/31/2005	11/10/2006	01/11/2007
US	FEDLAND	Federal and Indian Lands	U.S. Geological Survey	12/31/2005	02/06/2006	01/11/2007
US	FUDS	Formerly Used Defense Sites	U.S. Army Corps of Engineers	01/31/2015	07/08/2015	10/13/2015
US	UMTRA	Uranium Mill Tailings Sites	Department of Energy	06/23/2017	10/11/2017	11/03/2017
US	ODI	Open Dump Inventory	Environmental Protection Agency	06/30/1985	08/09/2004	09/17/2004
US	US MINES	Mines Master Index File	Department of Labor, Mine Safety and Health A	05/03/2018	05/31/2018	06/29/2018
US	US MINES 2	Ferrous and Nonferrous Metal Mines Database Listing	USGS	12/05/2005	02/29/2008	04/18/2008
US	US MINES 3	Active Mines & Mineral Plants Database Listing	USGS	04/14/2011	06/08/2011	09/13/2011
US	PRP	Potentially Responsible Parties	EPA	10/25/2013	10/17/2014	10/20/2014
US	TRIS	Toxic Chemical Release Inventory System	EPA	12/31/2016	01/10/2018	01/12/2018
US	TSCA	Toxic Substances Control Act	EPA	12/31/2016	06/21/2017	01/05/2018
US	FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fu	EPA/Office of Prevention, Pesticides and Toxi	04/09/2009	04/16/2009	05/11/2009
US	FTTS INSP	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fu	EPA	04/09/2009	04/16/2009	05/11/2009
US	HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing	Environmental Protection Agency	10/19/2006	03/01/2007	04/10/2007
US	HIST FTTS INSP	FIFRA/TSCA Tracking System Inspection & Enforcement Case Lis	Environmental Protection Agency	10/19/2006	03/01/2007	04/10/2007
US	SSTS	Section 7 Tracking Systems	EPA	12/31/2009	12/10/2010	02/25/2011
US	ICIS	Integrated Compliance Information System	Environmental Protection Agency	11/18/2016	11/23/2016	02/10/2017
US	PADS	PCB Activity Database System	EPA	06/01/2017	06/09/2017	10/13/2017
US	MLTS	Material Licensing Tracking System	Nuclear Regulatory Commission	08/30/2016	09/08/2016	10/21/2016
US	RADINFO	Radiation Information Database	Environmental Protection Agency	04/03/2018	04/05/2018	06/29/2018
US	FINDS	Facility Index System/Facility Registry System	EPA	02/21/2018	02/23/2018	03/23/2018
US	RAATS	RCRA Administrative Action Tracking System	EPA	04/17/1995	07/03/1995	08/07/1995
US	RMP	Risk Management Plans	Environmental Protection Agency	11/02/2017	11/17/2017	12/08/2017
US	BRS	Biennial Reporting System	EPA/NTIS	12/31/2015	02/22/2017	09/28/2017
US	PWS	Public Water System Data	EPA	12/17/2013	01/09/2014	10/15/2014
US	INDIAN RESERV	Indian Reservations	USGS	12/31/2014	07/14/2015	01/10/2017
US	INDIAN ODI	Report on the Status of Open Dumps on Indian Lands	Environmental Protection Agency	12/31/1998	12/03/2007	01/24/2008
MA	AIRS	Permitted Facilities Listing	Department of Environmental Protection	04/13/2018	04/17/2018	06/15/2018
MA	ASBESTOS	Asbestos Notification Listing	Department of Environmental Protection	06/11/2018	06/15/2018	06/29/2018
MA	DRYCLEANERS	Regulated Drycleaning Facilities	Department of Environmental Protection	04/18/2018	05/04/2018	05/23/2018
MA	ENFORCEMENT	Enforcement Action Cases	Department of Environmental Quality	07/25/2018	07/27/2018	08/14/2018
MA	Financial Assurance 1	Financial Assurance Information Listing	Department of Environmental Protection	12/01/2010	12/23/2010	02/03/2011
MA	Financial Assurance 2	Financial Assurance Information Listing	Office of State Fire Marshal	10/21/2011	10/25/2011	11/18/2011
MA	Financial Assurance 3	Financial Assurance Information listing	Department of Environmental Protection	01/16/2018	04/17/2018	06/15/2018
MA	GWDP	Ground Water Discharge Permits	MassGIS	01/18/2018	05/04/2018	05/23/2018
MA	HW GEN	List of Massachusetts Hazardous Waste Generators	Department of Environmental Protection	06/04/2018	06/27/2018	08/14/2018
MA	LIENS	Liens Information Listing	Department of Environmental Protection	03/07/2018	03/09/2018	06/21/2018
MA	MA SPILLS	Historical Spill List	Department of Environmental Protection	09/30/1993	12/03/2003	12/31/2003
MA	MERCURY	Mercury Product Recyling Drop-Off Locations Listing	Department of Environmental Protection	05/07/2018	05/25/2018	06/25/2018
MA	NPDES	NPDES Permit Listing	Department of Environmental Protection	02/12/2018	02/14/2018	04/09/2018
MA	RELEASE	Reportable Releases	Department of Environmental Protection	04/18/2018	07/11/2018	08/14/2018
MA	SPILLS 80	SPILLS80 data from FirstSearch	FirstSearch	03/10/1998	01/03/2013	03/05/2013

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
MA	SPILLS 90	SPILLS90 data from FirstSearch	FirstSearch	12/11/2012	01/03/2013	02/08/2013
MA	TIER 2	Tier 2 Information Listing	Massachusetts Emergency Management Agency	12/31/2017	05/17/2018	06/29/2018
MA	TSD	TSD Facility	Department of Environmental Protection	06/04/2018	06/29/2018	08/14/2018
US	ECHO	Enforcement & Compliance History Information	Environmental Protection Agency	02/25/2018	03/17/2018	06/08/2018
US	FUELS PROGRAM	EPA Fuels Program Registered Listing	EPA	02/20/2018	02/21/2018	03/23/2018
US	DOCKET HWC	Hazardous Waste Compliance Docket Listing	Environmental Protection Agency	01/04/2018	01/19/2018	04/13/2018
US	IHS OPEN DUMPS	Open Dumps on Indian Land	Department of Health & Human Serivces, Indian	04/01/2014	08/06/2014	01/29/2015
US	UXO	Unexploded Ordnance Sites	Department of Defense	09/30/2016	10/31/2017	01/12/2018
US	ABANDONED MINES	Abandoned Mines	Department of Interior	03/08/2018	03/13/2018	06/08/2018

HISTORICAL USE RECORDS

US	EDR MGP	EDR Proprietary Manufactured Gas Plants	EDR, Inc.			
US	EDR Hist Auto	EDR Exclusive Historical Auto Stations	EDR, Inc.			
US	EDR Hist Cleaner	EDR Exclusive Historical Cleaners	EDR, Inc.			
MA	RGA HWS	Recovered Government Archive State Hazardous Waste Facilitie	Department of Environmental Protection		07/01/2013	12/24/2013
MA	RGA LUST	Recovered Government Archive Leaking Underground Storage Tan	Department of Environmental Protection		07/01/2013	12/24/2013

STREET AND ADDRESS INFORMATION

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APPENDIX H

SITE PHOTOGRAPHS

Cashman Elementary School -193 Lions Mouth Road in Amesbury, Massachusetts

Photo 1 – View of side of front from entrance



Photo 2 – View from front of school entrance



Environmental & Construction Management Services, Inc.

Photo 3 – Elevator room with hydraulics



Photo 4 – Elevator.



Photo 5 – View of typical classroom.

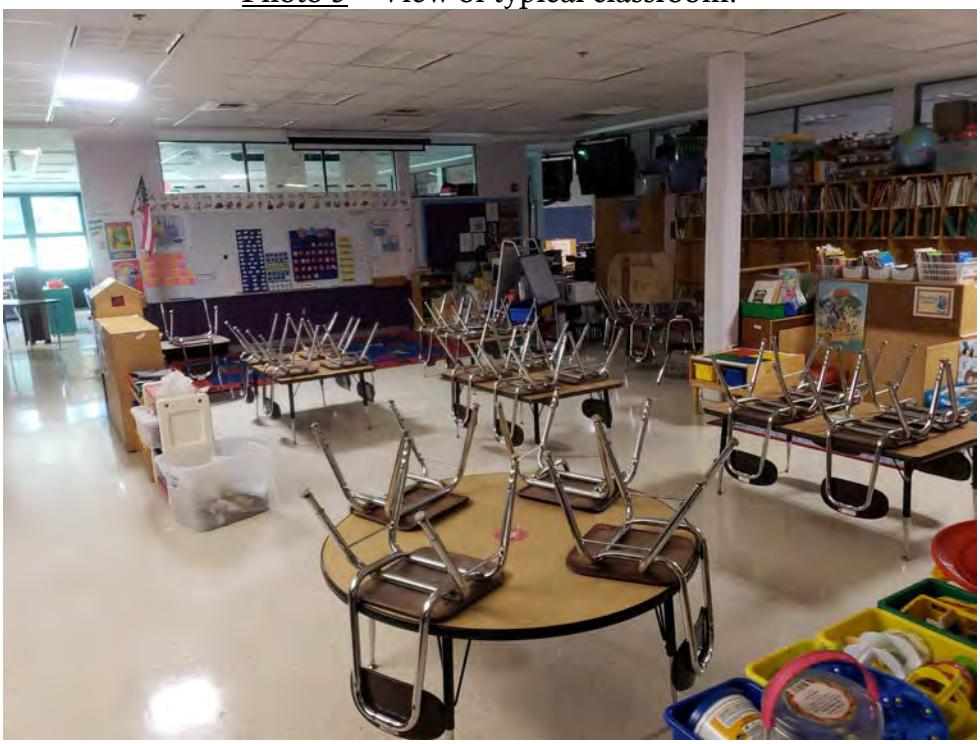

Photo 6 – View of typical janitorial closet.



Cashman Elementary School -193 Lions Mouth Road in Amesbury, Massachusetts

Photo 7 – Interior wheel chair lift.



Photo 8 – View of kitchen area



Photo 9 – View of loading dock area.

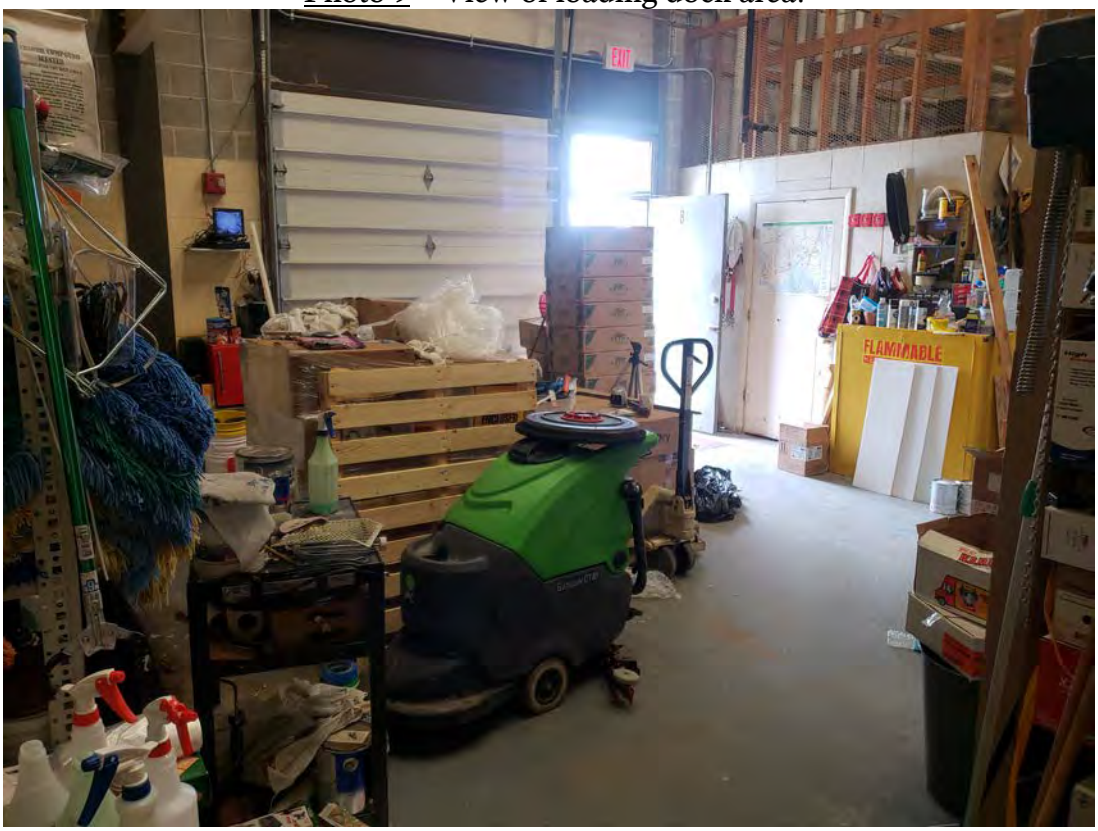

Photo 10 – View of natural gas fired boiler units.



Photo 13 – View of loading dock area.



Photo 14 – View of energy efficiency electrical panel.



Photo 15 – View of electrical room.



Photo 16 – View of roof-stop HVAC unit.



Photo 17 – View of diesel fuel fired emergency generator.

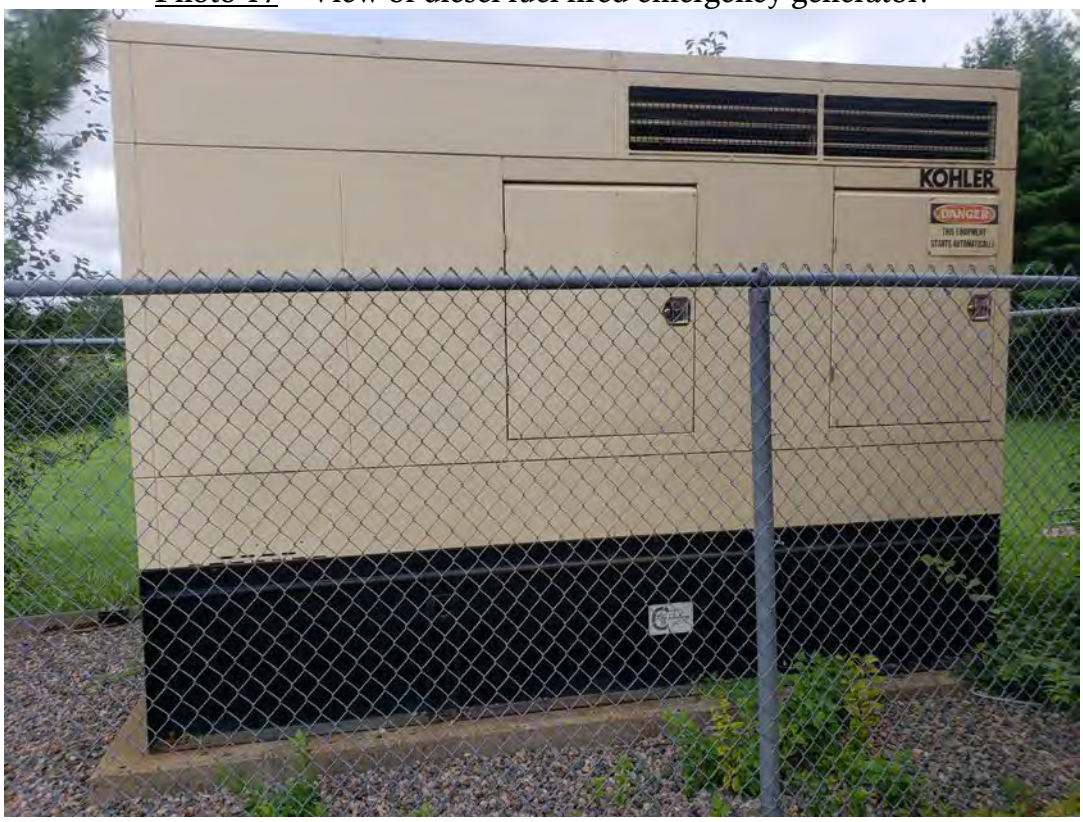

Photo 18 – Another view of transformer unit.



Cashman Elementary School -193 Lions Mouth Road in Amesbury, Massachusetts

Photo 19 – View of athletic fields



Photo 20 – View of solid waste dumpster.



Photo 21 – View of sewer pump station.



Photo 22 – View of natural gas line into building.



Attachment D

ACM PLM Sample Results

NEW AMESBURY ELEMENTARY SCHOOL
SUBSURFACE EXPLORATION DATA
023000

Environmental & Construction Management Services, Inc.

288 Grove Street #391 Phone: (617) 338-2121
Braintree, Massachusetts 02184 www.ecmsinc.com

August 11, 2020

Ms. Vivian Low
DiNisco Design
99 Chauncy Street, Suite 901
Boston, MA 02111

Re: ACM PLM Sample Results – Cashman Elementary School
Amesbury, Massachusetts
ECMS Project No. 1009.073

Dear Ms. Low:

Pursuant to a request from *DiNisco Design*, *Environmental & Construction Management Services, Inc.* (*ECMS*) collected bulk samples of materials suspected to contain asbestos that may be disturbed by planned renovations. Sampling was conducted on June 3 and August 8, 2020.

Asbestos Sampling

ECMS, working with a masonry contractor, removed bricks from the retaining wall to determine if damp proofing was present. *ECMS* also dug a small trench along the foundation of the wall to search for sub-grade damp proofing. No damp proofing was identified.

The suspect materials identified and sampled were as follows:

Retaining Wall sampled June 3, 2020

- Expansion Joint Caulk
- Glazing, Window

Concession Stand sampled June 3, 2020

- Roofing Shingles
- Roofing Tar

Concession Stand sampled August 8, 2020

- Joint Compound (walls & ceilings)
- Sheetrock (walls & ceilings)
- Mastic, Vinyl Wall Covering

Shed sampled August 8, 2020

- Roofing Shingles

Bulk samples collected were taken to *Asbestos Identification Lab* for analysis using Polarized Light Microscopy with dispersion staining. The visual estimation technique was used to quantify all reported asbestos concentrations (unless otherwise noted).

Asbestos was not detected in any of the samples collected.

Recommendations - Asbestos

Should any additional materials be encountered during renovation, suspect ACM should be sampled to determine if the affected materials must be treated as ACM. Should additional suspect ACMs be encountered during any renovation or demolition activities, work should be discontinued until samples of the suspect materials can be obtained for analysis.

If you have any questions or concerns, please contact us at (617) 338-2121.

Sincerely,

For ***Environmental & Construction Management Services, Inc.*** by,

Holly Drum

Holly C. Drum
Environmental Scientist

Stephen T. Weydt
Principal Environmental Scientist

Attachments

ATTACHMENT A

ASBESTOS BULK SAMPLE RESULTS

Asbestos Identification Laboratory

165 New Boston St., Ste 227
Woburn, MA 01801
781-932-9600

Web: www.asbestosidentificationlab.com
Email: mikemanning@asbestosidentificationlab.com

Batch: 53247

NVLAP®
Lab Code: 200919-0

June 08, 2020

Holly Drum
ECMS Inc.
288 Grove Street
#391
Braintree, MA 02184

Project Name:	*1009.073 Cashman*
Project Number:	1009.073
Date Sampled:	2020-06-03
Work Received:	2020-06-03
Work Analyzed:	2020-06-05

Analysis Method: BULK PLM ANALYSIS EPA/600/R-93/116

Dear Holly Drum,

Asbestos Identification Laboratory has completed the analysis of the samples from your office for the above referenced project. The information and analysis contained in this report have been generated using the EPA /600/R-93/116 Method for the Determination of Asbestos in Bulk Building Materials. Materials or products that contain more than 1% of any kind or combination of asbestos are considered an asbestos containing building material as determined by the EPA. This Polarized Light Microscope (PLM) technique may be performed either by visual estimation or point counting. Point counting provides a determination of the area percentage of asbestos in a sample. If the asbestos is estimated to be less than 10% by visual estimation of friable material, the determination may be repeated using the point counting technique. The results of the point counting supersede visual PLM results. Results in this report only relate to the items tested. This report may not be used by the customer to claim product endorsement by NVLAP or any other U.S. Government Agency.
Laboratory results represent the analysis of samples as submitted by the customer. Information regarding sample location, description, area, volume, etc., was provided by the customer. Asbestos Identification Laboratory is not responsible for sample collection activities or analytical method limitations. Unless notified in writing to return samples, Asbestos Identification Laboratory discards customer samples after 30 days. Samples containing subsamples or layers will be analyzed separately when applicable. Reports are kept at Asbestos Identification Laboratory for three years. This report shall not be reproduced, except in full, without the written consent of Asbestos Identification Laboratory.

- NVLAP Lab Code: 200919-0
- Massachusetts Certification License: AA000208
- State of Connecticut, Department of Public Health Approved Environmental Laboratory Registration Number: PH-0142
- State of Maine, Department of Environmental Protection Asbestos Analytical Laboratory License Number: LB-0078(Bulk) LA-0087(Air)
- State of Rhode Island and Providence Plantations. Department of Health Certification: AAL-121
- State of Vermont, Department of Health Environmental Health License AL934461

Thank you Holly Drum for your business.

Michael Manning
Owner/Director

June 08, 2020

Holly Drum
ECMS Inc.
288 Grove Street
#391
Braintree, MA 02184

Project Name: *1009.073 Cashman*
Project Number: 1009.073
Date Sampled: 2020-06-03
Work Received: 2020-06-03
Work Analyzed: 2020-06-05

Analysis Method: BULK PLM ANALYSIS EPA/600/R-93/116

FieldID / LabID	Material	Location	Color	Non-Asbestos %	Asbestos %
01A / 594604	Expansion Joint Caulk	Retaining Wall	gray	Non-Fibrous 100	None Detected
01B / 594605	Expansion Joint Caulk	Retaining Wall	gray	Non-Fibrous 100	None Detected
02A / 594606	Glazing, Window	Next to Retaining Wall	brown	Non-Fibrous 100	None Detected
02B / 594607	Glazing, Window	Next to Retaining Wall	brown	Non-Fibrous 100	None Detected
03A / 594608	Roofing Shingles	Concession Stand	black	Fiberglass 20 Non-Fibrous 80	None Detected
03B / 594609	Roofing Shingles	Concession Stand	black	Fiberglass 20 Non-Fibrous 80	None Detected
04A / 594610	Roofing Tar	Concession Stand	black	Fiberglass 5 Non-Fibrous 95	None Detected
04B / 594611	Roofing Tar	Concession Stand	black	Fiberglass 5 Non-Fibrous 95	None Detected

Monday 08 June 2020 End of Report Page 1 of 1

Analyzed by: 

Batch: 53247

CHAIN OF CUSTODY

EPA/600/R-93/116

Asbestos Identification Lab
165 New Boston St.
Suite 227
Woburn, MA 01801
(781)932-9600
www.asbestosidentificationlab.com

Client: Environmental & Construction Management Services, Inc.
Address:
Project Site & #: 1009.073 CASHMAN
Phone / email address: (508) 231-7015/holly.drum@ecmsinc.com
Contact: Holly Drum
Relinquish by/date:
Received by/date: 6/3/2020
# of Samples Received: 8

Date Sampled: 06/03/2020

BATCH# 53247 Rev 12/15

Turnaround Time
- [ ] Less 3 Hrs
- [ ] Same Day
- [ ] Next Day
- [ ] Two Day 72 HR

Sample Method
- [X] Bulk
- [ ] Soil
- [ ] Wipe
- [ ] Point Count

Stop on 1st Positive? Yes/No
Notify Method: Mail/E-Mail/Verbal
Anayzed By:
Date: 6/5/2020

Temp in Celcius = 23

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Material / Location	Stereo Scope: % of Asbestos	Color	Homogeneity	Texture	Friable	Asbestos Minerals	Optical Properties: Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI: II	RI: ⊥	Non-Asbestos Percentage (%): Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous
53247	01A	**Material** EXPANSION JOINT CAULK **Location** RETAINING WALL	0	Gy	S	S	Y	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite															Leo
								Anthophylite															
								Actinolite															
53	01B	**Material** **Location** ↓	0	Gy	S	S	Y	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite															Leo
								Anthophylite															
								Actinolite															
53247	01A	**Material** GLAZING, WINDOW **Location** NEXT TO RETAINING WALL	0	Br	S	S	Y	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite															Leo
								Anthophylite															
								Actinolite															

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Temp in Celcius = ____ / Material / Location	Stereo Scope: % of Asbestos	Color	Homogeneity	Texture	Friable	Asbestos Minerals	Optical Properties: Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI: =	RI: ⊥	Non-Asbestos Percentage (%): Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous
10	03B	Material: GLAZING, WINDOW Location: NEXT TO RETAINING WALL	O	Br	S	S	—	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite															Lo
								Anthophylite															
								Actinolite															
09	03A	Material: ROOFING SHINGLES Location: CONCESSION STAND	O	Bk	~	F	~	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite									2						
								Anthophylite									20						80
								Actinolite															
08	03B	Material: ↓ Location: ↓	O	Bk	~	F	~	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite									I						
								Anthophylite									20						80
								Actinolite															
07	04A	Material: ROOFING TAR Location: CONCESSION STAND	O	Bk	S	S	—	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite									5						95
								Anthophylite															
								Actinolite															
11746 05	04B	Material: ↓ Location: ↓	O	Bk	S	S	—	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite									5						95
								Anthophylite															
								Actinolite															

Asbestos Identification Laboratory

165 New Boston St., Ste 227
Woburn, MA 01801
781-932-9600

Web: www.asbestosidentificationlab.com
Email: mikemanning@asbestosidentificationlab.com

Batch: 55022

NVLAP® Testing Lab Code: 200919-0

August 10, 2020

Holly Drum
ECMS Inc.
288 Grove Street
#391
Braintree, MA 02184

Project Name:	*Cashman*
Project Number:	1009.073
Date Sampled:	2020-08-06
Work Received:	2020-08-06
Work Analyzed:	2020-08-07

Analysis Method: BULK PLM ANALYSIS EPA/600/R-93/116

Dear Holly Drum,

Asbestos Identification Laboratory has completed the analysis of the samples from your office for the above referenced project. The information and analysis contained in this report have been generated using the EPA /600/R-93/116 Method for the Determination of Asbestos in Bulk Building Materials. Materials or products that contain more than 1% of any kind or combination of asbestos are considered an asbestos containing building material as determined by the EPA. This Polarized Light Microscope (PLM) technique may be performed either by visual estimation or point counting. Point counting provides a determination of the area percentage of asbestos in a sample. If the asbestos is estimated to be less than 10% by visual estimation of friable material, the determination may be repeated using the point counting technique. The results of the point counting supersede visual PLM results. Results in this report only relate to the items tested. This report may not be used by the customer to claim product endorsement by NVLAP or any other U.S. Government Agency.
Laboratory results represent the analysis of samples as submitted by the customer. Information regarding sample location, description, area, volume, etc., was provided by the customer. Asbestos Identification Laboratory is not responsible for sample collection activities or analytical method limitations. Unless notified in writing to return samples, Asbestos Identification Laboratory discards customer samples after 30 days. Samples containing subsamples or layers will be analyzed separately when applicable. Reports are kept at Asbestos Identification Laboratory for three years. This report shall not be reproduced, except in full, without the written consent of Asbestos Identification Laboratory.

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- State of Rhode Island and Providence Plantations. Department of Health Certification: AAL-121
- State of Vermont, Department of Health Environmental Health License AL934461

Thank you Holly Drum for your business.

Michael Manning
Owner/Director

August 10, 2020

Holly Drum
ECMS Inc.
288 Grove Street
#391
Braintree, MA 02184

Project Name: *Cashman*
Project Number: 1009.073
Date Sampled: 2020-08-06
Work Received: 2020-08-06
Work Analyzed: 2020-08-07

Analysis Method: BULK PLM ANALYSIS EPA/600/R-93/116

FieldID / LabID	Material	Location	Color	Non-Asbestos %	Asbestos %
01A / 612460	Shingles, Roof	Shed	black	Cellulose 30 Non-Fibrous 70	None Detected
01B / 612461	Shingles, Roof	Shed	black	Cellulose 30 Non-Fibrous 70	None Detected
02A / 612462	Joint Compound, Wall	Concession Stand	white	Non-Fibrous 100	None Detected
02B / 612463	Joint Compound, Wall	Concession Stand	white	Non-Fibrous 100	None Detected
03A / 612464	Sheetrock, Wall	Concession Stand	multi	Cellulose 10 Non-Fibrous 90	None Detected
03B / 612465	Sheetrock, Wall	Concession Stand	multi	Cellulose 10 Non-Fibrous 90	None Detected
04A / 612466	Sheetrock, Ceiling	Concession Stand	multi	Cellulose 10 Non-Fibrous 90	None Detected
04B / 612467	Sheetrock, Ceiling	Concession Stand	multi	Cellulose 10 Non-Fibrous 90	None Detected
05A / 612468	Joint Compoun, Ceiling	Concession Stand	white	Non-Fibrous 100	None Detected
05B / 612469	Joint Compoun, Ceiling	Concession Stand	white	Non-Fibrous 100	None Detected
06A / 612470	Mastic, Vinyl Wall Covering	Concession Stand	tan	Non-Fibrous 100	None Detected
06B / 612471	Mastic, Vinyl Wall Covering	Concession Stand	tan	Non-Fibrous 100	None Detected

Monday 10 August
Analyzed by:

End of Report

Batch: 55022

CHAIN OF CUSTODY

EPA/600/R-93/116

Page 1 of 3

Client: Environmental & Construction Management Services, Inc.

Address:

Project Site & #: 1009.073 Cashman

Phone / email address: (508) 231-7015/holly.drum@ecmsinc.com

Contact: Holly Drum

Relinquish by/date: 1605 08/06/2020

Received by/date: 8/6/20

# of Samples Received: 10

Asbestos Identification Lab

165 New Boston St.
Suite 227
Woburn, MA 01801
(781)932-9600
www.asbestosidentificationlab.com

Date Sampled: 08/06/2020

BATCH# 55027 Rev 12/15

Turnaround Time
- [ ] Less 3 Hrs
- [ ] Same Day
- [ ] Next Day
- [x] Two Day

Sample Method
- [x] Bulk
- [ ] Soil
- [ ] Wipe
- [ ] Point Count

Stop on 1st Positive? Yes/No

Notify Method: Mail/E-Mail/Verbal

Anayzed By:

Date: 8/7/20

Temp in Celcius = 25

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Material / Location	Stereo Scope: % of Asbestos	Color	Homogeneity	Texture	Friable	Asbestos Minerals	Optical Properties: Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI: II	RI: ⊥	Non-Asbestos Percentage (%): Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous
012440	01A	Material: SHINGLES, ROOF Location: SHED	0	BLK	N	F/Gr	N	Chrysotile											R				
								Amosite															
								Crocidolite															
								Tremolite											30				70
								Anthophylite															
								Actinolite															
41	01B	Material: Location: ↓	0	BLK	N	F/Gr	N	Chrysotile											R				
								Amosite															
								Crocidolite															
								Tremolite											30				70
								Anthophylite															
								Actinolite															
42	02A	Material: JOINT COMPOUND, WALL Location: CONCESSION STAND	0	W	Y	Gr	Y	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite															
								Anthophylite															
								Actinolite															100

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Temp in Celcius = ____ / Material / Location	Stereo Scope: % of Asbestos	Color	Homogeneity	Texture	Friable	Asbestos Minerals	Optical Properties: Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI: II	RI: ⊥	Non-Asbestos Percentage (%): Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous
03	03B	Material: JOINT COMPOUND, WALL Location: CONCESSION STAND	0	W	Y	Gr	Y	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite															100
								Anthophylite															
								Actinolite															
04	03A	Material: SHEETROCK, WALL Location	0	MC	N	F/Gr	Y	Chrysotile															
								Amosite															
								Crocidolite												R			
								Tremolite												10			90
								Anthophylite															
								Actinolite															
05	03B	Material Location	0	MC	N	F/Gr	Y	Chrysotile															
								Amosite															
								Crocidolite												R			
								Tremolite												10			90
								Anthophylite															
								Actinolite															
06	04A	Material: SHEETROCK, CEILING Location	0	MC	N	F/Gr	Y	Chrysotile															
								Amosite															
								Crocidolite												R			
								Tremolite												10			90
								Anthophylite															
								Actinolite															
07	04B	Material Location	0	MC	N	F/Gr	Y	Chrysotile															
								Amosite															
								Crocidolite												R			
								Tremolite												10			90
								Anthophylite															
								Actinolite															

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Temp in Celcius = ____ / Material / Location	Stereo Scope: % of Asbestos	Color	Homogeneity	Texture	Friable	Asbestos Minerals	Optical Properties: Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI: =	RI: ⊥	Non-Asbestos Percentage (%): Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous
02	05A	Material: JOINT COMPOUND, CEILING Location: CONCESSIONS STAND	0	W	Y	Bn	Y	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite															100
								Anthophylite															
								Actinolite															
04	05B	Material: ↓ Location	0	W	Y	Bn	Y	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite															100
								Anthophylite															
								Actinolite															
01	06A	Material: MASTIC, VINYL WALL COVERING Location	0	t	Y	Bn	N	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite															100
								Anthophylite															
								Actinolite															
012471	06B	Material: ↓ Location	0	t	Y	Bn	N	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite															100
								Anthophylite															
								Actinolite															
		Material Location						Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite															
								Anthophylite															
								Actinolite															

ATTACHMENT B

PHOTOS

ACM ASSESMENT PHOTOGRAPHS

Project: 1009.073 Cashman Elementary School

Date: June 3, 2020

Address: 193 Lions Mouth Rd., Amesbury, MA

Description:				Picture:
Sample: 01	Expansion Joint Caulk			
Date Sampled: 06/03/2020				

Description:				Picture:
Sample: 02	Glazing, Window			
Date Sampled: 06/03/2020				

ACM ASSESMENT PHOTOGRAPHS

Project: 1009.073 Cashman Elementary School

Date: June 3, 2020

Address: 193 Lions Mouth Rd., Amesbury, MA

Description:				Picture:
Sample: 03	Roofing Shingles			
Date Sampled: 06/03/2020				

Description:				Picture:
Sample: 04	Roofing Tar			
Date Sampled: 06/03/2020				

ACM ASSESMENT PHOTOGRAPHS

Project: 1009.073 Cashman Elementary School

Date: June 3, 2020

Address: 193 Lions Mouth Rd., Amesbury, MA

Description:				Picture:
Sample:	No weatherproofing on foundation of retaining wall			
Date Sampled: 06/03/2020				

Description:				Picture:
Sample:	No mastic behind brick on retaining wall			
Date Sampled: 06/03/2020				

ACM ASSESMENT PHOTOGRAPHS

Project: 1009.073 Cashman Elementary School

Date: June 3, 2020

Address: 193 Lions Mouth Rd., Amesbury, MA

Description:				Picture:
Sample:	No mastic behind brick on retaining wall		No mastic behind brick on retaining wall	
Date Sampled: 06/03/2020				

Description:				Picture:
Sample:	No mastic behind brick on retaining wall			
Date Sampled: 06/03/2020				

ACM ASSESMENT PHOTOGRAPHS

Project: 1009.073 Cashman Elementary School

Date: June 3, 2020

Address: 193 Lions Mouth Rd., Amesbury, MA

Description:		Picture:
Sample:	No weatherproofing on foundation of concession stand	
Date Sampled: 06/03/2020		

Description:		Picture:
Sample:		
Date Sampled:		

ACM ASSESMENT PHOTOGRAPHS

Project: 1009.073 Cashman Elementary School

Date: August 6, 2020

Address: 193 Lions Mouth Rd., Amesbury, MA

Description:			Picture:
Sample: 01	Roofing Shingles, Shed		
Date Sampled: 08/06/2020			

Description:			Picture:
Sample: 02	Joint Compound, Wall Concession Stand		
Date Sampled: 08/06/2020			

ACM ASSESMENT PHOTOGRAPHS

Project: 1009.073 Cashman Elementary School

Date: August 6, 2020

Address: 193 Lions Mouth Rd., Amesbury, MA

Description:				Picture:
Sample: 03	Sheetrock, Wall Concession Stand			
Date Sampled: 08/06/2020				

Description:				Picture:
Sample: 04	Sheetrock, Ceiling Concession Stand			
Date Sampled: 08/06/2020				

ACM ASSESMENT PHOTOGRAPHS

Project: 1009.073 Cashman Elementary School

Date: August 6, 2020

Address: 193 Lions Mouth Rd., Amesbury, MA

Description:			Picture:
Sample: 05	Joint Compound, Ceiling Concession Stand		
Date Sampled: 08/06/2020			

Description:			Picture:
Sample: 06	Mastic, Vinyl Wall Covering Concession Stand		
Date Sampled: 08/06/2020			

Attachment E

Imminent Hazard Evaluation

NEW AMESBURY ELEMENTARY SCHOOL
SUBSURFACE EXPLORATION DATA
023000

Environmental & Construction Management Services, Inc.

288 Grove Street #391 Phone: (617) 338-2121
Braintree, Massachusetts 02184 www.ecmsinc.com

July 24, 2020

Ms. Vivian Low
DiNisco Design
99 Chauncy Street, Suite 901
Boston, Massachusetts 02111

Re: Loam/Topsoil and Subsoil Sampling, Laboratory Analysis and LSP Opinion Letter
Charles C. Cashman Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts 01913
***ECMS* Project No. 1009.073**

Dear Ms. Low:

Pursuant to your request, *Environmental & Construction Management Services, Inc. (ECMS)* has completed the collection of loam/topsoil and subsoils samples from representative areas proximate to the Cashman School and from the field adjacent to the school for laboratory analysis for potential oil and/or hazardous material (OHM) prior to proposed site construction activities. Refer to Figure 1, Site Locus/Location Plan for the general location of the Site.

On July 9, 2020, *ECMS* personnel collected fifteen (15) surficial loam/topsoil and two (2) subsoil samples. The samples were collected from areas identified by *DiNisco Design (DiNisco)* in Proposed Topsoil Removal Limit Plan (Markup) dated July 6, 2020. Refer to Figure 2, Soil Sample Location Plan for the location of the soil samples. Loam/topsoil samples were collected below the grass surface from 2 to 6 inches below surface grade and subsurface soil samples were collected approximately 2 feet below grade at refusal.

All soil samples were analyzed under chain of custody (COC) by Massachusetts approved laboratory *Eurofins Spectrum Analytical* of Agawam, Massachusetts for Comm97 Soil Laboratory Analysis plus additional analysis for Mass Reclamation Facilities which includes: Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) Method 8260, Semi Volatile Organic Compounds (SVOCs) by EPA Method 8270, Polychlorinated Biphenyls (PCBs) by EPA Method 8082 and Total Petroleum Hydrocarbons (TPH) by Gas Chromatograph (GC), MassDEP 14 Metals, Herbicides and Pesticides by EPA Method 8151A and Method 8151B. Additionally, all soil samples were further characterized by the analysis of pH, flashpoint and reactivity (cyanide and sulfide).

In Massachusetts, the regulatory program that concerns releases of OHM to the environment is the Massachusetts Contingency Plan (MCP) 310 CMR 40.0000. This program is implemented by the Massachusetts Department of Environmental Protection (the "MassDEP") and includes specific

provisions regarding releases of oil and/or hazardous material (OHM) to the environment that must be reported to the MassDEP.

Soil Sampling Results

No concentrations of OHM in any of the fifteen (15) loam/topsoil and/or two (2) subsoil samples analyzed were detected above their applicable reportable concentration RCS-1 specified in Massachusetts Oil and Hazardous Materials List (MOHML) 310 CMR 40.1600 and 310 CMR 40.0300 **with the exception of arsenic. Concentrations of arsenic in all 17 soil samples submitted were detected above their RCS-1 of 20 milligrams per kilogram (mg/kg)**. The concentrations of arsenic ranged between 20.5 mg/kg and 82.3 mg/kg with an RCS-1 of 20 mg/kg. No concentrations of arsenic were detected above their applicable upper concentration limit (UCL) of 500 mg/kg. A copy of the laboratory results and their respective MCP RCS-1 reporting concentrations (RCs) are presented in Tables 1 through 4.

In addition, several SVOC compounds were above their applicable MCP RCS-1 310 CMR 40.0300 and 40.1600 criteria. The MDLs for these compounds are generally less than one order magnitude over their respective MDL and the past use of the site does not include the past use, storage of application of any OHM and therefore these compounds are not considered to be compounds of concern (COC).

Summary and Conclusions

In accordance with the Massachusetts Contingency Plan (MCP) 310 CMR 40.0361: Reportable Concentrations of Oil and Hazardous Material in Soil:

> (1) For the purpose of determining whether a notification obligation exists under 310 CMR 40.0315, measured concentrations of any oil or hazardous material listed at 310 CMR 40.1600 shall be compared to the Reportable Concentration value in the reporting category that best characterizes the current use of the site under evaluation, as described below:
>
> > (a) Reporting Category RCS-1. Reporting category RCS-1 shall be applied to all soil samples obtained at or within 500 feet of a residential dwelling, a residentially-zoned property, school, playground, recreational area or park.

The **detection of arsenic collected on July 9, 2020 in the site soils at concentrations exceeding their applicable RCS-1 triggers a 120-day notification requirement to the MassDEP under MCP 310 CMR 40.0315: Releases Which Require Notification Within 120 Days**.

Additionally, **since five (5) of the 17 soil samples exceeded a concentration of arsenic over 40 mg/kg the criteria for a release that could pose an Imminent Hazard to human health** in accordance with MCP 310 CMR 40.0321(2) which is "a release to the environment indicated by the measurement of concentrations of hazardous material, equal to or greater than any of the following concentrations at the ground surface or within a depth of twelve (12) inches below the

ground surface, at any location within 500 feet of a residential dwelling, school, playground, recreation area or park, unless access by children is controlled or prevented by means of bituminous pavement, concrete, fence, or other physical barrier". **A release that <u>could pose</u> an Imminent Hazard to human health requires a "Two Hour" release notification obligation to the MassDEP**.

<u>Recommendations</u>

At this time, due to the limited time to properly evaluate whether the detection of the concentrations of arsenic from the soil results from the July 9, 2020 soil precharacterization sampling prior to construction are naturally occurring as believed, ***ECMS*** **recommends that the MassDEP be notified of a release that <u>could pose</u> an Imminent Hazard to human health requires a "Two Hour" release notification obligation.**

As stated in MCP 310 CMR 40.0321(3) Notwithstanding the provisions of 310 CMR 40.0321(2) and 40.0321(3), a person required to notify under 310 CMR 40.0331 may demonstrate to the Department by a preponderance of the evidence that release or site conditions specified in 310 CMR 40.0321(2) and/or (3) do not constitute an actual Imminent Hazard to human health, in conformance with the Imminent Hazard Evaluation process described in 310 CMR 40.0426, and in consideration of the site-specific factors and the risk assessment and risk management criteria contained in 310 CMR 40.0950. No such demonstration, however, shall relieve any person of the obligation to notify the Department of a release or threat of release under the provisions of 310 CMR 40.0311 or 40.0312.

ECMS recommends that an **Imminent Hazard Evaluation** be completed to ensure that an Imminent Hazard does not exist.

ECMS also recommends that after MassDEP release notification that an evaluation be conducted to determine if a **Release Notification Retraction** under MCP 310 CMR 40.0335(1)(c), this release notification is being retracted on the basis that the subject release did not meet one or more of the sets of notification criteria specified in 310 CMR 40.0300. Specifically, releases of arsenic do not require notification pursuant to 310 CMR 40.0317(22) if they are in areas that are documented to have elevated arsenic measured in soil or groundwater that:

- is consistently present in the environment at and in the vicinity of the sampling location;
- is solely attributable to natural geologic or ecologic conditions; and
- has not been mobilized or transferred to another environmental medium or increased in concentration in an environmental medium as a result of anthropogenic activities.

Preliminary research indicates that the City of Amesbury lies within an area of Massachusetts that has been identified in studies by the United States Geological Survey (USGS) as being underlain by bedrock units, particularly the Merrimack and Nashoba formations, containing elevated arsenic concentrations (see *Arsenic and Uranium in Water from Private Well Completed in Bedrock of East-Central Massachusetts– Concentrations, Correlations with Bedrock Units, and Estimated Probability Maps*, John A. Colman, USGS, Scientific Investigations Report 2011-5013). Refer to https://pubs.usgs.gov/sir/2011/5013/.

Review of the test pits data completed by GZA as part of the geotechnical investigation indicates the presence of fill. Before any conclusion can be made to whether the detection of elevated arsenic in the site's soils is applicable for retraction, the nature and the source of the fill should be evaluated. Refer to Figure 3 Soil Test Location Plan dated December 23, 2019.

ECMS recommends that additional soil samples be collected at depths (greater than could be achieved during the sampling on July 9, 2020) as well as additional samples from areas further away from the ball fields where the majority of the July 9, 2020 sampling was conducted and analyzed for arsenic. As some of the site has been filled, additional research on the source of this fill will be conducted to determine its origin whether it was reworked from the site or imported, if possible.

Should you have any further questions or comments, please do not hesitate to contact us at (617) 338-2121.

Sincerely,

*For **Environmental & Construction Management Services, Inc.** by*

Kevin J. Kavanaugh, LSP, CHMM
Principal Environmental Engineer

Stephen T. Weydt
Principal Environmental Engineer

Attachments:

Figure 1 – Site Locus/Street Location Plan
Figure 2 – Soil Sample Location Plan July 9, 2020
Figure 3 – Soil Test Location Plan dated December 23, 2019

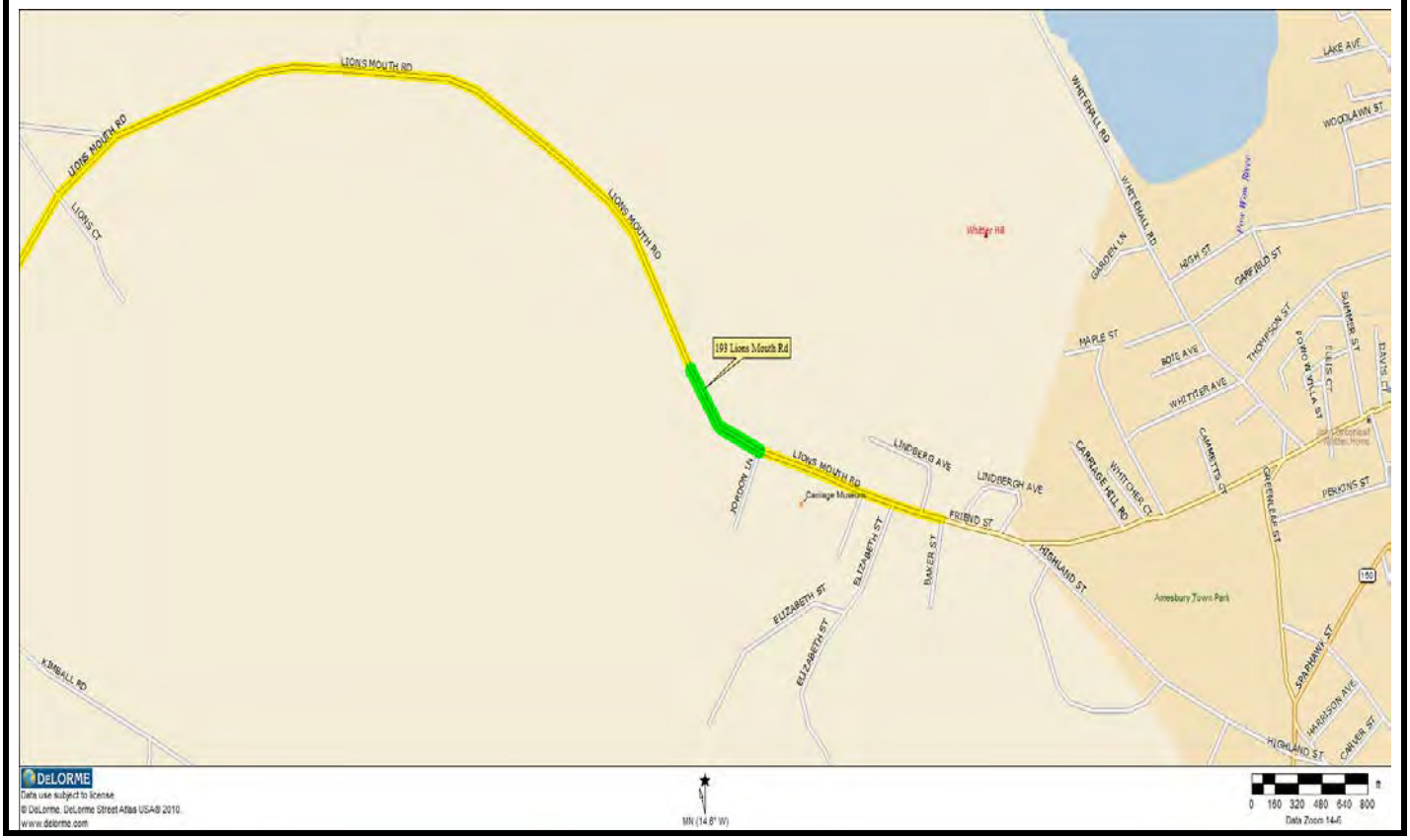
Table 1 – Summary of Subsoils Laboratory Analysis for pH, Reactivity, Ignitability, MassDEP 14 Metals, Polychlorinated Biphenyls (PCBS) and Total Petroleum Hydrocarbons (TPH)
Table 2 - Summary of Subsoils Laboratory Analysis for Volatile Organic Compounds (VOCs)
Table 3 - Summary of Subsoils Laboratory Analysis for Semi-Volatile Organic Compounds (SVOCs)

Table 4 - Summary of Subsoils Laboratory Analysis for Herbicides and Pesticides

Appendix A –Soil Laboratory Analysis Reports
Appendix B – Qualifications/Limitations

FIGURES





Cashman Elementary School **193 Lions Mouth Road** **Amesbury, Massachusetts** **01913**	**Environmental & Construction Management Services, Inc.**	**Project No.** 1009.073	**Figure 1**
		Site Locus / Street Location Plan	
		Drawn By: KJK	**Date:** 8/24/18

N

GENERAL NOTES

1. SEE SHEETS 1.3.01 AND 1.3.02 FOR ALL EROSION AND SEDIMENT CONTROL BARRIER INSTALLATIONS.
2. SEE SHEETS 1.3.01 AND 1.3.02 FOR ALL AREAS OF FUTURE STORMWATER MANAGEMENT. ALSO SEE NOTE 3 ON SHEET 1.3.01.
3. FOR TREES TO BE PROTECTED AND TO REMAIN, SEE LANDSCAPE PLANS.

Soil Sample Legend

- Surface Loam Sample
- Subsoil Sample
  - 24" Depth at Smaple 1
  - 22" Depth at Sample 2

STRIP EXISTING LOAM TOPSOIL AND STOCKPILE IN THE AREA DESIGNATED FOR STOCKPILING (AREA SHOWN CROSS HATCHED)

STRIP EXISTING LOAM TOPSOIL AND STOCKPILE IN THE AREA DESIGNATED FOR STOCKPILING (AREA SHOWN CROSS HATCHED)

STRIP EXISTING LOAM TOPSOIL AND STOCKPILE IN THE AREA DESIGNATED FOR STOCKPILING (AREA SHOWN CROSS HATCHED)

STRIP EXISTING LOAM TOPSOIL AND STOCKPILE IN THE AREA DESIGNATED FOR STOCKPILING (AREA SHOWN CROSS HATCHED)

WITHIN THE AREA OF THE EXISTING LOW SPOT, DO NOT REMOVE THE VEGETATIVE COVER OR TOPSOIL.

LOAM TOPSOIL STOCKPILE AREA WITHIN THE LIMIT SHOWN FOR LOAM TOPSOIL STOCKPILE. DO NOT REMOVE THE VEGETATIVE COVER OR TOPSOIL.

DO NOT REMOVE THE VEGETATIVE COVER OR TOPSOIL WITHIN THIS AREA.

LION'S MOUTH ROAD

LINDBERGH AVENUE (PUBLIC - 50' WIDE)

LINDBERGH AVENUE (DISCONTINUED)

MASSACHUSETTS STATE PLANE COORDINATES (NAD83 - GEOID 12A)

AMESBURY ELEMENTARY SCHOOL

EARLY SITE PREPARATION

AMESBURY, MA

DINISCO DESIGN
architects + planners

99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2858

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

Thompson Engineering Company, Inc.
Electrical Engineers
89 Newbury Street, Suite 103
Danvers, MA 01923
(617) 866-9066

Hancock Associates
Surveyor
185 Centre Street
Danvers, MA 09123
(978) 777-3050

KEY PLAN

NORTH ARROW | STAMP

Date: 6 JULY 2020

Drawn By: KMR

Scale: 0 40 80

Revisions

Number	Date	Description

90% EARLY SITE PACKAGE

Proposed Topsoil Removal Limit Plan

1.3.06

G:\Condocs\ active\ 23286\ Dwg\ 23286_Eng_ Rtk.dwg

© 2020 DiNisco Design

TABLES

TABLE 1

SUMMARY OF TOPSOIL/LOAM/SUBSOIL SAMPLES FOR pH, REACTIVITY, IGNITABILITY, MASSDEP 14 METALS, POLCHLORINATED BIPHENYLS (PCBs) & TOTAL PETROLEUM HYDROCARBONS (TPH)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SS-1	SS-2	SSS-3	SSS-4	SSS-5	SSS-6	SSS-7	SSS-8	SSS-9	MassDEP	MassDEP
Laboratory ID		SC58794-01	SC58794-02	SC58794-10	SC58794-11	SC58794-12	SC58794-13	SC58794-14	SC58794-15	SC58794-16	Reportable Concentrations	Imminent Hazard
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020		
Sample Depth		24"	22"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1	
SM2540 G (11) Mod. (%)												
solids	% Solids	89.3	88.8	82.7	88.9	85.8	92.6	83.4	86.1	78.7	NA	
SW846 9045D (pH Units)												
pH		5.99	6.08	6.13	5.58	5.57	5.74	5.71	5.56	5.41	NA	
SW846 Ch. 7.3 (mg/kg dry)												
Reactivity		Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative		
Reactive Cyanide		<6	<7	<7	<6	<6	<6	<7	<6	<7	30	
Reactive Sulfide		< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20		
SW846 1030 (N/A)												
NA	Ignitability by Definition	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	NA	
MassDEP 14 Metals - SW846 6010C (mg/kg)												
7440-36-0	Antimony	<5.59	<5.58	<5.98	<5.41	<6.27	<5.63	<6.01	<6.24	<6.28	20	
7440-38-2	Arsenic	**39.9**	**55.9**	**36.6**	**20.5**	**53.4**	**29.6**	**48.6**	**48.7**	**82.3**	**20**	**40**
7440-41-7	Beryllium	<0.559	<0.558	<0.598	<0.541	<0.627	<0.563	<0.601	<0.624	<0.628	90	
7440-43-9	Cadmium	<0.559	<0.558	<0.598	<0.541	<0.627	<0.563	<0.601	<0.624	<0.628	70	
7440-47-3	Chromium	22.6	19.4	21.8	18.8	25.0	30.0	65.9	31.6	24.7	100	
7439-92-1	Lead	8.42	19.3	17.0	18.6	17.0	15.8	28.6	21.0	22.9	200	
7440-02-0	Nickel	39.7	71.4	33.2	20.3	46.2	25.6	44.8	47.7	76.0	600	
7782-49-2	Selenium	<1.68	<1.67	<1.80	<1.62	<1.88	<1.69	<1.80	<1.87	<1.88	400	
7440-22-4	Silver	<3.35	<3.35	<3.59	<3.25	<3.76	<3.38	<3.60	<3.75	<3.77	100	
7440-28-0	Thallium	<3.35	<3.35	<3.59	<3.25	<3.76	<3.38	<3.60	<3.75	<3.77	8	
7440-62-2	Vanadium	22.7	24.5	30.1	24.5	33.9	35.8	46.7	36.0	39.4	400	
7440-66-6	Zinc	36.3	58.5	107	36.0	52.1	43.2	56.2	52.3	64.7	1000	
7440-39-3	Barium	18.4	22.5	30.0	29.5	30.3	28.6	34.6	33.0	29.1	1000	
RCRA Metals - SW846 7471B (mg/kg)												
7439-97-6	Mercury	<0.115	<0.127	<0.110	<0.116	<0.103	<0.120	<0.128	<0.115	<0.120	20	
Polychlorinated biphenyls (PCBs) - SW846 8082A (µg/kg)												
12674-11-2	Aroclor-1016	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
11104-28-2	Aroclor-1221	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
11141-16-5	Aroclor-1232	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
53469-21-9	Aroclor-1242	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
12672-29-6	Aroclor-1248	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
11097-69-1	Aroclor-1254	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
11096-82-5	Aroclor-1260	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
37324-23-5	Aroclor-1262	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	-	
11100-14-4	Aroclor-1268	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	-	
Total Petroleum Hydrocarbons (TPH) 8100 by GC (mg/kg)												
PH(TOT)	Total Petroleum Hydrocarbons	24.9	38.7	113	118	106	134	170	111	129	1000	

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazrdous Materials List (MOHML) revised (effective) 2014

Environmental & Construction Management Services, Inc.

TABLE 1

SUMMARY OF TOPSOIL/LOAM/SUBSOIL SAMPLES FOR pH, REACTIVITY, IGNITABILITY, MASSDEP 14 METALS, POLCHLORINATED BIPHENYLS (PCBs) & TOTAL PETROLEUM HYDROCARBONS (TPH)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location Laboratory ID Sample Date Sample Depth		SSS-10 SC58794-03 7/9/2020 2-6"	SSS-11 SC58794-04 7/9/2020 2-6"	SSS-12 SC58794-05 7/9/2020 2-6"	SSS-13 SC58794-06 7/9/2020 2-6"	SSS-14 SC58794-07 7/9/2020 2-6"	SSS-15 SC58794-17 7/9/2020 2-6"	SSS-16 SC58794-08 7/9/2020 2-6"	SSS-17 SC58794-09 7/9/2020 2-6"	MassDEP Reportable Concentrations RCS-1	MassDEP Imminent Hazard
SM2540 G (11) Mod. (%)											
solids	% Solids	80.1	80.6	83.3	79.0	86.9	79.8	90.3	89.6	NA	
SW846 9045D (pH Units)											
pH		6.17	5.47	5.71	6.35	6.03	5.69	6.08	6.11		
SW846 Ch. 7.3 (mg/kg dry)											
Reactivity		Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative		
Reactive Cyanide		<7	<9	<6	<7	<6	<7	<6	<6	30	
Reactive Sulfide		< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20		
SW846 1030 (N/A)											
NA	Ignitability by Definition	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	NA	
MassDEP 14 Metals - SW846 6010C (mg/kg)											
7440-36-0	Antimony	<5.89	<6.24	<5.56	<6.11	<5.63	<6.33	<5.58	<5.33	20	
7440-38-2	Arsenic	**25.4**	**33.6**	**39.2**	**49.1**	**23.7**	**37.8**	**36.6**	**21.9**	**20**	**40**
7440-41-7	Beryllium	<0.589	<0.624	<0.556	<0.611	<0.563	<0.633	<0.558	<0.533	90	
7440-43-9	Cadmium	<0.589	<0.624	<0.556	<0.611	<0.563	<0.633	<0.558	<0.533	70	
7440-47-3	Chromium	22.9	23.2	17.4	23.3	36.0	31.5	21.7	19.4	100	
7439-92-1	Lead	13.7	18.9	19.6	22.7	13.7	25.9	17.5	12.1	200	
7440-02-0	Nickel	28.2	30.4	26.9	37.2	26.1	37.7	30.6	27.9	600	
7782-49-2	Selenium	<1.77	<1.87	<1.67	<1.83	<1.69	<1.90	<1.67	<1.60	400	
7440-22-4	Silver	<3.53	<3.74	<3.34	<3.67	<3.38	<3.80	<3.35	<3.20	100	
7440-28-0	Thallium	<3.53	<3.74	<3.34	<3.67	<3.38	<3.80	<3.35	<3.20	8	
7440-62-2	Vanadium	29.6	38.3	33.5	34.6	41.9	36.3	30.6	8.48	400	
7440-66-6	Zinc	60.8	43.2	37.9	49.2	44.6	60.7	44.3	61.8	1000	
7440-39-3	Barium	26.5	24.8	21.7	28.9	44.1	46.3	24.0	113	1000	
RCRA Metals - SW846 7471B (mg/kg)											
7439-97-6	Mercury	<0.117	<0.126	<0.129	<0.133	<0.118	<0.123	<0.119	<0.116	20	
Polychlorinated biphenyls (PCBs) - SW846 8082A (µg/kg)											
12674-11-2	Aroclor-1016	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
11104-28-2	Aroclor-1221	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
11141-16-5	Aroclor-1232	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
53469-21-9	Aroclor-1242	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
12672-29-6	Aroclor-1248	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
11097-69-1	Aroclor-1254	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
11096-82-5	Aroclor-1260	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
37324-23-5	Aroclor-1262	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	-	
11100-14-4	Aroclor-1268	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	-	
Total Petroleum Hydrocarbons (TPH) 8100 by GC (mg/kg)											
PH(TOT)	Total Petroleum Hydrocarbons	109	184	180	93.0	116	168	93.6	49.7	1000	

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazrdous Materials List (MOHML) revised (effective) 2014

Environmental & Construction Management Services, Inc.

TABLE 2

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR VOLATILE ORGANIC COMPOUNDS (VOCs)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SS-1	SS-2	SSS-3	SSS-4	SSS-5	SSS-6	SSS-7	SSS-8	SSS-9	MassDEP Reportable Concentrations
Laboratory ID		SC58794-01	SC58794-02	SC58794-10	SC58794-11	SC58794-12	SC58794-13	SC58794-14	SC58794-15	SC58794-16	
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	
Sample Depth		24"	22"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Volatile Organic Compounds (VOCs) - SW846 8260B (µg/kg)											
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
67-64-1	Acetone	<532	<573	<711	<643	<662	<521	<594	<605	<760	6000
107-13-1	Acrylonitrile	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
71-43-2	Benzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	2000
108-86-1	Bromobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
74-97-5	Bromochloromethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
75-27-4	Bromodichloromethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
75-25-2	Bromoform	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
74-83-9	Bromomethane	<106	<115	<142	<129	<132	<104	<119	<121	<152	500
78-93-3	2-Butanone (MEK)	<106	<115	<142	<129	<132	<104	<119	<121	<152	4000
104-51-8	n-Butylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
135-98-8	sec-Butylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
98-06-6	tert-Butylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
75-15-0	Carbon disulfide	<106	<115	<142	<129	<132	<104	<119	<121	<152	100000
56-23-5	Carbon tetrachloride	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	5000
108-90-7	Chlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000
75-00-3	Chloroethane	<106	<115	<142	<129	<132	<104	<119	<121	<152	100000
67-66-3	Chloroform	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	200
74-87-3	Chloromethane	<106	<115	<142	<129	<132	<104	<119	<121	<152	100000
95-49-8	2-Chlorotoluene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
106-43-4	4-Chlorotoluene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
96-12-8	1,2-Dibromo-3-chloropropane	<106	<115	<142	<129	<132	<104	<119	<121	<152	10000
124-48-1	Dibromochloromethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	5
106-93-4	1,2-Dibromoethane (EDB)	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
74-95-3	Dibromomethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	500000
95-50-1	1,2-Dichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	9000
541-73-1	1,3-Dichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	3000
106-46-7	1,4-Dichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	700
75-71-8	Dichlorodifluoromethane (Freon12)	<106	<115	<142	<129	<132	<104	<119	<121	<152	1000000
75-34-3	1,1-Dichloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	400
107-06-2	1,2-Dichloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
75-35-4	1,1-Dichloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	3000
156-59-2	cis-1,2-Dichloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	300
156-60-5	trans-1,2-Dichloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000
78-87-5	1,2-Dichloropropane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
142-28-9	1,3-Dichloropropane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	500000
594-20-7	2,2-Dichloropropane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
563-58-6	1,1-Dichloropropene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
10061-01-5	cis-1,3-Dichloropropene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	10
10061-02-6	trans-1,3-Dichloropropene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	10
100-41-4	Ethylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	40000
87-68-3	Hexachlorobutadiene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	30000
591-78-6	2-Hexanone (MBK)	<106	<115	<142	<129	<132	<104	<119	<121	<152	100000
98-82-8	Isopropylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000000
99-87-6	4-Isopropyltoluene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
1634-04-4	Methyl tert-butyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
108-10-1	4-Methyl-2-pentanone (MIBK)	<106	<115	<142	<129	<132	<104	<119	<121	<152	400
75-09-2	Methylene chloride	<106	<115	<142	<129	<132	<104	<119	<121	<152	100
91-20-3	Naphthalene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	4000
103-65-1	n-Propylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
100-42-5	Styrene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	3000
630-20-6	1,1,1,2-Tetrachloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
79-34-5	1,1,2,2-Tetrachloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	5
127-18-4	Tetrachloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000
108-88-3	Toluene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	30000
87-61-6	1,2,3-Trichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
120-82-1	1,2,4-Trichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	2000
108-70-3	1,3,5-Trichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	30000
71-55-6	1,1,1-Trichloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
79-00-5	1,1,2-Trichloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
79-01-6	Trichloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	300
75-69-4	Trichlorofluoromethane (Freon 11)	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000000
96-18-4	1,2,3-Trichloropropane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
95-63-6	1,2,4-Trimethylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000000
108-67-8	1,3,5-Trimethylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	10000
75-01-4	Vinyl chloride	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	700
179601-23-1	m,p-Xylene	<106	<115	<142	<129	<132	<104	<119	<121	<152	300000
95-47-6	o-Xylene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	500000
109-99-9	Tetrahydrofuran	<106	<115	<142	<129	<132	<104	<119	<121	<152	500000
60-29-7	Ethyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
994-05-8	Tert-amyl methyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
637-92-3	Ethyl tert-butyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
108-20-3	Di-isopropyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
75-65-0	Tert-Butanol / butyl alcohol	<1060	<1150	<1420	<1290	<1320	<1040	<1190	<1210	<1520	100000
123-91-1	1,4-Dioxane	<1060	<1150	<1420	<1290	<1320	<1040	<1190	<1210	<1520	10000
110-57-6	trans-1,4-Dichloro-2-butene	<266	<286	<356	<321	<331	<261	<297	<302	<380	200
64-17-5	Ethanol	<10600	<11500	<14200	<12900	<13200	<10400	<11900	<12100	<15200	100000

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazrdous Materials List (MOHML) revised (effective) February 14, 2008

Environmental & Construction Management Services, Inc.

TABLE 2

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR VOLATILE ORGANIC COMPOUNDS (VOCs)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SSS-10	SSS-11	SSS-12	SSS-13	SSS-14	SSS-15	SSS-16	SSS-17	MassDEP Reportable Concentrations
Laboratory ID		SC58794-03	SC58794-04	SC58794-05	SC58794-06	SC58794-07	SC58794-17	SC58794-08	SC58794-09	
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	
Sample Depth		2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Volatile Organic Compounds (VOCs) - SW846 8260B (µg/kg)										
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
67-64-1	Acetone	<686	<693	<637	<695	<585	<695	<540	<529	6000
107-13-1	Acrylonitrile	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
71-43-2	Benzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	2000
108-86-1	Bromobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
74-97-5	Bromochloromethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
75-27-4	Bromodichloromethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
75-25-2	Bromoform	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
74-83-9	Bromomethane	<137	<139	<127	<139	<117	<139	<108	<106	500
78-93-3	2-Butanone (MEK)	<137	<139	<127	<139	<117	<139	<108	<106	4000
104-51-8	n-Butylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
135-98-8	sec-Butylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
98-06-6	tert-Butylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
75-15-0	Carbon disulfide	<137	<139	<127	<139	<117	<139	<108	<106	100000
56-23-5	Carbon tetrachloride	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	5000
108-90-7	Chlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000
75-00-3	Chloroethane	<137	<139	<127	<139	<117	<139	<108	<106	100000
67-66-3	Chloroform	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	200
74-87-3	Chloromethane	<137	<139	<127	<139	<117	<139	<108	<106	100000
95-49-8	2-Chlorotoluene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
106-43-4	4-Chlorotoluene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
96-12-8	1,2-Dibromo-3-chloropropane	<137	<139	<127	<139	<117	<139	<108	<106	10000
124-48-1	Dibromochloromethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	5
106-93-4	1,2-Dibromoethane (EDB)	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
74-95-3	Dibromomethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	500000
95-50-1	1,2-Dichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	9000
541-73-1	1,3-Dichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	3000
106-46-7	1,4-Dichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	700
75-71-8	Dichlorodifluoromethane (Freon12)	<137	<139	<127	<139	<117	<139	<108	<106	1000000
75-34-3	1,1-Dichloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	400
107-06-2	1,2-Dichloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
75-35-4	1,1-Dichloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	3000
156-59-2	cis-1,2-Dichloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	300
156-60-5	trans-1,2-Dichloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000
78-87-5	1,2-Dichloropropane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
142-28-9	1,3-Dichloropropane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	500000
594-20-7	2,2-Dichloropropane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
563-58-6	1,1-Dichloropropene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
10061-01-5	cis-1,3-Dichloropropene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	10
10061-02-6	trans-1,3-Dichloropropene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	10
100-41-4	Ethylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	40000
87-68-3	Hexachlorobutadiene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	30000
591-78-6	2-Hexanone (MBK)	<137	<139	<127	<139	<117	<139	<108	<106	100000
98-82-8	Isopropylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000000
99-87-6	4-Isopropyltoluene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
1634-04-4	Methyl tert-butyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
108-10-1	4-Methyl-2-pentanone (MIBK)	<137	<139	<127	<139	<117	<139	<108	<106	400
75-09-2	Methylene chloride	<137	<139	<127	<139	<117	<139	<108	<106	100
91-20-3	Naphthalene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	4000
103-65-1	n-Propylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
100-42-5	Styrene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	3000
630-20-6	1,1,1,2-Tetrachloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
79-34-5	1,1,2,2-Tetrachloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	5
127-18-4	Tetrachloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000
108-88-3	Toluene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	30000
87-61-6	1,2,3-Trichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
120-82-1	1,2,4-Trichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	2000
108-70-3	1,3,5-Trichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	30000
71-55-6	1,1,1-Trichloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
79-00-5	1,1,2-Trichloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
79-01-6	Trichloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	300
75-69-4	Trichlorofluoromethane (Freon 11)	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000000
96-18-4	1,2,3-Trichloropropane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
95-63-6	1,2,4-Trimethylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000000
108-67-8	1,3,5-Trimethylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	10000
75-01-4	Vinyl chloride	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	700
179601-23-1	m,p-Xylene	<137	<139	<127	<139	<117	<139	<108	<106	300000
95-47-6	o-Xylene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	500000
109-99-9	Tetrahydrofuran	<137	<139	<127	<139	<117	<139	<108	<106	500000
60-29-7	Ethyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
994-05-8	Tert-amyl methyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
637-92-3	Ethyl tert-butyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
108-20-3	Di-isopropyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
75-65-0	Tert-Butanol / butyl alcohol	<1370	<1390	<1270	<1390	<1170	<1390	<1080	<1060	100000
123-91-1	1,4-Dioxane	<1370	<1390	<1270	<1390	<1170	<1390	<1080	<1060	10000
110-57-6	trans-1,4-Dichloro-2-butene	<343	<347	<318	<348	<292	<347	<270	<264	200
64-17-5	Ethanol	<13700	<13900	<12700	<13900	<11700	<13900	<10800	<10600	100000

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazrdous Materials List (MOHML) revised (effective) February 14, 2008

Environmental & Construction Management Services, Inc.

TABLE 3

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SS-1	SS-2	SSS-3	SSS-4	SSS-5	SSS-6	SSS-7	SSS-8	SSS-9	MassDEP Reportable Concentrations
Laboratory ID		SC58794-01	SC58794-02	SC58794-10	SC58794-11	SC58794-12	SC58794-13	SC58794-14	SC58794-15	SC58794-16	
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	
Sample Depth		24"	22"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Semi-Volatile Organic Compounds (SVOCs) - SW846 8270D (µg/kg)											
83-32-9	Acenaphthene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	4000
208-96-8	Acenaphthylene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000
62-53-3	Aniline	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
120-12-7	Anthracene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
103-33-3	Azobenzene/Diphenyldiazene	<368	<369	<396	<367	<379	<352	<394	<379	<415	50000
92-87-5	Benzidine	<736	<738	<792	<735	<759	<704	<787	<757	<829	10000
56-55-3	Benzo (a) anthracene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	7000
50-32-8	Benzo (a) pyrene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	2000
205-99-2	Benzo (b) fluoranthene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	7000
191-24-2	Benzo (g,h,i) perylene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
207-08-9	Benzo (k) fluoranthene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
65-85-0	Benzoic acid	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
100-51-6	Benzyl alcohol	<368	<369	<396	<367	<379	<352	<394	<379	<415	-
111-91-1	Bis(2-chloroethoxy)methane	<368	<369	<396	<367	<379	<352	<394	<379	<415	500000
111-44-4	Bis(2-chloroethyl)ether	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
108-60-1	Bis(2-chloroisopropyl)ether	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
117-81-7	Bis(2-ethylhexyl)phthalate	<186	<187	<201	<186	<192	<178	<199	<192	<210	200000
101-55-3	4-Bromophenyl phenyl ether	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
85-68-7	Butyl benzyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
86-74-8	Carbazole	<186	<187	<201	<186	<192	<178	<199	<192	<210	-
59-50-7	4-Chloro-3-methylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
106-47-8	4-Chloroaniline	<186	<187	<201	<186	<192	<178	<199	<192	<210	1000
91-58-7	2-Chloronaphthalene	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
95-57-8	2-Chlorophenol	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
7005-72-3	4-Chlorophenyl phenyl ether	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
218-01-9	Chrysene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	70000
53-70-3	Dibenzo (a,h) anthracene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	700
132-64-9	Dibenzofuran	<186	<187	<201	<186	<192	<178	<199	<192	<210	100000
95-50-1	1,2-Dichlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	9000
541-73-1	1,3-Dichlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000
106-46-7	1,4-Dichlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	700
91-94-1	3,3´-Dichlorobenzidine	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000
120-83-2	2,4-Dichlorophenol	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
84-66-2	Diethyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	10000
131-11-3	Dimethyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	30000
105-67-9	2,4-Dimethylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	700
84-74-2	Di-n-butyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	50000
534-52-1	4,6-Dinitro-2-methylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	50000
51-28-5	2,4-Dinitrophenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	3000
121-14-2	2,4-Dinitrotoluene	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
606-20-2	2,6-Dinitrotoluene	<186	<187	<201	<186	<192	<178	<199	<192	<210	100000
117-84-0	Di-n-octyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
206-44-0	Fluoranthene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
86-73-7	Fluorene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
118-74-1	Hexachlorobenzene	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
87-68-3	Hexachlorobutadiene	<186	<187	<201	<186	<192	<178	<199	<192	<210	6000
77-47-4	Hexachlorocyclopentadiene	<186	<187	<201	<186	<192	<178	<199	<192	<210	50000
67-72-1	Hexachloroethane	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
193-39-5	Indeno (1,2,3-cd) pyrene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	7000
78-59-1	Isophorone	<186	<187	<201	<186	<192	<178	<199	<192	<210	100000
91-57-6	2-Methylnaphthalene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	700
95-48-7	2-Methylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	500000
108-39-4, 106-44-5	3 & 4-Methylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	500000
91-20-3	Naphthalene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	4000
88-74-4	2-Nitroaniline	<368	<369	<396	<367	<379	<352	<394	<379	<415	-
99-09-2	3-Nitroaniline	<368	<369	<396	<367	<379	<352	<394	<379	<415	-
100-01-6	4-Nitroaniline	<186	<187	<201	<186	<192	<178	<199	<192	<210	1000000
98-95-3	Nitrobenzene	<186	<187	<201	<186	<192	<178	<199	<192	<210	500000
88-75-5	2-Nitrophenol	<186	<187	<201	<186	<192	<178	<199	<192	<210	100000
100-02-7	4-Nitrophenol	<1470	<1480	<1580	<1470	<1520	<1410	<1570	<1510	<1660	100000
62-75-9	N-Nitrosodimethylamine	<186	<187	<201	<186	<192	<178	<199	<192	<210	50000
621-64-7	N-Nitrosodi-n-propylamine	<186	<187	<201	<186	<192	<178	<199	<192	<210	50000
86-30-6	N-Nitrosodiphenylamine	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
87-86-5	Pentachlorophenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	3000
85-01-8	Phenanthrene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	10000
108-95-2	Phenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000
129-00-0	Pyrene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
110-86-1	Pyridine	<368	<369	<396	<367	<379	<352	<394	<379	<415	500000
120-82-1	1,2,4-Trichlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	2000
90-12-0	1-Methylnaphthalene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	-
95-95-4	2,4,5-Trichlorophenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	3000
88-06-2	2,4,6-Trichlorophenol	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
82-68-8	Pentachloronitrobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
95-94-3	1,2,4,5-Tetrachlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Boldfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

Environmental & Construction Management Services, Inc.

TABLE 3

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SSS-10	SSS-11	SSS-12	SSS-13	SSS-14	SSS-15	SSS-16	SSS-17	MassDEP Reportable Concentrations
Laboratory ID		SC58794-03	SC58794-04	SC58794-05	SC58794-06	SC58794-07	SC58794-17	SC58794-08	SC58794-09	
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	
Sample Depth		2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Semi-Volatile Organic Compounds (SVOCs) - SW846 8270D (µg/kg)										
83-32-9	Acenaphthene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	4000
208-96-8	Acenaphthylene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000
62-53-3	Aniline	<407	<405	<385	<414	<375	<407	<361	<356	100000
120-12-7	Anthracene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
103-33-3	Azobenzene/Diphenyldiazene	<407	<405	<385	<414	<375	<407	<361	<356	50000
92-87-5	Benzidine	<815	<809	<771	<828	<750	<814	<722	<713	10000
56-55-3	Benzo (a) anthracene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	7000
50-32-8	Benzo (a) pyrene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	2000
205-99-2	Benzo (b) fluoranthene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	7000
191-24-2	Benzo (g,h,i) perylene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
207-08-9	Benzo (k) fluoranthene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
65-85-0	Benzoic acid	<407	<405	<385	<414	<375	<407	<361	<356	1000000
100-51-6	Benzyl alcohol	<407	<405	<385	<414	<375	<407	<361	<356	-
111-91-1	Bis(2-chloroethoxy)methane	<407	<405	<385	<414	<375	<407	<361	<356	500000
111-44-4	Bis(2-chloroethyl)ether	<206	<205	<195	<210	<190	<206	<183	<180	700
108-60-1	Bis(2-chloroisopropyl)ether	<206	<205	<195	<210	<190	<206	<183	<180	700
117-81-7	Bis(2-ethylhexyl)phthalate	305	<205	<195	<210	<190	<206	<183	<180	200000
101-55-3	4-Bromophenyl phenyl ether	<407	<405	<385	<414	<375	<407	<361	<356	100000
85-68-7	Butyl benzyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	100000
86-74-8	Carbazole	<206	<205	<195	<210	<190	<206	<183	<180	-
59-50-7	4-Chloro-3-methylphenol	<407	<405	<385	<414	<375	<407	<361	<356	1000000
106-47-8	4-Chloroaniline	<206	<205	<195	<210	<190	<206	<183	<180	1000
91-58-7	2-Chloronaphthalene	<407	<405	<385	<414	<375	<407	<361	<356	1000000
95-57-8	2-Chlorophenol	<206	<205	<195	<210	<190	<206	<183	<180	700
7005-72-3	4-Chlorophenyl phenyl ether	<407	<405	<385	<414	<375	<407	<361	<356	1000000
218-01-9	Chrysene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	70000
53-70-3	Dibenzo (a,h) anthracene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	700
132-64-9	Dibenzofuran	<206	<205	<195	<210	<190	<206	<183	<180	100000
95-50-1	1,2-Dichlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	9000
541-73-1	1,3-Dichlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	1000
106-46-7	1,4-Dichlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	700
91-94-1	3,3'-Dichlorobenzidine	<407	<405	<385	<414	<375	<407	<361	<356	1000
120-83-2	2,4-Dichlorophenol	<206	<205	<195	<210	<190	<206	<183	<180	700
84-66-2	Diethyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	10000
131-11-3	Dimethyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	30000
105-67-9	2,4-Dimethylphenol	<407	<405	<385	<414	<375	<407	<361	<356	700
84-74-2	Di-n-butyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	50000
534-52-1	4,6-Dinitro-2-methylphenol	<407	<405	<385	<414	<375	<407	<361	<356	50000
51-28-5	2,4-Dinitrophenol	<407	<405	<385	<414	<375	<407	<361	<356	3000
121-14-2	2,4-Dinitrotoluene	<206	<205	<195	<210	<190	<206	<183	<180	700
606-20-2	2,6-Dinitrotoluene	<206	<205	<195	<210	<190	<206	<183	<180	100000
117-84-0	Di-n-octyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	1000000
206-44-0	Fluoranthene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
86-73-7	Fluorene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
118-74-1	Hexachlorobenzene	<206	<205	<195	<210	<190	<206	<183	<180	700
87-68-3	Hexachlorobutadiene	<206	<205	<195	<210	<190	<206	<183	<180	6000
77-47-4	Hexachlorocyclopentadiene	<206	<205	<195	<210	<190	<206	<183	<180	50000
67-72-1	Hexachloroethane	<206	<205	<195	<210	<190	<206	<183	<180	700
193-39-5	Indeno (1,2,3-cd) pyrene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	7000
78-59-1	Isophorone	<206	<205	<195	<210	<190	<206	<183	<180	100000
91-57-6	2-Methylnaphthalene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	700
95-48-7	2-Methylphenol	<407	<405	<385	<414	<375	<407	<361	<356	500000
108-39-4, 106-44-5	3 & 4-Methylphenol	<407	<405	<385	<414	<375	<407	<361	<356	500000
91-20-3	Naphthalene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	4000
88-74-4	2-Nitroaniline	<407	<405	<385	<414	<375	<407	<361	<356	-
99-09-2	3-Nitroaniline	<407	<405	<385	<414	<375	<407	<361	<356	-
100-01-6	4-Nitroaniline	<206	<205	<195	<210	<190	<206	<183	<180	1000000
98-95-3	Nitrobenzene	<206	<205	<195	<210	<190	<206	<183	<180	500000
88-75-5	2-Nitrophenol	<206	<205	<195	<210	<190	<206	<183	<180	100000
100-02-7	4-Nitrophenol	<1630	<1620	<1540	<1660	<1500	<1630	<1440	<1430	100000
62-75-9	N-Nitrosodimethylamine	<206	<205	<195	<210	<190	<206	<183	<180	50000
621-64-7	N-Nitrosodi-n-propylamine	<206	<205	<195	<210	<190	<206	<183	<180	50000
86-30-6	N-Nitrosodiphenylamine	<407	<405	<385	<414	<375	<407	<361	<356	100000
87-86-5	Pentachlorophenol	<407	<405	<385	<414	<375	<407	<361	<356	3000
85-01-8	Phenanthrene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	10000
108-95-2	Phenol	<407	<405	<385	<414	<375	<407	<361	<356	1000
129-00-0	Pyrene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
110-86-1	Pyridine	<407	<405	<385	<414	<375	<407	<361	<356	500000
120-82-1	1,2,4-Trichlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	2000
90-12-0	1-Methylnaphthalene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	-
95-95-4	2,4,5-Trichlorophenol	<407	<405	<385	<414	<375	<407	<361	<356	3000
88-06-2	2,4,6-Trichlorophenol	<206	<205	<195	<210	<190	<206	<183	<180	700
82-68-8	Pentachloronitrobenzene	<407	<405	<385	<414	<375	<407	<361	<356	100000
95-94-3	1,2,4,5-Tetrachlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	1000000

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Boldfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

Environmental & Construction Management Services, Inc.

TABLE 4

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR PESTICIDES AND HERBICIDES

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location Laboratory ID Sample Date Sample Depth		SS-1 SC58794-01 7/9/2020 24"	SS-2 SC58794-02 7/9/2020 22"	SSS-3 SC58794-10 7/9/2020 2-6"	SSS-4 SC58794-11 7/9/2020 2-6"	SSS-5 SC58794-12 7/9/2020 2-6"	SSS-6 SC58794-13 7/9/2020 2-6"	SSS-7 SC58794-14 7/9/2020 2-6"	SSS-8 SC58794-15 7/9/2020 2-6"	SSS-9 SC58794-16 7/9/2020 2-6"	MCP Reportable Concentrations RCS-1
Pesticides - SW846 8081B (µg/kg)											
319-84-6	a-BHC	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	50000
319-85-7	b-BHC	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	10000
319-86-8	d-BHC	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	10000
58-89-9	g-BHC (Lindane)	<3.32	<3.34	<3.46	<3.23	<3.46	<3.22	<3.57	<3.45	<3.80	3000
76-44-8	Heptachlor	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	200
309-00-2	Aldrin	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	100000
1024-57-3	Heptachlor epoxide	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	90
959-98-8	Endosulfan I	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	500
60-57-1	Dieldrin	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	50
72-55-9	4,4' -DDE	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	3000
72-20-8	Endrin	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	8000
33213-65-9	Endosulfan II	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	500
72-54-8	4,4' -DDD	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	4000
1031-07-8	Endosulfan sulfate	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	-
50-29-3	4,4' -DDT	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	-
72-43-5	Methoxychlor	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	200000
53494-70-5	Endrin ketone	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	8000
7421-93-4	Endrin aldehyde	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	10000
5103-71-9	alpha-Chlordane	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	-
5103-74-2	gamma-Chlordane	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	-
8001-35-2	Toxaphene	<111	<111	<115	<108	<115	<107	<119	<115	<127	10000
57-74-9	Chlordane	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	700
15972-60-8	Alachlor	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	100
Herbicides - SW846 8151A (µg/kg)											
93-76-5	2,4,5-T	<80	<80	<80	<80	<80	<80	<80	<80	<80	100000
93-72-1	2,4,5-TP (Silvex)	<80	<80	<80	<80	<80	<80	<80	<80	<80	100000
94-75-7	2,4-D	<80	<80	<80	<80	<80	<80	<80	<80	<80	100000
94-82-6	2,4-DB	<80	<80	<80	<80	<80	<80	<80	<80	<80	100000
75-99-0	Dalapon	<80	<80	<80	<80	<80	<80	<80	<80	<80	1000000
1918-00-9	Dicamba	<80	<80	<80	<80	<80	<80	<80	<80	<80	500000
120-36-5	Dichloroprop	<80	<80	<80	<80	<80	<80	<80	<80	<80	-
88-85-7	Dinoseb	<80	<80	<80	<80	<80	<80	<80	<80	<80	500000
94-74-6	MCPA	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	100000
7085-19-0	MCPP	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	-

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Boldfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

TABLE 4

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR PESTICIDES AND HERBICIDES

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SSS-10	SSS-11	SSS-12	SSS-13	SSS-14	SSS-15	SSS-16	SSS-17	MCP
Laboratory ID		SC58794-03	SC58794-04	SC58794-05	SC58794-06	SC58794-07	SC58794-17	SC58794-08	SC58794-09	Reportable
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	Concentrations
Sample Depth		2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Pesticides - SW846 8081B (µg/kg)										
319-84-6	a-BHC	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	4000
319-85-7	b-BHC	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	3000
319-86-8	d-BHC	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	3000
58-89-9	g-BHC (Lindane)	<3.64	<3.69	<3.51	<3.78	<3.38	<3.73	<3.26	<3.34	50000
76-44-8	Heptachlor	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	100
309-00-2	Aldrin	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	100000
1024-57-3	Heptachlor epoxide	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	10000
959-98-8	Endosulfan I	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	700
60-57-1	Dieldrin	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	10000
72-55-9	4,4' -DDE	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	50
72-20-8	Endrin	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	500
33213-65-9	Endosulfan II	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	500
72-54-8	4,4' -DDD	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	-
1031-07-8	Endosulfan sulfate	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	8000
50-29-3	4,4' -DDT	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	10000
72-43-5	Methoxychlor	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	8000
53494-70-5	Endrin ketone	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	3000
7421-93-4	Endrin aldehyde	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	200
5103-71-9	alpha-Chlordane	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	90
5103-74-2	gamma-Chlordane	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	700
8001-35-2	Toxaphene	<121	<123	<117	<126	<113	<124	<109	<111	200000
57-74-9	Chlordane	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	10000
15972-60-8	Alachlor	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	-
Herbicides - SW846 8151A (µg/kg)										
93-76-5	2,4,5-T	<80	<80	<80	<80	<80	<80	<80	<80	100000
93-72-1	2,4,5-TP (Silvex)	<80	<80	<80	<80	<80	<80	<80	<80	100000
94-75-7	2,4-D	<80	<80	<80	<80	<80	<80	<80	<80	100000
94-82-6	2,4-DB	<80	<80	<80	<80	<80	<80	<80	<80	100000
75-99-0	Dalapon	<80	<80	<80	<80	<80	<80	<80	<80	1000000
1918-00-9	Dicamba	<80	<80	<80	<80	<80	<80	<80	<80	500000
120-36-5	Dichloroprop	<80	<80	<80	<80	<80	<80	<80	<80	-
88-85-7	Dinoseb	<80	<80	<80	<80	<80	<80	<80	<80	500000
94-74-6	MCPA	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	100000
7085-19-0	MCPP	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	-

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Boldfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

APPENDIX A

SOIL LABORATORY ANALYSIS REPORTS

eurofins | Environment Testing New England

☑ Final Report
☐ Revised Report

Report Date:
17-Jul-20 14:44

Laboratory Report
SC58794

ECMS, Inc.
639 Granite Street, Suite 407
Braintree, MA 02184
Attn: Kevin Kavanaugh

Project: Cashman School - Amesbury, MA
Project #: 1009.073

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.
All applicable NELAC requirements have been met.

Massachusetts # RI907
New York # 11393
Rhode Island # LAI00368
USDA # P330-20-00109

Authorized by:

Agnes Huntley
Project Manager



Eurofins Environment Testing New England holds primary NELAC certification in the State of New York for the analytes as indicated with an X in the "Cert." column within this report. Please note that the State of New York does not offer certification for all analytes. Please refer to our website for specific certification holdings in each state.
Please note that this report contains 175 pages of analytical data plus Chain of Custody document(s). When the Laboratory Report is indicated as revised, this report supersedes any previously dated reports for the laboratory ID(s) referenced above. Where this report identifies subcontracted analyses, copies of the subcontractor's test report are available upon request. This report may not be reproduced, except in full, without written approval from Eurofins Environment Testing New England.

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Please contact the Laboratory or Technical Director at 413-789-9018 with any questions regarding the data contained in this laboratory report.

Sample Summary

Work Order: SC58794

Project: Cashman School - Amesbury, MA

Project Number: 1009.073

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
SC58794-01	SS-1	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-02	SS-2	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-03	SSS-10	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-04	SSS-11	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-05	SSS-12	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-06	SSS-13	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-07	SSS-14	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-08	SSS-16	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-09	SSS-17	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-10	SSS-3	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-11	SSS-4	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-12	SSS-5	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-13	SSS-6	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-14	SSS-7	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-15	SSS-8	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-16	SSS-9	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-17	SSS-15	Soil	09-Jul-20 00:00	10-Jul-20 15:28

MassDEP Analytical Protocol Certification Form

Laboratory Name: Eurofins Spectrum Analytical, Inc. **Project #:** 1009.073

Project Location: Cashman School - Amesbury, MA **RTN:**

This form provides certifications for the following data set: SC58794-01 through SC58794-17

Matrices: Soil

CAM Protocol

✓ 8260 VOC CAM II A	✓ 7470/7471 Hg CAM III B	MassDEP VPH CAM IV A	✓ 8081 Pesticides CAM V B	7196 Hex Cr CAM VI B	MassDEP APH CAM IX A
✓ 8270 SVOC CAM II B	7010 Metals CAM III C	MassDEP EPH CAM IV B	✓ 8151 Herbicides CAM V C	8330 Explosives CAM VIII A	TO-15 VOC CAM IX B
✓ 6010 Metals CAM III A	6020 Metals CAM III D	✓ 8082 PCB CAM V A	9012 Total Cyanide/PAC CAM VI A	9014 Total Cyanide/PAC CAM VI A	6860 Perchlorate CAM VIII B

Affirmative responses to questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain of Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	Yes ✓ No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	✓ Yes No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	✓ Yes No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	✓ Yes No
E	a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	Yes No Yes No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to questions A through E)?	✓ Yes No

Responses to questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	✓ Yes No

***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**

H	Were all QC performance standards specified in the CAM protocol(s) achieved?	Yes ✓ No
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	✓ Yes No

All negative responses are addressed in a case narrative on the cover page of this report.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Dawn E. Wojcik

Dawn E. Wojcik
Laboratory Director
Date: 7/17/2020

CASE NARRATIVE:

Data has been reported to the RDL. This report excludes estimated concentrations detected below the RDL and above the MDL (J-Flag).

All non-detects and all results below the reporting limit are reported as "<" (less than) the reporting limit in this report.

The samples were received 2.3 degrees Celsius, please refer to the Chain of Custody for details specific to temperature upon receipt. An infrared thermometer with a tolerance of +/- 1.0 degrees Celsius was used immediately upon receipt of the samples.

If a Matrix Spike (MS), Matrix Spike Duplicate (MSD) or Duplicate (DUP) was not requested on the Chain of Custody, method criteria may have been fulfilled with a source sample not of this Sample Delivery Group. If method or program required MS/MSD/Dup were not performed, sufficient sample was not provided to the laboratory.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method. Regulatory limits may not be achieved if specific method and/or technique was not requested on the Chain of Custody.

According to WSC-CAM 5/2009 Rev.1, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although they may still be within the recommended recovery range, a range has been set based on historical control limits.

Some target analytes which are not listed as exceptions in the Summary of CAM Reporting Limits may exceed the recommended RL based on sample initial volume or weight provided, % moisture content, or responsiveness of a particular analyte to purge and trap instrumentation.

All VOC soils samples submitted and analyzed in methanol will have a minimum dilution factor of 50. This is the minimum amount of solvent allowed on the instrumentation without causing interference. Soils are run on a manual load instrument. 100ug of sample (MEOH) is spiked into 5ml DI water along with the surrogate and added directly onto the instrument. Additional dilution factors may be required to keep analyte concentration within instrument calibration range.

Method SW846 5035A is designed to use on samples containing low levels of VOCs, ranging from 0.5 to 200 ug/Kg. Target analytes that are less responsive to purge and trap may be present at concentrations over 200ug/Kg but may not be reportable in the methanol preserved vial (SW846 5030). This is the result of the inherent dilution factor required for the methanol preservation.

Analyses for Total Hardness, pH, and Total Residual Chlorine fall under the state of Pennsylvania code Chapter 252.6 accreditation by rule.

Reactivity (40 CFR 261.23) Case Narrative:

These samples do not exhibit the characteristics of reactivity as defined in 40 CFR 261.23, sections (1), (2) and (4); however, Eurofins Spectrum Analytical, Inc. does not test for detonation, explosive reaction or potential, or forbidden explosives as defined in 40 CFR 261.23, sections (3), (6), (7) and (8).

Reactive sulfide and cyanide are tested at a pH of 2 and not tested at all conditions between pH 2 and12.5 as stated in 40 CFR 261.23, section (5); thus reactive cyanide and sulfide results as reported in this document can not be used to support the nonreactive properties of these samples.

The responsibility falls on the generator to use knowledge of the waste to determine if the waste meets or does not meet the descriptive, prose definition of reactivity.

See below for any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

SW8151A

Laboratory Control Samples:

537320A BSD

SW8151A

Laboratory Control Samples:

537320A BSD

Dinoseb RPD 64.3% (20%) is outside individual acceptance criteria.

CG33195-LCS

This parameter is outside laboratory rpd specified recovery limits.

Dinoseb

CG33195-LCSD

This parameter is outside laboratory rpd specified recovery limits.

Dinoseb

SW846 6010C

Laboratory Control Samples:

2001078 SRM/SRMD

Lead percent recoveries (82/86) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

Spikes:

2001078-MS1 *Source: SC58794-02*

The spike recovery exceeded the QC control limits for the MS and/or MSD. The batch was accepted based upon acceptable PS and /or LCS recovery.

Antimony

2001078-MSD1 *Source: SC58794-02*

The spike recovery exceeded the QC control limits for the MS and/or MSD. The batch was accepted based upon acceptable PS and /or LCS recovery.

Antimony

Duplicates:

2001078-DUP1 *Source: SC58794-02*

The RPD exceeded the QC control limits; however precision is demonstrated with acceptable RPD values for MS/MSD.

Nickel

SW846 7471B

Spikes:

2001079-MS1 *Source: SC58794-01*

The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

Mercury

SW846 8081B

Laboratory Control Samples:

2001088 BS/BSD

Chlordane [2C] percent recoveries (0/0) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

Chlordane percent recoveries (0/0) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

SW846 8081B

Laboratory Control Samples:

2001088 BS/BSD

Toxaphene [2C] percent recoveries (0/0) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

Toxaphene percent recoveries (0/0) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

Samples:

SC58794-05 *SSS-12*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-06 *SSS-13*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-07 *SSS-14*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SW846 8081B

Samples:

SC58794-08 *SSS-16*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-09 *SSS-17*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-10 *SSS-3*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-11 *SSS-4*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-12 *SSS-5*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-13 *SSS-6*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-14 *SSS-7*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-15 *SSS-8*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-16 *SSS-9*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-17 *SSS-15*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SW846 8260C

Laboratory Control Samples:

2001076 BS/BSD

SW846 8260C

Laboratory Control Samples:

2001076 BS/BSD

1,1,2-Trichlorotrifluoroethane (Freon 113) percent recoveries (130/131) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

2-Butanone (MEK) percent recoveries (133/109) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

SW846 8260C

Laboratory Control Samples:

2001076 BS/BSD

2-Hexanone (MBK) percent recoveries (150/130) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

Acetone percent recoveries (121/143) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

SW846 8260C

Laboratory Control Samples:

2001076 BS/BSD

Chloroethane percent recoveries (147/137) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

Chloromethane percent recoveries (133/137) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

SW846 8260C

Laboratory Control Samples:

2001076 BS/BSD

Dichlorodifluoromethane (Freon12) percent recoveries (150/150) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

Trichlorofluoromethane (Freon 11) percent recoveries (140/138) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

SW846 8270D

Laboratory Control Samples:

2001083 BSD

N-Nitrosodimethylamine RPD 32% (30%) is outside individual acceptance criteria.

Pyridine RPD 33% (30%) is outside individual acceptance criteria.

2001083-BSD1

Analyte is out of acceptance range in the QC spike but the total number of out of range analytes is within overall method criteria.

N-Nitrosodimethylamine
Pyridine

SW846 8270D

Spikes:

2001083-MS1 *Source: SC58794-01*

The spike recovery for this QC sample is outside the established control limits. The sample results for the QC batch were accepted based on LCS/LCSD or SRM recoveries within the control limits.

2,4-Dinitrophenol
Aniline
Benzidine
Benzoic acid

2001083-MSD1 *Source: SC58794-01*

The spike recovery for this QC sample is outside the established control limits. The sample results for the QC batch were accepted based on LCS/LCSD or SRM recoveries within the control limits.

Aniline
Benzidine

Sample Acceptance Check Form

Client:	ECMS, Inc.
Project:	Cashman School - Amesbury, MA / 1009.073
Work Order:	SC58794
Sample(s) received on:	7/10/2020

The following outlines the condition of samples for the attached Chain of Custody upon receipt.

	Yes	No	N/A
Were custody seals present?	☐	☑	☐
Were custody seals intact?	☐	☐	☑
Were samples received at a temperature of ≤ 6°C?	☑	☐	☐
Were samples cooled on ice upon transfer to laboratory representative?	☑	☐	☐
Were sample containers received intact?	☑	☐	☐
Were samples properly labeled (labels affixed to sample containers and include sample ID, site location, and/or project number and the collection date)?	☑	☐	☐
Were samples accompanied by a Chain of Custody document?	☑	☐	☐
Does Chain of Custody document include proper, full, and complete documentation, which shall include sample ID, site location, and/or project number, date and time of collection, collector's name, preservation type, sample matrix and any special remarks concerning the sample?	☐	☑	☐
Did sample container labels agree with Chain of Custody document?	☑	☐	☐
Were samples received within method-specific holding times?	☑	☐	☐

Summary of Hits

Lab ID: SC58794-01 **Client ID:** SS-1

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	39.9		1.68	mg/kg	SW846 6010C
Barium	18.4		1.12	mg/kg	SW846 6010C
Chromium	22.6		1.12	mg/kg	SW846 6010C
Lead	8.42		1.68	mg/kg	SW846 6010C
Nickel	39.7		1.12	mg/kg	SW846 6010C
Vanadium	22.7		1.68	mg/kg	SW846 6010C
Zinc	36.3		3.35	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	24.9		14.9	mg/kg	SW846 8100Mod.

Lab ID: SC58794-02 **Client ID:** SS-2

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	55.9		1.67	mg/kg	SW846 6010C
Barium	22.5		1.12	mg/kg	SW846 6010C
Chromium	19.4		1.12	mg/kg	SW846 6010C
Lead	19.3		1.67	mg/kg	SW846 6010C
Nickel	71.4		1.12	mg/kg	SW846 6010C
Vanadium	24.5		1.67	mg/kg	SW846 6010C
Zinc	58.5		3.35	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	38.7		14.6	mg/kg	SW846 8100Mod.

Lab ID: SC58794-03 **Client ID:** SSS-10

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	25.4		1.77	mg/kg	SW846 6010C
Barium	26.5		1.18	mg/kg	SW846 6010C
Chromium	22.9		1.18	mg/kg	SW846 6010C
Lead	13.7		1.77	mg/kg	SW846 6010C
Nickel	28.2		1.18	mg/kg	SW846 6010C
Vanadium	29.6		1.77	mg/kg	SW846 6010C
Zinc	60.8		3.53	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	109		16.2	mg/kg	SW846 8100Mod.
Bis(2-ethylhexyl)phthalate	305		206	µg/kg	SW846 8270D

Lab ID: SC58794-04 **Client ID:** SSS-11

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	33.6		1.87	mg/kg	SW846 6010C
Barium	24.8		1.25	mg/kg	SW846 6010C
Chromium	23.2		1.25	mg/kg	SW846 6010C
Lead	18.9		1.87	mg/kg	SW846 6010C
Nickel	30.4		1.25	mg/kg	SW846 6010C
Vanadium	38.3		1.87	mg/kg	SW846 6010C
Zinc	43.2		3.74	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	184		16.4	mg/kg	SW846 8100Mod.

Lab ID: SC58794-05 **Client ID:** SSS-12

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	39.2		1.67	mg/kg	SW846 6010C
Barium	21.7		1.11	mg/kg	SW846 6010C
Chromium	17.4		1.11	mg/kg	SW846 6010C
Lead	19.6		1.67	mg/kg	SW846 6010C
Nickel	26.9		1.11	mg/kg	SW846 6010C
Vanadium	33.5		1.67	mg/kg	SW846 6010C
Zinc	37.9		3.34	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	180		15.9	mg/kg	SW846 8100Mod.

Lab ID: SC58794-06 **Client ID:** SSS-13

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	49.1		1.83	mg/kg	SW846 6010C
Barium	28.9		1.22	mg/kg	SW846 6010C
Chromium	23.3		1.22	mg/kg	SW846 6010C
Lead	22.7		1.83	mg/kg	SW846 6010C
Nickel	37.2		1.22	mg/kg	SW846 6010C
Vanadium	34.6		1.83	mg/kg	SW846 6010C
Zinc	49.2		3.67	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	93.0		16.5	mg/kg	SW846 8100Mod.

Lab ID: SC58794-07 **Client ID:** SSS-14

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	23.7		1.69	mg/kg	SW846 6010C
Barium	44.1		1.13	mg/kg	SW846 6010C
Chromium	36.0		1.13	mg/kg	SW846 6010C
Lead	13.7		1.69	mg/kg	SW846 6010C
Nickel	26.1		1.13	mg/kg	SW846 6010C
Vanadium	41.9		1.69	mg/kg	SW846 6010C
Zinc	44.6		3.38	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	116		15.2	mg/kg	SW846 8100Mod.

Lab ID: SC58794-08 **Client ID:** SSS-16

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	36.6		1.67	mg/kg	SW846 6010C
Barium	24.0		1.12	mg/kg	SW846 6010C
Chromium	21.7		1.12	mg/kg	SW846 6010C
Lead	17.5		1.67	mg/kg	SW846 6010C
Nickel	30.6		1.12	mg/kg	SW846 6010C
Vanadium	30.6		1.67	mg/kg	SW846 6010C
Zinc	44.3		3.35	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	93.6		14.7	mg/kg	SW846 8100Mod.

Lab ID: SC58794-09 **Client ID:** SSS-17

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	21.9		1.60	mg/kg	SW846 6010C
Barium	113		1.07	mg/kg	SW846 6010C
Chromium	19.4		1.07	mg/kg	SW846 6010C
Lead	12.1		1.60	mg/kg	SW846 6010C
Nickel	27.9		1.07	mg/kg	SW846 6010C
Vanadium	8.48		1.60	mg/kg	SW846 6010C
Zinc	61.8		3.20	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	49.7		14.5	mg/kg	SW846 8100Mod.

Lab ID: SC58794-10 **Client ID:** SSS-3

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	36.6		1.80	mg/kg	SW846 6010C
Barium	30.0		1.20	mg/kg	SW846 6010C
Chromium	21.8		1.20	mg/kg	SW846 6010C
Lead	17.0		1.80	mg/kg	SW846 6010C
Nickel	33.2		1.20	mg/kg	SW846 6010C
Vanadium	30.1		1.80	mg/kg	SW846 6010C
Zinc	107		3.59	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	113		15.9	mg/kg	SW846 8100Mod.

Lab ID: SC58794-11 **Client ID:** SSS-4

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	20.5		1.62	mg/kg	SW846 6010C
Barium	29.5		1.08	mg/kg	SW846 6010C
Chromium	18.8		1.08	mg/kg	SW846 6010C
Lead	18.6		1.62	mg/kg	SW846 6010C
Nickel	20.3		1.08	mg/kg	SW846 6010C
Vanadium	24.5		1.62	mg/kg	SW846 6010C
Zinc	36.0		3.25	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	118		14.5	mg/kg	SW846 8100Mod.

Lab ID: SC58794-12 **Client ID:** SSS-5

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	53.4		1.88	mg/kg	SW846 6010C
Barium	30.3		1.25	mg/kg	SW846 6010C
Chromium	25.0		1.25	mg/kg	SW846 6010C
Lead	17.0		1.88	mg/kg	SW846 6010C
Nickel	46.2		1.25	mg/kg	SW846 6010C
Vanadium	33.9		1.88	mg/kg	SW846 6010C
Zinc	52.1		3.76	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	106		15.4	mg/kg	SW846 8100Mod.

Lab ID: SC58794-13 **Client ID:** SSS-6

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	29.6		1.69	mg/kg	SW846 6010C
Barium	28.6		1.13	mg/kg	SW846 6010C
Chromium	30.0		1.13	mg/kg	SW846 6010C
Lead	15.8		1.69	mg/kg	SW846 6010C
Nickel	25.6		1.13	mg/kg	SW846 6010C
Vanadium	35.8		1.69	mg/kg	SW846 6010C
Zinc	43.2		3.38	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	134		14.3	mg/kg	SW846 8100Mod.

Lab ID: SC58794-14 **Client ID:** SSS-7

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	48.6		1.80	mg/kg	SW846 6010C
Barium	34.6		1.20	mg/kg	SW846 6010C
Chromium	65.9		1.20	mg/kg	SW846 6010C
Lead	28.6		1.80	mg/kg	SW846 6010C
Nickel	44.8		1.20	mg/kg	SW846 6010C
Vanadium	46.7		1.80	mg/kg	SW846 6010C
Zinc	56.2		3.60	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	170		15.8	mg/kg	SW846 8100Mod.

Lab ID: SC58794-15 **Client ID:** SSS-8

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	48.7		1.87	mg/kg	SW846 6010C
Barium	33.0		1.25	mg/kg	SW846 6010C
Chromium	31.6		1.25	mg/kg	SW846 6010C
Lead	21.0		1.87	mg/kg	SW846 6010C
Nickel	47.7		1.25	mg/kg	SW846 6010C
Vanadium	36.0		1.87	mg/kg	SW846 6010C
Zinc	52.3		3.75	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	111		15.4	mg/kg	SW846 8100Mod.

Lab ID: SC58794-16 **Client ID:** SSS-9

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	82.3		1.88	mg/kg	SW846 6010C
Barium	29.1		1.26	mg/kg	SW846 6010C
Chromium	24.7		1.26	mg/kg	SW846 6010C
Lead	22.9		1.88	mg/kg	SW846 6010C
Nickel	76.0		1.26	mg/kg	SW846 6010C
Vanadium	39.4		1.88	mg/kg	SW846 6010C
Zinc	64.7		3.77	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	129		16.8	mg/kg	SW846 8100Mod.

Lab ID: SC58794-17 **Client ID:** SSS-15

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	37.8		1.90	mg/kg	SW846 6010C
Barium	46.3		1.27	mg/kg	SW846 6010C
Chromium	31.5		1.27	mg/kg	SW846 6010C
Lead	25.9		1.90	mg/kg	SW846 6010C
Nickel	37.7		1.27	mg/kg	SW846 6010C
Vanadium	36.3		1.90	mg/kg	SW846 6010C
Zinc	60.7		3.80	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	168		16.7	mg/kg	SW846 8100Mod.

Please note that because there are no reporting limits associated with hazardous waste characterizations or micro analyses, this summary does not include hits from these analyses if included in this work order.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-1	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-01				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 17.81 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 53.2		µg/kg dry	53.2	29.1	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 532		µg/kg dry	532	67.2	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 53.2		µg/kg dry	53.2	19.2	50	"	"	"	"	"	X
71-43-2	Benzene	< 53.2		µg/kg dry	53.2	8.51	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 53.2		µg/kg dry	53.2	12.0	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 53.2		µg/kg dry	53.2	7.60	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 53.2		µg/kg dry	53.2	13.7	50	"	"	"	"	"	X
75-25-2	Bromoform	< 53.2		µg/kg dry	53.2	11.4	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 106		µg/kg dry	106	26.3	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 106		µg/kg dry	106	24.3	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 53.2		µg/kg dry	53.2	21.3	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 53.2		µg/kg dry	53.2	16.3	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 53.2		µg/kg dry	53.2	21.7	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 106		µg/kg dry	106	19.7	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 53.2		µg/kg dry	53.2	15.9	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 53.2		µg/kg dry	53.2	6.43	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 106		µg/kg dry	106	23.7	50	"	"	"	"	"	X
67-66-3	Chloroform	< 53.2		µg/kg dry	53.2	6.27	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 106		µg/kg dry	106	63.2	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 53.2		µg/kg dry	53.2	13.2	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 53.2		µg/kg dry	53.2	9.62	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 106		µg/kg dry	106	21.0	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 53.2		µg/kg dry	53.2	8.40	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 53.2		µg/kg dry	53.2	14.5	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 53.2		µg/kg dry	53.2	10.0	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 53.2		µg/kg dry	53.2	9.57	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 53.2		µg/kg dry	53.2	13.2	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 53.2		µg/kg dry	53.2	9.52	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 106		µg/kg dry	106	69.5	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 53.2		µg/kg dry	53.2	12.3	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 53.2		µg/kg dry	53.2	13.9	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 53.2		µg/kg dry	53.2	13.6	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 53.2		µg/kg dry	53.2	17.7	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 53.2		µg/kg dry	53.2	12.1	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 53.2		µg/kg dry	53.2	18.4	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 53.2		µg/kg dry	53.2	16.8	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 53.2		µg/kg dry	53.2	14.0	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 53.2		µg/kg dry	53.2	16.3	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 53.2		µg/kg dry	53.2	12.5	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 53.2		µg/kg dry	53.2	21.6	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 53.2		µg/kg dry	53.2	11.1	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 53.2		µg/kg dry	53.2	17.0	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 106		µg/kg dry	106	35.4	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-1	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-01				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 17.81 g						
98-82-8	Isopropylbenzene	< 53.2		µg/kg dry	53.2	19.3	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 53.2		µg/kg dry	53.2	14.7	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 53.2		µg/kg dry	53.2	16.0	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 106		µg/kg dry	106	38.1	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 106		µg/kg dry	106	45.4	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 53.2		µg/kg dry	53.2	15.4	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 53.2		µg/kg dry	53.2	13.2	50	"	"	"	"	"	X
100-42-5	Styrene	< 53.2		µg/kg dry	53.2	7.02	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 53.2		µg/kg dry	53.2	12.8	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 53.2		µg/kg dry	53.2	16.9	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 53.2		µg/kg dry	53.2	16.7	50	"	"	"	"	"	X
108-88-3	Toluene	< 53.2		µg/kg dry	53.2	8.56	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 53.2		µg/kg dry	53.2	12.4	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 53.2		µg/kg dry	53.2	8.77	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 53.2		µg/kg dry	53.2	8.40	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 53.2		µg/kg dry	53.2	12.9	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 53.2		µg/kg dry	53.2	16.4	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 53.2		µg/kg dry	53.2	9.09	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 53.2		µg/kg dry	53.2	24.0	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 53.2		µg/kg dry	53.2	24.5	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 53.2		µg/kg dry	53.2	13.5	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 53.2		µg/kg dry	53.2	11.1	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 53.2		µg/kg dry	53.2	26.2	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 106		µg/kg dry	106	31.3	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 53.2		µg/kg dry	53.2	16.4	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 106		µg/kg dry	106	38.9	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 53.2		µg/kg dry	53.2	14.4	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 53.2		µg/kg dry	53.2	29.4	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 53.2		µg/kg dry	53.2	14.7	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 53.2		µg/kg dry	53.2	17.2	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1060		µg/kg dry	1060	755	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1060		µg/kg dry	1060	313	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 266		µg/kg dry	266	35.1	50	"	"	"	"	"	X
64-17-5	Ethanol	< 10600		µg/kg dry	10600	916	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*105*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*103*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*103*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*103*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 74.4		µg/kg dry	74.4	39.5	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-1	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-01				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 74.4		µg/kg dry	74.4	38.8	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 368		µg/kg dry	368	23.4	1	"	"	"	"	"	X
120-12-7	Anthracene	< 74.4		µg/kg dry	74.4	42.8	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 368		µg/kg dry	368	39.9	1	"	"	"	"	"	
92-87-5	Benzidine	< 736		µg/kg dry	736	23.4	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 74.4		µg/kg dry	74.4	41.8	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 74.4		µg/kg dry	74.4	50.8	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 74.4		µg/kg dry	74.4	56.0	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 74.4		µg/kg dry	74.4	52.5	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 74.4		µg/kg dry	74.4	63.6	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 368		µg/kg dry	368	22.1	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 368		µg/kg dry	368	85.2	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 368		µg/kg dry	368	37.1	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 186		µg/kg dry	186	34.5	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 186		µg/kg dry	186	29.9	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 186		µg/kg dry	186	47.4	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 368		µg/kg dry	368	41.6	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 368		µg/kg dry	368	36.9	1	"	"	"	"	"	X
86-74-8	Carbazole	< 186		µg/kg dry	186	42.8	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 368		µg/kg dry	368	43.3	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 186		µg/kg dry	186	23.0	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 368		µg/kg dry	368	50.4	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 186		µg/kg dry	186	35.7	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 368		µg/kg dry	368	36.0	1	"	"	"	"	"	X
218-01-9	Chrysene	< 74.4		µg/kg dry	74.4	42.0	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 74.4		µg/kg dry	74.4	55.0	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 186		µg/kg dry	186	50.1	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 368		µg/kg dry	368	43.9	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 368		µg/kg dry	368	39.7	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 368		µg/kg dry	368	41.8	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 368		µg/kg dry	368	40.7	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 186		µg/kg dry	186	45.2	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 368		µg/kg dry	368	38.6	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 368		µg/kg dry	368	41.4	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 368		µg/kg dry	368	29.1	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 368		µg/kg dry	368	39.4	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 368		µg/kg dry	368	52.7	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 368		µg/kg dry	368	38.1	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 186		µg/kg dry	186	44.6	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 186		µg/kg dry	186	38.0	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 368		µg/kg dry	368	54.8	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 74.4		µg/kg dry	74.4	43.6	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-1	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-01				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 74.4		µg/kg dry	74.4	48.1	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 186		µg/kg dry	186	46.8	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 186		µg/kg dry	186	46.8	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 186		µg/kg dry	186	46.9	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 186		µg/kg dry	186	42.0	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 74.4		µg/kg dry	74.4	50.8	1	"	"	"	"	"	X
78-59-1	Isophorone	< 186		µg/kg dry	186	28.7	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 74.4		µg/kg dry	74.4	52.1	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 368		µg/kg dry	368	29.6	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 368		µg/kg dry	368	28.9	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 74.4		µg/kg dry	74.4	42.9	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 368		µg/kg dry	368	33.3	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 368		µg/kg dry	368	34.0	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 186		µg/kg dry	186	49.1	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 186		µg/kg dry	186	43.0	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 186		µg/kg dry	186	32.6	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1470		µg/kg dry	1470	49.0	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 186		µg/kg dry	186	24.3	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 186		µg/kg dry	186	32.6	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 368		µg/kg dry	368	37.5	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 368		µg/kg dry	368	43.8	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 74.4		µg/kg dry	74.4	42.2	1	"	"	"	"	"	X
108-95-2	Phenol	< 368		µg/kg dry	368	37.2	1	"	"	"	"	"	X
129-00-0	Pyrene	< 74.4		µg/kg dry	74.4	41.0	1	"	"	"	"	"	X
110-86-1	Pyridine	< 368		µg/kg dry	368	87.1	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 368		µg/kg dry	368	45.3	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 74.4		µg/kg dry	74.4	41.0	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 368		µg/kg dry	368	38.0	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 186		µg/kg dry	186	45.5	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 368		µg/kg dry	368	39.1	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 368		µg/kg dry	368	43.8	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*91*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*87*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*81*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*105*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*92*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*85*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 22.1		µg/kg dry	22.1	15.9	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 22.1		µg/kg dry	22.1	6.54	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 22.1		µg/kg dry	22.1	6.13	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-1	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-01				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 22.1		µg/kg dry	22.1	2.10	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 22.1		µg/kg dry	22.1	6.92	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 22.1		µg/kg dry	22.1	17.2	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 22.1		µg/kg dry	22.1	4.76	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 22.1		µg/kg dry	22.1	5.16	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 22.1		µg/kg dry	22.1	4.71	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*93*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*86*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*81*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*71*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546													
319-84-6	alpha-BHC	< 5.53		µg/kg dry	5.53	0.255	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.53		µg/kg dry	5.53	0.354	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.53		µg/kg dry	5.53	0.288	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.32		µg/kg dry	3.32	0.587	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.53		µg/kg dry	5.53	0.642	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.53		µg/kg dry	5.53	0.188	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.53		µg/kg dry	5.53	0.221	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.53		µg/kg dry	5.53	0.255	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.53		µg/kg dry	5.53	0.266	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.53		µg/kg dry	5.53	0.288	1	"	"	"	"	"	X
72-20-8	Endrin	< 8.85		µg/kg dry	8.85	0.542	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 8.85		µg/kg dry	8.85	0.354	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 8.85		µg/kg dry	8.85	0.465	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 8.85		µg/kg dry	8.85	0.808	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 8.85		µg/kg dry	8.85	3.80	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 8.85		µg/kg dry	8.85	0.598	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 8.85		µg/kg dry	8.85	0.321	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 8.85		µg/kg dry	8.85	1.39	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.53		µg/kg dry	5.53	0.232	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.53		µg/kg dry	5.53	0.277	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 111		µg/kg dry	111	78.1	1	"	"	"	"	"	X
57-74-9	Chlordane	< 22.1		µg/kg dry	22.1	2.78	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.53		µg/kg dry	5.53	0.487	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*82*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*85*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*68*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*65*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-1 SC58794-01	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**24.9**		mg/kg dry	14.9	12.4	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*76*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*101*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.35		mg/kg dry	3.35	0.181	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**39.9**		mg/kg dry	1.68	0.212	1	"	"	"	"	"	X
7440-39-3	Barium	**18.4**		mg/kg dry	1.12	0.132	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.559		mg/kg dry	0.559	0.0281	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.559		mg/kg dry	0.559	0.0290	1	"	"	"	"	"	X
7440-47-3	Chromium	**22.6**		mg/kg dry	1.12	0.149	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.115		mg/kg dry	0.115	0.0096	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**39.7**		mg/kg dry	1.12	0.129	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**8.42**		mg/kg dry	1.68	0.237	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.59		mg/kg dry	5.59	0.420	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.68		mg/kg dry	1.68	0.320	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.35		mg/kg dry	3.35	1.23	1	"	"	"	"	"	X
7440-62-2	Vanadium	**22.7**		mg/kg dry	1.68	0.297	1	"	"	"	"	"	X
7440-66-6	Zinc	**36.3**		mg/kg dry	3.35	0.865	1	"	"	"	"	"	X
General Chemistry Parameters													
	% Solids	**89.3**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.99**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 13-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 17:28	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*86*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-1 SC58794-01	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:30	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-2	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-02				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.55 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 57.3		µg/kg dry	57.3	31.4	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 573		µg/kg dry	573	72.4	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 57.3		µg/kg dry	57.3	20.7	50	"	"	"	"	"	X
71-43-2	Benzene	< 57.3		µg/kg dry	57.3	9.17	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 57.3		µg/kg dry	57.3	12.9	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 57.3		µg/kg dry	57.3	8.19	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 57.3		µg/kg dry	57.3	14.8	50	"	"	"	"	"	X
75-25-2	Bromoform	< 57.3		µg/kg dry	57.3	12.3	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 115		µg/kg dry	115	28.3	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 115		µg/kg dry	115	26.2	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 57.3		µg/kg dry	57.3	22.9	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 57.3		µg/kg dry	57.3	17.6	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 57.3		µg/kg dry	57.3	23.4	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 115		µg/kg dry	115	21.2	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 57.3		µg/kg dry	57.3	17.1	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 57.3		µg/kg dry	57.3	6.93	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 115		µg/kg dry	115	25.6	50	"	"	"	"	"	X
67-66-3	Chloroform	< 57.3		µg/kg dry	57.3	6.76	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 115		µg/kg dry	115	68.1	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 57.3		µg/kg dry	57.3	14.2	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 57.3		µg/kg dry	57.3	10.4	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 115		µg/kg dry	115	22.6	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 57.3		µg/kg dry	57.3	9.05	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 57.3		µg/kg dry	57.3	15.6	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 57.3		µg/kg dry	57.3	10.8	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 57.3		µg/kg dry	57.3	10.3	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 57.3		µg/kg dry	57.3	14.3	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 57.3		µg/kg dry	57.3	10.3	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 115		µg/kg dry	115	74.9	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 57.3		µg/kg dry	57.3	13.2	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 57.3		µg/kg dry	57.3	15.0	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 57.3		µg/kg dry	57.3	14.7	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 57.3		µg/kg dry	57.3	19.1	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 57.3		µg/kg dry	57.3	13.1	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 57.3		µg/kg dry	57.3	19.9	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 57.3		µg/kg dry	57.3	18.1	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 57.3		µg/kg dry	57.3	15.1	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 57.3		µg/kg dry	57.3	17.5	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 57.3		µg/kg dry	57.3	13.5	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 57.3		µg/kg dry	57.3	23.3	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 57.3		µg/kg dry	57.3	12.0	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 57.3		µg/kg dry	57.3	18.3	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 115		µg/kg dry	115	38.1	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-2	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-02				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 16.55 g						
98-82-8	Isopropylbenzene	< 57.3		µg/kg dry	57.3	20.8	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 57.3		µg/kg dry	57.3	15.9	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 57.3		µg/kg dry	57.3	17.2	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 115		µg/kg dry	115	41.0	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 115		µg/kg dry	115	48.9	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 57.3		µg/kg dry	57.3	16.6	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 57.3		µg/kg dry	57.3	14.3	50	"	"	"	"	"	X
100-42-5	Styrene	< 57.3		µg/kg dry	57.3	7.56	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 57.3		µg/kg dry	57.3	13.8	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 57.3		µg/kg dry	57.3	18.2	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 57.3		µg/kg dry	57.3	18.0	50	"	"	"	"	"	X
108-88-3	Toluene	< 57.3		µg/kg dry	57.3	9.22	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 57.3		µg/kg dry	57.3	13.3	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 57.3		µg/kg dry	57.3	9.45	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 57.3		µg/kg dry	57.3	9.05	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 57.3		µg/kg dry	57.3	13.9	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 57.3		µg/kg dry	57.3	17.7	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 57.3		µg/kg dry	57.3	9.80	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 57.3		µg/kg dry	57.3	25.9	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 57.3		µg/kg dry	57.3	26.4	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 57.3		µg/kg dry	57.3	14.5	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 57.3		µg/kg dry	57.3	12.0	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 57.3		µg/kg dry	57.3	28.2	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 115		µg/kg dry	115	33.7	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 57.3		µg/kg dry	57.3	17.6	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 115		µg/kg dry	115	41.9	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 57.3		µg/kg dry	57.3	15.5	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 57.3		µg/kg dry	57.3	31.7	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 57.3		µg/kg dry	57.3	15.9	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 57.3		µg/kg dry	57.3	18.5	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1150		µg/kg dry	1150	814	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1150		µg/kg dry	1150	337	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 286		µg/kg dry	286	37.8	50	"	"	"	"	"	X
64-17-5	Ethanol	< 11500		µg/kg dry	11500	987	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*105*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*104*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*104*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*106*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 74.6		µg/kg dry	74.6	39.6	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-2	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-02				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 74.6		µg/kg dry	74.6	38.9	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 369		µg/kg dry	369	23.5	1	"	"	"	"	"	X
120-12-7	Anthracene	< 74.6		µg/kg dry	74.6	42.9	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 369		µg/kg dry	369	40.0	1	"	"	"	"	"	
92-87-5	Benzidine	< 738		µg/kg dry	738	23.5	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 74.6		µg/kg dry	74.6	41.9	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 74.6		µg/kg dry	74.6	51.0	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 74.6		µg/kg dry	74.6	56.1	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 74.6		µg/kg dry	74.6	52.6	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 74.6		µg/kg dry	74.6	63.7	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 369		µg/kg dry	369	22.1	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 369		µg/kg dry	369	85.4	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 369		µg/kg dry	369	37.2	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 187		µg/kg dry	187	34.5	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 187		µg/kg dry	187	30.0	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 187		µg/kg dry	187	47.5	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 369		µg/kg dry	369	41.7	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 369		µg/kg dry	369	37.0	1	"	"	"	"	"	X
86-74-8	Carbazole	< 187		µg/kg dry	187	42.9	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 369		µg/kg dry	369	43.4	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 187		µg/kg dry	187	23.0	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 369		µg/kg dry	369	50.5	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 187		µg/kg dry	187	35.8	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 369		µg/kg dry	369	36.1	1	"	"	"	"	"	X
218-01-9	Chrysene	< 74.6		µg/kg dry	74.6	42.1	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 74.6		µg/kg dry	74.6	55.1	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 187		µg/kg dry	187	50.2	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 369		µg/kg dry	369	44.0	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 369		µg/kg dry	369	39.8	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 369		µg/kg dry	369	41.9	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 369		µg/kg dry	369	40.8	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 187		µg/kg dry	187	45.3	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 369		µg/kg dry	369	38.7	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 369		µg/kg dry	369	41.5	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 369		µg/kg dry	369	29.2	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 369		µg/kg dry	369	39.5	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 369		µg/kg dry	369	52.9	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 369		µg/kg dry	369	38.2	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 187		µg/kg dry	187	44.7	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 187		µg/kg dry	187	38.1	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 369		µg/kg dry	369	54.9	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 74.6		µg/kg dry	74.6	43.7	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-2	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-02				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 74.6		µg/kg dry	74.6	48.2	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 187		µg/kg dry	187	46.9	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 187		µg/kg dry	187	46.9	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 187		µg/kg dry	187	47.1	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 187		µg/kg dry	187	42.1	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 74.6		µg/kg dry	74.6	51.0	1	"	"	"	"	"	X
78-59-1	Isophorone	< 187		µg/kg dry	187	28.7	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 74.6		µg/kg dry	74.6	52.2	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 369		µg/kg dry	369	29.6	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 369		µg/kg dry	369	28.9	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 74.6		µg/kg dry	74.6	43.0	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 369		µg/kg dry	369	33.4	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 369		µg/kg dry	369	34.1	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 187		µg/kg dry	187	49.2	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 187		µg/kg dry	187	43.1	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 187		µg/kg dry	187	32.6	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1480		µg/kg dry	1480	49.1	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 187		µg/kg dry	187	24.4	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 187		µg/kg dry	187	32.6	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 369		µg/kg dry	369	37.6	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 369		µg/kg dry	369	43.9	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 74.6		µg/kg dry	74.6	42.3	1	"	"	"	"	"	X
108-95-2	Phenol	< 369		µg/kg dry	369	37.3	1	"	"	"	"	"	X
129-00-0	Pyrene	< 74.6		µg/kg dry	74.6	41.1	1	"	"	"	"	"	X
110-86-1	Pyridine	< 369		µg/kg dry	369	87.3	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 369		µg/kg dry	369	45.4	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 74.6		µg/kg dry	74.6	41.1	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 369		µg/kg dry	369	38.1	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 187		µg/kg dry	187	45.6	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 369		µg/kg dry	369	39.2	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 369		µg/kg dry	369	43.9	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*99*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*100*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*89*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*108*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*92*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*86*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 22.3		µg/kg dry	22.3	16.0	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 22.3		µg/kg dry	22.3	6.58	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 22.3		µg/kg dry	22.3	6.16	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-2	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-02				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 22.3		µg/kg dry	22.3	2.11	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 22.3		µg/kg dry	22.3	6.95	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 22.3		µg/kg dry	22.3	17.3	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 22.3		µg/kg dry	22.3	4.79	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 22.3		µg/kg dry	22.3	5.19	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 22.3		µg/kg dry	22.3	4.74	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*97*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*89*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*87*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*78*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546													
319-84-6	alpha-BHC	< 5.56		µg/kg dry	5.56	0.256	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.56		µg/kg dry	5.56	0.356	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.56		µg/kg dry	5.56	0.289	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.34		µg/kg dry	3.34	0.590	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.56		µg/kg dry	5.56	0.645	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.56		µg/kg dry	5.56	0.189	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.56		µg/kg dry	5.56	0.223	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.56		µg/kg dry	5.56	0.256	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.56		µg/kg dry	5.56	0.267	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.56		µg/kg dry	5.56	0.289	1	"	"	"	"	"	X
72-20-8	Endrin	< 8.90		µg/kg dry	8.90	0.545	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 8.90		µg/kg dry	8.90	0.356	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 8.90		µg/kg dry	8.90	0.467	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 8.90		µg/kg dry	8.90	0.812	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 8.90		µg/kg dry	8.90	3.82	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 8.90		µg/kg dry	8.90	0.601	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 8.90		µg/kg dry	8.90	0.323	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 8.90		µg/kg dry	8.90	1.40	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.56		µg/kg dry	5.56	0.234	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.56		µg/kg dry	5.56	0.278	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 111		µg/kg dry	111	78.5	1	"	"	"	"	"	X
57-74-9	Chlordane	< 22.3		µg/kg dry	22.3	2.80	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.56		µg/kg dry	5.56	0.490	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*87*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*93*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*81*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*77*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-2	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-02				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC													
Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**38.7**		mg/kg dry	14.6	12.2	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*76*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*101*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.35		mg/kg dry	3.35	0.181	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**55.9**		mg/kg dry	1.67	0.212	1	"	"	"	"	"	X
7440-39-3	Barium	**22.5**		mg/kg dry	1.12	0.132	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.558		mg/kg dry	0.558	0.0280	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.558		mg/kg dry	0.558	0.0289	1	"	"	"	"	"	X
7440-47-3	Chromium	**19.4**		mg/kg dry	1.12	0.148	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.127		mg/kg dry	0.127	0.0105	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**71.4**		mg/kg dry	1.12	0.128	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**19.3**		mg/kg dry	1.67	0.236	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.58		mg/kg dry	5.58	0.419	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.67		mg/kg dry	1.67	0.319	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.35		mg/kg dry	3.35	1.23	1	"	"	"	"	"	X
7440-62-2	Vanadium	**24.5**		mg/kg dry	1.67	0.297	1	"	"	"	"	"	X
7440-66-6	Zinc	**58.5**		mg/kg dry	3.35	0.863	1	"	"	"	"	"	X
General Chemistry Parameters													
	% Solids	**88.8**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**6.08**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses													
Prepared by method SW8151A									Methylation date: 13-Jul-20				
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 17:52	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*82*			*30-150 %*			"	"	"	"	"	

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Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-2 SC58794-02	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 7		mg/kg	7	7	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:31	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-10	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-03				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.67 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 68.6		µg/kg dry	68.6	37.6	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 686		µg/kg dry	686	86.8	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 68.6		µg/kg dry	68.6	24.8	50	"	"	"	"	"	X
71-43-2	Benzene	< 68.6		µg/kg dry	68.6	11.0	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 68.6		µg/kg dry	68.6	15.5	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 68.6		µg/kg dry	68.6	9.81	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 68.6		µg/kg dry	68.6	17.7	50	"	"	"	"	"	X
75-25-2	Bromoform	< 68.6		µg/kg dry	68.6	14.7	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 137		µg/kg dry	137	33.9	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 137		µg/kg dry	137	31.4	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 68.6		µg/kg dry	68.6	27.5	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 68.6		µg/kg dry	68.6	21.1	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 68.6		µg/kg dry	68.6	28.0	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 137		µg/kg dry	137	25.4	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 68.6		µg/kg dry	68.6	20.5	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 68.6		µg/kg dry	68.6	8.30	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 137		µg/kg dry	137	30.6	50	"	"	"	"	"	X
67-66-3	Chloroform	< 68.6		µg/kg dry	68.6	8.10	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 137		µg/kg dry	137	81.5	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 68.6		µg/kg dry	68.6	17.0	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 68.6		µg/kg dry	68.6	12.4	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 137		µg/kg dry	137	27.1	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 68.6		µg/kg dry	68.6	10.8	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 68.6		µg/kg dry	68.6	18.7	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 68.6		µg/kg dry	68.6	12.9	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 68.6		µg/kg dry	68.6	12.4	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 68.6		µg/kg dry	68.6	17.1	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 68.6		µg/kg dry	68.6	12.3	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 137		µg/kg dry	137	89.8	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 68.6		µg/kg dry	68.6	15.9	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 68.6		µg/kg dry	68.6	18.0	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 68.6		µg/kg dry	68.6	17.6	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 68.6		µg/kg dry	68.6	22.9	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 68.6		µg/kg dry	68.6	15.6	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 68.6		µg/kg dry	68.6	23.8	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 68.6		µg/kg dry	68.6	21.7	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 68.6		µg/kg dry	68.6	18.1	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 68.6		µg/kg dry	68.6	21.0	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 68.6		µg/kg dry	68.6	16.2	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 68.6		µg/kg dry	68.6	27.9	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 68.6		µg/kg dry	68.6	14.3	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 68.6		µg/kg dry	68.6	22.0	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 137		µg/kg dry	137	45.6	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-10	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-03				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
						Initial weight: 16.67 g							
98-82-8	Isopropylbenzene	< 68.6		µg/kg dry	68.6	24.9	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 68.6		µg/kg dry	68.6	19.0	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 68.6		µg/kg dry	68.6	20.7	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 137		µg/kg dry	137	49.1	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 137		µg/kg dry	137	58.6	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 68.6		µg/kg dry	68.6	19.9	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 68.6		µg/kg dry	68.6	17.1	50	"	"	"	"	"	X
100-42-5	Styrene	< 68.6		µg/kg dry	68.6	9.06	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 68.6		µg/kg dry	68.6	16.5	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 68.6		µg/kg dry	68.6	21.8	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 68.6		µg/kg dry	68.6	21.6	50	"	"	"	"	"	X
108-88-3	Toluene	< 68.6		µg/kg dry	68.6	11.1	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 68.6		µg/kg dry	68.6	16.0	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 68.6		µg/kg dry	68.6	11.3	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 68.6		µg/kg dry	68.6	10.8	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 68.6		µg/kg dry	68.6	16.6	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 68.6		µg/kg dry	68.6	21.2	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 68.6		µg/kg dry	68.6	11.7	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 68.6		µg/kg dry	68.6	31.0	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 68.6		µg/kg dry	68.6	31.6	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 68.6		µg/kg dry	68.6	17.4	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 68.6		µg/kg dry	68.6	14.3	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 68.6		µg/kg dry	68.6	33.8	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 137		µg/kg dry	137	40.4	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 68.6		µg/kg dry	68.6	21.1	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 137		µg/kg dry	137	50.2	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 68.6		µg/kg dry	68.6	18.6	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 68.6		µg/kg dry	68.6	38.0	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 68.6		µg/kg dry	68.6	19.0	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 68.6		µg/kg dry	68.6	22.2	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1370		µg/kg dry	1370	975	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1370		µg/kg dry	1370	404	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-butene	< 343		µg/kg dry	343	45.3	50	"	"	"	"	"	X
64-17-5	Ethanol	< 13700		µg/kg dry	13700	1180	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*104*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*106*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*106*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 82.3		µg/kg dry	82.3	43.7	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-10	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-03				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 82.3		µg/kg dry	82.3	43.0	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 407		µg/kg dry	407	25.9	1	"	"	"	"	"	X
120-12-7	Anthracene	< 82.3		µg/kg dry	82.3	47.4	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 407		µg/kg dry	407	44.2	1	"	"	"	"	"	
92-87-5	Benzidine	< 815		µg/kg dry	815	25.9	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 82.3		µg/kg dry	82.3	46.3	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 82.3		µg/kg dry	82.3	56.3	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 82.3		µg/kg dry	82.3	62.0	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 82.3		µg/kg dry	82.3	58.1	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 82.3		µg/kg dry	82.3	70.4	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 407		µg/kg dry	407	24.4	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 407		µg/kg dry	407	94.3	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 407		µg/kg dry	407	41.1	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 206		µg/kg dry	206	38.1	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 206		µg/kg dry	206	33.1	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	**305**		µg/kg dry	206	52.5	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 407		µg/kg dry	407	46.0	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 407		µg/kg dry	407	40.9	1	"	"	"	"	"	X
86-74-8	Carbazole	< 206		µg/kg dry	206	47.4	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 407		µg/kg dry	407	47.9	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 206		µg/kg dry	206	25.4	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 407		µg/kg dry	407	55.8	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 206		µg/kg dry	206	39.5	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 407		µg/kg dry	407	39.9	1	"	"	"	"	"	X
218-01-9	Chrysene	< 82.3		µg/kg dry	82.3	46.5	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 82.3		µg/kg dry	82.3	60.9	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 206		µg/kg dry	206	55.4	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 407		µg/kg dry	407	48.6	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 407		µg/kg dry	407	43.9	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 407		µg/kg dry	407	46.3	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 407		µg/kg dry	407	45.1	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 206		µg/kg dry	206	50.0	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 407		µg/kg dry	407	42.7	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 407		µg/kg dry	407	45.8	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 407		µg/kg dry	407	32.2	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 407		µg/kg dry	407	43.6	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 407		µg/kg dry	407	58.4	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 407		µg/kg dry	407	42.2	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 206		µg/kg dry	206	49.4	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 206		µg/kg dry	206	42.1	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 407		µg/kg dry	407	60.6	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 82.3		µg/kg dry	82.3	48.3	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-10	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-03				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 82.3		µg/kg dry	82.3	53.2	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 206		µg/kg dry	206	51.8	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 206		µg/kg dry	206	51.8	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 206		µg/kg dry	206	52.0	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 206		µg/kg dry	206	46.5	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 82.3		µg/kg dry	82.3	56.3	1	"	"	"	"	"	X
78-59-1	Isophorone	< 206		µg/kg dry	206	31.7	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 82.3		µg/kg dry	82.3	57.6	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 407		µg/kg dry	407	32.7	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 407		µg/kg dry	407	32.0	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 82.3		µg/kg dry	82.3	47.5	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 407		µg/kg dry	407	36.9	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 407		µg/kg dry	407	37.6	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 206		µg/kg dry	206	54.3	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 206		µg/kg dry	206	47.6	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 206		µg/kg dry	206	36.0	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1630		µg/kg dry	1630	54.2	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 206		µg/kg dry	206	26.9	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 206		µg/kg dry	206	36.0	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 407		µg/kg dry	407	41.5	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 407		µg/kg dry	407	48.5	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 82.3		µg/kg dry	82.3	46.7	1	"	"	"	"	"	X
108-95-2	Phenol	< 407		µg/kg dry	407	41.2	1	"	"	"	"	"	X
129-00-0	Pyrene	< 82.3		µg/kg dry	82.3	45.4	1	"	"	"	"	"	X
110-86-1	Pyridine	< 407		µg/kg dry	407	96.4	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 407		µg/kg dry	407	50.1	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 82.3		µg/kg dry	82.3	45.4	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 407		µg/kg dry	407	42.1	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 206		µg/kg dry	206	50.4	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 407		µg/kg dry	407	43.3	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 407		µg/kg dry	407	48.5	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*94*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*105*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*88*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*106*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*86*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*73*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 24.3		µg/kg dry	24.3	17.5	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 24.3		µg/kg dry	24.3	7.18	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 24.3		µg/kg dry	24.3	6.73	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-10	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-03				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 24.3		µg/kg dry	24.3	2.31	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 24.3		µg/kg dry	24.3	7.59	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 24.3		µg/kg dry	24.3	18.9	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 24.3		µg/kg dry	24.3	5.22	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 24.3		µg/kg dry	24.3	5.66	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 24.3		µg/kg dry	24.3	5.17	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*80*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*75*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*79*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*72*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546													
319-84-6	alpha-BHC	< 6.07		µg/kg dry	6.07	0.279	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 6.07		µg/kg dry	6.07	0.389	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 6.07		µg/kg dry	6.07	0.316	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.64		µg/kg dry	3.64	0.643	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 6.07		µg/kg dry	6.07	0.704	1	"	"	"	"	"	X
309-00-2	Aldrin	< 6.07		µg/kg dry	6.07	0.206	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 6.07		µg/kg dry	6.07	0.243	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 6.07		µg/kg dry	6.07	0.279	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 6.07		µg/kg dry	6.07	0.291	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 6.07		µg/kg dry	6.07	0.316	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.71		µg/kg dry	9.71	0.595	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.71		µg/kg dry	9.71	0.389	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.71		µg/kg dry	9.71	0.510	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.71		µg/kg dry	9.71	0.886	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.71		µg/kg dry	9.71	4.16	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.71		µg/kg dry	9.71	0.656	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.71		µg/kg dry	9.71	0.352	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.71		µg/kg dry	9.71	1.53	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 6.07		µg/kg dry	6.07	0.255	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 6.07		µg/kg dry	6.07	0.304	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 121		µg/kg dry	121	85.7	1	"	"	"	"	"	X
57-74-9	Chlordane	< 24.3		µg/kg dry	24.3	3.05	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 6.07		µg/kg dry	6.07	0.534	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*87*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*83*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*71*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*70*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-10 SC58794-03	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**109**		mg/kg dry	16.2	13.5	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*76*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*100*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.53		mg/kg dry	3.53	0.191	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**25.4**		mg/kg dry	1.77	0.224	1	"	"	"	"	"	X
7440-39-3	Barium	**26.5**		mg/kg dry	1.18	0.139	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.589		mg/kg dry	0.589	0.0296	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.589		mg/kg dry	0.589	0.0305	1	"	"	"	"	"	X
7440-47-3	Chromium	**22.9**		mg/kg dry	1.18	0.157	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.117		mg/kg dry	0.117	0.0098	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**28.2**		mg/kg dry	1.18	0.135	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**13.7**		mg/kg dry	1.77	0.250	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.89		mg/kg dry	5.89	0.443	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.77		mg/kg dry	1.77	0.337	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.53		mg/kg dry	3.53	1.30	1	"	"	"	"	"	X
7440-62-2	Vanadium	**29.6**		mg/kg dry	1.77	0.313	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**60.8**		mg/kg dry	3.53	0.911	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**80.1**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**6.17**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 13-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 18:17	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*76*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-10 SC58794-03	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 7		mg/kg	7	7	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:32	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-11	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-04				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.23 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 69.3		µg/kg dry	69.3	38.0	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 693		µg/kg dry	693	87.6	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 69.3		µg/kg dry	69.3	25.0	50	"	"	"	"	"	X
71-43-2	Benzene	< 69.3		µg/kg dry	69.3	11.1	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 69.3		µg/kg dry	69.3	15.7	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 69.3		µg/kg dry	69.3	9.91	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 69.3		µg/kg dry	69.3	17.9	50	"	"	"	"	"	X
75-25-2	Bromoform	< 69.3		µg/kg dry	69.3	14.8	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 139		µg/kg dry	139	34.2	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 139		µg/kg dry	139	31.7	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 69.3		µg/kg dry	69.3	27.7	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 69.3		µg/kg dry	69.3	21.3	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 69.3		µg/kg dry	69.3	28.3	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 139		µg/kg dry	139	25.6	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 69.3		µg/kg dry	69.3	20.7	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 69.3		µg/kg dry	69.3	8.39	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 139		µg/kg dry	139	30.9	50	"	"	"	"	"	X
67-66-3	Chloroform	< 69.3		µg/kg dry	69.3	8.18	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 139		µg/kg dry	139	82.4	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 69.3		µg/kg dry	69.3	17.2	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 69.3		µg/kg dry	69.3	12.5	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 139		µg/kg dry	139	27.4	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 69.3		µg/kg dry	69.3	11.0	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 69.3		µg/kg dry	69.3	18.9	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 69.3		µg/kg dry	69.3	13.0	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 69.3		µg/kg dry	69.3	12.5	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 69.3		µg/kg dry	69.3	17.3	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 69.3		µg/kg dry	69.3	12.4	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 139		µg/kg dry	139	90.7	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 69.3		µg/kg dry	69.3	16.0	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 69.3		µg/kg dry	69.3	18.2	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 69.3		µg/kg dry	69.3	17.7	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 69.3		µg/kg dry	69.3	23.1	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 69.3		µg/kg dry	69.3	15.8	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 69.3		µg/kg dry	69.3	24.1	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 69.3		µg/kg dry	69.3	21.9	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 69.3		µg/kg dry	69.3	18.2	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 69.3		µg/kg dry	69.3	21.2	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 69.3		µg/kg dry	69.3	16.4	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 69.3		µg/kg dry	69.3	28.2	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 69.3		µg/kg dry	69.3	14.5	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 69.3		µg/kg dry	69.3	22.2	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 139		µg/kg dry	139	46.1	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-11	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-04				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 16.23 g						
98-82-8	Isopropylbenzene	< 69.3		µg/kg dry	69.3	25.2	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 69.3		µg/kg dry	69.3	19.2	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 69.3		µg/kg dry	69.3	20.9	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 139		µg/kg dry	139	49.6	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 139		µg/kg dry	139	59.2	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 69.3		µg/kg dry	69.3	20.1	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 69.3		µg/kg dry	69.3	17.3	50	"	"	"	"	"	X
100-42-5	Styrene	< 69.3		µg/kg dry	69.3	9.15	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 69.3		µg/kg dry	69.3	16.7	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 69.3		µg/kg dry	69.3	22.0	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 69.3		µg/kg dry	69.3	21.8	50	"	"	"	"	"	X
108-88-3	Toluene	< 69.3		µg/kg dry	69.3	11.2	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 69.3		µg/kg dry	69.3	16.2	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 69.3		µg/kg dry	69.3	11.4	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 69.3		µg/kg dry	69.3	11.0	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 69.3		µg/kg dry	69.3	16.8	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 69.3		µg/kg dry	69.3	21.4	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 69.3		µg/kg dry	69.3	11.9	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 69.3		µg/kg dry	69.3	31.3	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 69.3		µg/kg dry	69.3	32.0	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 69.3		µg/kg dry	69.3	17.5	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 69.3		µg/kg dry	69.3	14.5	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 69.3		µg/kg dry	69.3	34.1	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 139		µg/kg dry	139	40.8	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 69.3		µg/kg dry	69.3	21.4	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 139		µg/kg dry	139	50.7	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 69.3		µg/kg dry	69.3	18.8	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 69.3		µg/kg dry	69.3	38.3	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 69.3		µg/kg dry	69.3	19.2	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 69.3		µg/kg dry	69.3	22.4	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1390		µg/kg dry	1390	984	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1390		µg/kg dry	1390	408	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 347		µg/kg dry	347	45.8	50	"	"	"	"	"	X
64-17-5	Ethanol	< 13900		µg/kg dry	13900	1190	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*104*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*106*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*104*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*105*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 81.8		µg/kg dry	81.8	43.4	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-11	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-04				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 81.8		µg/kg dry	81.8	42.7	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 405		µg/kg dry	405	25.7	1	"	"	"	"	"	X
120-12-7	Anthracene	< 81.8		µg/kg dry	81.8	47.1	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 405		µg/kg dry	405	43.9	1	"	"	"	"	"	
92-87-5	Benzidine	< 809		µg/kg dry	809	25.7	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 81.8		µg/kg dry	81.8	46.0	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 81.8		µg/kg dry	81.8	55.9	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 81.8		µg/kg dry	81.8	61.6	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 81.8		µg/kg dry	81.8	57.7	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 81.8		µg/kg dry	81.8	69.9	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 405		µg/kg dry	405	24.3	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 405		µg/kg dry	405	93.7	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 405		µg/kg dry	405	40.8	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 205		µg/kg dry	205	37.9	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 205		µg/kg dry	205	32.9	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 205		µg/kg dry	205	52.1	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 405		µg/kg dry	405	45.7	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 405		µg/kg dry	405	40.6	1	"	"	"	"	"	X
86-74-8	Carbazole	< 205		µg/kg dry	205	47.1	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 405		µg/kg dry	405	47.6	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 205		µg/kg dry	205	25.3	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 405		µg/kg dry	405	55.4	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 205		µg/kg dry	205	39.2	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 405		µg/kg dry	405	39.6	1	"	"	"	"	"	X
218-01-9	Chrysene	< 81.8		µg/kg dry	81.8	46.2	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 81.8		µg/kg dry	81.8	60.4	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 205		µg/kg dry	205	55.1	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 405		µg/kg dry	405	48.3	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 405		µg/kg dry	405	43.6	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 405		µg/kg dry	405	46.0	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 405		µg/kg dry	405	44.8	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 205		µg/kg dry	205	49.7	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 405		µg/kg dry	405	42.4	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 405		µg/kg dry	405	45.5	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 405		µg/kg dry	405	32.0	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 405		µg/kg dry	405	43.3	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 405		µg/kg dry	405	58.0	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 405		µg/kg dry	405	41.9	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 205		µg/kg dry	205	49.0	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 205		µg/kg dry	205	41.8	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 405		µg/kg dry	405	60.2	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 81.8		µg/kg dry	81.8	47.9	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-11	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-04				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 81.8		µg/kg dry	81.8	52.8	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 205		µg/kg dry	205	51.5	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 205		µg/kg dry	205	51.5	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 205		µg/kg dry	205	51.6	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 205		µg/kg dry	205	46.2	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 81.8		µg/kg dry	81.8	55.9	1	"	"	"	"	"	X
78-59-1	Isophorone	< 205		µg/kg dry	205	31.5	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 81.8		µg/kg dry	81.8	57.3	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 405		µg/kg dry	405	32.5	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 405		µg/kg dry	405	31.8	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 81.8		µg/kg dry	81.8	47.2	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 405		µg/kg dry	405	36.7	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 405		µg/kg dry	405	37.4	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 205		µg/kg dry	205	53.9	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 205		µg/kg dry	205	47.3	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 205		µg/kg dry	205	35.8	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1620		µg/kg dry	1620	53.8	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 205		µg/kg dry	205	26.7	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 205		µg/kg dry	205	35.8	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 405		µg/kg dry	405	41.2	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 405		µg/kg dry	405	48.2	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 81.8		µg/kg dry	81.8	46.3	1	"	"	"	"	"	X
108-95-2	Phenol	< 405		µg/kg dry	405	41.0	1	"	"	"	"	"	X
129-00-0	Pyrene	< 81.8		µg/kg dry	81.8	45.1	1	"	"	"	"	"	X
110-86-1	Pyridine	< 405		µg/kg dry	405	95.8	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 405		µg/kg dry	405	49.8	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 81.8		µg/kg dry	81.8	45.1	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 405		µg/kg dry	405	41.8	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 205		µg/kg dry	205	50.0	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 405		µg/kg dry	405	43.0	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 405		µg/kg dry	405	48.2	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*73*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*86*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*89*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*99*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*84*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*92*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 24.6		µg/kg dry	24.6	17.7	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 24.6		µg/kg dry	24.6	7.27	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 24.6		µg/kg dry	24.6	6.81	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-11	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-04				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 24.6		µg/kg dry	24.6	2.34	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 24.6		µg/kg dry	24.6	7.69	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 24.6		µg/kg dry	24.6	19.1	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 24.6		µg/kg dry	24.6	5.29	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 24.6		µg/kg dry	24.6	5.73	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 24.6		µg/kg dry	24.6	5.24	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*74*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*68*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*78*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*71*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546													
319-84-6	alpha-BHC	< 6.15		µg/kg dry	6.15	0.283	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 6.15		µg/kg dry	6.15	0.394	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 6.15		µg/kg dry	6.15	0.320	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.69		µg/kg dry	3.69	0.652	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 6.15		µg/kg dry	6.15	0.713	1	"	"	"	"	"	X
309-00-2	Aldrin	< 6.15		µg/kg dry	6.15	0.209	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 6.15		µg/kg dry	6.15	0.246	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 6.15		µg/kg dry	6.15	0.283	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 6.15		µg/kg dry	6.15	0.295	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 6.15		µg/kg dry	6.15	0.320	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.84		µg/kg dry	9.84	0.603	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.84		µg/kg dry	9.84	0.394	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.84		µg/kg dry	9.84	0.517	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.84		µg/kg dry	9.84	0.898	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.84		µg/kg dry	9.84	4.22	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.84		µg/kg dry	9.84	0.664	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.84		µg/kg dry	9.84	0.357	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.84		µg/kg dry	9.84	1.55	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 6.15		µg/kg dry	6.15	0.258	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 6.15		µg/kg dry	6.15	0.308	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 123		µg/kg dry	123	86.8	1	"	"	"	"	"	X
57-74-9	Chlordane	< 24.6		µg/kg dry	24.6	3.09	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 6.15		µg/kg dry	6.15	0.541	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*88*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*84*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*61*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*58*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-11 SC58794-04	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**184**		mg/kg dry	16.4	13.8	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*79*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*103*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.74		mg/kg dry	3.74	0.202	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**33.6**		mg/kg dry	1.87	0.237	1	"	"	"	"	"	X
7440-39-3	Barium	**24.8**		mg/kg dry	1.25	0.147	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.624		mg/kg dry	0.624	0.0313	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.624		mg/kg dry	0.624	0.0323	1	"	"	"	"	"	X
7440-47-3	Chromium	**23.2**		mg/kg dry	1.25	0.166	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.126		mg/kg dry	0.126	0.0105	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**30.4**		mg/kg dry	1.25	0.144	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**18.9**		mg/kg dry	1.87	0.265	1	"	"	"	"	"	X
7440-36-0	Antimony	< 6.24		mg/kg dry	6.24	0.469	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.87		mg/kg dry	1.87	0.357	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.74		mg/kg dry	3.74	1.38	1	"	"	"	"	"	X
7440-62-2	Vanadium	**38.3**		mg/kg dry	1.87	0.332	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**43.2**		mg/kg dry	3.74	0.966	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**80.6**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.47**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 13-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 19:30	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*81*			*30-150 %*			"	"	"	"	"	

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Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-11 SC58794-04	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 9		mg/kg	9	9	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:33	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-12	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-05				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.77 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 63.7		µg/kg dry	63.7	34.9	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 637		µg/kg dry	637	80.5	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 63.7		µg/kg dry	63.7	23.0	50	"	"	"	"	"	X
71-43-2	Benzene	< 63.7		µg/kg dry	63.7	10.2	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 63.7		µg/kg dry	63.7	14.4	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 63.7		µg/kg dry	63.7	9.11	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 63.7		µg/kg dry	63.7	16.4	50	"	"	"	"	"	X
75-25-2	Bromoform	< 63.7		µg/kg dry	63.7	13.6	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 127		µg/kg dry	127	31.5	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 127		µg/kg dry	127	29.1	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 63.7		µg/kg dry	63.7	25.5	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 63.7		µg/kg dry	63.7	19.6	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 63.7		µg/kg dry	63.7	26.0	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 127		µg/kg dry	127	23.6	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 63.7		µg/kg dry	63.7	19.0	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 63.7		µg/kg dry	63.7	7.71	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 127		µg/kg dry	127	28.4	50	"	"	"	"	"	X
67-66-3	Chloroform	< 63.7		µg/kg dry	63.7	7.52	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 127		µg/kg dry	127	75.7	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 63.7		µg/kg dry	63.7	15.8	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 63.7		µg/kg dry	63.7	11.5	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 127		µg/kg dry	127	25.2	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 63.7		µg/kg dry	63.7	10.1	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 63.7		µg/kg dry	63.7	17.3	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 63.7		µg/kg dry	63.7	12.0	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 63.7		µg/kg dry	63.7	11.5	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 63.7		µg/kg dry	63.7	15.9	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 63.7		µg/kg dry	63.7	11.4	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 127		µg/kg dry	127	83.3	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 63.7		µg/kg dry	63.7	14.7	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 63.7		µg/kg dry	63.7	16.7	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 63.7		µg/kg dry	63.7	16.3	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 63.7		µg/kg dry	63.7	21.2	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 63.7		µg/kg dry	63.7	14.5	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 63.7		µg/kg dry	63.7	22.1	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 63.7		µg/kg dry	63.7	20.1	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 63.7		µg/kg dry	63.7	16.7	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 63.7		µg/kg dry	63.7	19.5	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 63.7		µg/kg dry	63.7	15.0	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 63.7		µg/kg dry	63.7	25.9	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 63.7		µg/kg dry	63.7	13.3	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 63.7		µg/kg dry	63.7	20.4	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 127		µg/kg dry	127	42.4	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-12	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-05				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
						Initial weight: 16.77 g							
98-82-8	Isopropylbenzene	< 63.7		µg/kg dry	63.7	23.1	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 63.7		µg/kg dry	63.7	17.6	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 63.7		µg/kg dry	63.7	19.2	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 127		µg/kg dry	127	45.6	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 127		µg/kg dry	127	54.4	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 63.7		µg/kg dry	63.7	18.5	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 63.7		µg/kg dry	63.7	15.9	50	"	"	"	"	"	X
100-42-5	Styrene	< 63.7		µg/kg dry	63.7	8.41	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 63.7		µg/kg dry	63.7	15.3	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 63.7		µg/kg dry	63.7	20.2	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 63.7		µg/kg dry	63.7	20.1	50	"	"	"	"	"	X
108-88-3	Toluene	< 63.7		µg/kg dry	63.7	10.3	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 63.7		µg/kg dry	63.7	14.8	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 63.7		µg/kg dry	63.7	10.5	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 63.7		µg/kg dry	63.7	10.1	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 63.7		µg/kg dry	63.7	15.4	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 63.7		µg/kg dry	63.7	19.7	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 63.7		µg/kg dry	63.7	10.9	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 63.7		µg/kg dry	63.7	28.8	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 63.7		µg/kg dry	63.7	29.4	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 63.7		µg/kg dry	63.7	16.1	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 63.7		µg/kg dry	63.7	13.3	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 63.7		µg/kg dry	63.7	31.3	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 127		µg/kg dry	127	37.4	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 63.7		µg/kg dry	63.7	19.6	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 127		µg/kg dry	127	46.6	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 63.7		µg/kg dry	63.7	17.3	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 63.7		µg/kg dry	63.7	35.2	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 63.7		µg/kg dry	63.7	17.6	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 63.7		µg/kg dry	63.7	20.6	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1270		µg/kg dry	1270	904	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1270		µg/kg dry	1270	375	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 318		µg/kg dry	318	42.0	50	"	"	"	"	"	X
64-17-5	Ethanol	< 12700		µg/kg dry	12700	1100	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*106*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*103*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*102*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*104*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 77.9		µg/kg dry	77.9	41.4	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-12	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-05				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 77.9		µg/kg dry	77.9	40.7	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 385		µg/kg dry	385	24.5	1	"	"	"	"	"	X
120-12-7	Anthracene	< 77.9		µg/kg dry	77.9	44.9	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 385		µg/kg dry	385	41.8	1	"	"	"	"	"	
92-87-5	Benzidine	< 771		µg/kg dry	771	24.5	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 77.9		µg/kg dry	77.9	43.8	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 77.9		µg/kg dry	77.9	53.3	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 77.9		µg/kg dry	77.9	58.6	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 77.9		µg/kg dry	77.9	55.0	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 77.9		µg/kg dry	77.9	66.6	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 385		µg/kg dry	385	23.1	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 385		µg/kg dry	385	89.2	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 385		µg/kg dry	385	38.9	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 195		µg/kg dry	195	36.1	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 195		µg/kg dry	195	31.3	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 195		µg/kg dry	195	49.6	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 385		µg/kg dry	385	43.6	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 385		µg/kg dry	385	38.7	1	"	"	"	"	"	X
86-74-8	Carbazole	< 195		µg/kg dry	195	44.9	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 385		µg/kg dry	385	45.3	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 195		µg/kg dry	195	24.1	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 385		µg/kg dry	385	52.8	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 195		µg/kg dry	195	37.4	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 385		µg/kg dry	385	37.7	1	"	"	"	"	"	X
218-01-9	Chrysene	< 77.9		µg/kg dry	77.9	44.0	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 77.9		µg/kg dry	77.9	57.6	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 195		µg/kg dry	195	52.4	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 385		µg/kg dry	385	46.0	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 385		µg/kg dry	385	41.6	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 385		µg/kg dry	385	43.8	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 385		µg/kg dry	385	42.6	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 195		µg/kg dry	195	47.3	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 385		µg/kg dry	385	40.4	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 385		µg/kg dry	385	43.3	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 385		µg/kg dry	385	30.5	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 385		µg/kg dry	385	41.2	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 385		µg/kg dry	385	55.3	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 385		µg/kg dry	385	39.9	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 195		µg/kg dry	195	46.7	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 195		µg/kg dry	195	39.8	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 385		µg/kg dry	385	57.4	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 77.9		µg/kg dry	77.9	45.7	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-12	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-05				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 77.9		µg/kg dry	77.9	50.3	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 195		µg/kg dry	195	49.1	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 195		µg/kg dry	195	49.1	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 195		µg/kg dry	195	49.2	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 195		µg/kg dry	195	44.0	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 77.9		µg/kg dry	77.9	53.3	1	"	"	"	"	"	X
78-59-1	Isophorone	< 195		µg/kg dry	195	30.0	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 77.9		µg/kg dry	77.9	54.6	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 385		µg/kg dry	385	31.0	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 385		µg/kg dry	385	30.3	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 77.9		µg/kg dry	77.9	45.0	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 385		µg/kg dry	385	34.9	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 385		µg/kg dry	385	35.6	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 195		µg/kg dry	195	51.4	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 195		µg/kg dry	195	45.1	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 195		µg/kg dry	195	34.1	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1540		µg/kg dry	1540	51.3	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 195		µg/kg dry	195	25.5	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 195		µg/kg dry	195	34.1	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 385		µg/kg dry	385	39.2	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 385		µg/kg dry	385	45.9	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 77.9		µg/kg dry	77.9	44.2	1	"	"	"	"	"	X
108-95-2	Phenol	< 385		µg/kg dry	385	39.0	1	"	"	"	"	"	X
129-00-0	Pyrene	< 77.9		µg/kg dry	77.9	43.0	1	"	"	"	"	"	X
110-86-1	Pyridine	< 385		µg/kg dry	385	91.2	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 385		µg/kg dry	385	47.4	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 77.9		µg/kg dry	77.9	43.0	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 385		µg/kg dry	385	39.8	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 195		µg/kg dry	195	47.7	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 385		µg/kg dry	385	41.0	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 385		µg/kg dry	385	45.9	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*88*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*95*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*79*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*99*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*87*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*75*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 23.4		µg/kg dry	23.4	16.9	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 23.4		µg/kg dry	23.4	6.91	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 23.4		µg/kg dry	23.4	6.48	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-12	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-05				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 23.4		µg/kg dry	23.4	2.22	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 23.4		µg/kg dry	23.4	7.31	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 23.4		µg/kg dry	23.4	18.2	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 23.4		µg/kg dry	23.4	5.03	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 23.4		µg/kg dry	23.4	5.45	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 23.4		µg/kg dry	23.4	4.98	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*71*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*68*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*81*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*73*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides			Z-2										
Prepared by method SW846 3546													
319-84-6	alpha-BHC	< 5.85		µg/kg dry	5.85	0.269	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.85		µg/kg dry	5.85	0.374	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.85		µg/kg dry	5.85	0.304	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.51		µg/kg dry	3.51	0.620	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.85		µg/kg dry	5.85	0.678	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.85		µg/kg dry	5.85	0.199	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.85		µg/kg dry	5.85	0.234	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.85		µg/kg dry	5.85	0.269	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.85		µg/kg dry	5.85	0.281	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.85		µg/kg dry	5.85	0.304	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.36		µg/kg dry	9.36	0.573	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.36		µg/kg dry	9.36	0.374	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.36		µg/kg dry	9.36	0.491	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.36		µg/kg dry	9.36	0.854	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.36		µg/kg dry	9.36	4.01	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.36		µg/kg dry	9.36	0.632	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.36		µg/kg dry	9.36	0.339	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.36		µg/kg dry	9.36	1.47	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.85		µg/kg dry	5.85	0.246	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.85		µg/kg dry	5.85	0.292	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 117		µg/kg dry	117	82.5	1	"	"	"	"	"	X
57-74-9	Chlordane	< 23.4		µg/kg dry	23.4	2.94	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.85		µg/kg dry	5.85	0.515	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*88*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*88*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*58*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*55*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-12 SC58794-05	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**180**		mg/kg dry	15.9	13.3	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*84*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*112*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.34		mg/kg dry	3.34	0.180	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**39.2**		mg/kg dry	1.67	0.211	1	"	"	"	"	"	X
7440-39-3	Barium	**21.7**		mg/kg dry	1.11	0.131	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.556		mg/kg dry	0.556	0.0279	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.556		mg/kg dry	0.556	0.0288	1	"	"	"	"	"	X
7440-47-3	Chromium	**17.4**		mg/kg dry	1.11	0.148	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.129		mg/kg dry	0.129	0.0107	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**26.9**		mg/kg dry	1.11	0.128	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**19.6**		mg/kg dry	1.67	0.236	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.56		mg/kg dry	5.56	0.418	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.67		mg/kg dry	1.67	0.318	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.34		mg/kg dry	3.34	1.23	1	"	"	"	"	"	X
7440-62-2	Vanadium	**33.5**		mg/kg dry	1.67	0.296	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**37.9**		mg/kg dry	3.34	0.861	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**83.3**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.71**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 13-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 19:54	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*82*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-12 SC58794-05	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:33	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-13	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-06				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.9 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 69.5		µg/kg dry	69.5	38.1	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 695		µg/kg dry	695	87.9	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 69.5		µg/kg dry	69.5	25.1	50	"	"	"	"	"	X
71-43-2	Benzene	< 69.5		µg/kg dry	69.5	11.1	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 69.5		µg/kg dry	69.5	15.7	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 69.5		µg/kg dry	69.5	9.94	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 69.5		µg/kg dry	69.5	17.9	50	"	"	"	"	"	X
75-25-2	Bromoform	< 69.5		µg/kg dry	69.5	14.9	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 139		µg/kg dry	139	34.3	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 139		µg/kg dry	139	31.8	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 69.5		µg/kg dry	69.5	27.8	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 69.5		µg/kg dry	69.5	21.3	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 69.5		µg/kg dry	69.5	28.4	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 139		µg/kg dry	139	25.7	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 69.5		µg/kg dry	69.5	20.8	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 69.5		µg/kg dry	69.5	8.41	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 139		µg/kg dry	139	31.0	50	"	"	"	"	"	X
67-66-3	Chloroform	< 69.5		µg/kg dry	69.5	8.20	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 139		µg/kg dry	139	82.6	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 69.5		µg/kg dry	69.5	17.2	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 69.5		µg/kg dry	69.5	12.6	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 139		µg/kg dry	139	27.5	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 69.5		µg/kg dry	69.5	11.0	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 69.5		µg/kg dry	69.5	18.9	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 69.5		µg/kg dry	69.5	13.1	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 69.5		µg/kg dry	69.5	12.5	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 69.5		µg/kg dry	69.5	17.3	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 69.5		µg/kg dry	69.5	12.4	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 139		µg/kg dry	139	90.9	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 69.5		µg/kg dry	69.5	16.1	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 69.5		µg/kg dry	69.5	18.2	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 69.5		µg/kg dry	69.5	17.8	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 69.5		µg/kg dry	69.5	23.1	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 69.5		µg/kg dry	69.5	15.8	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 69.5		µg/kg dry	69.5	24.1	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 69.5		µg/kg dry	69.5	22.0	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 69.5		µg/kg dry	69.5	18.3	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 69.5		µg/kg dry	69.5	21.3	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 69.5		µg/kg dry	69.5	16.4	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 69.5		µg/kg dry	69.5	28.3	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 69.5		µg/kg dry	69.5	14.5	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 69.5		µg/kg dry	69.5	22.2	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 139		µg/kg dry	139	46.2	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-13	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-06				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
						Initial weight: 16.9 g							
98-82-8	Isopropylbenzene	< 69.5		µg/kg dry	69.5	25.2	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 69.5		µg/kg dry	69.5	19.3	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 69.5		µg/kg dry	69.5	20.9	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 139		µg/kg dry	139	49.8	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 139		µg/kg dry	139	59.4	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 69.5		µg/kg dry	69.5	20.2	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 69.5		µg/kg dry	69.5	17.3	50	"	"	"	"	"	X
100-42-5	Styrene	< 69.5		µg/kg dry	69.5	9.17	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 69.5		µg/kg dry	69.5	16.7	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 69.5		µg/kg dry	69.5	22.0	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 69.5		µg/kg dry	69.5	21.9	50	"	"	"	"	"	X
108-88-3	Toluene	< 69.5		µg/kg dry	69.5	11.2	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 69.5		µg/kg dry	69.5	16.2	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 69.5		µg/kg dry	69.5	11.5	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 69.5		µg/kg dry	69.5	11.0	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 69.5		µg/kg dry	69.5	16.8	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 69.5		µg/kg dry	69.5	21.5	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 69.5		µg/kg dry	69.5	11.9	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 69.5		µg/kg dry	69.5	31.4	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 69.5		µg/kg dry	69.5	32.0	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 69.5		µg/kg dry	69.5	17.6	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 69.5		µg/kg dry	69.5	14.5	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 69.5		µg/kg dry	69.5	34.2	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 139		µg/kg dry	139	40.9	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 69.5		µg/kg dry	69.5	21.4	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 139		µg/kg dry	139	50.8	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 69.5		µg/kg dry	69.5	18.8	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 69.5		µg/kg dry	69.5	38.4	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 69.5		µg/kg dry	69.5	19.3	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 69.5		µg/kg dry	69.5	22.4	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1390		µg/kg dry	1390	987	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1390		µg/kg dry	1390	409	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-butene	< 348		µg/kg dry	348	45.9	50	"	"	"	"	"	X
64-17-5	Ethanol	< 13900		µg/kg dry	13900	1200	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*102*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*103*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*105*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 83.7		µg/kg dry	83.7	44.4	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-13	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-06				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 83.7		µg/kg dry	83.7	43.7	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 414		µg/kg dry	414	26.4	1	"	"	"	"	"	X
120-12-7	Anthracene	< 83.7		µg/kg dry	83.7	48.2	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 414		µg/kg dry	414	44.9	1	"	"	"	"	"	
92-87-5	Benzidine	< 828		µg/kg dry	828	26.4	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 83.7		µg/kg dry	83.7	47.1	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 83.7		µg/kg dry	83.7	57.2	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 83.7		µg/kg dry	83.7	63.0	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 83.7		µg/kg dry	83.7	59.1	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 83.7		µg/kg dry	83.7	71.5	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 414		µg/kg dry	414	24.8	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 414		µg/kg dry	414	95.9	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 414		µg/kg dry	414	41.8	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 210		µg/kg dry	210	38.8	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 210		µg/kg dry	210	33.6	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 210		µg/kg dry	210	53.3	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 414		µg/kg dry	414	46.8	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 414		µg/kg dry	414	41.5	1	"	"	"	"	"	X
86-74-8	Carbazole	< 210		µg/kg dry	210	48.2	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 414		µg/kg dry	414	48.7	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 210		µg/kg dry	210	25.9	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 414		µg/kg dry	414	56.7	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 210		µg/kg dry	210	40.2	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 414		µg/kg dry	414	40.5	1	"	"	"	"	"	X
218-01-9	Chrysene	< 83.7		µg/kg dry	83.7	47.3	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 83.7		µg/kg dry	83.7	61.9	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 210		µg/kg dry	210	56.3	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 414		µg/kg dry	414	49.4	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 414		µg/kg dry	414	44.7	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 414		µg/kg dry	414	47.1	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 414		µg/kg dry	414	45.8	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 210		µg/kg dry	210	50.8	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 414		µg/kg dry	414	43.4	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 414		µg/kg dry	414	46.6	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 414		µg/kg dry	414	32.8	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 414		µg/kg dry	414	44.3	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 414		µg/kg dry	414	59.4	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 414		µg/kg dry	414	42.9	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 210		µg/kg dry	210	50.2	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 210		µg/kg dry	210	42.8	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 414		µg/kg dry	414	61.6	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 83.7		µg/kg dry	83.7	49.1	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-13	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-06				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 83.7		µg/kg dry	83.7	54.1	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 210		µg/kg dry	210	52.7	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 210		µg/kg dry	210	52.7	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 210		µg/kg dry	210	52.8	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 210		µg/kg dry	210	47.3	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 83.7		µg/kg dry	83.7	57.2	1	"	"	"	"	"	X
78-59-1	Isophorone	< 210		µg/kg dry	210	32.3	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 83.7		µg/kg dry	83.7	58.6	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 414		µg/kg dry	414	33.3	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 414		µg/kg dry	414	32.5	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 83.7		µg/kg dry	83.7	48.3	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 414		µg/kg dry	414	37.5	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 414		µg/kg dry	414	38.3	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 210		µg/kg dry	210	55.2	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 210		µg/kg dry	210	48.4	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 210		µg/kg dry	210	36.6	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1660		µg/kg dry	1660	55.1	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 210		µg/kg dry	210	27.4	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 210		µg/kg dry	210	36.6	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 414		µg/kg dry	414	42.2	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 414		µg/kg dry	414	49.3	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 83.7		µg/kg dry	83.7	47.4	1	"	"	"	"	"	X
108-95-2	Phenol	< 414		µg/kg dry	414	41.9	1	"	"	"	"	"	X
129-00-0	Pyrene	< 83.7		µg/kg dry	83.7	46.2	1	"	"	"	"	"	X
110-86-1	Pyridine	< 414		µg/kg dry	414	98.0	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 414		µg/kg dry	414	50.9	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 83.7		µg/kg dry	83.7	46.2	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 414		µg/kg dry	414	42.8	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 210		µg/kg dry	210	51.2	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 414		µg/kg dry	414	44.0	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 414		µg/kg dry	414	49.3	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*94*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*88*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*84*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*100*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*77*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*84*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 25.2		µg/kg dry	25.2	18.2	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 25.2		µg/kg dry	25.2	7.45	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 25.2		µg/kg dry	25.2	6.98	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-13	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-06				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 25.2		µg/kg dry	25.2	2.39	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 25.2		µg/kg dry	25.2	7.88	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 25.2		µg/kg dry	25.2	19.6	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 25.2		µg/kg dry	25.2	5.42	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 25.2		µg/kg dry	25.2	5.87	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 25.2		µg/kg dry	25.2	5.37	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*91*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*84*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*84*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*76*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 6.30		µg/kg dry	6.30	0.290	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 6.30		µg/kg dry	6.30	0.403	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 6.30		µg/kg dry	6.30	0.328	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.78		µg/kg dry	3.78	0.668	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 6.30		µg/kg dry	6.30	0.731	1	"	"	"	"	"	X
309-00-2	Aldrin	< 6.30		µg/kg dry	6.30	0.214	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 6.30		µg/kg dry	6.30	0.252	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 6.30		µg/kg dry	6.30	0.290	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 6.30		µg/kg dry	6.30	0.302	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 6.30		µg/kg dry	6.30	0.328	1	"	"	"	"	"	X
72-20-8	Endrin	< 10.1		µg/kg dry	10.1	0.618	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 10.1		µg/kg dry	10.1	0.403	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 10.1		µg/kg dry	10.1	0.529	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 10.1		µg/kg dry	10.1	0.920	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 10.1		µg/kg dry	10.1	4.32	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 10.1		µg/kg dry	10.1	0.681	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 10.1		µg/kg dry	10.1	0.365	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 10.1		µg/kg dry	10.1	1.59	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 6.30		µg/kg dry	6.30	0.265	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 6.30		µg/kg dry	6.30	0.315	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 126		µg/kg dry	126	88.9	1	"	"	"	"	"	X
57-74-9	Chlordane	< 25.2		µg/kg dry	25.2	3.17	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 6.30		µg/kg dry	6.30	0.555	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*72*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*62*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*52*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*53*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-13 SC58794-06	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**93.0**		mg/kg dry	16.5	13.8	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*78*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*105*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.67		mg/kg dry	3.67	0.198	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**49.1**		mg/kg dry	1.83	0.232	1	"	"	"	"	"	X
7440-39-3	Barium	**28.9**		mg/kg dry	1.22	0.144	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.611		mg/kg dry	0.611	0.0307	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.611		mg/kg dry	0.611	0.0316	1	"	"	"	"	"	X
7440-47-3	Chromium	**23.3**		mg/kg dry	1.22	0.163	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.133		mg/kg dry	0.133	0.0111	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**37.2**		mg/kg dry	1.22	0.141	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**22.7**		mg/kg dry	1.83	0.259	1	"	"	"	"	"	X
7440-36-0	Antimony	< 6.11		mg/kg dry	6.11	0.459	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.83		mg/kg dry	1.83	0.349	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.67		mg/kg dry	3.67	1.35	1	"	"	"	"	"	X
7440-62-2	Vanadium	**34.6**		mg/kg dry	1.83	0.325	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**49.2**		mg/kg dry	3.67	0.946	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**79.0**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**6.35**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 13-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 20:19	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*85*			*30-150 %*			"	"	"	"	"	

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Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-13 SC58794-06	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 7		mg/kg	7	7	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:34	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-14	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-07				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.96 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 58.5		µg/kg dry	58.5	32.0	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 585		µg/kg dry	585	73.9	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 58.5		µg/kg dry	58.5	21.1	50	"	"	"	"	"	X
71-43-2	Benzene	< 58.5		µg/kg dry	58.5	9.36	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 58.5		µg/kg dry	58.5	13.2	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 58.5		µg/kg dry	58.5	8.36	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 58.5		µg/kg dry	58.5	15.1	50	"	"	"	"	"	X
75-25-2	Bromoform	< 58.5		µg/kg dry	58.5	12.5	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 117		µg/kg dry	117	28.9	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 117		µg/kg dry	117	26.7	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 58.5		µg/kg dry	58.5	23.4	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 58.5		µg/kg dry	58.5	18.0	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 58.5		µg/kg dry	58.5	23.9	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 117		µg/kg dry	117	21.6	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 58.5		µg/kg dry	58.5	17.5	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 58.5		µg/kg dry	58.5	7.08	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 117		µg/kg dry	117	26.1	50	"	"	"	"	"	X
67-66-3	Chloroform	< 58.5		µg/kg dry	58.5	6.90	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 117		µg/kg dry	117	69.5	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 58.5		µg/kg dry	58.5	14.5	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 58.5		µg/kg dry	58.5	10.6	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 117		µg/kg dry	117	23.1	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 58.5		µg/kg dry	58.5	9.24	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 58.5		µg/kg dry	58.5	15.9	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 58.5		µg/kg dry	58.5	11.0	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 58.5		µg/kg dry	58.5	10.5	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 58.5		µg/kg dry	58.5	14.6	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 58.5		µg/kg dry	58.5	10.5	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 117		µg/kg dry	117	76.5	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 58.5		µg/kg dry	58.5	13.5	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 58.5		µg/kg dry	58.5	15.3	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 58.5		µg/kg dry	58.5	15.0	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 58.5		µg/kg dry	58.5	19.5	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 58.5		µg/kg dry	58.5	13.3	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 58.5		µg/kg dry	58.5	20.3	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 58.5		µg/kg dry	58.5	18.5	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 58.5		µg/kg dry	58.5	15.4	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 58.5		µg/kg dry	58.5	17.9	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 58.5		µg/kg dry	58.5	13.8	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 58.5		µg/kg dry	58.5	23.8	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 58.5		µg/kg dry	58.5	12.2	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 58.5		µg/kg dry	58.5	18.7	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 117		µg/kg dry	117	38.9	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-14	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-07				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260							Initial weight: 16.96 g						
98-82-8	Isopropylbenzene	< 58.5		µg/kg dry	58.5	21.2	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 58.5		µg/kg dry	58.5	16.2	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 58.5		µg/kg dry	58.5	17.6	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 117		µg/kg dry	117	41.9	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 117		µg/kg dry	117	49.9	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 58.5		µg/kg dry	58.5	17.0	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 58.5		µg/kg dry	58.5	14.6	50	"	"	"	"	"	X
100-42-5	Styrene	< 58.5		µg/kg dry	58.5	7.72	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 58.5		µg/kg dry	58.5	14.1	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 58.5		µg/kg dry	58.5	18.5	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 58.5		µg/kg dry	58.5	18.4	50	"	"	"	"	"	X
108-88-3	Toluene	< 58.5		µg/kg dry	58.5	9.41	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 58.5		µg/kg dry	58.5	13.6	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 58.5		µg/kg dry	58.5	9.65	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 58.5		µg/kg dry	58.5	9.24	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 58.5		µg/kg dry	58.5	14.2	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 58.5		µg/kg dry	58.5	18.1	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 58.5		µg/kg dry	58.5	10.0	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 58.5		µg/kg dry	58.5	26.4	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 58.5		µg/kg dry	58.5	27.0	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 58.5		µg/kg dry	58.5	14.8	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 58.5		µg/kg dry	58.5	12.2	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 58.5		µg/kg dry	58.5	28.8	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 117		µg/kg dry	117	34.4	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 58.5		µg/kg dry	58.5	18.0	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 117		µg/kg dry	117	42.7	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 58.5		µg/kg dry	58.5	15.8	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 58.5		µg/kg dry	58.5	32.3	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 58.5		µg/kg dry	58.5	16.2	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 58.5		µg/kg dry	58.5	18.9	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1170		µg/kg dry	1170	830	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1170		µg/kg dry	1170	344	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 292		µg/kg dry	292	38.6	50	"	"	"	"	"	X
64-17-5	Ethanol	< 11700		µg/kg dry	11700	1010	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*107*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*104*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*107*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 75.8		µg/kg dry	75.8	40.2	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-14	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-07				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 75.8		µg/kg dry	75.8	39.5	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 375		µg/kg dry	375	23.9	1	"	"	"	"	"	X
120-12-7	Anthracene	< 75.8		µg/kg dry	75.8	43.6	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 375		µg/kg dry	375	40.7	1	"	"	"	"	"	
92-87-5	Benzidine	< 750		µg/kg dry	750	23.9	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 75.8		µg/kg dry	75.8	42.6	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 75.8		µg/kg dry	75.8	51.8	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 75.8		µg/kg dry	75.8	57.0	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 75.8		µg/kg dry	75.8	53.5	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 75.8		µg/kg dry	75.8	64.7	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 375		µg/kg dry	375	22.5	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 375		µg/kg dry	375	86.8	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 375		µg/kg dry	375	37.8	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 190		µg/kg dry	190	35.1	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 190		µg/kg dry	190	30.4	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 190		µg/kg dry	190	48.3	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 375		µg/kg dry	375	42.4	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 375		µg/kg dry	375	37.6	1	"	"	"	"	"	X
86-74-8	Carbazole	< 190		µg/kg dry	190	43.6	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 375		µg/kg dry	375	44.1	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 190		µg/kg dry	190	23.4	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 375		µg/kg dry	375	51.3	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 190		µg/kg dry	190	36.3	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 375		µg/kg dry	375	36.7	1	"	"	"	"	"	X
218-01-9	Chrysene	< 75.8		µg/kg dry	75.8	42.8	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 75.8		µg/kg dry	75.8	56.0	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 190		µg/kg dry	190	51.0	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 375		µg/kg dry	375	44.8	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 375		µg/kg dry	375	40.4	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 375		µg/kg dry	375	42.6	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 375		µg/kg dry	375	41.5	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 190		µg/kg dry	190	46.0	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 375		µg/kg dry	375	39.3	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 375		µg/kg dry	375	42.1	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 375		µg/kg dry	375	29.6	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 375		µg/kg dry	375	40.1	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 375		µg/kg dry	375	53.7	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 375		µg/kg dry	375	38.8	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 190		µg/kg dry	190	45.4	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 190		µg/kg dry	190	38.7	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 375		µg/kg dry	375	55.8	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 75.8		µg/kg dry	75.8	44.4	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-14	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-07				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 75.8		µg/kg dry	75.8	49.0	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 190		µg/kg dry	190	47.7	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 190		µg/kg dry	190	47.7	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 190		µg/kg dry	190	47.8	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 190		µg/kg dry	190	42.8	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 75.8		µg/kg dry	75.8	51.8	1	"	"	"	"	"	X
78-59-1	Isophorone	< 190		µg/kg dry	190	29.2	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 75.8		µg/kg dry	75.8	53.0	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 375		µg/kg dry	375	30.1	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 375		µg/kg dry	375	29.4	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 75.8		µg/kg dry	75.8	43.7	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 375		µg/kg dry	375	34.0	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 375		µg/kg dry	375	34.6	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 190		µg/kg dry	190	50.0	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 190		µg/kg dry	190	43.8	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 190		µg/kg dry	190	33.2	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1500		µg/kg dry	1500	49.9	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 190		µg/kg dry	190	24.8	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 190		µg/kg dry	190	33.2	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 375		µg/kg dry	375	38.2	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 375		µg/kg dry	375	44.6	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 75.8		µg/kg dry	75.8	42.9	1	"	"	"	"	"	X
108-95-2	Phenol	< 375		µg/kg dry	375	37.9	1	"	"	"	"	"	X
129-00-0	Pyrene	< 75.8		µg/kg dry	75.8	41.8	1	"	"	"	"	"	X
110-86-1	Pyridine	< 375		µg/kg dry	375	88.7	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 375		µg/kg dry	375	46.1	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 75.8		µg/kg dry	75.8	41.8	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 375		µg/kg dry	375	38.7	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 190		µg/kg dry	190	46.3	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 375		µg/kg dry	375	39.9	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 375		µg/kg dry	375	44.6	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*94*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*96*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*83*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*106*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*89*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*71*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 22.5		µg/kg dry	22.5	16.2	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 22.5		µg/kg dry	22.5	6.65	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 22.5		µg/kg dry	22.5	6.24	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-14	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-07				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 22.5		µg/kg dry	22.5	2.14	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 22.5		µg/kg dry	22.5	7.04	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 22.5		µg/kg dry	22.5	17.5	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 22.5		µg/kg dry	22.5	4.84	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 22.5		µg/kg dry	22.5	5.25	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 22.5		µg/kg dry	22.5	4.80	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*94*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*85*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*84*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*75*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.63		µg/kg dry	5.63	0.259	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.63		µg/kg dry	5.63	0.360	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.63		µg/kg dry	5.63	0.293	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.38		µg/kg dry	3.38	0.597	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.63		µg/kg dry	5.63	0.653	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.63		µg/kg dry	5.63	0.191	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.63		µg/kg dry	5.63	0.225	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.63		µg/kg dry	5.63	0.259	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.63		µg/kg dry	5.63	0.270	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.63		µg/kg dry	5.63	0.293	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.01		µg/kg dry	9.01	0.552	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.01		µg/kg dry	9.01	0.360	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.01		µg/kg dry	9.01	0.473	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.01		µg/kg dry	9.01	0.822	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.01		µg/kg dry	9.01	3.86	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.01		µg/kg dry	9.01	0.608	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.01		µg/kg dry	9.01	0.326	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.01		µg/kg dry	9.01	1.42	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.63		µg/kg dry	5.63	0.236	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.63		µg/kg dry	5.63	0.281	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 113		µg/kg dry	113	79.4	1	"	"	"	"	"	X
57-74-9	Chlordane	< 22.5		µg/kg dry	22.5	2.83	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.63		µg/kg dry	5.63	0.495	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*80*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*80*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*57*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*67*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-14 SC58794-07	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**116**		mg/kg dry	15.2	12.7	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*75*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*101*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.38		mg/kg dry	3.38	0.183	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**23.7**		mg/kg dry	1.69	0.214	1	"	"	"	"	"	X
7440-39-3	Barium	**44.1**		mg/kg dry	1.13	0.133	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.563		mg/kg dry	0.563	0.0283	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.563		mg/kg dry	0.563	0.0292	1	"	"	"	"	"	X
7440-47-3	Chromium	**36.0**		mg/kg dry	1.13	0.150	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.118		mg/kg dry	0.118	0.0098	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**26.1**		mg/kg dry	1.13	0.130	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**13.7**		mg/kg dry	1.69	0.239	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.63		mg/kg dry	5.63	0.424	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.69		mg/kg dry	1.69	0.322	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.38		mg/kg dry	3.38	1.24	1	"	"	"	"	"	X
7440-62-2	Vanadium	**41.9**		mg/kg dry	1.69	0.300	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**44.6**		mg/kg dry	3.38	0.872	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**86.9**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**6.03**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 13-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 21:33	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*81*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-14 SC58794-07	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:37	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-16	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-08				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 17.1 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 54.0		µg/kg dry	54.0	29.6	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 540		µg/kg dry	540	68.3	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 54.0		µg/kg dry	54.0	19.5	50	"	"	"	"	"	X
71-43-2	Benzene	< 54.0		µg/kg dry	54.0	8.64	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 54.0		µg/kg dry	54.0	12.2	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 54.0		µg/kg dry	54.0	7.72	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 54.0		µg/kg dry	54.0	13.9	50	"	"	"	"	"	X
75-25-2	Bromoform	< 54.0		µg/kg dry	54.0	11.6	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 108		µg/kg dry	108	26.7	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 108		µg/kg dry	108	24.7	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 54.0		µg/kg dry	54.0	21.6	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 54.0		µg/kg dry	54.0	16.6	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 54.0		µg/kg dry	54.0	22.0	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 108		µg/kg dry	108	20.0	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 54.0		µg/kg dry	54.0	16.1	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 54.0		µg/kg dry	54.0	6.53	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 108		µg/kg dry	108	24.1	50	"	"	"	"	"	X
67-66-3	Chloroform	< 54.0		µg/kg dry	54.0	6.37	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 108		µg/kg dry	108	64.1	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 54.0		µg/kg dry	54.0	13.4	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 54.0		µg/kg dry	54.0	9.77	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 108		µg/kg dry	108	21.3	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 54.0		µg/kg dry	54.0	8.53	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 54.0		µg/kg dry	54.0	14.7	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 54.0		µg/kg dry	54.0	10.2	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 54.0		µg/kg dry	54.0	9.72	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 54.0		µg/kg dry	54.0	13.4	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 54.0		µg/kg dry	54.0	9.67	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 108		µg/kg dry	108	70.6	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 54.0		µg/kg dry	54.0	12.5	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 54.0		µg/kg dry	54.0	14.1	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 54.0		µg/kg dry	54.0	13.8	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 54.0		µg/kg dry	54.0	18.0	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 54.0		µg/kg dry	54.0	12.3	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 54.0		µg/kg dry	54.0	18.7	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 54.0		µg/kg dry	54.0	17.1	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 54.0		µg/kg dry	54.0	14.2	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 54.0		µg/kg dry	54.0	16.5	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 54.0		µg/kg dry	54.0	12.7	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 54.0		µg/kg dry	54.0	22.0	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 54.0		µg/kg dry	54.0	11.3	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 54.0		µg/kg dry	54.0	17.3	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 108		µg/kg dry	108	35.9	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-16	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-08				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 17.1 g						
98-82-8	Isopropylbenzene	< 54.0		µg/kg dry	54.0	19.6	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 54.0		µg/kg dry	54.0	15.0	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 54.0		µg/kg dry	54.0	16.3	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 108		µg/kg dry	108	38.7	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 108		µg/kg dry	108	46.1	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 54.0		µg/kg dry	54.0	15.7	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 54.0		µg/kg dry	54.0	13.4	50	"	"	"	"	"	X
100-42-5	Styrene	< 54.0		µg/kg dry	54.0	7.13	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 54.0		µg/kg dry	54.0	13.0	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 54.0		µg/kg dry	54.0	17.1	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 54.0		µg/kg dry	54.0	17.0	50	"	"	"	"	"	X
108-88-3	Toluene	< 54.0		µg/kg dry	54.0	8.69	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 54.0		µg/kg dry	54.0	12.6	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 54.0		µg/kg dry	54.0	8.91	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 54.0		µg/kg dry	54.0	8.53	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 54.0		µg/kg dry	54.0	13.1	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 54.0		µg/kg dry	54.0	16.7	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 54.0		µg/kg dry	54.0	9.23	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 54.0		µg/kg dry	54.0	24.4	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 54.0		µg/kg dry	54.0	24.9	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 54.0		µg/kg dry	54.0	13.7	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 54.0		µg/kg dry	54.0	11.3	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 54.0		µg/kg dry	54.0	26.6	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 108		µg/kg dry	108	31.7	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 54.0		µg/kg dry	54.0	16.6	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 108		µg/kg dry	108	39.5	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 54.0		µg/kg dry	54.0	14.6	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 54.0		µg/kg dry	54.0	29.9	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 54.0		µg/kg dry	54.0	15.0	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 54.0		µg/kg dry	54.0	17.4	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1080		µg/kg dry	1080	767	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1080		µg/kg dry	1080	318	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 270		µg/kg dry	270	35.6	50	"	"	"	"	"	X
64-17-5	Ethanol	< 10800		µg/kg dry	10800	930	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*104*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*105*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 73.0		µg/kg dry	73.0	38.7	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-16	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-08				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 73.0		µg/kg dry	73.0	38.1	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 361		µg/kg dry	361	23.0	1	"	"	"	"	"	X
120-12-7	Anthracene	< 73.0		µg/kg dry	73.0	42.0	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 361		µg/kg dry	361	39.2	1	"	"	"	"	"	
92-87-5	Benzidine	< 722		µg/kg dry	722	23.0	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 73.0		µg/kg dry	73.0	41.0	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 73.0		µg/kg dry	73.0	49.9	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 73.0		µg/kg dry	73.0	54.9	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 73.0		µg/kg dry	73.0	51.5	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 73.0		µg/kg dry	73.0	62.4	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 361		µg/kg dry	361	21.7	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 361		µg/kg dry	361	83.6	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 361		µg/kg dry	361	36.4	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 183		µg/kg dry	183	33.8	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 183		µg/kg dry	183	29.3	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 183		µg/kg dry	183	46.5	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 361		µg/kg dry	361	40.8	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 361		µg/kg dry	361	36.2	1	"	"	"	"	"	X
86-74-8	Carbazole	< 183		µg/kg dry	183	42.0	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 361		µg/kg dry	361	42.5	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 183		µg/kg dry	183	22.5	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 361		µg/kg dry	361	49.5	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 183		µg/kg dry	183	35.0	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 361		µg/kg dry	361	35.3	1	"	"	"	"	"	X
218-01-9	Chrysene	< 73.0		µg/kg dry	73.0	41.3	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 73.0		µg/kg dry	73.0	53.9	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 183		µg/kg dry	183	49.1	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 361		µg/kg dry	361	43.1	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 361		µg/kg dry	361	39.0	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 361		µg/kg dry	361	41.0	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 361		µg/kg dry	361	39.9	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 183		µg/kg dry	183	44.3	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 361		µg/kg dry	361	37.9	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 361		µg/kg dry	361	40.6	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 361		µg/kg dry	361	28.6	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 361		µg/kg dry	361	38.6	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 361		µg/kg dry	361	51.8	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 361		µg/kg dry	361	37.4	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 183		µg/kg dry	183	43.8	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 183		µg/kg dry	183	37.3	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 361		µg/kg dry	361	53.7	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 73.0		µg/kg dry	73.0	42.8	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-16	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-08				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 73.0		µg/kg dry	73.0	47.2	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 183		µg/kg dry	183	46.0	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 183		µg/kg dry	183	46.0	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 183		µg/kg dry	183	46.1	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 183		µg/kg dry	183	41.3	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 73.0		µg/kg dry	73.0	49.9	1	"	"	"	"	"	X
78-59-1	Isophorone	< 183		µg/kg dry	183	28.1	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 73.0		µg/kg dry	73.0	51.1	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 361		µg/kg dry	361	29.0	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 361		µg/kg dry	361	28.3	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 73.0		µg/kg dry	73.0	42.1	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 361		µg/kg dry	361	32.7	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 361		µg/kg dry	361	33.4	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 183		µg/kg dry	183	48.1	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 183		µg/kg dry	183	42.2	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 183		µg/kg dry	183	32.0	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1440		µg/kg dry	1440	48.0	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 183		µg/kg dry	183	23.9	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 183		µg/kg dry	183	32.0	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 361		µg/kg dry	361	36.8	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 361		µg/kg dry	361	43.0	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 73.0		µg/kg dry	73.0	41.4	1	"	"	"	"	"	X
108-95-2	Phenol	< 361		µg/kg dry	361	36.5	1	"	"	"	"	"	X
129-00-0	Pyrene	< 73.0		µg/kg dry	73.0	40.3	1	"	"	"	"	"	X
110-86-1	Pyridine	< 361		µg/kg dry	361	85.5	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 361		µg/kg dry	361	44.4	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 73.0		µg/kg dry	73.0	40.3	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 361		µg/kg dry	361	37.3	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 183		µg/kg dry	183	44.6	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 361		µg/kg dry	361	38.4	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 361		µg/kg dry	361	43.0	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*64*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*85*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*78*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*90*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*84*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*74*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 21.8		µg/kg dry	21.8	15.7	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 21.8		µg/kg dry	21.8	6.43	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 21.8		µg/kg dry	21.8	6.03	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-16	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-08				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 21.8		µg/kg dry	21.8	2.07	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 21.8		µg/kg dry	21.8	6.80	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 21.8		µg/kg dry	21.8	16.9	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 21.8		µg/kg dry	21.8	4.68	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 21.8		µg/kg dry	21.8	5.07	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 21.8		µg/kg dry	21.8	4.64	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*73*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*67*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*81*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*74*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.44		µg/kg dry	5.44	0.250	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.44		µg/kg dry	5.44	0.348	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.44		µg/kg dry	5.44	0.283	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.26		µg/kg dry	3.26	0.577	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.44		µg/kg dry	5.44	0.631	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.44		µg/kg dry	5.44	0.185	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.44		µg/kg dry	5.44	0.218	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.44		µg/kg dry	5.44	0.250	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.44		µg/kg dry	5.44	0.261	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.44		µg/kg dry	5.44	0.283	1	"	"	"	"	"	X
72-20-8	Endrin	< 8.71		µg/kg dry	8.71	0.533	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 8.71		µg/kg dry	8.71	0.348	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 8.71		µg/kg dry	8.71	0.457	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 8.71		µg/kg dry	8.71	0.794	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 8.71		µg/kg dry	8.71	3.73	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 8.71		µg/kg dry	8.71	0.588	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 8.71		µg/kg dry	8.71	0.316	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 8.71		µg/kg dry	8.71	1.37	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.44		µg/kg dry	5.44	0.229	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.44		µg/kg dry	5.44	0.272	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 109		µg/kg dry	109	76.8	1	"	"	"	"	"	X
57-74-9	Chlordane	< 21.8		µg/kg dry	21.8	2.74	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.44		µg/kg dry	5.44	0.479	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*68*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*61*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*53*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*55*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-16 SC58794-08	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**93.6**		mg/kg dry	14.7	12.3	1	SW846 8100Mod.	14-Jul-20	16-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*73*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*97*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.35		mg/kg dry	3.35	0.181	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**36.6**		mg/kg dry	1.67	0.212	1	"	"	"	"	"	X
7440-39-3	Barium	**24.0**		mg/kg dry	1.12	0.132	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.558		mg/kg dry	0.558	0.0280	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.558		mg/kg dry	0.558	0.0289	1	"	"	"	"	"	X
7440-47-3	Chromium	**21.7**		mg/kg dry	1.12	0.148	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.119		mg/kg dry	0.119	0.0099	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**30.6**		mg/kg dry	1.12	0.128	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**17.5**		mg/kg dry	1.67	0.237	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.58		mg/kg dry	5.58	0.420	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.67		mg/kg dry	1.67	0.319	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.35		mg/kg dry	3.35	1.23	1	"	"	"	"	"	X
7440-62-2	Vanadium	**30.6**		mg/kg dry	1.67	0.297	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**44.3**		mg/kg dry	3.35	0.864	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**90.3**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**6.08**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 13-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 21:57	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*84*			*30-150 %*			"	"	"	"	"	

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Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-16 SC58794-08	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:38	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-17	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-09				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 17.77 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 52.9		µg/kg dry	52.9	29.0	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 529		µg/kg dry	529	66.8	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 52.9		µg/kg dry	52.9	19.1	50	"	"	"	"	"	X
71-43-2	Benzene	< 52.9		µg/kg dry	52.9	8.46	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 52.9		µg/kg dry	52.9	12.0	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 52.9		µg/kg dry	52.9	7.56	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 52.9		µg/kg dry	52.9	13.6	50	"	"	"	"	"	X
75-25-2	Bromoform	< 52.9		µg/kg dry	52.9	11.3	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 106		µg/kg dry	106	26.1	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 106		µg/kg dry	106	24.2	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 52.9		µg/kg dry	52.9	21.2	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 52.9		µg/kg dry	52.9	16.2	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 52.9		µg/kg dry	52.9	21.6	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 106		µg/kg dry	106	19.6	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 52.9		µg/kg dry	52.9	15.8	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 52.9		µg/kg dry	52.9	6.40	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 106		µg/kg dry	106	23.6	50	"	"	"	"	"	X
67-66-3	Chloroform	< 52.9		µg/kg dry	52.9	6.24	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 106		µg/kg dry	106	62.8	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 52.9		µg/kg dry	52.9	13.1	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 52.9		µg/kg dry	52.9	9.57	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 106		µg/kg dry	106	20.9	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 52.9		µg/kg dry	52.9	8.35	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 52.9		µg/kg dry	52.9	14.4	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 52.9		µg/kg dry	52.9	9.94	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 52.9		µg/kg dry	52.9	9.52	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 52.9		µg/kg dry	52.9	13.2	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 52.9		µg/kg dry	52.9	9.47	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 106		µg/kg dry	106	69.2	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 52.9		µg/kg dry	52.9	12.2	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 52.9		µg/kg dry	52.9	13.9	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 52.9		µg/kg dry	52.9	13.5	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 52.9		µg/kg dry	52.9	17.6	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 52.9		µg/kg dry	52.9	12.1	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 52.9		µg/kg dry	52.9	18.3	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 52.9		µg/kg dry	52.9	16.7	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 52.9		µg/kg dry	52.9	13.9	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 52.9		µg/kg dry	52.9	16.2	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 52.9		µg/kg dry	52.9	12.5	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 52.9		µg/kg dry	52.9	21.5	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 52.9		µg/kg dry	52.9	11.1	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 52.9		µg/kg dry	52.9	16.9	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 106		µg/kg dry	106	35.2	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-17	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-09				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 17.77 g						
98-82-8	Isopropylbenzene	< 52.9		µg/kg dry	52.9	19.2	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 52.9		µg/kg dry	52.9	14.6	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 52.9		µg/kg dry	52.9	15.9	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 106		µg/kg dry	106	37.9	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 106		µg/kg dry	106	45.2	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 52.9		µg/kg dry	52.9	15.3	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 52.9		µg/kg dry	52.9	13.2	50	"	"	"	"	"	X
100-42-5	Styrene	< 52.9		µg/kg dry	52.9	6.98	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 52.9		µg/kg dry	52.9	12.7	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 52.9		µg/kg dry	52.9	16.8	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 52.9		µg/kg dry	52.9	16.7	50	"	"	"	"	"	X
108-88-3	Toluene	< 52.9		µg/kg dry	52.9	8.51	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 52.9		µg/kg dry	52.9	12.3	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 52.9		µg/kg dry	52.9	8.72	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 52.9		µg/kg dry	52.9	8.35	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 52.9		µg/kg dry	52.9	12.8	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 52.9		µg/kg dry	52.9	16.3	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 52.9		µg/kg dry	52.9	9.04	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 52.9		µg/kg dry	52.9	23.9	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 52.9		µg/kg dry	52.9	24.4	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 52.9		µg/kg dry	52.9	13.4	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 52.9		µg/kg dry	52.9	11.1	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 52.9		µg/kg dry	52.9	26.0	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 106		µg/kg dry	106	31.1	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 52.9		µg/kg dry	52.9	16.3	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 106		µg/kg dry	106	38.7	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 52.9		µg/kg dry	52.9	14.3	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 52.9		µg/kg dry	52.9	29.2	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 52.9		µg/kg dry	52.9	14.6	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 52.9		µg/kg dry	52.9	17.1	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1060		µg/kg dry	1060	751	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1060		µg/kg dry	1060	311	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 264		µg/kg dry	264	34.9	50	"	"	"	"	"	X
64-17-5	Ethanol	< 10600		µg/kg dry	10600	911	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*102*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*106*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*106*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 72.0		µg/kg dry	72.0	38.2	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-17	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-09				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 72.0		µg/kg dry	72.0	37.6	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 356		µg/kg dry	356	22.7	1	"	"	"	"	"	X
120-12-7	Anthracene	< 72.0		µg/kg dry	72.0	41.5	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 356		µg/kg dry	356	38.7	1	"	"	"	"	"	
92-87-5	Benzidine	< 713		µg/kg dry	713	22.7	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 72.0		µg/kg dry	72.0	40.5	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 72.0		µg/kg dry	72.0	49.2	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 72.0		µg/kg dry	72.0	54.2	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 72.0		µg/kg dry	72.0	50.9	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 72.0		µg/kg dry	72.0	61.5	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 356		µg/kg dry	356	21.4	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 356		µg/kg dry	356	82.5	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 356		µg/kg dry	356	36.0	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 180		µg/kg dry	180	33.4	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 180		µg/kg dry	180	28.9	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 180		µg/kg dry	180	45.9	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 356		µg/kg dry	356	40.3	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 356		µg/kg dry	356	35.7	1	"	"	"	"	"	X
86-74-8	Carbazole	< 180		µg/kg dry	180	41.5	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 356		µg/kg dry	356	41.9	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 180		µg/kg dry	180	22.2	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 356		µg/kg dry	356	48.8	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 180		µg/kg dry	180	34.6	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 356		µg/kg dry	356	34.9	1	"	"	"	"	"	X
218-01-9	Chrysene	< 72.0		µg/kg dry	72.0	40.7	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 72.0		µg/kg dry	72.0	53.2	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 180		µg/kg dry	180	48.5	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 356		µg/kg dry	356	42.5	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 356		µg/kg dry	356	38.4	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 356		µg/kg dry	356	40.5	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 356		µg/kg dry	356	39.4	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 180		µg/kg dry	180	43.7	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 356		µg/kg dry	356	37.4	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 356		µg/kg dry	356	40.1	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 356		µg/kg dry	356	28.2	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 356		µg/kg dry	356	38.1	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 356		µg/kg dry	356	51.1	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 356		µg/kg dry	356	36.9	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 180		µg/kg dry	180	43.2	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 180		µg/kg dry	180	36.8	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 356		µg/kg dry	356	53.0	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 72.0		µg/kg dry	72.0	42.2	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-17	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-09				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 72.0		µg/kg dry	72.0	46.5	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 180		µg/kg dry	180	45.4	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 180		µg/kg dry	180	45.4	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 180		µg/kg dry	180	45.5	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 180		µg/kg dry	180	40.7	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 72.0		µg/kg dry	72.0	49.2	1	"	"	"	"	"	X
78-59-1	Isophorone	< 180		µg/kg dry	180	27.8	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 72.0		µg/kg dry	72.0	50.4	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 356		µg/kg dry	356	28.6	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 356		µg/kg dry	356	28.0	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 72.0		µg/kg dry	72.0	41.6	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 356		µg/kg dry	356	32.3	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 356		µg/kg dry	356	32.9	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 180		µg/kg dry	180	47.5	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 180		µg/kg dry	180	41.7	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 180		µg/kg dry	180	31.5	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1430		µg/kg dry	1430	47.4	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 180		µg/kg dry	180	23.5	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 180		µg/kg dry	180	31.5	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 356		µg/kg dry	356	36.3	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 356		µg/kg dry	356	42.4	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 72.0		µg/kg dry	72.0	40.8	1	"	"	"	"	"	X
108-95-2	Phenol	< 356		µg/kg dry	356	36.1	1	"	"	"	"	"	X
129-00-0	Pyrene	< 72.0		µg/kg dry	72.0	39.7	1	"	"	"	"	"	X
110-86-1	Pyridine	< 356		µg/kg dry	356	84.3	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 356		µg/kg dry	356	43.8	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 72.0		µg/kg dry	72.0	39.7	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 356		µg/kg dry	356	36.8	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 180		µg/kg dry	180	44.1	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 356		µg/kg dry	356	37.9	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 356		µg/kg dry	356	42.4	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*81*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*92*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*87*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*97*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*97*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*84*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 22.3		µg/kg dry	22.3	16.1	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 22.3		µg/kg dry	22.3	6.59	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 22.3		µg/kg dry	22.3	6.17	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-17	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-09				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 22.3		µg/kg dry	22.3	2.12	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 22.3		µg/kg dry	22.3	6.96	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 22.3		µg/kg dry	22.3	17.3	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 22.3		µg/kg dry	22.3	4.79	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 22.3		µg/kg dry	22.3	5.19	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 22.3		µg/kg dry	22.3	4.75	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*95*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*87*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*86*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*79*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.57		µg/kg dry	5.57	0.256	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.57		µg/kg dry	5.57	0.357	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.57		µg/kg dry	5.57	0.290	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.34		µg/kg dry	3.34	0.591	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.57		µg/kg dry	5.57	0.646	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.57		µg/kg dry	5.57	0.189	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.57		µg/kg dry	5.57	0.223	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.57		µg/kg dry	5.57	0.256	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.57		µg/kg dry	5.57	0.267	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.57		µg/kg dry	5.57	0.290	1	"	"	"	"	"	X
72-20-8	Endrin	< 8.92		µg/kg dry	8.92	0.546	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 8.92		µg/kg dry	8.92	0.357	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 8.92		µg/kg dry	8.92	0.468	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 8.92		µg/kg dry	8.92	0.814	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 8.92		µg/kg dry	8.92	3.82	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 8.92		µg/kg dry	8.92	0.602	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 8.92		µg/kg dry	8.92	0.323	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 8.92		µg/kg dry	8.92	1.40	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.57		µg/kg dry	5.57	0.234	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.57		µg/kg dry	5.57	0.279	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 111		µg/kg dry	111	78.6	1	"	"	"	"	"	X
57-74-9	Chlordane	< 22.3		µg/kg dry	22.3	2.80	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.57		µg/kg dry	5.57	0.490	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*72*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*66*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*53*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*54*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-17 SC58794-09	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**49.7**		mg/kg dry	14.5	12.1	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*83*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*111*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.20		mg/kg dry	3.20	0.173	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**21.9**		mg/kg dry	1.60	0.203	1	"	"	"	"	"	X
7440-39-3	Barium	**113**		mg/kg dry	1.07	0.126	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.533		mg/kg dry	0.533	0.0268	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.533		mg/kg dry	0.533	0.0276	1	"	"	"	"	"	X
7440-47-3	Chromium	**19.4**		mg/kg dry	1.07	0.142	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.116		mg/kg dry	0.116	0.0096	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**27.9**		mg/kg dry	1.07	0.123	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**12.1**		mg/kg dry	1.60	0.226	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.33		mg/kg dry	5.33	0.401	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.60		mg/kg dry	1.60	0.305	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.20		mg/kg dry	3.20	1.18	1	"	"	"	"	"	X
7440-62-2	Vanadium	**8.48**		mg/kg dry	1.60	0.284	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**61.8**		mg/kg dry	3.20	0.826	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**89.6**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**6.11**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 13-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 22:22	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*83*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-17 SC58794-09	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:39	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-3	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-10				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 14.95 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 71.1		µg/kg dry	71.1	39.0	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 711		µg/kg dry	711	89.9	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 71.1		µg/kg dry	71.1	25.7	50	"	"	"	"	"	X
71-43-2	Benzene	< 71.1		µg/kg dry	71.1	11.4	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 71.1		µg/kg dry	71.1	16.1	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 71.1		µg/kg dry	71.1	10.2	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 71.1		µg/kg dry	71.1	18.3	50	"	"	"	"	"	X
75-25-2	Bromoform	< 71.1		µg/kg dry	71.1	15.2	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 142		µg/kg dry	142	35.1	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 142		µg/kg dry	142	32.5	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 71.1		µg/kg dry	71.1	28.4	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 71.1		µg/kg dry	71.1	21.8	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 71.1		µg/kg dry	71.1	29.0	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 142		µg/kg dry	142	26.3	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 71.1		µg/kg dry	71.1	21.3	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 71.1		µg/kg dry	71.1	8.60	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 142		µg/kg dry	142	31.7	50	"	"	"	"	"	X
67-66-3	Chloroform	< 71.1		µg/kg dry	71.1	8.39	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 142		µg/kg dry	142	84.5	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 71.1		µg/kg dry	71.1	17.6	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 71.1		µg/kg dry	71.1	12.9	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 142		µg/kg dry	142	28.1	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 71.1		µg/kg dry	71.1	11.2	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 71.1		µg/kg dry	71.1	19.3	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 71.1		µg/kg dry	71.1	13.4	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 71.1		µg/kg dry	71.1	12.8	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 71.1		µg/kg dry	71.1	17.7	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 71.1		µg/kg dry	71.1	12.7	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 142		µg/kg dry	142	93.0	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 71.1		µg/kg dry	71.1	16.4	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 71.1		µg/kg dry	71.1	18.6	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 71.1		µg/kg dry	71.1	18.2	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 71.1		µg/kg dry	71.1	23.7	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 71.1		µg/kg dry	71.1	16.2	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 71.1		µg/kg dry	71.1	24.7	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 71.1		µg/kg dry	71.1	22.5	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 71.1		µg/kg dry	71.1	18.7	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 71.1		µg/kg dry	71.1	21.8	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 71.1		µg/kg dry	71.1	16.8	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 71.1		µg/kg dry	71.1	28.9	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 71.1		µg/kg dry	71.1	14.9	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 71.1		µg/kg dry	71.1	22.8	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 142		µg/kg dry	142	47.3	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-3	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-10				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 14.95 g						
98-82-8	Isopropylbenzene	< 71.1		µg/kg dry	71.1	25.8	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 71.1		µg/kg dry	71.1	19.7	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 71.1		µg/kg dry	71.1	21.4	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 142		µg/kg dry	142	50.9	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 142		µg/kg dry	142	60.7	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 71.1		µg/kg dry	71.1	20.6	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 71.1		µg/kg dry	71.1	17.7	50	"	"	"	"	"	X
100-42-5	Styrene	< 71.1		µg/kg dry	71.1	9.39	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 71.1		µg/kg dry	71.1	17.1	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 71.1		µg/kg dry	71.1	22.5	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 71.1		µg/kg dry	71.1	22.4	50	"	"	"	"	"	X
108-88-3	Toluene	< 71.1		µg/kg dry	71.1	11.4	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 71.1		µg/kg dry	71.1	16.6	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 71.1		µg/kg dry	71.1	11.7	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 71.1		µg/kg dry	71.1	11.2	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 71.1		µg/kg dry	71.1	17.2	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 71.1		µg/kg dry	71.1	22.0	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 71.1		µg/kg dry	71.1	12.2	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 71.1		µg/kg dry	71.1	32.1	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 71.1		µg/kg dry	71.1	32.8	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 71.1		µg/kg dry	71.1	18.0	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 71.1		µg/kg dry	71.1	14.9	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 71.1		µg/kg dry	71.1	35.0	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 142		µg/kg dry	142	41.8	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 71.1		µg/kg dry	71.1	21.9	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 142		µg/kg dry	142	52.0	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 71.1		µg/kg dry	71.1	19.3	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 71.1		µg/kg dry	71.1	39.3	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 71.1		µg/kg dry	71.1	19.7	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 71.1		µg/kg dry	71.1	23.0	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1420		µg/kg dry	1420	1010	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1420		µg/kg dry	1420	419	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-butene	< 356		µg/kg dry	356	46.9	50	"	"	"	"	"	X
64-17-5	Ethanol	< 14200		µg/kg dry	14200	1230	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*104*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*109*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*108*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 80.1		µg/kg dry	80.1	42.5	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-3	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-10				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 80.1		µg/kg dry	80.1	41.8	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 396		µg/kg dry	396	25.2	1	"	"	"	"	"	X
120-12-7	Anthracene	< 80.1		µg/kg dry	80.1	46.1	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 396		µg/kg dry	396	43.0	1	"	"	"	"	"	
92-87-5	Benzidine	< 792		µg/kg dry	792	25.2	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 80.1		µg/kg dry	80.1	45.0	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 80.1		µg/kg dry	80.1	54.7	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 80.1		µg/kg dry	80.1	60.3	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 80.1		µg/kg dry	80.1	56.6	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 80.1		µg/kg dry	80.1	68.4	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 396		µg/kg dry	396	23.8	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 396		µg/kg dry	396	91.7	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 396		µg/kg dry	396	40.0	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 201		µg/kg dry	201	37.1	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 201		µg/kg dry	201	32.2	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 201		µg/kg dry	201	51.0	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 396		µg/kg dry	396	44.8	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 396		µg/kg dry	396	39.7	1	"	"	"	"	"	X
86-74-8	Carbazole	< 201		µg/kg dry	201	46.1	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 396		µg/kg dry	396	46.6	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 201		µg/kg dry	201	24.7	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 396		µg/kg dry	396	54.3	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 201		µg/kg dry	201	38.4	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 396		µg/kg dry	396	38.8	1	"	"	"	"	"	X
218-01-9	Chrysene	< 80.1		µg/kg dry	80.1	45.3	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 80.1		µg/kg dry	80.1	59.2	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 201		µg/kg dry	201	53.9	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 396		µg/kg dry	396	47.3	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 396		µg/kg dry	396	42.7	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 396		µg/kg dry	396	45.0	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 396		µg/kg dry	396	43.8	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 201		µg/kg dry	201	48.6	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 396		µg/kg dry	396	41.5	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 396		µg/kg dry	396	44.5	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 396		µg/kg dry	396	31.3	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 396		µg/kg dry	396	42.4	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 396		µg/kg dry	396	56.8	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 396		µg/kg dry	396	41.1	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 201		µg/kg dry	201	48.0	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 201		µg/kg dry	201	40.9	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 396		µg/kg dry	396	59.0	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 80.1		µg/kg dry	80.1	46.9	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-3	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-10				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 80.1		µg/kg dry	80.1	51.7	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 201		µg/kg dry	201	50.4	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 201		µg/kg dry	201	50.4	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 201		µg/kg dry	201	50.5	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 201		µg/kg dry	201	45.3	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 80.1		µg/kg dry	80.1	54.7	1	"	"	"	"	"	X
78-59-1	Isophorone	< 201		µg/kg dry	201	30.9	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 80.1		µg/kg dry	80.1	56.1	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 396		µg/kg dry	396	31.8	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 396		µg/kg dry	396	31.1	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 80.1		µg/kg dry	80.1	46.2	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 396		µg/kg dry	396	35.9	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 396		µg/kg dry	396	36.6	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 201		µg/kg dry	201	52.8	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 201		µg/kg dry	201	46.3	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 201		µg/kg dry	201	35.1	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1580		µg/kg dry	1580	52.7	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 201		µg/kg dry	201	26.2	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 201		µg/kg dry	201	35.1	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 396		µg/kg dry	396	40.3	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 396		µg/kg dry	396	47.2	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 80.1		µg/kg dry	80.1	45.4	1	"	"	"	"	"	X
108-95-2	Phenol	< 396		µg/kg dry	396	40.1	1	"	"	"	"	"	X
129-00-0	Pyrene	< 80.1		µg/kg dry	80.1	44.2	1	"	"	"	"	"	X
110-86-1	Pyridine	< 396		µg/kg dry	396	93.8	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 396		µg/kg dry	396	48.7	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 80.1		µg/kg dry	80.1	44.2	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 396		µg/kg dry	396	40.9	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 201		µg/kg dry	201	49.0	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 396		µg/kg dry	396	42.1	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 396		µg/kg dry	396	47.2	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*91*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*88*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*81*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*101*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*93*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*72*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 23.1		µg/kg dry	23.1	16.6	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 23.1		µg/kg dry	23.1	6.83	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 23.1		µg/kg dry	23.1	6.40	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-3	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-10				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 23.1		µg/kg dry	23.1	2.19	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 23.1		µg/kg dry	23.1	7.22	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 23.1		µg/kg dry	23.1	18.0	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 23.1		µg/kg dry	23.1	4.97	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 23.1		µg/kg dry	23.1	5.38	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 23.1		µg/kg dry	23.1	4.92	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*90*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*82*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*82*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*72*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.77		µg/kg dry	5.77	0.266	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.77		µg/kg dry	5.77	0.370	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.77		µg/kg dry	5.77	0.300	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.46		µg/kg dry	3.46	0.612	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.77		µg/kg dry	5.77	0.670	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.77		µg/kg dry	5.77	0.196	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.77		µg/kg dry	5.77	0.231	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.77		µg/kg dry	5.77	0.266	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.77		µg/kg dry	5.77	0.277	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.77		µg/kg dry	5.77	0.300	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.24		µg/kg dry	9.24	0.566	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.24		µg/kg dry	9.24	0.370	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.24		µg/kg dry	9.24	0.485	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.24		µg/kg dry	9.24	0.843	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.24		µg/kg dry	9.24	3.96	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.24		µg/kg dry	9.24	0.624	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.24		µg/kg dry	9.24	0.335	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.24		µg/kg dry	9.24	1.46	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.77		µg/kg dry	5.77	0.243	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.77		µg/kg dry	5.77	0.289	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 115		µg/kg dry	115	81.5	1	"	"	"	"	"	X
57-74-9	Chlordane	< 23.1		µg/kg dry	23.1	2.91	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.77		µg/kg dry	5.77	0.508	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*74*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*69*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*55*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*55*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-3 SC58794-10	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**113**		mg/kg dry	15.9	13.3	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*84*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*113*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.59		mg/kg dry	3.59	0.194	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**36.6**		mg/kg dry	1.80	0.227	1	"	"	"	"	"	X
7440-39-3	Barium	**30.0**		mg/kg dry	1.20	0.141	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.598		mg/kg dry	0.598	0.0300	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.598		mg/kg dry	0.598	0.0310	1	"	"	"	"	"	X
7440-47-3	Chromium	**21.8**		mg/kg dry	1.20	0.159	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.110		mg/kg dry	0.110	0.0092	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**33.2**		mg/kg dry	1.20	0.138	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**17.0**		mg/kg dry	1.80	0.254	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.98		mg/kg dry	5.98	0.450	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.80		mg/kg dry	1.80	0.342	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.59		mg/kg dry	3.59	1.32	1	"	"	"	"	"	X
7440-62-2	Vanadium	**30.1**		mg/kg dry	1.80	0.318	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**107**		mg/kg dry	3.59	0.926	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**82.7**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**6.13**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A									Methylation date: 13-Jul-20				
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 22:46	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*80*			*30-150 %*			"	"	"	"	"	

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Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-3 SC58794-10	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 7		mg/kg	7	7	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:40	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-4	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-11				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 14.54 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 64.3		µg/kg dry	64.3	35.2	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 643		µg/kg dry	643	81.3	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 64.3		µg/kg dry	64.3	23.2	50	"	"	"	"	"	X
71-43-2	Benzene	< 64.3		µg/kg dry	64.3	10.3	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 64.3		µg/kg dry	64.3	14.5	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 64.3		µg/kg dry	64.3	9.19	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 64.3		µg/kg dry	64.3	16.6	50	"	"	"	"	"	X
75-25-2	Bromoform	< 64.3		µg/kg dry	64.3	13.8	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 129		µg/kg dry	129	31.8	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 129		µg/kg dry	129	29.4	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 64.3		µg/kg dry	64.3	25.7	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 64.3		µg/kg dry	64.3	19.7	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 64.3		µg/kg dry	64.3	26.2	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 129		µg/kg dry	129	23.8	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 64.3		µg/kg dry	64.3	19.2	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 64.3		µg/kg dry	64.3	7.78	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 129		µg/kg dry	129	28.7	50	"	"	"	"	"	X
67-66-3	Chloroform	< 64.3		µg/kg dry	64.3	7.59	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 129		µg/kg dry	129	76.4	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 64.3		µg/kg dry	64.3	15.9	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 64.3		µg/kg dry	64.3	11.6	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 129		µg/kg dry	129	25.4	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 64.3		µg/kg dry	64.3	10.2	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 64.3		µg/kg dry	64.3	17.5	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 64.3		µg/kg dry	64.3	12.1	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 64.3		µg/kg dry	64.3	11.6	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 64.3		µg/kg dry	64.3	16.0	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 64.3		µg/kg dry	64.3	11.5	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 129		µg/kg dry	129	84.1	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 64.3		µg/kg dry	64.3	14.9	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 64.3		µg/kg dry	64.3	16.8	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 64.3		µg/kg dry	64.3	16.5	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 64.3		µg/kg dry	64.3	21.4	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 64.3		µg/kg dry	64.3	14.7	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 64.3		µg/kg dry	64.3	22.3	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 64.3		µg/kg dry	64.3	20.3	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 64.3		µg/kg dry	64.3	16.9	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 64.3		µg/kg dry	64.3	19.7	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 64.3		µg/kg dry	64.3	15.2	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 64.3		µg/kg dry	64.3	26.2	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 64.3		µg/kg dry	64.3	13.4	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 64.3		µg/kg dry	64.3	20.6	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 129		µg/kg dry	129	42.8	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-4 SC58794-11	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 14.54 g						
98-82-8	Isopropylbenzene	< 64.3		µg/kg dry	64.3	23.3	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 64.3		µg/kg dry	64.3	17.8	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 64.3		µg/kg dry	64.3	19.4	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 129		µg/kg dry	129	46.0	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 129		µg/kg dry	129	54.9	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 64.3		µg/kg dry	64.3	18.6	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 64.3		µg/kg dry	64.3	16.0	50	"	"	"	"	"	X
100-42-5	Styrene	< 64.3		µg/kg dry	64.3	8.49	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 64.3		µg/kg dry	64.3	15.5	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 64.3		µg/kg dry	64.3	20.4	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 64.3		µg/kg dry	64.3	20.3	50	"	"	"	"	"	X
108-88-3	Toluene	< 64.3		µg/kg dry	64.3	10.4	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 64.3		µg/kg dry	64.3	15.0	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 64.3		µg/kg dry	64.3	10.6	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 64.3		µg/kg dry	64.3	10.2	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 64.3		µg/kg dry	64.3	15.6	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 64.3		µg/kg dry	64.3	19.9	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 64.3		µg/kg dry	64.3	11.0	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 64.3		µg/kg dry	64.3	29.1	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 64.3		µg/kg dry	64.3	29.6	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 64.3		µg/kg dry	64.3	16.3	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 64.3		µg/kg dry	64.3	13.4	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 64.3		µg/kg dry	64.3	31.6	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 129		µg/kg dry	129	37.8	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 64.3		µg/kg dry	64.3	19.8	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 129		µg/kg dry	129	47.0	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 64.3		µg/kg dry	64.3	17.4	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 64.3		µg/kg dry	64.3	35.6	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 64.3		µg/kg dry	64.3	17.8	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 64.3		µg/kg dry	64.3	20.8	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1290		µg/kg dry	1290	913	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1290		µg/kg dry	1290	379	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 321		µg/kg dry	321	42.4	50	"	"	"	"	"	X
64-17-5	Ethanol	< 12900		µg/kg dry	12900	1110	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*102*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*103*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*105*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 74.3		µg/kg dry	74.3	39.4	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-4	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-11				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 74.3		µg/kg dry	74.3	38.7	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 367		µg/kg dry	367	23.4	1	"	"	"	"	"	X
120-12-7	Anthracene	< 74.3		µg/kg dry	74.3	42.8	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 367		µg/kg dry	367	39.9	1	"	"	"	"	"	
92-87-5	Benzidine	< 735		µg/kg dry	735	23.4	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 74.3		µg/kg dry	74.3	41.8	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 74.3		µg/kg dry	74.3	50.8	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 74.3		µg/kg dry	74.3	55.9	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 74.3		µg/kg dry	74.3	52.4	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 74.3		µg/kg dry	74.3	63.5	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 367		µg/kg dry	367	22.0	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 367		µg/kg dry	367	85.1	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 367		µg/kg dry	367	37.1	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 186		µg/kg dry	186	34.4	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 186		µg/kg dry	186	29.8	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 186		µg/kg dry	186	47.3	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 367		µg/kg dry	367	41.5	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 367		µg/kg dry	367	36.9	1	"	"	"	"	"	X
86-74-8	Carbazole	< 186		µg/kg dry	186	42.8	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 367		µg/kg dry	367	43.2	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 186		µg/kg dry	186	22.9	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 367		µg/kg dry	367	50.3	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 186		µg/kg dry	186	35.6	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 367		µg/kg dry	367	36.0	1	"	"	"	"	"	X
218-01-9	Chrysene	< 74.3		µg/kg dry	74.3	42.0	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 74.3		µg/kg dry	74.3	54.9	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 186		µg/kg dry	186	50.0	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 367		µg/kg dry	367	43.9	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 367		µg/kg dry	367	39.6	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 367		µg/kg dry	367	41.8	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 367		µg/kg dry	367	40.6	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 186		µg/kg dry	186	45.1	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 367		µg/kg dry	367	38.5	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 367		µg/kg dry	367	41.3	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 367		µg/kg dry	367	29.1	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 367		µg/kg dry	367	39.3	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 367		µg/kg dry	367	52.7	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 367		µg/kg dry	367	38.1	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 186		µg/kg dry	186	44.5	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 186		µg/kg dry	186	38.0	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 367		µg/kg dry	367	54.7	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 74.3		µg/kg dry	74.3	43.5	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-4	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-11				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 74.3		µg/kg dry	74.3	48.0	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 186		µg/kg dry	186	46.8	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 186		µg/kg dry	186	46.8	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 186		µg/kg dry	186	46.9	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 186		µg/kg dry	186	42.0	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 74.3		µg/kg dry	74.3	50.8	1	"	"	"	"	"	X
78-59-1	Isophorone	< 186		µg/kg dry	186	28.6	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 74.3		µg/kg dry	74.3	52.0	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 367		µg/kg dry	367	29.5	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 367		µg/kg dry	367	28.8	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 74.3		µg/kg dry	74.3	42.9	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 367		µg/kg dry	367	33.3	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 367		µg/kg dry	367	34.0	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 186		µg/kg dry	186	49.0	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 186		µg/kg dry	186	43.0	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 186		µg/kg dry	186	32.5	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1470		µg/kg dry	1470	48.9	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 186		µg/kg dry	186	24.3	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 186		µg/kg dry	186	32.5	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 367		µg/kg dry	367	37.4	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 367		µg/kg dry	367	43.8	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 74.3		µg/kg dry	74.3	42.1	1	"	"	"	"	"	X
108-95-2	Phenol	< 367		µg/kg dry	367	37.2	1	"	"	"	"	"	X
129-00-0	Pyrene	< 74.3		µg/kg dry	74.3	41.0	1	"	"	"	"	"	X
110-86-1	Pyridine	< 367		µg/kg dry	367	87.0	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 367		µg/kg dry	367	45.2	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 74.3		µg/kg dry	74.3	41.0	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 367		µg/kg dry	367	38.0	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 186		µg/kg dry	186	45.4	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 367		µg/kg dry	367	39.1	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 367		µg/kg dry	367	43.8	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*63*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*78*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*74*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*86*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*82*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*74*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 21.5		µg/kg dry	21.5	15.5	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 21.5		µg/kg dry	21.5	6.36	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 21.5		µg/kg dry	21.5	5.96	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-4	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-11				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 21.5		µg/kg dry	21.5	2.04	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 21.5		µg/kg dry	21.5	6.72	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 21.5		µg/kg dry	21.5	16.7	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 21.5		µg/kg dry	21.5	4.62	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 21.5		µg/kg dry	21.5	5.01	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 21.5		µg/kg dry	21.5	4.58	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*95*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*85*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*88*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*80*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.38		µg/kg dry	5.38	0.247	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.38		µg/kg dry	5.38	0.344	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.38		µg/kg dry	5.38	0.280	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.23		µg/kg dry	3.23	0.570	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.38		µg/kg dry	5.38	0.624	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.38		µg/kg dry	5.38	0.183	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.38		µg/kg dry	5.38	0.215	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.38		µg/kg dry	5.38	0.247	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.38		µg/kg dry	5.38	0.258	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.38		µg/kg dry	5.38	0.280	1	"	"	"	"	"	X
72-20-8	Endrin	< 8.60		µg/kg dry	8.60	0.527	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 8.60		µg/kg dry	8.60	0.344	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 8.60		µg/kg dry	8.60	0.452	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 8.60		µg/kg dry	8.60	0.785	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 8.60		µg/kg dry	8.60	3.69	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 8.60		µg/kg dry	8.60	0.581	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 8.60		µg/kg dry	8.60	0.312	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 8.60		µg/kg dry	8.60	1.36	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.38		µg/kg dry	5.38	0.226	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.38		µg/kg dry	5.38	0.269	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 108		µg/kg dry	108	75.9	1	"	"	"	"	"	X
57-74-9	Chlordane	< 21.5		µg/kg dry	21.5	2.71	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.38		µg/kg dry	5.38	0.473	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*67*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*73*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*55*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*51*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-4 SC58794-11	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**118**		mg/kg dry	14.5	12.1	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*76*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*102*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.25		mg/kg dry	3.25	0.175	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**20.5**		mg/kg dry	1.62	0.206	1	"	"	"	"	"	X
7440-39-3	Barium	**29.5**		mg/kg dry	1.08	0.128	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.541		mg/kg dry	0.541	0.0272	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.541		mg/kg dry	0.541	0.0280	1	"	"	"	"	"	X
7440-47-3	Chromium	**18.8**		mg/kg dry	1.08	0.144	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.116		mg/kg dry	0.116	0.0097	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**20.3**		mg/kg dry	1.08	0.125	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**18.6**		mg/kg dry	1.62	0.230	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.41		mg/kg dry	5.41	0.407	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.62		mg/kg dry	1.62	0.310	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.25		mg/kg dry	3.25	1.19	1	"	"	"	"	"	X
7440-62-2	Vanadium	**24.5**		mg/kg dry	1.62	0.288	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**36.0**		mg/kg dry	3.25	0.838	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**88.9**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.58**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 14-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	14-Jul-20	15-Jul-20 17:03	M-CT007	537320A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*92*			*30-150 %*			"	"	"	"	"	

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Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-4 SC58794-11	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:41	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-5	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-12				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 15.08 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 66.2		µg/kg dry	66.2	36.3	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 662		µg/kg dry	662	83.7	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 66.2		µg/kg dry	66.2	23.9	50	"	"	"	"	"	X
71-43-2	Benzene	< 66.2		µg/kg dry	66.2	10.6	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 66.2		µg/kg dry	66.2	15.0	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 66.2		µg/kg dry	66.2	9.47	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 66.2		µg/kg dry	66.2	17.1	50	"	"	"	"	"	X
75-25-2	Bromoform	< 66.2		µg/kg dry	66.2	14.2	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 132		µg/kg dry	132	32.7	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 132		µg/kg dry	132	30.3	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 66.2		µg/kg dry	66.2	26.5	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 66.2		µg/kg dry	66.2	20.3	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 66.2		µg/kg dry	66.2	27.0	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 132		µg/kg dry	132	24.5	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 66.2		µg/kg dry	66.2	19.8	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 66.2		µg/kg dry	66.2	8.02	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 132		µg/kg dry	132	29.5	50	"	"	"	"	"	X
67-66-3	Chloroform	< 66.2		µg/kg dry	66.2	7.82	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 132		µg/kg dry	132	78.7	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 66.2		µg/kg dry	66.2	16.4	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 66.2		µg/kg dry	66.2	12.0	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 132		µg/kg dry	132	26.2	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 66.2		µg/kg dry	66.2	10.5	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 66.2		µg/kg dry	66.2	18.0	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 66.2		µg/kg dry	66.2	12.5	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 66.2		µg/kg dry	66.2	11.9	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 66.2		µg/kg dry	66.2	16.5	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 66.2		µg/kg dry	66.2	11.9	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 132		µg/kg dry	132	86.6	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 66.2		µg/kg dry	66.2	15.3	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 66.2		µg/kg dry	66.2	17.4	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 66.2		µg/kg dry	66.2	17.0	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 66.2		µg/kg dry	66.2	22.1	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 66.2		µg/kg dry	66.2	15.1	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 66.2		µg/kg dry	66.2	23.0	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 66.2		µg/kg dry	66.2	20.9	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 66.2		µg/kg dry	66.2	17.4	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 66.2		µg/kg dry	66.2	20.3	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 66.2		µg/kg dry	66.2	15.6	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 66.2		µg/kg dry	66.2	27.0	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 66.2		µg/kg dry	66.2	13.8	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 66.2		µg/kg dry	66.2	21.2	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 132		µg/kg dry	132	44.1	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-5	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-12				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 15.08 g						
98-82-8	Isopropylbenzene	< 66.2		µg/kg dry	66.2	24.0	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 66.2		µg/kg dry	66.2	18.3	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 66.2		µg/kg dry	66.2	19.9	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 132		µg/kg dry	132	47.4	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 132		µg/kg dry	132	56.6	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 66.2		µg/kg dry	66.2	19.2	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 66.2		µg/kg dry	66.2	16.5	50	"	"	"	"	"	X
100-42-5	Styrene	< 66.2		µg/kg dry	66.2	8.74	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 66.2		µg/kg dry	66.2	16.0	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 66.2		µg/kg dry	66.2	21.0	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 66.2		µg/kg dry	66.2	20.9	50	"	"	"	"	"	X
108-88-3	Toluene	< 66.2		µg/kg dry	66.2	10.7	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 66.2		µg/kg dry	66.2	15.4	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 66.2		µg/kg dry	66.2	10.9	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 66.2		µg/kg dry	66.2	10.5	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 66.2		µg/kg dry	66.2	16.0	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 66.2		µg/kg dry	66.2	20.5	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 66.2		µg/kg dry	66.2	11.3	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 66.2		µg/kg dry	66.2	29.9	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 66.2		µg/kg dry	66.2	30.5	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 66.2		µg/kg dry	66.2	16.8	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 66.2		µg/kg dry	66.2	13.8	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 66.2		µg/kg dry	66.2	32.6	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 132		µg/kg dry	132	39.0	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 66.2		µg/kg dry	66.2	20.4	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 132		µg/kg dry	132	48.4	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 66.2		µg/kg dry	66.2	18.0	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 66.2		µg/kg dry	66.2	36.6	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 66.2		µg/kg dry	66.2	18.3	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 66.2		µg/kg dry	66.2	21.4	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1320		µg/kg dry	1320	941	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1320		µg/kg dry	1320	390	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 331		µg/kg dry	331	43.7	50	"	"	"	"	"	X
64-17-5	Ethanol	< 13200		µg/kg dry	13200	1140	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*104*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*102*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*105*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*104*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 76.7		µg/kg dry	76.7	40.7	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-5	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-12				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 76.7		µg/kg dry	76.7	40.0	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 379		µg/kg dry	379	24.1	1	"	"	"	"	"	X
120-12-7	Anthracene	< 76.7		µg/kg dry	76.7	44.2	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 379		µg/kg dry	379	41.2	1	"	"	"	"	"	
92-87-5	Benzidine	< 759		µg/kg dry	759	24.1	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 76.7		µg/kg dry	76.7	43.1	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 76.7		µg/kg dry	76.7	52.4	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 76.7		µg/kg dry	76.7	57.7	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 76.7		µg/kg dry	76.7	54.2	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 76.7		µg/kg dry	76.7	65.5	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 379		µg/kg dry	379	22.8	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 379		µg/kg dry	379	87.9	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 379		µg/kg dry	379	38.3	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 192		µg/kg dry	192	35.5	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 192		µg/kg dry	192	30.8	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 192		µg/kg dry	192	48.9	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 379		µg/kg dry	379	42.9	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 379		µg/kg dry	379	38.1	1	"	"	"	"	"	X
86-74-8	Carbazole	< 192		µg/kg dry	192	44.2	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 379		µg/kg dry	379	44.6	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 192		µg/kg dry	192	23.7	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 379		µg/kg dry	379	52.0	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 192		µg/kg dry	192	36.8	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 379		µg/kg dry	379	37.1	1	"	"	"	"	"	X
218-01-9	Chrysene	< 76.7		µg/kg dry	76.7	43.4	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 76.7		µg/kg dry	76.7	56.7	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 192		µg/kg dry	192	51.6	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 379		µg/kg dry	379	45.3	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 379		µg/kg dry	379	40.9	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 379		µg/kg dry	379	43.1	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 379		µg/kg dry	379	42.0	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 192		µg/kg dry	192	46.6	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 379		µg/kg dry	379	39.8	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 379		µg/kg dry	379	42.7	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 379		µg/kg dry	379	30.0	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 379		µg/kg dry	379	40.6	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 379		µg/kg dry	379	54.4	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 379		µg/kg dry	379	39.3	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 192		µg/kg dry	192	46.0	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 192		µg/kg dry	192	39.2	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 379		µg/kg dry	379	56.5	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 76.7		µg/kg dry	76.7	45.0	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-5	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-12				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 76.7		µg/kg dry	76.7	49.6	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 192		µg/kg dry	192	48.3	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 192		µg/kg dry	192	48.3	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 192		µg/kg dry	192	48.4	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 192		µg/kg dry	192	43.4	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 76.7		µg/kg dry	76.7	52.4	1	"	"	"	"	"	X
78-59-1	Isophorone	< 192		µg/kg dry	192	29.6	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 76.7		µg/kg dry	76.7	53.7	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 379		µg/kg dry	379	30.5	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 379		µg/kg dry	379	29.8	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 76.7		µg/kg dry	76.7	44.3	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 379		µg/kg dry	379	34.4	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 379		µg/kg dry	379	35.1	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 192		µg/kg dry	192	50.6	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 192		µg/kg dry	192	44.4	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 192		µg/kg dry	192	33.6	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1520		µg/kg dry	1520	50.5	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 192		µg/kg dry	192	25.1	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 192		µg/kg dry	192	33.6	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 379		µg/kg dry	379	38.6	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 379		µg/kg dry	379	45.2	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 76.7		µg/kg dry	76.7	43.5	1	"	"	"	"	"	X
108-95-2	Phenol	< 379		µg/kg dry	379	38.4	1	"	"	"	"	"	X
129-00-0	Pyrene	< 76.7		µg/kg dry	76.7	42.3	1	"	"	"	"	"	X
110-86-1	Pyridine	< 379		µg/kg dry	379	89.8	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 379		µg/kg dry	379	46.7	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 76.7		µg/kg dry	76.7	42.3	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 379		µg/kg dry	379	39.2	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 192		µg/kg dry	192	46.9	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 379		µg/kg dry	379	40.4	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 379		µg/kg dry	379	45.2	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*79*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*91*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*75*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*95*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*90*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*81*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 23.0		µg/kg dry	23.0	16.6	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 23.0		µg/kg dry	23.0	6.81	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 23.0		µg/kg dry	23.0	6.38	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-5	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-12				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 23.0		µg/kg dry	23.0	2.19	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 23.0		µg/kg dry	23.0	7.20	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 23.0		µg/kg dry	23.0	17.9	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 23.0		µg/kg dry	23.0	4.95	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 23.0		µg/kg dry	23.0	5.37	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 23.0		µg/kg dry	23.0	4.91	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*94*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*84*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*84*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*77*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.76		µg/kg dry	5.76	0.265	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.76		µg/kg dry	5.76	0.369	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.76		µg/kg dry	5.76	0.299	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.46		µg/kg dry	3.46	0.610	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.76		µg/kg dry	5.76	0.668	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.76		µg/kg dry	5.76	0.196	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.76		µg/kg dry	5.76	0.230	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.76		µg/kg dry	5.76	0.265	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.76		µg/kg dry	5.76	0.276	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.76		µg/kg dry	5.76	0.299	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.21		µg/kg dry	9.21	0.564	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.21		µg/kg dry	9.21	0.369	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.21		µg/kg dry	9.21	0.484	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.21		µg/kg dry	9.21	0.841	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.21		µg/kg dry	9.21	3.95	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.21		µg/kg dry	9.21	0.622	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.21		µg/kg dry	9.21	0.334	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.21		µg/kg dry	9.21	1.45	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.76		µg/kg dry	5.76	0.242	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.76		µg/kg dry	5.76	0.288	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 115		µg/kg dry	115	81.3	1	"	"	"	"	"	X
57-74-9	Chlordane	< 23.0		µg/kg dry	23.0	2.90	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.76		µg/kg dry	5.76	0.507	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*75*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*75*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*61*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*58*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-5 SC58794-12	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**106**		mg/kg dry	15.4	12.9	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*64*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*86*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.76		mg/kg dry	3.76	0.203	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**53.4**		mg/kg dry	1.88	0.238	1	"	"	"	"	"	X
7440-39-3	Barium	**30.3**		mg/kg dry	1.25	0.148	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.627		mg/kg dry	0.627	0.0315	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.627		mg/kg dry	0.627	0.0325	1	"	"	"	"	"	X
7440-47-3	Chromium	**25.0**		mg/kg dry	1.25	0.167	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.103		mg/kg dry	0.103	0.0086	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**46.2**		mg/kg dry	1.25	0.144	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**17.0**		mg/kg dry	1.88	0.266	1	"	"	"	"	"	X
7440-36-0	Antimony	< 6.27		mg/kg dry	6.27	0.471	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.88		mg/kg dry	1.88	0.359	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.76		mg/kg dry	3.76	1.38	1	"	"	"	"	"	X
7440-62-2	Vanadium	**33.9**		mg/kg dry	1.88	0.333	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**52.1**		mg/kg dry	3.76	0.970	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**85.8**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.57**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 14-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	14-Jul-20	15-Jul-20 17:27	M-CT007	537320A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*80*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-5 SC58794-12	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:42	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-6	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-13				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.85 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 52.1		µg/kg dry	52.1	28.6	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 521		µg/kg dry	521	65.9	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 52.1		µg/kg dry	52.1	18.8	50	"	"	"	"	"	X
71-43-2	Benzene	< 52.1		µg/kg dry	52.1	8.34	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 52.1		µg/kg dry	52.1	11.8	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 52.1		µg/kg dry	52.1	7.45	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 52.1		µg/kg dry	52.1	13.4	50	"	"	"	"	"	X
75-25-2	Bromoform	< 52.1		µg/kg dry	52.1	11.2	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 104		µg/kg dry	104	25.7	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 104		µg/kg dry	104	23.8	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 52.1		µg/kg dry	52.1	20.8	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 52.1		µg/kg dry	52.1	16.0	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 52.1		µg/kg dry	52.1	21.3	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 104		µg/kg dry	104	19.3	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 52.1		µg/kg dry	52.1	15.6	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 52.1		µg/kg dry	52.1	6.30	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 104		µg/kg dry	104	23.2	50	"	"	"	"	"	X
67-66-3	Chloroform	< 52.1		µg/kg dry	52.1	6.15	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 104		µg/kg dry	104	61.9	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 52.1		µg/kg dry	52.1	12.9	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 52.1		µg/kg dry	52.1	9.43	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 104		µg/kg dry	104	20.6	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 52.1		µg/kg dry	52.1	8.23	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 52.1		µg/kg dry	52.1	14.2	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 52.1		µg/kg dry	52.1	9.80	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 52.1		µg/kg dry	52.1	9.38	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 52.1		µg/kg dry	52.1	13.0	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 52.1		µg/kg dry	52.1	9.33	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 104		µg/kg dry	104	68.2	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 52.1		µg/kg dry	52.1	12.0	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 52.1		µg/kg dry	52.1	13.7	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 52.1		µg/kg dry	52.1	13.3	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 52.1		µg/kg dry	52.1	17.4	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 52.1		µg/kg dry	52.1	11.9	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 52.1		µg/kg dry	52.1	18.1	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 52.1		µg/kg dry	52.1	16.5	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 52.1		µg/kg dry	52.1	13.7	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 52.1		µg/kg dry	52.1	15.9	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 52.1		µg/kg dry	52.1	12.3	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 52.1		µg/kg dry	52.1	21.2	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 52.1		µg/kg dry	52.1	10.9	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 52.1		µg/kg dry	52.1	16.7	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 104		µg/kg dry	104	34.6	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-6	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-13				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 16.85 g						
98-82-8	Isopropylbenzene	< 52.1		µg/kg dry	52.1	18.9	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 52.1		µg/kg dry	52.1	14.4	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 52.1		µg/kg dry	52.1	15.7	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 104		µg/kg dry	104	37.3	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 104		µg/kg dry	104	44.5	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 52.1		µg/kg dry	52.1	15.1	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 52.1		µg/kg dry	52.1	13.0	50	"	"	"	"	"	X
100-42-5	Styrene	< 52.1		µg/kg dry	52.1	6.88	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 52.1		µg/kg dry	52.1	12.6	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 52.1		µg/kg dry	52.1	16.5	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 52.1		µg/kg dry	52.1	16.4	50	"	"	"	"	"	X
108-88-3	Toluene	< 52.1		µg/kg dry	52.1	8.39	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 52.1		µg/kg dry	52.1	12.1	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 52.1		µg/kg dry	52.1	8.60	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 52.1		µg/kg dry	52.1	8.23	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 52.1		µg/kg dry	52.1	12.6	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 52.1		µg/kg dry	52.1	16.1	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 52.1		µg/kg dry	52.1	8.91	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 52.1		µg/kg dry	52.1	23.6	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 52.1		µg/kg dry	52.1	24.0	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 52.1		µg/kg dry	52.1	13.2	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 52.1		µg/kg dry	52.1	10.9	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 52.1		µg/kg dry	52.1	25.6	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 104		µg/kg dry	104	30.6	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 52.1		µg/kg dry	52.1	16.0	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 104		µg/kg dry	104	38.1	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 52.1		µg/kg dry	52.1	14.1	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 52.1		µg/kg dry	52.1	28.8	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 52.1		µg/kg dry	52.1	14.4	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 52.1		µg/kg dry	52.1	16.8	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1040		µg/kg dry	1040	740	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1040		µg/kg dry	1040	307	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 261		µg/kg dry	261	34.4	50	"	"	"	"	"	X
64-17-5	Ethanol	< 10400		µg/kg dry	10400	898	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*105*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*105*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*105*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 71.1		µg/kg dry	71.1	37.7	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-6	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-13				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 71.1		µg/kg dry	71.1	37.1	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 352		µg/kg dry	352	22.4	1	"	"	"	"	"	X
120-12-7	Anthracene	< 71.1		µg/kg dry	71.1	40.9	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 352		µg/kg dry	352	38.2	1	"	"	"	"	"	
92-87-5	Benzidine	< 704		µg/kg dry	704	22.4	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 71.1		µg/kg dry	71.1	40.0	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 71.1		µg/kg dry	71.1	48.6	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 71.1		µg/kg dry	71.1	53.5	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 71.1		µg/kg dry	71.1	50.2	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 71.1		µg/kg dry	71.1	60.8	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 352		µg/kg dry	352	21.1	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 352		µg/kg dry	352	81.5	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 352		µg/kg dry	352	35.5	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 178		µg/kg dry	178	33.0	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 178		µg/kg dry	178	28.6	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 178		µg/kg dry	178	45.3	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 352		µg/kg dry	352	39.8	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 352		µg/kg dry	352	35.3	1	"	"	"	"	"	X
86-74-8	Carbazole	< 178		µg/kg dry	178	40.9	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 352		µg/kg dry	352	41.4	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 178		µg/kg dry	178	22.0	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 352		µg/kg dry	352	48.2	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 178		µg/kg dry	178	34.1	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 352		µg/kg dry	352	34.4	1	"	"	"	"	"	X
218-01-9	Chrysene	< 71.1		µg/kg dry	71.1	40.2	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 71.1		µg/kg dry	71.1	52.6	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 178		µg/kg dry	178	47.9	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 352		µg/kg dry	352	42.0	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 352		µg/kg dry	352	38.0	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 352		µg/kg dry	352	40.0	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 352		µg/kg dry	352	38.9	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 178		µg/kg dry	178	43.2	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 352		µg/kg dry	352	36.9	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 352		µg/kg dry	352	39.6	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 352		µg/kg dry	352	27.8	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 352		µg/kg dry	352	37.6	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 352		µg/kg dry	352	50.4	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 352		µg/kg dry	352	36.5	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 178		µg/kg dry	178	42.7	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 178		µg/kg dry	178	36.4	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 352		µg/kg dry	352	52.4	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 71.1		µg/kg dry	71.1	41.7	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-6	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-13				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 71.1		µg/kg dry	71.1	46.0	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 178		µg/kg dry	178	44.8	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 178		µg/kg dry	178	44.8	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 178		µg/kg dry	178	44.9	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 178		µg/kg dry	178	40.2	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 71.1		µg/kg dry	71.1	48.6	1	"	"	"	"	"	X
78-59-1	Isophorone	< 178		µg/kg dry	178	27.4	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 71.1		µg/kg dry	71.1	49.8	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 352		µg/kg dry	352	28.3	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 352		µg/kg dry	352	27.6	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 71.1		µg/kg dry	71.1	41.1	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 352		µg/kg dry	352	31.9	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 352		µg/kg dry	352	32.5	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 178		µg/kg dry	178	46.9	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 178		µg/kg dry	178	41.2	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 178		µg/kg dry	178	31.1	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1410		µg/kg dry	1410	46.8	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 178		µg/kg dry	178	23.2	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 178		µg/kg dry	178	31.1	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 352		µg/kg dry	352	35.8	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 352		µg/kg dry	352	41.9	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 71.1		µg/kg dry	71.1	40.3	1	"	"	"	"	"	X
108-95-2	Phenol	< 352		µg/kg dry	352	35.6	1	"	"	"	"	"	X
129-00-0	Pyrene	< 71.1		µg/kg dry	71.1	39.2	1	"	"	"	"	"	X
110-86-1	Pyridine	< 352		µg/kg dry	352	83.3	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 352		µg/kg dry	352	43.3	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 71.1		µg/kg dry	71.1	39.2	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 352		µg/kg dry	352	36.4	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 178		µg/kg dry	178	43.5	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 352		µg/kg dry	352	37.4	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 352		µg/kg dry	352	41.9	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*100*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*93*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*78*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*98*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*87*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*77*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 21.4		µg/kg dry	21.4	15.5	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 21.4		µg/kg dry	21.4	6.34	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 21.4		µg/kg dry	21.4	5.94	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-6	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-13				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 21.4		µg/kg dry	21.4	2.04	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 21.4		µg/kg dry	21.4	6.70	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 21.4		µg/kg dry	21.4	16.7	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 21.4		µg/kg dry	21.4	4.61	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 21.4		µg/kg dry	21.4	5.00	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 21.4		µg/kg dry	21.4	4.57	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*93*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*82*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*78*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*70*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.36		µg/kg dry	5.36	0.247	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.36		µg/kg dry	5.36	0.343	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.36		µg/kg dry	5.36	0.279	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.22		µg/kg dry	3.22	0.568	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.36		µg/kg dry	5.36	0.622	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.36		µg/kg dry	5.36	0.182	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.36		µg/kg dry	5.36	0.214	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.36		µg/kg dry	5.36	0.247	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.36		µg/kg dry	5.36	0.257	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.36		µg/kg dry	5.36	0.279	1	"	"	"	"	"	X
72-20-8	Endrin	< 8.58		µg/kg dry	8.58	0.525	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 8.58		µg/kg dry	8.58	0.343	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 8.58		µg/kg dry	8.58	0.450	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 8.58		µg/kg dry	8.58	0.783	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 8.58		µg/kg dry	8.58	3.68	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 8.58		µg/kg dry	8.58	0.579	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 8.58		µg/kg dry	8.58	0.311	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 8.58		µg/kg dry	8.58	1.35	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.36		µg/kg dry	5.36	0.225	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.36		µg/kg dry	5.36	0.268	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 107		µg/kg dry	107	75.7	1	"	"	"	"	"	X
57-74-9	Chlordane	< 21.4		µg/kg dry	21.4	2.70	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.36		µg/kg dry	5.36	0.472	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*64*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*57*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*49*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*46*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-6 SC58794-13	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**134**		mg/kg dry	14.3	12.0	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*80*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*108*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.38		mg/kg dry	3.38	0.182	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**29.6**		mg/kg dry	1.69	0.214	1	"	"	"	"	"	X
7440-39-3	Barium	**28.6**		mg/kg dry	1.13	0.133	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.563		mg/kg dry	0.563	0.0282	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.563		mg/kg dry	0.563	0.0291	1	"	"	"	"	"	X
7440-47-3	Chromium	**30.0**		mg/kg dry	1.13	0.150	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.120		mg/kg dry	0.120	0.0100	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**25.6**		mg/kg dry	1.13	0.129	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**15.8**		mg/kg dry	1.69	0.239	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.63		mg/kg dry	5.63	0.423	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.69		mg/kg dry	1.69	0.322	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.38		mg/kg dry	3.38	1.24	1	"	"	"	"	"	X
7440-62-2	Vanadium	**35.8**		mg/kg dry	1.69	0.299	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**43.2**		mg/kg dry	3.38	0.871	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**92.6**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.74**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 14-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	14-Jul-20	15-Jul-20 17:52	M-CT007	537320A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*83*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-6 SC58794-13	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:42	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-7	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-14				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 18.18 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 59.4		µg/kg dry	59.4	32.6	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 594		µg/kg dry	594	75.1	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 59.4		µg/kg dry	59.4	21.5	50	"	"	"	"	"	X
71-43-2	Benzene	< 59.4		µg/kg dry	59.4	9.51	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 59.4		µg/kg dry	59.4	13.4	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 59.4		µg/kg dry	59.4	8.50	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 59.4		µg/kg dry	59.4	15.3	50	"	"	"	"	"	X
75-25-2	Bromoform	< 59.4		µg/kg dry	59.4	12.7	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 119		µg/kg dry	119	29.4	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 119		µg/kg dry	119	27.2	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 59.4		µg/kg dry	59.4	23.8	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 59.4		µg/kg dry	59.4	18.3	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 59.4		µg/kg dry	59.4	24.3	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 119		µg/kg dry	119	22.0	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 59.4		µg/kg dry	59.4	17.8	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 59.4		µg/kg dry	59.4	7.19	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 119		µg/kg dry	119	26.5	50	"	"	"	"	"	X
67-66-3	Chloroform	< 59.4		µg/kg dry	59.4	7.01	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 119		µg/kg dry	119	70.6	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 59.4		µg/kg dry	59.4	14.7	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 59.4		µg/kg dry	59.4	10.8	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 119		µg/kg dry	119	23.5	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 59.4		µg/kg dry	59.4	9.39	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 59.4		µg/kg dry	59.4	16.2	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 59.4		µg/kg dry	59.4	11.2	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 59.4		µg/kg dry	59.4	10.7	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 59.4		µg/kg dry	59.4	14.8	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 59.4		µg/kg dry	59.4	10.6	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 119		µg/kg dry	119	77.8	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 59.4		µg/kg dry	59.4	13.7	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 59.4		µg/kg dry	59.4	15.6	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 59.4		µg/kg dry	59.4	15.2	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 59.4		µg/kg dry	59.4	19.8	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 59.4		µg/kg dry	59.4	13.6	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 59.4		µg/kg dry	59.4	20.6	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 59.4		µg/kg dry	59.4	18.8	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 59.4		µg/kg dry	59.4	15.6	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 59.4		µg/kg dry	59.4	18.2	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 59.4		µg/kg dry	59.4	14.0	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 59.4		µg/kg dry	59.4	24.2	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 59.4		µg/kg dry	59.4	12.4	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 59.4		µg/kg dry	59.4	19.0	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 119		µg/kg dry	119	39.5	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-7	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-14				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 18.18 g						
98-82-8	Isopropylbenzene	< 59.4		µg/kg dry	59.4	21.6	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 59.4		µg/kg dry	59.4	16.5	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 59.4		µg/kg dry	59.4	17.9	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 119		µg/kg dry	119	42.6	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 119		µg/kg dry	119	50.8	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 59.4		µg/kg dry	59.4	17.2	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 59.4		µg/kg dry	59.4	14.8	50	"	"	"	"	"	X
100-42-5	Styrene	< 59.4		µg/kg dry	59.4	7.85	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 59.4		µg/kg dry	59.4	14.3	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 59.4		µg/kg dry	59.4	18.8	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 59.4		µg/kg dry	59.4	18.7	50	"	"	"	"	"	X
108-88-3	Toluene	< 59.4		µg/kg dry	59.4	9.57	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 59.4		µg/kg dry	59.4	13.9	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 59.4		µg/kg dry	59.4	9.81	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 59.4		µg/kg dry	59.4	9.39	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 59.4		µg/kg dry	59.4	14.4	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 59.4		µg/kg dry	59.4	18.4	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 59.4		µg/kg dry	59.4	10.2	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 59.4		µg/kg dry	59.4	26.9	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 59.4		µg/kg dry	59.4	27.4	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 59.4		µg/kg dry	59.4	15.0	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 59.4		µg/kg dry	59.4	12.4	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 59.4		µg/kg dry	59.4	29.2	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 119		µg/kg dry	119	35.0	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 59.4		µg/kg dry	59.4	18.3	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 119		µg/kg dry	119	43.5	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 59.4		µg/kg dry	59.4	16.1	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 59.4		µg/kg dry	59.4	32.9	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 59.4		µg/kg dry	59.4	16.5	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 59.4		µg/kg dry	59.4	19.2	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1190		µg/kg dry	1190	844	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1190		µg/kg dry	1190	350	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 297		µg/kg dry	297	39.2	50	"	"	"	"	"	X
64-17-5	Ethanol	< 11900		µg/kg dry	11900	1020	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*107*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*104*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*104*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 79.6		µg/kg dry	79.6	42.2	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-7	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-14				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 79.6		µg/kg dry	79.6	41.5	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 394		µg/kg dry	394	25.0	1	"	"	"	"	"	X
120-12-7	Anthracene	< 79.6		µg/kg dry	79.6	45.8	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 394		µg/kg dry	394	42.7	1	"	"	"	"	"	
92-87-5	Benzidine	< 787		µg/kg dry	787	25.0	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 79.6		µg/kg dry	79.6	44.7	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 79.6		µg/kg dry	79.6	54.4	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 79.6		µg/kg dry	79.6	59.9	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 79.6		µg/kg dry	79.6	56.2	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 79.6		µg/kg dry	79.6	68.0	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 394		µg/kg dry	394	23.6	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 394		µg/kg dry	394	91.1	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 394		µg/kg dry	394	39.7	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 199		µg/kg dry	199	36.9	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 199		µg/kg dry	199	32.0	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 199		µg/kg dry	199	50.7	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 394		µg/kg dry	394	44.5	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 394		µg/kg dry	394	39.5	1	"	"	"	"	"	X
86-74-8	Carbazole	< 199		µg/kg dry	199	45.8	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 394		µg/kg dry	394	46.3	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 199		µg/kg dry	199	24.6	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 394		µg/kg dry	394	53.9	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 199		µg/kg dry	199	38.2	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 394		µg/kg dry	394	38.5	1	"	"	"	"	"	X
218-01-9	Chrysene	< 79.6		µg/kg dry	79.6	45.0	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 79.6		µg/kg dry	79.6	58.8	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 199		µg/kg dry	199	53.6	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 394		µg/kg dry	394	47.0	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 394		µg/kg dry	394	42.5	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 394		µg/kg dry	394	44.7	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 394		µg/kg dry	394	43.5	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 199		µg/kg dry	199	48.3	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 394		µg/kg dry	394	41.3	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 394		µg/kg dry	394	44.3	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 394		µg/kg dry	394	31.1	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 394		µg/kg dry	394	42.1	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 394		µg/kg dry	394	56.4	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 394		µg/kg dry	394	40.8	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 199		µg/kg dry	199	47.7	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 199		µg/kg dry	199	40.7	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 394		µg/kg dry	394	58.6	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 79.6		µg/kg dry	79.6	46.6	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-7	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-14				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 79.6		µg/kg dry	79.6	51.4	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 199		µg/kg dry	199	50.1	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 199		µg/kg dry	199	50.1	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 199		µg/kg dry	199	50.2	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 199		µg/kg dry	199	45.0	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 79.6		µg/kg dry	79.6	54.4	1	"	"	"	"	"	X
78-59-1	Isophorone	< 199		µg/kg dry	199	30.7	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 79.6		µg/kg dry	79.6	55.7	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 394		µg/kg dry	394	31.6	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 394		µg/kg dry	394	30.9	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 79.6		µg/kg dry	79.6	45.9	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 394		µg/kg dry	394	35.7	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 394		µg/kg dry	394	36.4	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 199		µg/kg dry	199	52.5	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 199		µg/kg dry	199	46.0	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 199		µg/kg dry	199	34.8	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1570		µg/kg dry	1570	52.4	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 199		µg/kg dry	199	26.0	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 199		µg/kg dry	199	34.8	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 394		µg/kg dry	394	40.1	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 394		µg/kg dry	394	46.9	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 79.6		µg/kg dry	79.6	45.1	1	"	"	"	"	"	X
108-95-2	Phenol	< 394		µg/kg dry	394	39.8	1	"	"	"	"	"	X
129-00-0	Pyrene	< 79.6		µg/kg dry	79.6	43.9	1	"	"	"	"	"	X
110-86-1	Pyridine	< 394		µg/kg dry	394	93.2	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 394		µg/kg dry	394	48.4	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 79.6		µg/kg dry	79.6	43.9	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 394		µg/kg dry	394	40.7	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 199		µg/kg dry	199	48.7	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 394		µg/kg dry	394	41.9	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 394		µg/kg dry	394	46.9	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*105*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*90*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*88*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*101*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*83*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*63*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 23.8		µg/kg dry	23.8	17.1	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 23.8		µg/kg dry	23.8	7.02	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 23.8		µg/kg dry	23.8	6.58	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-7	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-14				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 23.8		µg/kg dry	23.8	2.26	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 23.8		µg/kg dry	23.8	7.43	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 23.8		µg/kg dry	23.8	18.5	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 23.8		µg/kg dry	23.8	5.11	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 23.8		µg/kg dry	23.8	5.54	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 23.8		µg/kg dry	23.8	5.06	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*74*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*68*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*86*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*76*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.94		µg/kg dry	5.94	0.273	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.94		µg/kg dry	5.94	0.380	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.94		µg/kg dry	5.94	0.309	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.57		µg/kg dry	3.57	0.630	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.94		µg/kg dry	5.94	0.689	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.94		µg/kg dry	5.94	0.202	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.94		µg/kg dry	5.94	0.238	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.94		µg/kg dry	5.94	0.273	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.94		µg/kg dry	5.94	0.285	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.94		µg/kg dry	5.94	0.309	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.51		µg/kg dry	9.51	0.582	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.51		µg/kg dry	9.51	0.380	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.51		µg/kg dry	9.51	0.499	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.51		µg/kg dry	9.51	0.867	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.51		µg/kg dry	9.51	4.08	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.51		µg/kg dry	9.51	0.642	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.51		µg/kg dry	9.51	0.345	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.51		µg/kg dry	9.51	1.50	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.94		µg/kg dry	5.94	0.250	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.94		µg/kg dry	5.94	0.297	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 119		µg/kg dry	119	83.8	1	"	"	"	"	"	X
57-74-9	Chlordane	< 23.8		µg/kg dry	23.8	2.99	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.94		µg/kg dry	5.94	0.523	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*79*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*64*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*51*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*50*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-7 SC58794-14	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**170**		mg/kg dry	15.8	13.2	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*84*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*113*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.60		mg/kg dry	3.60	0.195	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**48.6**		mg/kg dry	1.80	0.228	1	"	"	"	"	"	X
7440-39-3	Barium	**34.6**		mg/kg dry	1.20	0.142	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.601		mg/kg dry	0.601	0.0301	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.601		mg/kg dry	0.601	0.0311	1	"	"	"	"	"	X
7440-47-3	Chromium	**65.9**		mg/kg dry	1.20	0.160	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.128		mg/kg dry	0.128	0.0106	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**44.8**		mg/kg dry	1.20	0.138	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**28.6**		mg/kg dry	1.80	0.255	1	"	"	"	"	"	X
7440-36-0	Antimony	< 6.01		mg/kg dry	6.01	0.452	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.80		mg/kg dry	1.80	0.344	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.60		mg/kg dry	3.60	1.32	1	"	"	"	"	"	X
7440-62-2	Vanadium	**46.7**		mg/kg dry	1.80	0.320	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**56.2**		mg/kg dry	3.60	0.930	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**83.4**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.71**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 14-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	14-Jul-20	15-Jul-20 19:05	M-CT007	537320A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*85*			*30-150 %*			"	"	"	"	"	

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Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-7 SC58794-14	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 7		mg/kg	7	7	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:43	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-8	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-15				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.62 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 60.5		µg/kg dry	60.5	33.1	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 605		µg/kg dry	605	76.4	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 60.5		µg/kg dry	60.5	21.8	50	"	"	"	"	"	X
71-43-2	Benzene	< 60.5		µg/kg dry	60.5	9.67	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 60.5		µg/kg dry	60.5	13.7	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 60.5		µg/kg dry	60.5	8.64	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 60.5		µg/kg dry	60.5	15.6	50	"	"	"	"	"	X
75-25-2	Bromoform	< 60.5		µg/kg dry	60.5	12.9	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 121		µg/kg dry	121	29.9	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 121		µg/kg dry	121	27.6	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 60.5		µg/kg dry	60.5	24.2	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 60.5		µg/kg dry	60.5	18.6	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 60.5		µg/kg dry	60.5	24.7	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 121		µg/kg dry	121	22.4	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 60.5		µg/kg dry	60.5	18.1	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 60.5		µg/kg dry	60.5	7.31	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 121		µg/kg dry	121	27.0	50	"	"	"	"	"	X
67-66-3	Chloroform	< 60.5		µg/kg dry	60.5	7.13	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 121		µg/kg dry	121	71.8	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 60.5		µg/kg dry	60.5	15.0	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 60.5		µg/kg dry	60.5	10.9	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 121		µg/kg dry	121	23.9	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 60.5		µg/kg dry	60.5	9.55	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 60.5		µg/kg dry	60.5	16.4	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 60.5		µg/kg dry	60.5	11.4	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 60.5		µg/kg dry	60.5	10.9	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 60.5		µg/kg dry	60.5	15.1	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 60.5		µg/kg dry	60.5	10.8	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 121		µg/kg dry	121	79.1	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 60.5		µg/kg dry	60.5	14.0	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 60.5		µg/kg dry	60.5	15.8	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 60.5		µg/kg dry	60.5	15.5	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 60.5		µg/kg dry	60.5	20.1	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 60.5		µg/kg dry	60.5	13.8	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 60.5		µg/kg dry	60.5	21.0	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 60.5		µg/kg dry	60.5	19.1	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 60.5		µg/kg dry	60.5	15.9	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 60.5		µg/kg dry	60.5	18.5	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 60.5		µg/kg dry	60.5	14.3	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 60.5		µg/kg dry	60.5	24.6	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 60.5		µg/kg dry	60.5	12.6	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 60.5		µg/kg dry	60.5	19.3	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 121		µg/kg dry	121	40.2	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-8	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-15				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260							Initial weight: 16.62 g						
98-82-8	Isopropylbenzene	< 60.5		µg/kg dry	60.5	21.9	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 60.5		µg/kg dry	60.5	16.7	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 60.5		µg/kg dry	60.5	18.2	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 121		µg/kg dry	121	43.3	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 121		µg/kg dry	121	51.6	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 60.5		µg/kg dry	60.5	17.5	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 60.5		µg/kg dry	60.5	15.1	50	"	"	"	"	"	X
100-42-5	Styrene	< 60.5		µg/kg dry	60.5	7.98	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 60.5		µg/kg dry	60.5	14.6	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 60.5		µg/kg dry	60.5	19.2	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 60.5		µg/kg dry	60.5	19.0	50	"	"	"	"	"	X
108-88-3	Toluene	< 60.5		µg/kg dry	60.5	9.73	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 60.5		µg/kg dry	60.5	14.1	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 60.5		µg/kg dry	60.5	9.97	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 60.5		µg/kg dry	60.5	9.55	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 60.5		µg/kg dry	60.5	14.6	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 60.5		µg/kg dry	60.5	18.7	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 60.5		µg/kg dry	60.5	10.3	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 60.5		µg/kg dry	60.5	27.3	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 60.5		µg/kg dry	60.5	27.9	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 60.5		µg/kg dry	60.5	15.3	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 60.5		µg/kg dry	60.5	12.6	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 60.5		µg/kg dry	60.5	29.7	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 121		µg/kg dry	121	35.5	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 60.5		µg/kg dry	60.5	18.6	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 121		µg/kg dry	121	44.2	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 60.5		µg/kg dry	60.5	16.4	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 60.5		µg/kg dry	60.5	33.4	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 60.5		µg/kg dry	60.5	16.7	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 60.5		µg/kg dry	60.5	19.5	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1210		µg/kg dry	1210	858	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1210		µg/kg dry	1210	356	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 302		µg/kg dry	302	39.9	50	"	"	"	"	"	X
64-17-5	Ethanol	< 12100		µg/kg dry	12100	1040	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*106*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*108*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*107*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 76.5		µg/kg dry	76.5	40.6	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-8	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-15				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 76.5		µg/kg dry	76.5	39.9	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 379		µg/kg dry	379	24.1	1	"	"	"	"	"	X
120-12-7	Anthracene	< 76.5		µg/kg dry	76.5	44.0	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 379		µg/kg dry	379	41.1	1	"	"	"	"	"	
92-87-5	Benzidine	< 757		µg/kg dry	757	24.1	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 76.5		µg/kg dry	76.5	43.0	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 76.5		µg/kg dry	76.5	52.3	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 76.5		µg/kg dry	76.5	57.6	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 76.5		µg/kg dry	76.5	54.0	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 76.5		µg/kg dry	76.5	65.4	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 379		µg/kg dry	379	22.7	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 379		µg/kg dry	379	87.6	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 379		µg/kg dry	379	38.2	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 192		µg/kg dry	192	35.4	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 192		µg/kg dry	192	30.7	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 192		µg/kg dry	192	48.7	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 379		µg/kg dry	379	42.8	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 379		µg/kg dry	379	38.0	1	"	"	"	"	"	X
86-74-8	Carbazole	< 192		µg/kg dry	192	44.0	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 379		µg/kg dry	379	44.5	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 192		µg/kg dry	192	23.6	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 379		µg/kg dry	379	51.8	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 192		µg/kg dry	192	36.7	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 379		µg/kg dry	379	37.0	1	"	"	"	"	"	X
218-01-9	Chrysene	< 76.5		µg/kg dry	76.5	43.2	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 76.5		µg/kg dry	76.5	56.5	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 192		µg/kg dry	192	51.5	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 379		µg/kg dry	379	45.2	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 379		µg/kg dry	379	40.8	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 379		µg/kg dry	379	43.0	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 379		µg/kg dry	379	41.9	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 192		µg/kg dry	192	46.5	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 379		µg/kg dry	379	39.7	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 379		µg/kg dry	379	42.6	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 379		µg/kg dry	379	29.9	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 379		µg/kg dry	379	40.5	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 379		µg/kg dry	379	54.3	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 379		µg/kg dry	379	39.2	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 192		µg/kg dry	192	45.9	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 192		µg/kg dry	192	39.1	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 379		µg/kg dry	379	56.3	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 76.5		µg/kg dry	76.5	44.8	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-8	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-15				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 76.5		µg/kg dry	76.5	49.4	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 192		µg/kg dry	192	48.2	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 192		µg/kg dry	192	48.2	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 192		µg/kg dry	192	48.3	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 192		µg/kg dry	192	43.2	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 76.5		µg/kg dry	76.5	52.3	1	"	"	"	"	"	X
78-59-1	Isophorone	< 192		µg/kg dry	192	29.5	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 76.5		µg/kg dry	76.5	53.6	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 379		µg/kg dry	379	30.4	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 379		µg/kg dry	379	29.7	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 76.5		µg/kg dry	76.5	44.2	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 379		µg/kg dry	379	34.3	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 379		µg/kg dry	379	35.0	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 192		µg/kg dry	192	50.5	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 192		µg/kg dry	192	44.3	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 192		µg/kg dry	192	33.5	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1510		µg/kg dry	1510	50.4	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 192		µg/kg dry	192	25.0	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 192		µg/kg dry	192	33.5	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 379		µg/kg dry	379	38.5	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 379		µg/kg dry	379	45.1	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 76.5		µg/kg dry	76.5	43.4	1	"	"	"	"	"	X
108-95-2	Phenol	< 379		µg/kg dry	379	38.3	1	"	"	"	"	"	X
129-00-0	Pyrene	< 76.5		µg/kg dry	76.5	42.2	1	"	"	"	"	"	X
110-86-1	Pyridine	< 379		µg/kg dry	379	89.6	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 379		µg/kg dry	379	46.6	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 76.5		µg/kg dry	76.5	42.2	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 379		µg/kg dry	379	39.1	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 192		µg/kg dry	192	46.8	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 379		µg/kg dry	379	40.3	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 379		µg/kg dry	379	45.1	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*80*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*88*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*84*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*97*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*85*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*79*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 23.0		µg/kg dry	23.0	16.6	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 23.0		µg/kg dry	23.0	6.79	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 23.0		µg/kg dry	23.0	6.37	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-8	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-15				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 23.0		µg/kg dry	23.0	2.18	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 23.0		µg/kg dry	23.0	7.18	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 23.0		µg/kg dry	23.0	17.9	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 23.0		µg/kg dry	23.0	4.94	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 23.0		µg/kg dry	23.0	5.35	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 23.0		µg/kg dry	23.0	4.90	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*90*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*81*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*85*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*75*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.75		µg/kg dry	5.75	0.264	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.75		µg/kg dry	5.75	0.368	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.75		µg/kg dry	5.75	0.299	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.45		µg/kg dry	3.45	0.609	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.75		µg/kg dry	5.75	0.666	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.75		µg/kg dry	5.75	0.195	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.75		µg/kg dry	5.75	0.230	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.75		µg/kg dry	5.75	0.264	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.75		µg/kg dry	5.75	0.276	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.75		µg/kg dry	5.75	0.299	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.19		µg/kg dry	9.19	0.563	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.19		µg/kg dry	9.19	0.368	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.19		µg/kg dry	9.19	0.483	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.19		µg/kg dry	9.19	0.839	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.19		µg/kg dry	9.19	3.94	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.19		µg/kg dry	9.19	0.620	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.19		µg/kg dry	9.19	0.333	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.19		µg/kg dry	9.19	1.45	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.75		µg/kg dry	5.75	0.241	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.75		µg/kg dry	5.75	0.287	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 115		µg/kg dry	115	81.1	1	"	"	"	"	"	X
57-74-9	Chlordane	< 23.0		µg/kg dry	23.0	2.89	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.75		µg/kg dry	5.75	0.506	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*68*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*69*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*54*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*52*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-8 SC58794-15	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**111**		mg/kg dry	15.4	12.9	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*77*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*103*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.75		mg/kg dry	3.75	0.202	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**48.7**		mg/kg dry	1.87	0.237	1	"	"	"	"	"	X
7440-39-3	Barium	**33.0**		mg/kg dry	1.25	0.147	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.624		mg/kg dry	0.624	0.0313	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.624		mg/kg dry	0.624	0.0323	1	"	"	"	"	"	X
7440-47-3	Chromium	**31.6**		mg/kg dry	1.25	0.166	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.115		mg/kg dry	0.115	0.0095	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**47.7**		mg/kg dry	1.25	0.144	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**21.0**		mg/kg dry	1.87	0.265	1	"	"	"	"	"	X
7440-36-0	Antimony	< 6.24		mg/kg dry	6.24	0.469	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.87		mg/kg dry	1.87	0.357	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.75		mg/kg dry	3.75	1.38	1	"	"	"	"	"	X
7440-62-2	Vanadium	**36.0**		mg/kg dry	1.87	0.332	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**52.3**		mg/kg dry	3.75	0.966	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**86.1**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.56**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 14-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	14-Jul-20	15-Jul-20 19:29	M-CT007	537320A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*84*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-8 SC58794-15	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	15-Jul-20	15-Jul-20 13:52	M-CT007	537434A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	15-Jul-20 14:40	M-CT007	537434B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	15-Jul-20 14:43	15-Jul-20 14:43	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-9	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-16				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 15.23 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 76.0		µg/kg dry	76.0	41.7	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 760		µg/kg dry	760	96.1	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 76.0		µg/kg dry	76.0	27.5	50	"	"	"	"	"	X
71-43-2	Benzene	< 76.0		µg/kg dry	76.0	12.2	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 76.0		µg/kg dry	76.0	17.2	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 76.0		µg/kg dry	76.0	10.9	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 76.0		µg/kg dry	76.0	19.6	50	"	"	"	"	"	X
75-25-2	Bromoform	< 76.0		µg/kg dry	76.0	16.3	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 152		µg/kg dry	152	37.6	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 152		µg/kg dry	152	34.8	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 76.0		µg/kg dry	76.0	30.4	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 76.0		µg/kg dry	76.0	23.3	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 76.0		µg/kg dry	76.0	31.0	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 152		µg/kg dry	152	28.1	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 76.0		µg/kg dry	76.0	22.7	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 76.0		µg/kg dry	76.0	9.20	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 152		µg/kg dry	152	33.9	50	"	"	"	"	"	X
67-66-3	Chloroform	< 76.0		µg/kg dry	76.0	8.97	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 152		µg/kg dry	152	90.3	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 76.0		µg/kg dry	76.0	18.9	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 76.0		µg/kg dry	76.0	13.8	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 152		µg/kg dry	152	30.0	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 76.0		µg/kg dry	76.0	12.0	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 76.0		µg/kg dry	76.0	20.7	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 76.0		µg/kg dry	76.0	14.3	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 76.0		µg/kg dry	76.0	13.7	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 76.0		µg/kg dry	76.0	18.9	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 76.0		µg/kg dry	76.0	13.6	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 152		µg/kg dry	152	99.5	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 76.0		µg/kg dry	76.0	17.6	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 76.0		µg/kg dry	76.0	19.9	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 76.0		µg/kg dry	76.0	19.5	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 76.0		µg/kg dry	76.0	25.3	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 76.0		µg/kg dry	76.0	17.3	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 76.0		µg/kg dry	76.0	26.4	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 76.0		µg/kg dry	76.0	24.0	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 76.0		µg/kg dry	76.0	20.0	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 76.0		µg/kg dry	76.0	23.3	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 76.0		µg/kg dry	76.0	17.9	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 76.0		µg/kg dry	76.0	31.0	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 76.0		µg/kg dry	76.0	15.9	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 76.0		µg/kg dry	76.0	24.3	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 152		µg/kg dry	152	50.6	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-9	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-16				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 15.23 g						
98-82-8	Isopropylbenzene	< 76.0		µg/kg dry	76.0	27.6	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 76.0		µg/kg dry	76.0	21.1	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 76.0		µg/kg dry	76.0	22.9	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 152		µg/kg dry	152	54.5	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 152		µg/kg dry	152	64.9	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 76.0		µg/kg dry	76.0	22.1	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 76.0		µg/kg dry	76.0	18.9	50	"	"	"	"	"	X
100-42-5	Styrene	< 76.0		µg/kg dry	76.0	10.0	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 76.0		µg/kg dry	76.0	18.3	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 76.0		µg/kg dry	76.0	24.1	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 76.0		µg/kg dry	76.0	24.0	50	"	"	"	"	"	X
108-88-3	Toluene	< 76.0		µg/kg dry	76.0	12.2	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 76.0		µg/kg dry	76.0	17.7	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 76.0		µg/kg dry	76.0	12.5	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 76.0		µg/kg dry	76.0	12.0	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 76.0		µg/kg dry	76.0	18.4	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 76.0		µg/kg dry	76.0	23.5	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 76.0		µg/kg dry	76.0	13.0	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 76.0		µg/kg dry	76.0	34.4	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 76.0		µg/kg dry	76.0	35.1	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 76.0		µg/kg dry	76.0	19.2	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 76.0		µg/kg dry	76.0	15.9	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 76.0		µg/kg dry	76.0	37.4	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 152		µg/kg dry	152	44.7	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 76.0		µg/kg dry	76.0	23.4	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 152		µg/kg dry	152	55.6	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 76.0		µg/kg dry	76.0	20.6	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 76.0		µg/kg dry	76.0	42.1	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 76.0		µg/kg dry	76.0	21.1	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 76.0		µg/kg dry	76.0	24.6	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1520		µg/kg dry	1520	1080	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1520		µg/kg dry	1520	448	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 380		µg/kg dry	380	50.2	50	"	"	"	"	"	X
64-17-5	Ethanol	< 15200		µg/kg dry	15200	1310	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*103*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*102*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*102*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 83.8		µg/kg dry	83.8	44.5	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-9	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-16				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 83.8		µg/kg dry	83.8	43.7	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 415		µg/kg dry	415	26.4	1	"	"	"	"	"	X
120-12-7	Anthracene	< 83.8		µg/kg dry	83.8	48.2	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 415		µg/kg dry	415	45.0	1	"	"	"	"	"	
92-87-5	Benzidine	< 829		µg/kg dry	829	26.4	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 83.8		µg/kg dry	83.8	47.1	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 83.8		µg/kg dry	83.8	57.3	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 83.8		µg/kg dry	83.8	63.1	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 83.8		µg/kg dry	83.8	59.2	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 83.8		µg/kg dry	83.8	71.6	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 415		µg/kg dry	415	24.9	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 415		µg/kg dry	415	96.0	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 415		µg/kg dry	415	41.8	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 210		µg/kg dry	210	38.8	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 210		µg/kg dry	210	33.7	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 210		µg/kg dry	210	53.4	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 415		µg/kg dry	415	46.9	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 415		µg/kg dry	415	41.6	1	"	"	"	"	"	X
86-74-8	Carbazole	< 210		µg/kg dry	210	48.2	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 415		µg/kg dry	415	48.7	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 210		µg/kg dry	210	25.9	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 415		µg/kg dry	415	56.8	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 210		µg/kg dry	210	40.2	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 415		µg/kg dry	415	40.6	1	"	"	"	"	"	X
218-01-9	Chrysene	< 83.8		µg/kg dry	83.8	47.4	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 83.8		µg/kg dry	83.8	61.9	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 210		µg/kg dry	210	56.4	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 415		µg/kg dry	415	49.5	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 415		µg/kg dry	415	44.7	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 415		µg/kg dry	415	47.1	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 415		µg/kg dry	415	45.9	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 210		µg/kg dry	210	50.9	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 415		µg/kg dry	415	43.5	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 415		µg/kg dry	415	46.6	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 415		µg/kg dry	415	32.8	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 415		µg/kg dry	415	44.3	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 415		µg/kg dry	415	59.4	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 415		µg/kg dry	415	43.0	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 210		µg/kg dry	210	50.2	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 210		µg/kg dry	210	42.8	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 415		µg/kg dry	415	61.7	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 83.8		µg/kg dry	83.8	49.1	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-9	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-16				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 83.8		µg/kg dry	83.8	54.1	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 210		µg/kg dry	210	52.8	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 210		µg/kg dry	210	52.8	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 210		µg/kg dry	210	52.9	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 210		µg/kg dry	210	47.4	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 83.8		µg/kg dry	83.8	57.3	1	"	"	"	"	"	X
78-59-1	Isophorone	< 210		µg/kg dry	210	32.3	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 83.8		µg/kg dry	83.8	58.7	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 415		µg/kg dry	415	33.3	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 415		µg/kg dry	415	32.5	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 83.8		µg/kg dry	83.8	48.4	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 415		µg/kg dry	415	37.6	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 415		µg/kg dry	415	38.3	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 210		µg/kg dry	210	55.3	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 210		µg/kg dry	210	48.5	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 210		µg/kg dry	210	36.7	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1660		µg/kg dry	1660	55.1	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 210		µg/kg dry	210	27.4	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 210		µg/kg dry	210	36.7	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 415		µg/kg dry	415	42.2	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 415		µg/kg dry	415	49.4	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 83.8		µg/kg dry	83.8	47.5	1	"	"	"	"	"	X
108-95-2	Phenol	< 415		µg/kg dry	415	42.0	1	"	"	"	"	"	X
129-00-0	Pyrene	< 83.8		µg/kg dry	83.8	46.2	1	"	"	"	"	"	X
110-86-1	Pyridine	< 415		µg/kg dry	415	98.1	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 415		µg/kg dry	415	51.0	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 83.8		µg/kg dry	83.8	46.2	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 415		µg/kg dry	415	42.8	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 210		µg/kg dry	210	51.3	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 415		µg/kg dry	415	44.1	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 415		µg/kg dry	415	49.4	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*70*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*94*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*79*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*98*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*92*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*81*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 25.3		µg/kg dry	25.3	18.3	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 25.3		µg/kg dry	25.3	7.49	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 25.3		µg/kg dry	25.3	7.02	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-9	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-16				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 25.3		µg/kg dry	25.3	2.41	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 25.3		µg/kg dry	25.3	7.92	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 25.3		µg/kg dry	25.3	19.7	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 25.3		µg/kg dry	25.3	5.45	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 25.3		µg/kg dry	25.3	5.90	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 25.3		µg/kg dry	25.3	5.40	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*84*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*74*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*82*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*74*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 6.34		µg/kg dry	6.34	0.291	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 6.34		µg/kg dry	6.34	0.405	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 6.34		µg/kg dry	6.34	0.329	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.80		µg/kg dry	3.80	0.672	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 6.34		µg/kg dry	6.34	0.735	1	"	"	"	"	"	X
309-00-2	Aldrin	< 6.34		µg/kg dry	6.34	0.215	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 6.34		µg/kg dry	6.34	0.253	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 6.34		µg/kg dry	6.34	0.291	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 6.34		µg/kg dry	6.34	0.304	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 6.34		µg/kg dry	6.34	0.329	1	"	"	"	"	"	X
72-20-8	Endrin	< 10.1		µg/kg dry	10.1	0.621	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 10.1		µg/kg dry	10.1	0.405	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 10.1		µg/kg dry	10.1	0.532	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 10.1		µg/kg dry	10.1	0.925	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 10.1		µg/kg dry	10.1	4.35	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 10.1		µg/kg dry	10.1	0.684	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 10.1		µg/kg dry	10.1	0.367	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 10.1		µg/kg dry	10.1	1.60	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 6.34		µg/kg dry	6.34	0.266	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 6.34		µg/kg dry	6.34	0.317	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 127		µg/kg dry	127	89.4	1	"	"	"	"	"	X
57-74-9	Chlordane	< 25.3		µg/kg dry	25.3	3.19	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 6.34		µg/kg dry	6.34	0.558	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*57*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*53*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*52*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-9 SC58794-16	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**129**		mg/kg dry	16.8	14.0	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*82*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*108*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.77		mg/kg dry	3.77	0.203	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**82.3**		mg/kg dry	1.88	0.238	1	"	"	"	"	"	X
7440-39-3	Barium	**29.1**		mg/kg dry	1.26	0.148	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.628		mg/kg dry	0.628	0.0315	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.628		mg/kg dry	0.628	0.0325	1	"	"	"	"	"	X
7440-47-3	Chromium	**24.7**		mg/kg dry	1.26	0.167	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.120		mg/kg dry	0.120	0.0100	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**76.0**		mg/kg dry	1.26	0.144	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**22.9**		mg/kg dry	1.88	0.266	1	"	"	"	"	"	X
7440-36-0	Antimony	< 6.28		mg/kg dry	6.28	0.472	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.88		mg/kg dry	1.88	0.359	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.77		mg/kg dry	3.77	1.38	1	"	"	"	"	"	X
7440-62-2	Vanadium	**39.4**		mg/kg dry	1.88	0.334	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**64.7**		mg/kg dry	3.77	0.972	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**78.7**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.41**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 14-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	14-Jul-20	15-Jul-20 19:54	M-CT007	537320A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*73*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-9 SC58794-16	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 7		mg/kg	7	7	1	SW846 7.3.3.1/90	15-Jul-20	15-Jul-20 13:53	M-CT007	537434A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	15-Jul-20 14:40	M-CT007	537434B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	15-Jul-20 14:43	15-Jul-20 14:43	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-15	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-17				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.55 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 69.5		µg/kg dry	69.5	38.1	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 695		µg/kg dry	695	87.8	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 69.5		µg/kg dry	69.5	25.1	50	"	"	"	"	"	X
71-43-2	Benzene	< 69.5		µg/kg dry	69.5	11.1	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 69.5		µg/kg dry	69.5	15.7	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 69.5		µg/kg dry	69.5	9.93	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 69.5		µg/kg dry	69.5	17.9	50	"	"	"	"	"	X
75-25-2	Bromoform	< 69.5		µg/kg dry	69.5	14.9	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 139		µg/kg dry	139	34.3	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 139		µg/kg dry	139	31.7	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 69.5		µg/kg dry	69.5	27.8	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 69.5		µg/kg dry	69.5	21.3	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 69.5		µg/kg dry	69.5	28.3	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 139		µg/kg dry	139	25.7	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 69.5		µg/kg dry	69.5	20.8	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 69.5		µg/kg dry	69.5	8.41	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 139		µg/kg dry	139	31.0	50	"	"	"	"	"	X
67-66-3	Chloroform	< 69.5		µg/kg dry	69.5	8.20	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 139		µg/kg dry	139	82.5	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 69.5		µg/kg dry	69.5	17.2	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 69.5		µg/kg dry	69.5	12.6	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 139		µg/kg dry	139	27.4	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 69.5		µg/kg dry	69.5	11.0	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 69.5		µg/kg dry	69.5	18.9	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 69.5		µg/kg dry	69.5	13.1	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 69.5		µg/kg dry	69.5	12.5	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 69.5		µg/kg dry	69.5	17.3	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 69.5		µg/kg dry	69.5	12.4	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 139		µg/kg dry	139	90.9	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 69.5		µg/kg dry	69.5	16.0	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 69.5		µg/kg dry	69.5	18.2	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 69.5		µg/kg dry	69.5	17.8	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 69.5		µg/kg dry	69.5	23.1	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 69.5		µg/kg dry	69.5	15.8	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 69.5		µg/kg dry	69.5	24.1	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 69.5		µg/kg dry	69.5	22.0	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 69.5		µg/kg dry	69.5	18.3	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 69.5		µg/kg dry	69.5	21.3	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 69.5		µg/kg dry	69.5	16.4	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 69.5		µg/kg dry	69.5	28.3	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 69.5		µg/kg dry	69.5	14.5	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 69.5		µg/kg dry	69.5	22.2	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 139		µg/kg dry	139	46.2	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-15	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-17				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
						Initial weight: 16.55 g							
98-82-8	Isopropylbenzene	< 69.5		µg/kg dry	69.5	25.2	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 69.5		µg/kg dry	69.5	19.2	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 69.5		µg/kg dry	69.5	20.9	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 139		µg/kg dry	139	49.7	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 139		µg/kg dry	139	59.3	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 69.5		µg/kg dry	69.5	20.1	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 69.5		µg/kg dry	69.5	17.3	50	"	"	"	"	"	X
100-42-5	Styrene	< 69.5		µg/kg dry	69.5	9.17	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 69.5		µg/kg dry	69.5	16.7	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 69.5		µg/kg dry	69.5	22.0	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 69.5		µg/kg dry	69.5	21.9	50	"	"	"	"	"	X
108-88-3	Toluene	< 69.5		µg/kg dry	69.5	11.2	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 69.5		µg/kg dry	69.5	16.2	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 69.5		µg/kg dry	69.5	11.5	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 69.5		µg/kg dry	69.5	11.0	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 69.5		µg/kg dry	69.5	16.8	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 69.5		µg/kg dry	69.5	21.5	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 69.5		µg/kg dry	69.5	11.9	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 69.5		µg/kg dry	69.5	31.4	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 69.5		µg/kg dry	69.5	32.0	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 69.5		µg/kg dry	69.5	17.6	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 69.5		µg/kg dry	69.5	14.5	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 69.5		µg/kg dry	69.5	34.2	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 139		µg/kg dry	139	40.8	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 69.5		µg/kg dry	69.5	21.4	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 139		µg/kg dry	139	50.8	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 69.5		µg/kg dry	69.5	18.8	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 69.5		µg/kg dry	69.5	38.4	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 69.5		µg/kg dry	69.5	19.2	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 69.5		µg/kg dry	69.5	22.4	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1390		µg/kg dry	1390	986	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1390		µg/kg dry	1390	409	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 347		µg/kg dry	347	45.8	50	"	"	"	"	"	X
64-17-5	Ethanol	< 13900		µg/kg dry	13900	1200	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*104*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*104*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*106*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*105*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 82.3		µg/kg dry	82.3	43.7	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-15	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-17				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 82.3		µg/kg dry	82.3	42.9	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 407		µg/kg dry	407	25.9	1	"	"	"	"	"	X
120-12-7	Anthracene	< 82.3		µg/kg dry	82.3	47.4	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 407		µg/kg dry	407	44.2	1	"	"	"	"	"	
92-87-5	Benzidine	< 814		µg/kg dry	814	25.9	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 82.3		µg/kg dry	82.3	46.3	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 82.3		µg/kg dry	82.3	56.3	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 82.3		µg/kg dry	82.3	61.9	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 82.3		µg/kg dry	82.3	58.1	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 82.3		µg/kg dry	82.3	70.3	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 407		µg/kg dry	407	24.4	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 407		µg/kg dry	407	94.3	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 407		µg/kg dry	407	41.1	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 206		µg/kg dry	206	38.1	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 206		µg/kg dry	206	33.1	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 206		µg/kg dry	206	52.4	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 407		µg/kg dry	407	46.0	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 407		µg/kg dry	407	40.8	1	"	"	"	"	"	X
86-74-8	Carbazole	< 206		µg/kg dry	206	47.4	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 407		µg/kg dry	407	47.9	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 206		µg/kg dry	206	25.4	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 407		µg/kg dry	407	55.8	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 206		µg/kg dry	206	39.5	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 407		µg/kg dry	407	39.9	1	"	"	"	"	"	X
218-01-9	Chrysene	< 82.3		µg/kg dry	82.3	46.5	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 82.3		µg/kg dry	82.3	60.8	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 206		µg/kg dry	206	55.4	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 407		µg/kg dry	407	48.6	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 407		µg/kg dry	407	43.9	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 407		µg/kg dry	407	46.3	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 407		µg/kg dry	407	45.0	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 206		µg/kg dry	206	50.0	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 407		µg/kg dry	407	42.7	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 407		µg/kg dry	407	45.8	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 407		µg/kg dry	407	32.2	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 407		µg/kg dry	407	43.6	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 407		µg/kg dry	407	58.4	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 407		µg/kg dry	407	42.2	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 206		µg/kg dry	206	49.4	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 206		µg/kg dry	206	42.1	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 407		µg/kg dry	407	60.6	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 82.3		µg/kg dry	82.3	48.2	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-15	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-17				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 82.3		µg/kg dry	82.3	53.2	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 206		µg/kg dry	206	51.8	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 206		µg/kg dry	206	51.8	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 206		µg/kg dry	206	51.9	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 206		µg/kg dry	206	46.5	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 82.3		µg/kg dry	82.3	56.3	1	"	"	"	"	"	X
78-59-1	Isophorone	< 206		µg/kg dry	206	31.7	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 82.3		µg/kg dry	82.3	57.6	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 407		µg/kg dry	407	32.7	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 407		µg/kg dry	407	32.0	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 82.3		µg/kg dry	82.3	47.5	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 407		µg/kg dry	407	36.9	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 407		µg/kg dry	407	37.6	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 206		µg/kg dry	206	54.3	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 206		µg/kg dry	206	47.6	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 206		µg/kg dry	206	36.0	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1630		µg/kg dry	1630	54.2	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 206		µg/kg dry	206	26.9	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 206		µg/kg dry	206	36.0	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 407		µg/kg dry	407	41.5	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 407		µg/kg dry	407	48.5	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 82.3		µg/kg dry	82.3	46.6	1	"	"	"	"	"	X
108-95-2	Phenol	< 407		µg/kg dry	407	41.2	1	"	"	"	"	"	X
129-00-0	Pyrene	< 82.3		µg/kg dry	82.3	45.4	1	"	"	"	"	"	X
110-86-1	Pyridine	< 407		µg/kg dry	407	96.4	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 407		µg/kg dry	407	50.1	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 82.3		µg/kg dry	82.3	45.4	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 407		µg/kg dry	407	42.1	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 206		µg/kg dry	206	50.3	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 407		µg/kg dry	407	43.3	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 407		µg/kg dry	407	48.5	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*81*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*86*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*77*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*96*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*86*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*42*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 24.9		µg/kg dry	24.9	17.9	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 24.9		µg/kg dry	24.9	7.35	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 24.9		µg/kg dry	24.9	6.89	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-15	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-17				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 24.9		µg/kg dry	24.9	2.36	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 24.9		µg/kg dry	24.9	7.77	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 24.9		µg/kg dry	24.9	19.3	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 24.9		µg/kg dry	24.9	5.35	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 24.9		µg/kg dry	24.9	5.79	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 24.9		µg/kg dry	24.9	5.30	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*78*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*70*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*71*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*65*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 6.22		µg/kg dry	6.22	0.286	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 6.22		µg/kg dry	6.22	0.398	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 6.22		µg/kg dry	6.22	0.323	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.73		µg/kg dry	3.73	0.659	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 6.22		µg/kg dry	6.22	0.721	1	"	"	"	"	"	X
309-00-2	Aldrin	< 6.22		µg/kg dry	6.22	0.211	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 6.22		µg/kg dry	6.22	0.249	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 6.22		µg/kg dry	6.22	0.286	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 6.22		µg/kg dry	6.22	0.298	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 6.22		µg/kg dry	6.22	0.323	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.95		µg/kg dry	9.95	0.609	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.95		µg/kg dry	9.95	0.398	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.95		µg/kg dry	9.95	0.522	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.95		µg/kg dry	9.95	0.908	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.95		µg/kg dry	9.95	4.27	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.95		µg/kg dry	9.95	0.671	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.95		µg/kg dry	9.95	0.361	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.95		µg/kg dry	9.95	1.57	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 6.22		µg/kg dry	6.22	0.261	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 6.22		µg/kg dry	6.22	0.311	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 124		µg/kg dry	124	87.7	1	"	"	"	"	"	X
57-74-9	Chlordane	< 24.9		µg/kg dry	24.9	3.13	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 6.22		µg/kg dry	6.22	0.547	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*66*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*56*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*41*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*45*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-15	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-17				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC													
Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**168**		mg/kg dry	16.7	13.9	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*78*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*104*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.80		mg/kg dry	3.80	0.205	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**37.8**		mg/kg dry	1.90	0.241	1	"	"	"	"	"	X
7440-39-3	Barium	**46.3**		mg/kg dry	1.27	0.149	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.633		mg/kg dry	0.633	0.0318	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.633		mg/kg dry	0.633	0.0328	1	"	"	"	"	"	X
7440-47-3	Chromium	**31.5**		mg/kg dry	1.27	0.168	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.123		mg/kg dry	0.123	0.0102	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**37.7**		mg/kg dry	1.27	0.146	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**25.9**		mg/kg dry	1.90	0.269	1	"	"	"	"	"	X
7440-36-0	Antimony	< 6.33		mg/kg dry	6.33	0.476	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.90		mg/kg dry	1.90	0.362	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.80		mg/kg dry	3.80	1.40	1	"	"	"	"	"	X
7440-62-2	Vanadium	**36.3**		mg/kg dry	1.90	0.337	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**60.7**		mg/kg dry	3.80	0.980	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**79.8**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.69**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses													
Prepared by method SW8151A										Methylation date: 14-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	14-Jul-20	15-Jul-20 21:08	M-CT007	537320A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*81*			*30-150 %*			"	"	"	"	"	

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Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-15 SC58794-17	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 7		mg/kg	7	7	1	SW846 7.3.3.1/90	15-Jul-20	15-Jul-20 13:56	M-CT007	537434A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	15-Jul-20 14:40	M-CT007	537434B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	15-Jul-20 14:43	15-Jul-20 14:43	M-CT007	'[none]'	

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 2001076 - SW846 5035A Soil (high level)										
Blank (2001076-BLK1)					Prepared & Analyzed: 13-Jul-20					
1,1,2-Trichlorotrifluoroethane (Freon 113)	< 50.0		µg/kg wet	50.0						
Acetone	< 500		µg/kg wet	500						
Acrylonitrile	< 50.0		µg/kg wet	50.0						
Benzene	< 50.0		µg/kg wet	50.0						
Bromobenzene	< 50.0		µg/kg wet	50.0						
Bromochloromethane	< 50.0		µg/kg wet	50.0						
Bromodichloromethane	< 50.0		µg/kg wet	50.0						
Bromoform	< 50.0		µg/kg wet	50.0						
Bromomethane	< 100		µg/kg wet	100						
2-Butanone (MEK)	< 100		µg/kg wet	100						
n-Butylbenzene	< 50.0		µg/kg wet	50.0						
sec-Butylbenzene	< 50.0		µg/kg wet	50.0						
tert-Butylbenzene	< 50.0		µg/kg wet	50.0						
Carbon disulfide	< 100		µg/kg wet	100						
Carbon tetrachloride	< 50.0		µg/kg wet	50.0						
Chlorobenzene	< 50.0		µg/kg wet	50.0						
Chloroethane	< 100		µg/kg wet	100						
Chloroform	< 50.0		µg/kg wet	50.0						
Chloromethane	< 100		µg/kg wet	100						
2-Chlorotoluene	< 50.0		µg/kg wet	50.0						
4-Chlorotoluene	< 50.0		µg/kg wet	50.0						
1,2-Dibromo-3-chloropropane	< 100		µg/kg wet	100						
Dibromochloromethane	< 50.0		µg/kg wet	50.0						
1,2-Dibromoethane (EDB)	< 50.0		µg/kg wet	50.0						
Dibromomethane	< 50.0		µg/kg wet	50.0						
1,2-Dichlorobenzene	< 50.0		µg/kg wet	50.0						
1,3-Dichlorobenzene	< 50.0		µg/kg wet	50.0						
1,4-Dichlorobenzene	< 50.0		µg/kg wet	50.0						
Dichlorodifluoromethane (Freon12)	< 100		µg/kg wet	100						
1,1-Dichloroethane	< 50.0		µg/kg wet	50.0						
1,2-Dichloroethane	< 50.0		µg/kg wet	50.0						
1,1-Dichloroethene	< 50.0		µg/kg wet	50.0						
cis-1,2-Dichloroethene	< 50.0		µg/kg wet	50.0						
trans-1,2-Dichloroethene	< 50.0		µg/kg wet	50.0						
1,2-Dichloropropane	< 50.0		µg/kg wet	50.0						
1,3-Dichloropropane	< 50.0		µg/kg wet	50.0						
2,2-Dichloropropane	< 50.0		µg/kg wet	50.0						
1,1-Dichloropropene	< 50.0		µg/kg wet	50.0						
cis-1,3-Dichloropropene	< 50.0		µg/kg wet	50.0						
trans-1,3-Dichloropropene	< 50.0		µg/kg wet	50.0						
Ethylbenzene	< 50.0		µg/kg wet	50.0						
Hexachlorobutadiene	< 50.0		µg/kg wet	50.0						
2-Hexanone (MBK)	< 100		µg/kg wet	100						
Isopropylbenzene	< 50.0		µg/kg wet	50.0						
4-Isopropyltoluene	< 50.0		µg/kg wet	50.0						
Methyl tert-butyl ether	< 50.0		µg/kg wet	50.0						
4-Methyl-2-pentanone (MIBK)	< 100		µg/kg wet	100						
Methylene chloride	< 100		µg/kg wet	100						
Naphthalene	< 50.0		µg/kg wet	50.0						
n-Propylbenzene	< 50.0		µg/kg wet	50.0						

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 2001076 - SW846 5035A Soil (high level)										
Blank (2001076-BLK1)					Prepared & Analyzed: 13-Jul-20					
Styrene	< 50.0		µg/kg wet	50.0						
1,1,1,2-Tetrachloroethane	< 50.0		µg/kg wet	50.0						
1,1,2,2-Tetrachloroethane	< 50.0		µg/kg wet	50.0						
Tetrachloroethene	< 50.0		µg/kg wet	50.0						
Toluene	< 50.0		µg/kg wet	50.0						
1,2,3-Trichlorobenzene	< 50.0		µg/kg wet	50.0						
1,2,4-Trichlorobenzene	< 50.0		µg/kg wet	50.0						
1,3,5-Trichlorobenzene	< 50.0		µg/kg wet	50.0						
1,1,1-Trichloroethane	< 50.0		µg/kg wet	50.0						
1,1,2-Trichloroethane	< 50.0		µg/kg wet	50.0						
Trichloroethene	< 50.0		µg/kg wet	50.0						
Trichlorofluoromethane (Freon 11)	< 50.0		µg/kg wet	50.0						
1,2,3-Trichloropropane	< 50.0		µg/kg wet	50.0						
1,2,4-Trimethylbenzene	< 50.0		µg/kg wet	50.0						
1,3,5-Trimethylbenzene	< 50.0		µg/kg wet	50.0						
Vinyl chloride	< 50.0		µg/kg wet	50.0						
m,p-Xylene	< 100		µg/kg wet	100						
o-Xylene	< 50.0		µg/kg wet	50.0						
Tetrahydrofuran	< 100		µg/kg wet	100						
Ethyl ether	< 50.0		µg/kg wet	50.0						
Tert-amyl methyl ether	< 50.0		µg/kg wet	50.0						
Ethyl tert-butyl ether	< 50.0		µg/kg wet	50.0						
Di-isopropyl ether	< 50.0		µg/kg wet	50.0						
Tert-Butanol / butyl alcohol	< 1000		µg/kg wet	1000						
1,4-Dioxane	< 1000		µg/kg wet	1000						
trans-1,4-Dichloro-2-butene	< 250		µg/kg wet	250						
Ethanol	< 10000		µg/kg wet	10000						
Surrogate: 4-Bromofluorobenzene	*49.8*		µg/kg		*50.0*		*100*	*70-130*		
Surrogate: Toluene-d8	*52.5*		µg/kg		*50.0*		*105*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*53.0*		µg/kg		*50.0*		*106*	*70-130*		
Surrogate: Dibromofluoromethane	*53.1*		µg/kg		*50.0*		*106*	*70-130*		
LCS (2001076-BS1)					Prepared & Analyzed: 13-Jul-20					
1,1,2-Trichlorotrifluoroethane (Freon 113)	**26.0**		µg/kg		20.0		130	70-130		
Acetone	**24.3**		µg/kg		20.0		121	70-130		
Acrylonitrile	**23.5**		µg/kg		20.0		117	70-130		
Benzene	**22.7**		µg/kg		20.0		114	70-130		
Bromobenzene	**20.7**		µg/kg		20.0		104	70-130		
Bromochloromethane	**23.7**		µg/kg		20.0		118	70-130		
Bromodichloromethane	**24.1**		µg/kg		20.0		120	70-130		
Bromoform	**22.2**		µg/kg		20.0		111	70-130		
Bromomethane	**19.7**		µg/kg		20.0		98	70-130		
2-Butanone (MEK)	**26.5**	QC2	µg/kg		20.0		133	70-130		
n-Butylbenzene	**17.3**		µg/kg		20.0		86	70-130		
sec-Butylbenzene	**15.9**		µg/kg		20.0		80	70-130		
tert-Butylbenzene	**18.0**		µg/kg		20.0		90	70-130		
Carbon disulfide	**25.3**		µg/kg		20.0		126	70-130		
Carbon tetrachloride	**25.9**		µg/kg		20.0		130	70-130		
Chlorobenzene	**20.9**		µg/kg		20.0		104	70-130		
Chloroethane	**29.3**	QC2	µg/kg		20.0		147	70-130		
Chloroform	**23.8**		µg/kg		20.0		119	70-130		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 2001076 - SW846 5035A Soil (high level)										
LCS (2001076-BS1)						Prepared & Analyzed: 13-Jul-20				
Chloromethane	**26.6**	QC2	µg/kg		20.0		133	70-130		
2-Chlorotoluene	**20.8**		µg/kg		20.0		104	70-130		
4-Chlorotoluene	**21.1**		µg/kg		20.0		106	70-130		
1,2-Dibromo-3-chloropropane	**20.7**		µg/kg		20.0		104	70-130		
Dibromochloromethane	**23.6**		µg/kg		20.0		118	70-130		
1,2-Dibromoethane (EDB)	**24.1**		µg/kg		20.0		120	70-130		
Dibromomethane	**24.6**		µg/kg		20.0		123	70-130		
1,2-Dichlorobenzene	**20.4**		µg/kg		20.0		102	70-130		
1,3-Dichlorobenzene	**21.0**		µg/kg		20.0		105	70-130		
1,4-Dichlorobenzene	**19.8**		µg/kg		20.0		99	70-130		
Dichlorodifluoromethane (Freon12)	**29.9**	QC2	µg/kg		20.0		150	70-130		
1,1-Dichloroethane	**25.0**		µg/kg		20.0		125	70-130		
1,2-Dichloroethane	**24.0**		µg/kg		20.0		120	70-130		
1,1-Dichloroethene	**24.4**		µg/kg		20.0		122	70-130		
cis-1,2-Dichloroethene	**22.6**		µg/kg		20.0		113	70-130		
trans-1,2-Dichloroethene	**23.8**		µg/kg		20.0		119	70-130		
1,2-Dichloropropane	**22.1**		µg/kg		20.0		110	70-130		
1,3-Dichloropropane	**22.6**		µg/kg		20.0		113	70-130		
2,2-Dichloropropane	**24.4**		µg/kg		20.0		122	70-130		
1,1-Dichloropropene	**23.2**		µg/kg		20.0		116	70-130		
cis-1,3-Dichloropropene	**22.7**		µg/kg		20.0		114	70-130		
trans-1,3-Dichloropropene	**25.6**		µg/kg		20.0		128	70-130		
Ethylbenzene	**20.2**		µg/kg		20.0		101	70-130		
Hexachlorobutadiene	**15.8**		µg/kg		20.0		79	70-130		
2-Hexanone (MBK)	**29.9**	QC2	µg/kg		20.0		150	70-130		
Isopropylbenzene	**17.6**		µg/kg		20.0		88	70-130		
4-Isopropyltoluene	**16.2**		µg/kg		20.0		81	70-130		
Methyl tert-butyl ether	**22.3**		µg/kg		20.0		111	70-130		
4-Methyl-2-pentanone (MIBK)	**24.1**		µg/kg		20.0		121	70-130		
Methylene chloride	**23.4**		µg/kg		20.0		117	70-130		
Naphthalene	**16.0**		µg/kg		20.0		80	70-130		
n-Propylbenzene	**20.8**		µg/kg		20.0		104	70-130		
Styrene	**18.4**		µg/kg		20.0		92	70-130		
1,1,1,2-Tetrachloroethane	**21.8**		µg/kg		20.0		109	70-130		
1,1,2,2-Tetrachloroethane	**21.2**		µg/kg		20.0		106	70-130		
Tetrachloroethene	**23.7**		µg/kg		20.0		118	70-130		
Toluene	**21.8**		µg/kg		20.0		109	70-130		
1,2,3-Trichlorobenzene	**18.4**		µg/kg		20.0		92	70-130		
1,2,4-Trichlorobenzene	**18.5**		µg/kg		20.0		93	70-130		
1,3,5-Trichlorobenzene	**18.9**		µg/kg		20.0		94	70-130		
1,1,1-Trichloroethane	**24.0**		µg/kg		20.0		120	70-130		
1,1,2-Trichloroethane	**23.9**		µg/kg		20.0		120	70-130		
Trichloroethene	**21.8**		µg/kg		20.0		109	70-130		
Trichlorofluoromethane (Freon 11)	**28.0**	QC2	µg/kg		20.0		140	70-130		
1,2,3-Trichloropropane	**22.8**		µg/kg		20.0		114	70-130		
1,2,4-Trimethylbenzene	**18.0**		µg/kg		20.0		90	70-130		
1,3,5-Trimethylbenzene	**18.2**		µg/kg		20.0		91	70-130		
Vinyl chloride	**24.6**		µg/kg		20.0		123	70-130		
m,p-Xylene	**43.8**		µg/kg		40.0		110	70-130		
o-Xylene	**17.8**		µg/kg		20.0		89	70-130		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 2001076 - SW846 5035A Soil (high level)										
LCS (2001076-BS1)					Prepared & Analyzed: 13-Jul-20					
Tetrahydrofuran	**21.2**		µg/kg		20.0		106	70-130		
Ethyl ether	**23.0**		µg/kg		20.0		115	70-130		
Tert-amyl methyl ether	**23.6**		µg/kg		20.0		118	70-130		
Ethyl tert-butyl ether	**23.3**		µg/kg		20.0		116	70-130		
Di-isopropyl ether	**23.6**		µg/kg		20.0		118	70-130		
Tert-Butanol / butyl alcohol	**254**		µg/kg		200		127	70-130		
1,4-Dioxane	**234**		µg/kg		200		117	70-130		
trans-1,4-Dichloro-2-butene	**21.2**		µg/kg		20.0		106	70-130		
Ethanol	**476**		µg/kg		400		119	70-130		
Surrogate: 4-Bromofluorobenzene	*51.6*		µg/kg		*50.0*		*103*	*70-130*		
Surrogate: Toluene-d8	*52.4*		µg/kg		*50.0*		*105*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*53.0*		µg/kg		*50.0*		*106*	*70-130*		
Surrogate: Dibromofluoromethane	*54.7*		µg/kg		*50.0*		*109*	*70-130*		
LCS Dup (2001076-BSD1)					Prepared & Analyzed: 13-Jul-20					
1,1,2-Trichlorotrifluoroethane (Freon 113)	**26.3**	QC2	µg/kg		20.0		131	70-130	1	30
Acetone	**28.6**	QC2	µg/kg		20.0		143	70-130	16	30
Acrylonitrile	**24.0**		µg/kg		20.0		120	70-130	2	30
Benzene	**23.0**		µg/kg		20.0		115	70-130	1	30
Bromobenzene	**20.8**		µg/kg		20.0		104	70-130	0.3	30
Bromochloromethane	**24.4**		µg/kg		20.0		122	70-130	3	30
Bromodichloromethane	**23.2**		µg/kg		20.0		116	70-130	4	30
Bromoform	**22.5**		µg/kg		20.0		112	70-130	1	30
Bromomethane	**20.1**		µg/kg		20.0		101	70-130	2	30
2-Butanone (MEK)	**21.8**		µg/kg		20.0		109	70-130	19	30
n-Butylbenzene	**17.8**		µg/kg		20.0		89	70-130	3	30
sec-Butylbenzene	**16.6**		µg/kg		20.0		83	70-130	4	30
tert-Butylbenzene	**18.3**		µg/kg		20.0		92	70-130	2	30
Carbon disulfide	**25.7**		µg/kg		20.0		128	70-130	2	30
Carbon tetrachloride	**25.0**		µg/kg		20.0		125	70-130	4	30
Chlorobenzene	**21.4**		µg/kg		20.0		107	70-130	2	30
Chloroethane	**27.3**	QC2	µg/kg		20.0		137	70-130	7	30
Chloroform	**23.5**		µg/kg		20.0		118	70-130	0.9	30
Chloromethane	**27.5**	QC2	µg/kg		20.0		137	70-130	3	30
2-Chlorotoluene	**21.2**		µg/kg		20.0		106	70-130	2	30
4-Chlorotoluene	**22.1**		µg/kg		20.0		110	70-130	4	30
1,2-Dibromo-3-chloropropane	**22.2**		µg/kg		20.0		111	70-130	7	30
Dibromochloromethane	**24.3**		µg/kg		20.0		122	70-130	3	30
1,2-Dibromoethane (EDB)	**24.4**		µg/kg		20.0		122	70-130	1	30
Dibromomethane	**24.6**		µg/kg		20.0		123	70-130	0.1	30
1,2-Dichlorobenzene	**21.2**		µg/kg		20.0		106	70-130	4	30
1,3-Dichlorobenzene	**21.7**		µg/kg		20.0		108	70-130	3	30
1,4-Dichlorobenzene	**20.3**		µg/kg		20.0		101	70-130	3	30
Dichlorodifluoromethane (Freon12)	**29.9**	QC2	µg/kg		20.0		150	70-130	0.03	30
1,1-Dichloroethane	**25.0**		µg/kg		20.0		125	70-130	0.04	30
1,2-Dichloroethane	**23.7**		µg/kg		20.0		118	70-130	1	30
1,1-Dichloroethene	**24.1**		µg/kg		20.0		121	70-130	0.9	30
cis-1,2-Dichloroethene	**22.5**		µg/kg		20.0		113	70-130	0.2	30
trans-1,2-Dichloroethene	**24.3**		µg/kg		20.0		121	70-130	2	30
1,2-Dichloropropane	**22.4**		µg/kg		20.0		112	70-130	1	30
1,3-Dichloropropane	**22.5**		µg/kg		20.0		112	70-130	0.5	30

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 2001076 - SW846 5035A Soil (high level)										
LCS Dup (2001076-BSD1)					Prepared & Analyzed: 13-Jul-20					
2,2-Dichloropropane	**24.8**		µg/kg		20.0		124	70-130	2	30
1,1-Dichloropropene	**22.5**		µg/kg		20.0		113	70-130	3	30
cis-1,3-Dichloropropene	**22.9**		µg/kg		20.0		114	70-130	0.8	30
trans-1,3-Dichloropropene	**25.6**		µg/kg		20.0		128	70-130	0.04	30
Ethylbenzene	**20.8**		µg/kg		20.0		104	70-130	3	30
Hexachlorobutadiene	**16.6**		µg/kg		20.0		83	70-130	5	30
2-Hexanone (MBK)	**25.9**		µg/kg		20.0		130	70-130	14	30
Isopropylbenzene	**18.3**		µg/kg		20.0		92	70-130	4	30
4-Isopropyltoluene	**16.6**		µg/kg		20.0		83	70-130	3	30
Methyl tert-butyl ether	**23.0**		µg/kg		20.0		115	70-130	3	30
4-Methyl-2-pentanone (MIBK)	**24.5**		µg/kg		20.0		122	70-130	1	30
Methylene chloride	**22.9**		µg/kg		20.0		114	70-130	2	30
Naphthalene	**18.5**		µg/kg		20.0		92	70-130	14	30
n-Propylbenzene	**21.4**		µg/kg		20.0		107	70-130	3	30
Styrene	**18.7**		µg/kg		20.0		93	70-130	2	30
1,1,1,2-Tetrachloroethane	**22.4**		µg/kg		20.0		112	70-130	2	30
1,1,2,2-Tetrachloroethane	**21.8**		µg/kg		20.0		109	70-130	3	30
Tetrachloroethene	**23.2**		µg/kg		20.0		116	70-130	2	30
Toluene	**22.1**		µg/kg		20.0		111	70-130	2	30
1,2,3-Trichlorobenzene	**19.2**		µg/kg		20.0		96	70-130	4	30
1,2,4-Trichlorobenzene	**19.3**		µg/kg		20.0		96	70-130	4	30
1,3,5-Trichlorobenzene	**19.3**		µg/kg		20.0		97	70-130	3	30
1,1,1-Trichloroethane	**24.1**		µg/kg		20.0		121	70-130	0.7	30
1,1,2-Trichloroethane	**23.8**		µg/kg		20.0		119	70-130	0.6	30
Trichloroethene	**21.8**		µg/kg		20.0		109	70-130	0.1	30
Trichlorofluoromethane (Freon 11)	**27.6**	QC2	µg/kg		20.0		138	70-130	1	30
1,2,3-Trichloropropane	**22.6**		µg/kg		20.0		113	70-130	0.7	30
1,2,4-Trimethylbenzene	**18.8**		µg/kg		20.0		94	70-130	5	30
1,3,5-Trimethylbenzene	**18.5**		µg/kg		20.0		93	70-130	2	30
Vinyl chloride	**25.6**		µg/kg		20.0		128	70-130	4	30
m,p-Xylene	**45.2**		µg/kg		40.0		113	70-130	3	30
o-Xylene	**18.7**		µg/kg		20.0		93	70-130	5	30
Tetrahydrofuran	**23.4**		µg/kg		20.0		117	70-130	10	30
Ethyl ether	**22.7**		µg/kg		20.0		113	70-130	1	30
Tert-amyl methyl ether	**23.8**		µg/kg		20.0		119	70-130	0.8	30
Ethyl tert-butyl ether	**23.6**		µg/kg		20.0		118	70-130	1	30
Di-isopropyl ether	**24.2**		µg/kg		20.0		121	70-130	3	30
Tert-Butanol / butyl alcohol	**252**		µg/kg		200		126	70-130	1	30
1,4-Dioxane	**238**		µg/kg		200		119	70-130	2	30
trans-1,4-Dichloro-2-butene	**21.6**		µg/kg		20.0		108	70-130	2	30
Ethanol	**474**		µg/kg		400		119	70-130	0.4	30
Surrogate: 4-Bromofluorobenzene	*52.6*		µg/kg		*50.0*		*105*	*70-130*		
Surrogate: Toluene-d8	*51.9*		µg/kg		*50.0*		*104*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*51.8*		µg/kg		*50.0*		*104*	*70-130*		
Surrogate: Dibromofluoromethane	*54.1*		µg/kg		*50.0*		*108*	*70-130*		
Duplicate (2001076-DUP1)			**Source: SC58794-17**		Prepared & Analyzed: 13-Jul-20					
1,1,2-Trichlorotrifluoroethane (Freon 113)	< 69.5		µg/kg dry	69.5		BRL				30
Acetone	< 695		µg/kg dry	695		BRL				30
Acrylonitrile	< 69.5		µg/kg dry	69.5		BRL				30
Benzene	< 69.5		µg/kg dry	69.5		BRL				30

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 2001076 - SW846 5035A Soil (high level)										
Duplicate (2001076-DUP1)			**Source: SC58794-17**		Prepared & Analyzed: 13-Jul-20					
Bromobenzene	< 69.5		µg/kg dry	69.5		BRL				30
Bromochloromethane	< 69.5		µg/kg dry	69.5		BRL				30
Bromodichloromethane	< 69.5		µg/kg dry	69.5		BRL				30
Bromoform	< 69.5		µg/kg dry	69.5		BRL				30
Bromomethane	< 139		µg/kg dry	139		BRL				30
2-Butanone (MEK)	< 139		µg/kg dry	139		BRL				30
n-Butylbenzene	< 69.5		µg/kg dry	69.5		BRL				30
sec-Butylbenzene	< 69.5		µg/kg dry	69.5		BRL				30
tert-Butylbenzene	< 69.5		µg/kg dry	69.5		BRL				30
Carbon disulfide	< 139		µg/kg dry	139		BRL				30
Carbon tetrachloride	< 69.5		µg/kg dry	69.5		BRL				30
Chlorobenzene	< 69.5		µg/kg dry	69.5		BRL				30
Chloroethane	< 139		µg/kg dry	139		BRL				30
Chloroform	< 69.5		µg/kg dry	69.5		BRL				30
Chloromethane	< 139		µg/kg dry	139		BRL				30
2-Chlorotoluene	< 69.5		µg/kg dry	69.5		BRL				30
4-Chlorotoluene	< 69.5		µg/kg dry	69.5		BRL				30
1,2-Dibromo-3-chloropropane	< 139		µg/kg dry	139		BRL				30
Dibromochloromethane	< 69.5		µg/kg dry	69.5		BRL				30
1,2-Dibromoethane (EDB)	< 69.5		µg/kg dry	69.5		BRL				30
Dibromomethane	< 69.5		µg/kg dry	69.5		BRL				30
1,2-Dichlorobenzene	< 69.5		µg/kg dry	69.5		BRL				30
1,3-Dichlorobenzene	< 69.5		µg/kg dry	69.5		BRL				30
1,4-Dichlorobenzene	< 69.5		µg/kg dry	69.5		BRL				30
Dichlorodifluoromethane (Freon12)	< 139		µg/kg dry	139		BRL				30
1,1-Dichloroethane	< 69.5		µg/kg dry	69.5		BRL				30
1,2-Dichloroethane	< 69.5		µg/kg dry	69.5		BRL				30
1,1-Dichloroethene	< 69.5		µg/kg dry	69.5		BRL				30
cis-1,2-Dichloroethene	< 69.5		µg/kg dry	69.5		BRL				30
trans-1,2-Dichloroethene	< 69.5		µg/kg dry	69.5		BRL				30
1,2-Dichloropropane	< 69.5		µg/kg dry	69.5		BRL				30
1,3-Dichloropropane	< 69.5		µg/kg dry	69.5		BRL				30
2,2-Dichloropropane	< 69.5		µg/kg dry	69.5		BRL				30
1,1-Dichloropropene	< 69.5		µg/kg dry	69.5		BRL				30
cis-1,3-Dichloropropene	< 69.5		µg/kg dry	69.5		BRL				30
trans-1,3-Dichloropropene	< 69.5		µg/kg dry	69.5		BRL				30
Ethylbenzene	< 69.5		µg/kg dry	69.5		BRL				30
Hexachlorobutadiene	< 69.5		µg/kg dry	69.5		BRL				30
2-Hexanone (MBK)	< 139		µg/kg dry	139		BRL				30
Isopropylbenzene	< 69.5		µg/kg dry	69.5		BRL				30
4-Isopropyltoluene	< 69.5		µg/kg dry	69.5		BRL				30
Methyl tert-butyl ether	< 69.5		µg/kg dry	69.5		BRL				30
4-Methyl-2-pentanone (MIBK)	< 139		µg/kg dry	139		BRL				30
Methylene chloride	< 139		µg/kg dry	139		BRL				30
Naphthalene	< 69.5		µg/kg dry	69.5		BRL				30
n-Propylbenzene	< 69.5		µg/kg dry	69.5		BRL				30
Styrene	< 69.5		µg/kg dry	69.5		BRL				30
1,1,1,2-Tetrachloroethane	< 69.5		µg/kg dry	69.5		BRL				30
1,1,2,2-Tetrachloroethane	< 69.5		µg/kg dry	69.5		BRL				30
Tetrachloroethene	< 69.5		µg/kg dry	69.5		BRL				30

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 2001076 - SW846 5035A Soil (high level)										
Duplicate (2001076-DUP1)			**Source: SC58794-17**			Prepared & Analyzed: 13-Jul-20				
Toluene	< 69.5		µg/kg dry	69.5		BRL				30
1,2,3-Trichlorobenzene	< 69.5		µg/kg dry	69.5		BRL				30
1,2,4-Trichlorobenzene	< 69.5		µg/kg dry	69.5		BRL				30
1,3,5-Trichlorobenzene	< 69.5		µg/kg dry	69.5		BRL				30
1,1,1-Trichloroethane	< 69.5		µg/kg dry	69.5		BRL				30
1,1,2-Trichloroethane	< 69.5		µg/kg dry	69.5		BRL				30
Trichloroethene	< 69.5		µg/kg dry	69.5		BRL				30
Trichlorofluoromethane (Freon 11)	< 69.5		µg/kg dry	69.5		BRL				30
1,2,3-Trichloropropane	< 69.5		µg/kg dry	69.5		BRL				30
1,2,4-Trimethylbenzene	< 69.5		µg/kg dry	69.5		BRL				30
1,3,5-Trimethylbenzene	< 69.5		µg/kg dry	69.5		BRL				30
Vinyl chloride	< 69.5		µg/kg dry	69.5		BRL				30
m,p-Xylene	< 139		µg/kg dry	139		BRL				30
o-Xylene	< 69.5		µg/kg dry	69.5		BRL				30
Tetrahydrofuran	< 139		µg/kg dry	139		BRL				30
Ethyl ether	< 69.5		µg/kg dry	69.5		BRL				30
Tert-amyl methyl ether	< 69.5		µg/kg dry	69.5		BRL				30
Ethyl tert-butyl ether	< 69.5		µg/kg dry	69.5		BRL				30
Di-isopropyl ether	< 69.5		µg/kg dry	69.5		BRL				30
Tert-Butanol / butyl alcohol	< 1390		µg/kg dry	1390		BRL				30
1,4-Dioxane	< 1390		µg/kg dry	1390		BRL				30
trans-1,4-Dichloro-2-butene	< 347		µg/kg dry	347		BRL				30
Ethanol	< 13900		µg/kg dry	13900		BRL				30
Surrogate: 4-Bromofluorobenzene	*52.1*		µg/kg		*50.0*		*104*	*70-130*		
Surrogate: Toluene-d8	*53.8*		µg/kg		*50.0*		*108*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*53.9*		µg/kg		*50.0*		*108*	*70-130*		
Surrogate: Dibromofluoromethane	*52.9*		µg/kg		*50.0*		*106*	*70-130*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
Blank (2001083-BLK1)					Prepared & Analyzed: 13-Jul-20					
Acenaphthene	< 66.7		µg/kg wet	66.7						
Acenaphthylene	< 66.7		µg/kg wet	66.7						
Aniline	< 330		µg/kg wet	330						
Anthracene	< 66.7		µg/kg wet	66.7						
Azobenzene/Diphenyldiazene	< 330		µg/kg wet	330						
Benzidine	< 660		µg/kg wet	660						
Benzo (a) anthracene	< 66.7		µg/kg wet	66.7						
Benzo (a) pyrene	< 66.7		µg/kg wet	66.7						
Benzo (b) fluoranthene	< 66.7		µg/kg wet	66.7						
Benzo (g,h,i) perylene	< 66.7		µg/kg wet	66.7						
Benzo (k) fluoranthene	< 66.7		µg/kg wet	66.7						
Benzoic acid	< 330		µg/kg wet	330						
Benzyl alcohol	< 330		µg/kg wet	330						
Bis(2-chloroethoxy)methane	< 330		µg/kg wet	330						
Bis(2-chloroethyl)ether	< 167		µg/kg wet	167						
Bis(2-chloroisopropyl)ether	< 167		µg/kg wet	167						
Bis(2-ethylhexyl)phthalate	< 167		µg/kg wet	167						
4-Bromophenyl phenyl ether	< 330		µg/kg wet	330						
Butyl benzyl phthalate	< 330		µg/kg wet	330						
Carbazole	< 167		µg/kg wet	167						
4-Chloro-3-methylphenol	< 330		µg/kg wet	330						
4-Chloroaniline	< 167		µg/kg wet	167						
2-Chloronaphthalene	< 330		µg/kg wet	330						
2-Chlorophenol	< 167		µg/kg wet	167						
4-Chlorophenyl phenyl ether	< 330		µg/kg wet	330						
Chrysene	< 66.7		µg/kg wet	66.7						
Dibenzo (a,h) anthracene	< 66.7		µg/kg wet	66.7						
Dibenzofuran	< 167		µg/kg wet	167						
1,2-Dichlorobenzene	< 330		µg/kg wet	330						
1,3-Dichlorobenzene	< 330		µg/kg wet	330						
1,4-Dichlorobenzene	< 330		µg/kg wet	330						
3,3´-Dichlorobenzidine	< 330		µg/kg wet	330						
2,4-Dichlorophenol	< 167		µg/kg wet	167						
Diethyl phthalate	< 330		µg/kg wet	330						
Dimethyl phthalate	< 330		µg/kg wet	330						
2,4-Dimethylphenol	< 330		µg/kg wet	330						
Di-n-butyl phthalate	< 330		µg/kg wet	330						
4,6-Dinitro-2-methylphenol	< 330		µg/kg wet	330						
2,4-Dinitrophenol	< 330		µg/kg wet	330						
2,4-Dinitrotoluene	< 167		µg/kg wet	167						
2,6-Dinitrotoluene	< 167		µg/kg wet	167						
Di-n-octyl phthalate	< 330		µg/kg wet	330						
Fluoranthene	< 66.7		µg/kg wet	66.7						
Fluorene	< 66.7		µg/kg wet	66.7						
Hexachlorobenzene	< 167		µg/kg wet	167						
Hexachlorobutadiene	< 167		µg/kg wet	167						
Hexachlorocyclopentadiene	< 167		µg/kg wet	167						
Hexachloroethane	< 167		µg/kg wet	167						
Indeno (1,2,3-cd) pyrene	< 66.7		µg/kg wet	66.7						
Isophorone	< 167		µg/kg wet	167						

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
Blank (2001083-BLK1)					Prepared & Analyzed: 13-Jul-20					
2-Methylnaphthalene	< 66.7		µg/kg wet	66.7						
2-Methylphenol	< 330		µg/kg wet	330						
3 & 4-Methylphenol	< 330		µg/kg wet	330						
Naphthalene	< 66.7		µg/kg wet	66.7						
2-Nitroaniline	< 330		µg/kg wet	330						
3-Nitroaniline	< 330		µg/kg wet	330						
4-Nitroaniline	< 167		µg/kg wet	167						
Nitrobenzene	< 167		µg/kg wet	167						
2-Nitrophenol	< 167		µg/kg wet	167						
4-Nitrophenol	< 1320		µg/kg wet	1320						
N-Nitrosodimethylamine	< 167		µg/kg wet	167						
N-Nitrosodi-n-propylamine	< 167		µg/kg wet	167						
N-Nitrosodiphenylamine	< 330		µg/kg wet	330						
Pentachlorophenol	< 330		µg/kg wet	330						
Phenanthrene	< 66.7		µg/kg wet	66.7						
Phenol	< 330		µg/kg wet	330						
Pyrene	< 66.7		µg/kg wet	66.7						
Pyridine	< 330		µg/kg wet	330						
1,2,4-Trichlorobenzene	< 330		µg/kg wet	330						
1-Methylnaphthalene	< 66.7		µg/kg wet	66.7						
2,4,5-Trichlorophenol	< 330		µg/kg wet	330						
2,4,6-Trichlorophenol	< 167		µg/kg wet	167						
Pentachloronitrobenzene	< 330		µg/kg wet	330						
1,2,4,5-Tetrachlorobenzene	< 330		µg/kg wet	330						
Surrogate: 2-Fluorobiphenyl	*1570*		µg/kg wet		*1670*		*94*	*30-130*		
Surrogate: 2-Fluorophenol	*1520*		µg/kg wet		*1670*		*91*	*30-130*		
Surrogate: Nitrobenzene-d5	*1510*		µg/kg wet		*1670*		*90*	*30-130*		
Surrogate: Phenol-d5	*1760*		µg/kg wet		*1670*		*106*	*30-130*		
Surrogate: Terphenyl-dl4	*1580*		µg/kg wet		*1670*		*95*	*30-130*		
Surrogate: 2,4,6-Tribromophenol	*1450*		µg/kg wet		*1670*		*87*	*30-130*		
LCS (2001083-BS1)					Prepared & Analyzed: 13-Jul-20					
Acenaphthene	**1430**		µg/kg wet	66.7	1670		86	40-140		
Acenaphthylene	**1420**		µg/kg wet	66.7	1670		85	40-140		
Aniline	**775**		µg/kg wet	330	1670		47	40-140		
Anthracene	**1510**		µg/kg wet	66.7	1670		90	40-140		
Azobenzene/Diphenyldiazene	**1470**		µg/kg wet	330	1670		88	40-140		
Benzidine	**663**		µg/kg wet	660	1670		40	40-140		
Benzo (a) anthracene	**1660**		µg/kg wet	66.7	1670		99	40-140		
Benzo (a) pyrene	**1820**		µg/kg wet	66.7	1670		109	40-140		
Benzo (b) fluoranthene	**1710**		µg/kg wet	66.7	1670		103	40-140		
Benzo (g,h,i) perylene	**1710**		µg/kg wet	66.7	1670		102	40-140		
Benzo (k) fluoranthene	**1680**		µg/kg wet	66.7	1670		101	40-140		
Benzoic acid	**1650**		µg/kg wet	330	1670		99	30-130		
Benzyl alcohol	**1350**		µg/kg wet	330	1670		81	40-140		
Bis(2-chloroethoxy)methane	**1360**		µg/kg wet	330	1670		82	40-140		
Bis(2-chloroethyl)ether	**1060**		µg/kg wet	167	1670		63	40-140		
Bis(2-chloroisopropyl)ether	**904**		µg/kg wet	167	1670		54	40-140		
Bis(2-ethylhexyl)phthalate	**1650**		µg/kg wet	167	1670		99	40-140		
4-Bromophenyl phenyl ether	**1440**		µg/kg wet	330	1670		86	40-140		
Butyl benzyl phthalate	**1660**		µg/kg wet	330	1670		100	40-140		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
LCS (2001083-BS1)					Prepared & Analyzed: 13-Jul-20					
Carbazole	**1480**		µg/kg wet	167	1670		89	40-140		
4-Chloro-3-methylphenol	**1600**		µg/kg wet	330	1670		96	30-130		
4-Chloroaniline	**1020**		µg/kg wet	167	1670		61	40-140		
2-Chloronaphthalene	**1560**		µg/kg wet	330	1670		94	40-140		
2-Chlorophenol	**1240**		µg/kg wet	167	1670		75	30-130		
4-Chlorophenyl phenyl ether	**1250**		µg/kg wet	330	1670		75	40-140		
Chrysene	**1580**		µg/kg wet	66.7	1670		95	40-140		
Dibenzo (a,h) anthracene	**1760**		µg/kg wet	66.7	1670		106	40-140		
Dibenzofuran	**1840**		µg/kg wet	167	1670		111	40-140		
1,2-Dichlorobenzene	**1430**		µg/kg wet	330	1670		86	40-140		
1,3-Dichlorobenzene	**1310**		µg/kg wet	330	1670		78	40-140		
1,4-Dichlorobenzene	**1220**		µg/kg wet	330	1670		73	40-140		
3,3´-Dichlorobenzidine	**1720**		µg/kg wet	330	1670		103	40-140		
2,4-Dichlorophenol	**1310**		µg/kg wet	167	1670		79	30-130		
Diethyl phthalate	**1510**		µg/kg wet	330	1670		90	40-140		
Dimethyl phthalate	**1440**		µg/kg wet	330	1670		86	40-140		
2,4-Dimethylphenol	**1480**		µg/kg wet	330	1670		89	30-130		
Di-n-butyl phthalate	**1490**		µg/kg wet	330	1670		89	40-140		
4,6-Dinitro-2-methylphenol	**2110**		µg/kg wet	330	1670		126	30-130		
2,4-Dinitrophenol	**1990**		µg/kg wet	330	1670		120	30-130		
2,4-Dinitrotoluene	**1840**		µg/kg wet	167	1670		110	40-140		
2,6-Dinitrotoluene	**1260**		µg/kg wet	167	1670		76	40-140		
Di-n-octyl phthalate	**1710**		µg/kg wet	330	1670		103	40-140		
Fluoranthene	**1430**		µg/kg wet	66.7	1670		86	40-140		
Fluorene	**1130**		µg/kg wet	66.7	1670		68	40-140		
Hexachlorobenzene	**1590**		µg/kg wet	167	1670		96	40-140		
Hexachlorobutadiene	**1490**		µg/kg wet	167	1670		89	40-140		
Hexachlorocyclopentadiene	**1840**		µg/kg wet	167	1670		110	40-140		
Hexachloroethane	**1410**		µg/kg wet	167	1670		85	40-140		
Indeno (1,2,3-cd) pyrene	**1900**		µg/kg wet	66.7	1670		114	40-140		
Isophorone	**1240**		µg/kg wet	167	1670		75	40-140		
2-Methylnaphthalene	**1630**		µg/kg wet	66.7	1670		98	40-140		
2-Methylphenol	**1770**		µg/kg wet	330	1670		106	30-130		
3 & 4-Methylphenol	**1260**		µg/kg wet	330	1670		76	30-130		
Naphthalene	**1480**		µg/kg wet	66.7	1670		89	40-140		
2-Nitroaniline	**1290**		µg/kg wet	330	1670		77	40-140		
3-Nitroaniline	**1180**		µg/kg wet	330	1670		71	40-140		
4-Nitroaniline	**1390**		µg/kg wet	167	1670		84	40-140		
Nitrobenzene	**1430**		µg/kg wet	167	1670		86	40-140		
2-Nitrophenol	**1560**		µg/kg wet	167	1670		93	30-130		
4-Nitrophenol	**1730**		µg/kg wet	1320	1670		104	30-130		
N-Nitrosodimethylamine	**1020**		µg/kg wet	167	1670		61	40-140		
N-Nitrosodi-n-propylamine	**1120**		µg/kg wet	167	1670		67	40-140		
N-Nitrosodiphenylamine	**1400**		µg/kg wet	330	1670		84	40-140		
Pentachlorophenol	**1370**		µg/kg wet	330	1670		82	30-130		
Phenanthrene	**1450**		µg/kg wet	66.7	1670		87	40-140		
Phenol	**1360**		µg/kg wet	330	1670		81	30-130		
Pyrene	**1790**		µg/kg wet	66.7	1670		108	40-140		
Pyridine	**722**		µg/kg wet	330	1670		43	40-140		
1,2,4-Trichlorobenzene	**1600**		µg/kg wet	330	1670		96	40-140		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
LCS (2001083-BS1)					Prepared & Analyzed: 13-Jul-20					
1-Methylnaphthalene	**1610**		µg/kg wet	66.7	1670		96	40-140		
2,4,5-Trichlorophenol	**1340**		µg/kg wet	330	1670		80	30-130		
2,4,6-Trichlorophenol	**1450**		µg/kg wet	167	1670		87	30-130		
Pentachloronitrobenzene	**1460**		µg/kg wet	330	1670		88	40-140		
1,2,4,5-Tetrachlorobenzene	**1360**		µg/kg wet	330	1670		81	40-140		
Surrogate: 2-Fluorobiphenyl	*1570*		µg/kg wet		*1670*		*94*	*30-130*		
Surrogate: 2-Fluorophenol	*1240*		µg/kg wet		*1670*		*74*	*30-130*		
Surrogate: Nitrobenzene-d5	*1470*		µg/kg wet		*1670*		*88*	*30-130*		
Surrogate: Phenol-d5	*1360*		µg/kg wet		*1670*		*82*	*30-130*		
Surrogate: Terphenyl-dl4	*1750*		µg/kg wet		*1670*		*105*	*30-130*		
Surrogate: 2,4,6-Tribromophenol	*1820*		µg/kg wet		*1670*		*109*	*30-130*		
LCS Dup (2001083-BSD1)					Prepared & Analyzed: 13-Jul-20					
Acenaphthene	**1490**		µg/kg wet	66.7	1670		89	40-140	4	30
Acenaphthylene	**1460**		µg/kg wet	66.7	1670		87	40-140	2	30
Aniline	**785**		µg/kg wet	330	1670		47	40-140	1	30
Anthracene	**1510**		µg/kg wet	66.7	1670		91	40-140	0.5	30
Azobenzene/Diphenyldiazene	**1530**		µg/kg wet	330	1670		92	40-140	4	30
Benzidine	**829**		µg/kg wet	660	1670		50	40-140	22	30
Benzo (a) anthracene	**1710**		µg/kg wet	66.7	1670		102	40-140	3	30
Benzo (a) pyrene	**1830**		µg/kg wet	66.7	1670		110	40-140	0.5	30
Benzo (b) fluoranthene	**1700**		µg/kg wet	66.7	1670		102	40-140	0.5	30
Benzo (g,h,i) perylene	**1710**		µg/kg wet	66.7	1670		102	40-140	0.06	30
Benzo (k) fluoranthene	**1750**		µg/kg wet	66.7	1670		105	40-140	4	30
Benzoic acid	**1650**		µg/kg wet	330	1670		99	30-130	0.3	30
Benzyl alcohol	**1370**		µg/kg wet	330	1670		82	40-140	1	30
Bis(2-chloroethoxy)methane	**1430**		µg/kg wet	330	1670		86	40-140	5	30
Bis(2-chloroethyl)ether	**1090**		µg/kg wet	167	1670		66	40-140	3	30
Bis(2-chloroisopropyl)ether	**923**		µg/kg wet	167	1670		55	40-140	2	30
Bis(2-ethylhexyl)phthalate	**1830**		µg/kg wet	167	1670		110	40-140	10	30
4-Bromophenyl phenyl ether	**1450**		µg/kg wet	330	1670		87	40-140	0.9	30
Butyl benzyl phthalate	**1680**		µg/kg wet	330	1670		101	40-140	1	30
Carbazole	**1490**		µg/kg wet	167	1670		90	40-140	0.5	30
4-Chloro-3-methylphenol	**1600**		µg/kg wet	330	1670		96	30-130	0.02	30
4-Chloroaniline	**1040**		µg/kg wet	167	1670		62	40-140	1	30
2-Chloronaphthalene	**1610**		µg/kg wet	330	1670		97	40-140	3	30
2-Chlorophenol	**1270**		µg/kg wet	167	1670		76	30-130	2	30
4-Chlorophenyl phenyl ether	**1260**		µg/kg wet	330	1670		76	40-140	0.9	30
Chrysene	**1620**		µg/kg wet	66.7	1670		97	40-140	3	30
Dibenzo (a,h) anthracene	**1770**		µg/kg wet	66.7	1670		106	40-140	0.7	30
Dibenzofuran	**1890**		µg/kg wet	167	1670		113	40-140	2	30
1,2-Dichlorobenzene	**1510**		µg/kg wet	330	1670		91	40-140	5	30
1,3-Dichlorobenzene	**1320**		µg/kg wet	330	1670		79	40-140	1	30
1,4-Dichlorobenzene	**1230**		µg/kg wet	330	1670		74	40-140	0.9	30
3,3´-Dichlorobenzidine	**1790**		µg/kg wet	330	1670		107	40-140	4	30
2,4-Dichlorophenol	**1360**		µg/kg wet	167	1670		82	30-130	4	30
Diethyl phthalate	**1500**		µg/kg wet	330	1670		90	40-140	0.7	30
Dimethyl phthalate	**1400**		µg/kg wet	330	1670		84	40-140	3	30
2,4-Dimethylphenol	**1510**		µg/kg wet	330	1670		91	30-130	2	30
Di-n-butyl phthalate	**1500**		µg/kg wet	330	1670		90	40-140	0.8	30
4,6-Dinitro-2-methylphenol	**2100**		µg/kg wet	330	1670		126	30-130	0.08	30

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
LCS Dup (2001083-BSD1)					Prepared & Analyzed: 13-Jul-20					
2,4-Dinitrophenol	**2140**		µg/kg wet	330	1670		129	30-130	7	30
2,4-Dinitrotoluene	**1770**		µg/kg wet	167	1670		106	40-140	4	30
2,6-Dinitrotoluene	**1350**		µg/kg wet	167	1670		81	40-140	7	30
Di-n-octyl phthalate	**1730**		µg/kg wet	330	1670		104	40-140	0.9	30
Fluoranthene	**1460**		µg/kg wet	66.7	1670		88	40-140	2	30
Fluorene	**1170**		µg/kg wet	66.7	1670		70	40-140	3	30
Hexachlorobenzene	**1640**		µg/kg wet	167	1670		98	40-140	3	30
Hexachlorobutadiene	**1540**		µg/kg wet	167	1670		92	40-140	3	30
Hexachlorocyclopentadiene	**2270**		µg/kg wet	167	1670		136	40-140	21	30
Hexachloroethane	**1420**		µg/kg wet	167	1670		85	40-140	0.7	30
Indeno (1,2,3-cd) pyrene	**1910**		µg/kg wet	66.7	1670		114	40-140	0.4	30
Isophorone	**1260**		µg/kg wet	167	1670		76	40-140	1	30
2-Methylnaphthalene	**1680**		µg/kg wet	66.7	1670		101	40-140	3	30
2-Methylphenol	**1800**		µg/kg wet	330	1670		108	30-130	2	30
3 & 4-Methylphenol	**1230**		µg/kg wet	330	1670		74	30-130	2	30
Naphthalene	**1460**		µg/kg wet	66.7	1670		88	40-140	1	30
2-Nitroaniline	**1430**		µg/kg wet	330	1670		86	40-140	10	30
3-Nitroaniline	**1160**		µg/kg wet	330	1670		70	40-140	1	30
4-Nitroaniline	**1390**		µg/kg wet	167	1670		83	40-140	0.1	30
Nitrobenzene	**1520**		µg/kg wet	167	1670		91	40-140	6	30
2-Nitrophenol	**1640**		µg/kg wet	167	1670		98	30-130	5	30
4-Nitrophenol	**1810**		µg/kg wet	1320	1670		109	30-130	5	30
N-Nitrosodimethylamine	**739**	QC6	µg/kg wet	167	1670		44	40-140	32	30
N-Nitrosodi-n-propylamine	**1190**		µg/kg wet	167	1670		71	40-140	6	30
N-Nitrosodiphenylamine	**1370**		µg/kg wet	330	1670		82	40-140	3	30
Pentachlorophenol	**1320**		µg/kg wet	330	1670		79	30-130	4	30
Phenanthrene	**1490**		µg/kg wet	66.7	1670		90	40-140	3	30
Phenol	**1400**		µg/kg wet	330	1670		84	30-130	3	30
Pyrene	**1810**		µg/kg wet	66.7	1670		109	40-140	1	30
Pyridine	**1000**	QC6	µg/kg wet	330	1670		60	40-140	33	30
1,2,4-Trichlorobenzene	**1640**		µg/kg wet	330	1670		98	40-140	2	30
1-Methylnaphthalene	**1650**		µg/kg wet	66.7	1670		99	40-140	3	30
2,4,5-Trichlorophenol	**1290**		µg/kg wet	330	1670		78	30-130	4	30
2,4,6-Trichlorophenol	**1480**		µg/kg wet	167	1670		89	30-130	2	30
Pentachloronitrobenzene	**1350**		µg/kg wet	330	1670		81	40-140	8	30
1,2,4,5-Tetrachlorobenzene	**1410**		µg/kg wet	330	1670		85	40-140	4	30
Surrogate: 2-Fluorobiphenyl	*1590*		µg/kg wet		*1670*		*95*	*30-130*		
Surrogate: 2-Fluorophenol	*1220*		µg/kg wet		*1670*		*73*	*30-130*		
Surrogate: Nitrobenzene-d5	*1490*		µg/kg wet		*1670*		*89*	*30-130*		
Surrogate: Phenol-d5	*1400*		µg/kg wet		*1670*		*84*	*30-130*		
Surrogate: Terphenyl-dl4	*1750*		µg/kg wet		*1670*		*105*	*30-130*		
Surrogate: 2,4,6-Tribromophenol	*1840*		µg/kg wet		*1670*		*110*	*30-130*		
Duplicate (2001083-DUP1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Acenaphthene	< 74.4		µg/kg dry	74.4		BRL				30
Acenaphthylene	< 74.4		µg/kg dry	74.4		BRL				30
Aniline	< 368		µg/kg dry	368		BRL				30
Anthracene	< 74.4		µg/kg dry	74.4		BRL				30
Azobenzene/Diphenyldiazene	< 368		µg/kg dry	368		BRL				30
Benzidine	< 736		µg/kg dry	736		BRL				30
Benzo (a) anthracene	< 74.4		µg/kg dry	74.4		BRL				30

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
Duplicate (2001083-DUP1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Benzo (a) pyrene	< 74.4		µg/kg dry	74.4		BRL				30
Benzo (b) fluoranthene	< 74.4		µg/kg dry	74.4		BRL				30
Benzo (g,h,i) perylene	< 74.4		µg/kg dry	74.4		BRL				30
Benzo (k) fluoranthene	< 74.4		µg/kg dry	74.4		BRL				30
Benzoic acid	< 368		µg/kg dry	368		BRL				30
Benzyl alcohol	< 368		µg/kg dry	368		BRL				30
Bis(2-chloroethoxy)methane	< 368		µg/kg dry	368		BRL				30
Bis(2-chloroethyl)ether	< 186		µg/kg dry	186		BRL				30
Bis(2-chloroisopropyl)ether	< 186		µg/kg dry	186		BRL				30
Bis(2-ethylhexyl)phthalate	< 186		µg/kg dry	186		BRL				30
4-Bromophenyl phenyl ether	< 368		µg/kg dry	368		BRL				30
Butyl benzyl phthalate	< 368		µg/kg dry	368		BRL				30
Carbazole	< 186		µg/kg dry	186		BRL				30
4-Chloro-3-methylphenol	< 368		µg/kg dry	368		BRL				30
4-Chloroaniline	< 186		µg/kg dry	186		BRL				30
2-Chloronaphthalene	< 368		µg/kg dry	368		BRL				30
2-Chlorophenol	< 186		µg/kg dry	186		BRL				30
4-Chlorophenyl phenyl ether	< 368		µg/kg dry	368		BRL				30
Chrysene	< 74.4		µg/kg dry	74.4		BRL				30
Dibenzo (a,h) anthracene	< 74.4		µg/kg dry	74.4		BRL				30
Dibenzofuran	< 186		µg/kg dry	186		BRL				30
1,2-Dichlorobenzene	< 368		µg/kg dry	368		BRL				30
1,3-Dichlorobenzene	< 368		µg/kg dry	368		BRL				30
1,4-Dichlorobenzene	< 368		µg/kg dry	368		BRL				30
3,3´-Dichlorobenzidine	< 368		µg/kg dry	368		BRL				30
2,4-Dichlorophenol	< 186		µg/kg dry	186		BRL				30
Diethyl phthalate	< 368		µg/kg dry	368		BRL				30
Dimethyl phthalate	< 368		µg/kg dry	368		BRL				30
2,4-Dimethylphenol	< 368		µg/kg dry	368		BRL				30
Di-n-butyl phthalate	< 368		µg/kg dry	368		BRL				30
4,6-Dinitro-2-methylphenol	< 368		µg/kg dry	368		BRL				30
2,4-Dinitrophenol	< 368		µg/kg dry	368		BRL				30
2,4-Dinitrotoluene	< 186		µg/kg dry	186		BRL				30
2,6-Dinitrotoluene	< 186		µg/kg dry	186		BRL				30
Di-n-octyl phthalate	< 368		µg/kg dry	368		BRL				30
Fluoranthene	< 74.4		µg/kg dry	74.4		BRL				30
Fluorene	< 74.4		µg/kg dry	74.4		BRL				30
Hexachlorobenzene	< 186		µg/kg dry	186		BRL				30
Hexachlorobutadiene	< 186		µg/kg dry	186		BRL				30
Hexachlorocyclopentadiene	< 186		µg/kg dry	186		BRL				30
Hexachloroethane	< 186		µg/kg dry	186		BRL				30
Indeno (1,2,3-cd) pyrene	< 74.4		µg/kg dry	74.4		BRL				30
Isophorone	< 186		µg/kg dry	186		BRL				30
2-Methylnaphthalene	< 74.4		µg/kg dry	74.4		BRL				30
2-Methylphenol	< 368		µg/kg dry	368		BRL				30
3 & 4-Methylphenol	< 368		µg/kg dry	368		BRL				30
Naphthalene	< 74.4		µg/kg dry	74.4		BRL				30
2-Nitroaniline	< 368		µg/kg dry	368		BRL				30
3-Nitroaniline	< 368		µg/kg dry	368		BRL				30
4-Nitroaniline	< 186		µg/kg dry	186		BRL				30

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
Duplicate (2001083-DUP1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Nitrobenzene	< 186		µg/kg dry	186		BRL				30
2-Nitrophenol	< 186		µg/kg dry	186		BRL				30
4-Nitrophenol	< 1470		µg/kg dry	1470		BRL				30
N-Nitrosodimethylamine	< 186		µg/kg dry	186		BRL				30
N-Nitrosodi-n-propylamine	< 186		µg/kg dry	186		BRL				30
N-Nitrosodiphenylamine	< 368		µg/kg dry	368		BRL				30
Pentachlorophenol	< 368		µg/kg dry	368		BRL				30
Phenanthrene	< 74.4		µg/kg dry	74.4		BRL				30
Phenol	< 368		µg/kg dry	368		BRL				30
Pyrene	< 74.4		µg/kg dry	74.4		BRL				30
Pyridine	< 368		µg/kg dry	368		BRL				30
1,2,4-Trichlorobenzene	< 368		µg/kg dry	368		BRL				30
1-Methylnaphthalene	< 74.4		µg/kg dry	74.4		BRL				30
2,4,5-Trichlorophenol	< 368		µg/kg dry	368		BRL				30
2,4,6-Trichlorophenol	< 186		µg/kg dry	186		BRL				30
Pentachloronitrobenzene	< 368		µg/kg dry	368		BRL				30
1,2,4,5-Tetrachlorobenzene	< 368		µg/kg dry	368		BRL				30
Surrogate: 2-Fluorobiphenyl	*1710*		µg/kg dry		*1860*		*92*	*30-130*		
Surrogate: 2-Fluorophenol	*1620*		µg/kg dry		*1860*		*87*	*30-130*		
Surrogate: Nitrobenzene-d5	*1440*		µg/kg dry		*1860*		*78*	*30-130*		
Surrogate: Phenol-d5	*1830*		µg/kg dry		*1860*		*99*	*30-130*		
Surrogate: Terphenyl-dl4	*1660*		µg/kg dry		*1860*		*89*	*30-130*		
Surrogate: 2,4,6-Tribromophenol	*1610*		µg/kg dry		*1860*		*87*	*30-130*		
Matrix Spike (2001083-MS1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Acenaphthene	**1370**		µg/kg dry	74.5	1860	BRL	73	40-140		
Acenaphthylene	**1370**		µg/kg dry	74.5	1860	BRL	74	40-140		
Aniline	**690**	QM9	µg/kg dry	368	1860	BRL	37	40-140		
Anthracene	**1530**		µg/kg dry	74.5	1860	BRL	82	40-140		
Azobenzene/Diphenyldiazene	**1470**		µg/kg dry	368	1860	BRL	79	40-140		
Benzidine	**54.7**	QM9	µg/kg dry	737	1860	BRL	3	40-140		
Benzo (a) anthracene	**1690**		µg/kg dry	74.5	1860	BRL	91	40-140		
Benzo (a) pyrene	**1800**		µg/kg dry	74.5	1860	BRL	97	40-140		
Benzo (b) fluoranthene	**1890**		µg/kg dry	74.5	1860	BRL	102	40-140		
Benzo (g,h,i) perylene	**1710**		µg/kg dry	74.5	1860	BRL	92	40-140		
Benzo (k) fluoranthene	**1720**		µg/kg dry	74.5	1860	BRL	92	40-140		
Benzoic acid	**2730**	QM9	µg/kg dry	368	1860	BRL	147	30-130		
Benzyl alcohol	**1430**		µg/kg dry	368	1860	BRL	77	40-140		
Bis(2-chloroethoxy)methane	**1520**		µg/kg dry	368	1860	BRL	82	40-140		
Bis(2-chloroethyl)ether	**1200**		µg/kg dry	186	1860	BRL	64	40-140		
Bis(2-chloroisopropyl)ether	**975**		µg/kg dry	186	1860	BRL	52	40-140		
Bis(2-ethylhexyl)phthalate	**1660**		µg/kg dry	186	1860	BRL	89	40-140		
4-Bromophenyl phenyl ether	**1480**		µg/kg dry	368	1860	BRL	80	40-140		
Butyl benzyl phthalate	**1660**		µg/kg dry	368	1860	BRL	89	40-140		
Carbazole	**1500**		µg/kg dry	186	1860	BRL	81	40-140		
4-Chloro-3-methylphenol	**1720**		µg/kg dry	368	1860	BRL	92	30-130		
4-Chloroaniline	**929**		µg/kg dry	186	1860	BRL	50	40-140		
2-Chloronaphthalene	**1700**		µg/kg dry	368	1860	BRL	91	40-140		
2-Chlorophenol	**1370**		µg/kg dry	186	1860	BRL	74	30-130		
4-Chlorophenyl phenyl ether	**1250**		µg/kg dry	368	1860	BRL	67	40-140		
Chrysene	**1610**		µg/kg dry	74.5	1860	BRL	86	40-140		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
Matrix Spike (2001083-MS1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Dibenzo (a,h) anthracene	**1780**		µg/kg dry	74.5	1860	BRL	96	40-140		
Dibenzofuran	**1790**		µg/kg dry	186	1860	BRL	96	40-140		
1,2-Dichlorobenzene	**1640**		µg/kg dry	368	1860	BRL	88	40-140		
1,3-Dichlorobenzene	**1430**		µg/kg dry	368	1860	BRL	77	40-140		
1,4-Dichlorobenzene	**1310**		µg/kg dry	368	1860	BRL	71	40-140		
3,3´-Dichlorobenzidine	**918**		µg/kg dry	368	1860	BRL	49	40-140		
2,4-Dichlorophenol	**1430**		µg/kg dry	186	1860	BRL	77	30-130		
Diethyl phthalate	**1400**		µg/kg dry	368	1860	BRL	75	40-140		
Dimethyl phthalate	**1580**		µg/kg dry	368	1860	BRL	85	40-140		
2,4-Dimethylphenol	**1360**		µg/kg dry	368	1860	BRL	73	30-130		
Di-n-butyl phthalate	**1520**		µg/kg dry	368	1860	BRL	82	40-140		
4,6-Dinitro-2-methylphenol	**2410**		µg/kg dry	368	1860	BRL	130	30-130		
2,4-Dinitrophenol	**2510**	QM9	µg/kg dry	368	1860	BRL	135	30-130		
2,4-Dinitrotoluene	**1650**		µg/kg dry	186	1860	BRL	89	40-140		
2,6-Dinitrotoluene	**1420**		µg/kg dry	186	1860	BRL	77	40-140		
Di-n-octyl phthalate	**1750**		µg/kg dry	368	1860	BRL	94	40-140		
Fluoranthene	**1480**		µg/kg dry	74.5	1860	BRL	80	40-140		
Fluorene	**1180**		µg/kg dry	74.5	1860	BRL	64	40-140		
Hexachlorobenzene	**1650**		µg/kg dry	186	1860	BRL	89	40-140		
Hexachlorobutadiene	**1610**		µg/kg dry	186	1860	BRL	86	40-140		
Hexachlorocyclopentadiene	**1810**		µg/kg dry	186	1860	BRL	98	40-140		
Hexachloroethane	**1490**		µg/kg dry	186	1860	BRL	80	40-140		
Indeno (1,2,3-cd) pyrene	**1830**		µg/kg dry	74.5	1860	BRL	98	40-140		
Isophorone	**1400**		µg/kg dry	186	1860	BRL	75	30-130		
2-Methylnaphthalene	**1750**		µg/kg dry	74.5	1860	BRL	94	40-140		
2-Methylphenol	**1890**		µg/kg dry	368	1860	BRL	102	30-130		
3 & 4-Methylphenol	**1350**		µg/kg dry	368	1860	BRL	72	30-130		
Naphthalene	**1570**		µg/kg dry	74.5	1860	BRL	84	40-140		
2-Nitroaniline	**1430**		µg/kg dry	368	1860	BRL	77	40-140		
3-Nitroaniline	**1020**		µg/kg dry	368	1860	BRL	55	40-140		
4-Nitroaniline	**1410**		µg/kg dry	186	1860	BRL	76	40-140		
Nitrobenzene	**1620**		µg/kg dry	186	1860	BRL	87	40-140		
2-Nitrophenol	**1620**		µg/kg dry	186	1860	BRL	87	30-130		
4-Nitrophenol	**1850**		µg/kg dry	1470	1860	BRL	100	30-130		
N-Nitrosodimethylamine	**894**		µg/kg dry	186	1860	BRL	48	40-140		
N-Nitrosodi-n-propylamine	**1250**		µg/kg dry	186	1860	BRL	67	40-140		
N-Nitrosodiphenylamine	**1570**		µg/kg dry	368	1860	BRL	85	40-140		
Pentachlorophenol	**1600**		µg/kg dry	368	1860	BRL	86	30-130		
Phenanthrene	**1510**		µg/kg dry	74.5	1860	BRL	81	40-140		
Phenol	**1460**		µg/kg dry	368	1860	BRL	79	30-130		
Pyrene	**1820**		µg/kg dry	74.5	1860	BRL	98	40-140		
Pyridine	**1180**		µg/kg dry	368	1860	BRL	64	40-140		
1,2,4-Trichlorobenzene	**1710**		µg/kg dry	368	1860	BRL	92	40-140		
1-Methylnaphthalene	**1720**		µg/kg dry	74.5	1860	BRL	93	40-140		
2,4,5-Trichlorophenol	**1440**		µg/kg dry	368	1860	BRL	77	30-130		
2,4,6-Trichlorophenol	**1540**		µg/kg dry	186	1860	BRL	83	30-130		
Pentachloronitrobenzene	**1490**		µg/kg dry	368	1860	BRL	80	40-140		
1,2,4,5-Tetrachlorobenzene	**1450**		µg/kg dry	368	1860	BRL	78	40-140		
Surrogate: 2-Fluorobiphenyl	*1650*		µg/kg dry		*1860*		*89*	*30-130*		
Surrogate: 2-Fluorophenol	*1300*		µg/kg dry		*1860*		*70*	*30-130*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
Matrix Spike (2001083-MS1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Surrogate: Nitrobenzene-d5	*1550*		µg/kg dry		*1860*		*83*	*30-130*		
Surrogate: Phenol-d5	*1470*		µg/kg dry		*1860*		*79*	*30-130*		
Surrogate: Terphenyl-dl4	*1730*		µg/kg dry		*1860*		*93*	*30-130*		
Surrogate: 2,4,6-Tribromophenol	*1600*		µg/kg dry		*1860*		*86*	*30-130*		
Matrix Spike Dup (2001083-MSD1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Acenaphthene	**1380**		µg/kg dry	74.2	1850	BRL	75	40-140	1	30
Acenaphthylene	**1400**		µg/kg dry	74.2	1850	BRL	75	40-140	2	30
Aniline	**600**	QM9	µg/kg dry	367	1850	BRL	32	40-140	14	30
Anthracene	**1480**		µg/kg dry	74.2	1850	BRL	80	40-140	3	30
Azobenzene/Diphenyldiazene	**1460**		µg/kg dry	367	1850	BRL	79	40-140	0.8	30
Benzidine	**54.9**	QM9	µg/kg dry	734	1850	BRL	3	40-140	0.3	30
Benzo (a) anthracene	**1630**		µg/kg dry	74.2	1850	BRL	88	40-140	3	30
Benzo (a) pyrene	**1790**		µg/kg dry	74.2	1850	BRL	97	40-140	0.3	30
Benzo (b) fluoranthene	**1810**		µg/kg dry	74.2	1850	BRL	98	40-140	4	30
Benzo (g,h,i) perylene	**1690**		µg/kg dry	74.2	1850	BRL	91	40-140	1	30
Benzo (k) fluoranthene	**1760**		µg/kg dry	74.2	1850	BRL	95	40-140	2	30
Benzoic acid	**2650**		µg/kg dry	367	1850	BRL	143	30-130	3	30
Benzyl alcohol	**1360**		µg/kg dry	367	1850	BRL	73	40-140	5	30
Bis(2-chloroethoxy)methane	**1420**		µg/kg dry	367	1850	BRL	77	40-140	7	30
Bis(2-chloroethyl)ether	**1100**		µg/kg dry	186	1850	BRL	59	40-140	8	30
Bis(2-chloroisopropyl)ether	**957**		µg/kg dry	186	1850	BRL	52	40-140	2	30
Bis(2-ethylhexyl)phthalate	**1750**		µg/kg dry	186	1850	BRL	94	40-140	5	30
4-Bromophenyl phenyl ether	**1410**		µg/kg dry	367	1850	BRL	76	40-140	5	30
Butyl benzyl phthalate	**1610**		µg/kg dry	367	1850	BRL	87	40-140	3	30
Carbazole	**1460**		µg/kg dry	186	1850	BRL	79	40-140	3	30
4-Chloro-3-methylphenol	**1620**		µg/kg dry	367	1850	BRL	87	30-130	6	30
4-Chloroaniline	**1010**		µg/kg dry	186	1850	BRL	55	40-140	9	30
2-Chloronaphthalene	**1630**		µg/kg dry	367	1850	BRL	88	40-140	4	30
2-Chlorophenol	**1330**		µg/kg dry	186	1850	BRL	72	30-130	3	30
4-Chlorophenyl phenyl ether	**1240**		µg/kg dry	367	1850	BRL	67	40-140	1	30
Chrysene	**1540**		µg/kg dry	74.2	1850	BRL	83	40-140	4	30
Dibenzo (a,h) anthracene	**1750**		µg/kg dry	74.2	1850	BRL	95	40-140	1	30
Dibenzofuran	**1710**		µg/kg dry	186	1850	BRL	92	40-140	5	30
1,2-Dichlorobenzene	**1470**		µg/kg dry	367	1850	BRL	79	40-140	11	30
1,3-Dichlorobenzene	**1390**		µg/kg dry	367	1850	BRL	75	40-140	3	30
1,4-Dichlorobenzene	**1280**		µg/kg dry	367	1850	BRL	69	40-140	3	30
3,3´-Dichlorobenzidine	**826**		µg/kg dry	367	1850	BRL	45	40-140	11	30
2,4-Dichlorophenol	**1350**		µg/kg dry	186	1850	BRL	73	30-130	6	30
Diethyl phthalate	**1320**		µg/kg dry	367	1850	BRL	71	40-140	6	30
Dimethyl phthalate	**1500**		µg/kg dry	367	1850	BRL	81	40-140	6	30
2,4-Dimethylphenol	**1200**		µg/kg dry	367	1850	BRL	65	30-130	13	30
Di-n-butyl phthalate	**1450**		µg/kg dry	367	1850	BRL	78	40-140	5	30
4,6-Dinitro-2-methylphenol	**2190**		µg/kg dry	367	1850	BRL	118	30-130	9	30
2,4-Dinitrophenol	**2290**		µg/kg dry	367	1850	BRL	123	30-130	9	30
2,4-Dinitrotoluene	**1550**		µg/kg dry	186	1850	BRL	83	40-140	6	30
2,6-Dinitrotoluene	**1380**		µg/kg dry	186	1850	BRL	74	40-140	3	30
Di-n-octyl phthalate	**1730**		µg/kg dry	367	1850	BRL	93	40-140	1	30
Fluoranthene	**1420**		µg/kg dry	74.2	1850	BRL	77	40-140	4	30
Fluorene	**1140**		µg/kg dry	74.2	1850	BRL	61	40-140	4	30
Hexachlorobenzene	**1560**		µg/kg dry	186	1850	BRL	84	40-140	5	30

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
Matrix Spike Dup (2001083-MSD1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Hexachlorobutadiene	**1540**		µg/kg dry	186	1850	BRL	83	40-140	4	30
Hexachlorocyclopentadiene	**1620**		µg/kg dry	186	1850	BRL	88	40-140	11	30
Hexachloroethane	**1430**		µg/kg dry	186	1850	BRL	77	40-140	4	30
Indeno (1,2,3-cd) pyrene	**1810**		µg/kg dry	74.2	1850	BRL	98	40-140	0.7	30
Isophorone	**1320**		µg/kg dry	186	1850	BRL	71	30-130	6	30
2-Methylnaphthalene	**1690**		µg/kg dry	74.2	1850	BRL	91	40-140	3	30
2-Methylphenol	**1790**		µg/kg dry	367	1850	BRL	97	30-130	5	30
3 & 4-Methylphenol	**1260**		µg/kg dry	367	1850	BRL	68	30-130	7	30
Naphthalene	**1520**		µg/kg dry	74.2	1850	BRL	82	40-140	3	30
2-Nitroaniline	**1450**		µg/kg dry	367	1850	BRL	78	40-140	1	30
3-Nitroaniline	**1190**		µg/kg dry	367	1850	BRL	64	40-140	15	30
4-Nitroaniline	**1380**		µg/kg dry	186	1850	BRL	74	40-140	2	30
Nitrobenzene	**1520**		µg/kg dry	186	1850	BRL	82	40-140	6	30
2-Nitrophenol	**1600**		µg/kg dry	186	1850	BRL	86	30-130	1	30
4-Nitrophenol	**1840**		µg/kg dry	1470	1850	BRL	99	30-130	0.5	30
N-Nitrosodimethylamine	**825**		µg/kg dry	186	1850	BRL	44	40-140	8	30
N-Nitrosodi-n-propylamine	**1200**		µg/kg dry	186	1850	BRL	65	40-140	4	30
N-Nitrosodiphenylamine	**1420**		µg/kg dry	367	1850	BRL	77	40-140	10	30
Pentachlorophenol	**1490**		µg/kg dry	367	1850	BRL	81	30-130	7	30
Phenanthrene	**1420**		µg/kg dry	74.2	1850	BRL	77	40-140	6	30
Phenol	**1400**		µg/kg dry	367	1850	BRL	75	30-130	5	30
Pyrene	**1720**		µg/kg dry	74.2	1850	BRL	93	40-140	5	30
Pyridine	**910**		µg/kg dry	367	1850	BRL	49	40-140	26	30
1,2,4-Trichlorobenzene	**1650**		µg/kg dry	367	1850	BRL	89	40-140	4	30
1-Methylnaphthalene	**1700**		µg/kg dry	74.2	1850	BRL	91	40-140	2	30
2,4,5-Trichlorophenol	**1450**		µg/kg dry	367	1850	BRL	78	30-130	0.8	30
2,4,6-Trichlorophenol	**1470**		µg/kg dry	186	1850	BRL	79	30-130	5	30
Pentachloronitrobenzene	**1430**		µg/kg dry	367	1850	BRL	77	40-140	4	30
1,2,4,5-Tetrachlorobenzene	**1370**		µg/kg dry	367	1850	BRL	74	40-140	5	30
Surrogate: 2-Fluorobiphenyl	*1620*		µg/kg dry		*1850*		*87*	*30-130*		
Surrogate: 2-Fluorophenol	*1270*		µg/kg dry		*1850*		*69*	*30-130*		
Surrogate: Nitrobenzene-d5	*1540*		µg/kg dry		*1850*		*83*	*30-130*		
Surrogate: Phenol-d5	*1440*		µg/kg dry		*1850*		*78*	*30-130*		
Surrogate: Terphenyl-dl4	*1710*		µg/kg dry		*1850*		*92*	*30-130*		
Surrogate: 2,4,6-Tribromophenol	*1610*		µg/kg dry		*1850*		*87*	*30-130*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8082A										
Batch 2001087 - SW846 3546										
Blank (2001087-BLK1)					Prepared: 13-Jul-20 Analyzed: 15-Jul-20					
Aroclor-1016	< 20.0		µg/kg wet	20.0						
Aroclor-1016 [2C]	< 20.0		µg/kg wet	20.0						
Aroclor-1221	< 20.0		µg/kg wet	20.0						
Aroclor-1221 [2C]	< 20.0		µg/kg wet	20.0						
Aroclor-1232	< 20.0		µg/kg wet	20.0						
Aroclor-1232 [2C]	< 20.0		µg/kg wet	20.0						
Aroclor-1242	< 20.0		µg/kg wet	20.0						
Aroclor-1242 [2C]	< 20.0		µg/kg wet	20.0						
Aroclor-1248	< 20.0		µg/kg wet	20.0						
Aroclor-1248 [2C]	< 20.0		µg/kg wet	20.0						
Aroclor-1254	< 20.0		µg/kg wet	20.0						
Aroclor-1254 [2C]	< 20.0		µg/kg wet	20.0						
Aroclor-1260	< 20.0		µg/kg wet	20.0						
Aroclor-1260 [2C]	< 20.0		µg/kg wet	20.0						
Aroclor-1262	< 20.0		µg/kg wet	20.0						
Aroclor-1262 [2C]	< 20.0		µg/kg wet	20.0						
Aroclor-1268	< 20.0		µg/kg wet	20.0						
Aroclor-1268 [2C]	< 20.0		µg/kg wet	20.0						
Surrogate: Decachlorobiphenyl (Sr)	*14.0*		µg/kg wet		*13.3*		*105*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*12.4*		µg/kg wet		*13.3*		*93*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*12.6*		µg/kg wet		*13.3*		*94*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*11.0*		µg/kg wet		*13.3*		*82*	*30-150*		
LCS (2001087-BS1)					Prepared: 13-Jul-20 Analyzed: 15-Jul-20					
Aroclor-1016	**146**		µg/kg wet	20.0	167		88	40-140		
Aroclor-1016 [2C]	**143**		µg/kg wet	20.0	167		86	40-140		
Aroclor-1260	**151**		µg/kg wet	20.0	167		91	40-140		
Aroclor-1260 [2C]	**139**		µg/kg wet	20.0	167		83	40-140		
Surrogate: Decachlorobiphenyl (Sr)	*13.2*		µg/kg wet		*13.3*		*99*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*12.3*		µg/kg wet		*13.3*		*92*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*12.3*		µg/kg wet		*13.3*		*92*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*11.4*		µg/kg wet		*13.3*		*85*	*30-150*		
LCS Dup (2001087-BSD1)					Prepared: 13-Jul-20 Analyzed: 15-Jul-20					
Aroclor-1016	**156**		µg/kg wet	20.0	167		94	40-140	6	30
Aroclor-1016 [2C]	**153**		µg/kg wet	20.0	167		92	40-140	7	30
Aroclor-1260	**157**		µg/kg wet	20.0	167		94	40-140	3	30
Aroclor-1260 [2C]	**150**		µg/kg wet	20.0	167		90	40-140	8	30
Surrogate: Decachlorobiphenyl (Sr)	*12.8*		µg/kg wet		*13.3*		*96*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*12.1*		µg/kg wet		*13.3*		*91*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*12.2*		µg/kg wet		*13.3*		*91*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*11.1*		µg/kg wet		*13.3*		*83*	*30-150*		
Duplicate (2001087-DUP1)			**Source: SC58794-02**		Prepared: 13-Jul-20 Analyzed: 15-Jul-20					
Aroclor-1016	< 22.2		µg/kg dry	22.2		BRL				30
Aroclor-1016 [2C]	< 22.2		µg/kg dry	22.2		BRL				30
Aroclor-1260	< 22.2		µg/kg dry	22.2		BRL				30
Aroclor-1260 [2C]	< 22.2		µg/kg dry	22.2		BRL				30
Surrogate: Decachlorobiphenyl (Sr)	*11.4*		µg/kg dry		*14.8*		*77*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*10.4*		µg/kg dry		*14.8*		*70*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*12.6*		µg/kg dry		*14.8*		*85*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*11.0*		µg/kg dry		*14.8*		*74*	*30-150*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8082A										
Batch 2001087 - SW846 3546										
Matrix Spike (2001087-MS1)			**Source: SC58794-02**		Prepared: 13-Jul-20 Analyzed: 15-Jul-20					
Aroclor-1016	**156**		µg/kg dry	22.4	187	BRL	84	40-140		
Aroclor-1016 [2C]	**160**		µg/kg dry	22.4	187	BRL	86	40-140		
Aroclor-1260	**164**		µg/kg dry	22.4	187	BRL	88	40-140		
Aroclor-1260 [2C]	**155**		µg/kg dry	22.4	187	BRL	83	40-140		
Surrogate: Decachlorobiphenyl (Sr)	*13.3*		µg/kg dry		*14.9*		*89*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*13.0*		µg/kg dry		*14.9*		*87*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*12.0*		µg/kg dry		*14.9*		*81*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*11.6*		µg/kg dry		*14.9*		*78*	*30-150*		
Matrix Spike Dup (2001087-MSD1)			**Source: SC58794-02**		Prepared: 13-Jul-20 Analyzed: 15-Jul-20					
Aroclor-1016	**148**		µg/kg dry	21.3	178	BRL	83	40-140	6	30
Aroclor-1016 [2C]	**146**		µg/kg dry	21.3	178	BRL	82	40-140	9	30
Aroclor-1260	**157**		µg/kg dry	21.3	178	BRL	89	40-140	4	30
Aroclor-1260 [2C]	**148**		µg/kg dry	21.3	178	BRL	83	40-140	4	30
Surrogate: Decachlorobiphenyl (Sr)	*12.6*		µg/kg dry		*14.2*		*89*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*12.3*		µg/kg dry		*14.2*		*87*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*12.2*		µg/kg dry		*14.2*		*86*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*11.6*		µg/kg dry		*14.2*		*81*	*30-150*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8081B										
Batch 2001088 - SW846 3546										
Blank (2001088-BLK1)					Prepared: 13-Jul-20 Analyzed: 16-Jul-20					
alpha-BHC	< 5.00		µg/kg wet	5.00						
alpha-BHC [2C]	< 5.00		µg/kg wet	5.00						
beta-BHC	< 5.00		µg/kg wet	5.00						
beta-BHC [2C]	< 5.00		µg/kg wet	5.00						
delta-BHC	< 5.00		µg/kg wet	5.00						
delta-BHC [2C]	< 5.00		µg/kg wet	5.00						
gamma-BHC (Lindane)	< 3.00		µg/kg wet	3.00						
gamma-BHC (Lindane) [2C]	< 3.00		µg/kg wet	3.00						
Heptachlor	< 5.00		µg/kg wet	5.00						
Heptachlor [2C]	< 5.00		µg/kg wet	5.00						
Aldrin	< 5.00		µg/kg wet	5.00						
Aldrin [2C]	< 5.00		µg/kg wet	5.00						
Heptachlor epoxide	< 5.00		µg/kg wet	5.00						
Heptachlor epoxide [2C]	< 5.00		µg/kg wet	5.00						
Endosulfan I	< 5.00		µg/kg wet	5.00						
Endosulfan I [2C]	< 5.00		µg/kg wet	5.00						
Dieldrin	< 5.00		µg/kg wet	5.00						
Dieldrin [2C]	< 5.00		µg/kg wet	5.00						
4,4'-DDE (p,p')	< 5.00		µg/kg wet	5.00						
4,4'-DDE (p,p') [2C]	< 5.00		µg/kg wet	5.00						
Endrin	< 8.00		µg/kg wet	8.00						
Endrin [2C]	< 8.00		µg/kg wet	8.00						
Endosulfan II	< 8.00		µg/kg wet	8.00						
Endosulfan II [2C]	< 8.00		µg/kg wet	8.00						
4,4'-DDD (p,p')	< 8.00		µg/kg wet	8.00						
4,4'-DDD (p,p') [2C]	< 8.00		µg/kg wet	8.00						
Endosulfan sulfate	< 8.00		µg/kg wet	8.00						
Endosulfan sulfate [2C]	< 8.00		µg/kg wet	8.00						
4,4'-DDT (p,p')	< 8.00		µg/kg wet	8.00						
4,4'-DDT (p,p') [2C]	< 8.00		µg/kg wet	8.00						
Methoxychlor	< 8.00		µg/kg wet	8.00						
Methoxychlor [2C]	< 8.00		µg/kg wet	8.00						
Endrin ketone	< 8.00		µg/kg wet	8.00						
Endrin ketone [2C]	< 8.00		µg/kg wet	8.00						
Endrin aldehyde	< 8.00		µg/kg wet	8.00						
Endrin aldehyde [2C]	< 8.00		µg/kg wet	8.00						
alpha-Chlordane	< 5.00		µg/kg wet	5.00						
alpha-Chlordane [2C]	< 5.00		µg/kg wet	5.00						
gamma-Chlordane	< 5.00		µg/kg wet	5.00						
gamma-Chlordane [2C]	< 5.00		µg/kg wet	5.00						
Toxaphene	< 100		µg/kg wet	100						
Toxaphene [2C]	< 100		µg/kg wet	100						
Chlordane	< 20.0		µg/kg wet	20.0						
Chlordane [2C]	< 20.0		µg/kg wet	20.0						
Alachlor	< 5.00		µg/kg wet	5.00						
Alachlor [2C]	< 5.00		µg/kg wet	5.00						
Surrogate: Decachlorobiphenyl (Sr)	*10.8*		µg/kg wet		*13.3*		*81*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*11.9*		µg/kg wet		*13.3*		*89*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*10.2*		µg/kg wet		*13.3*		*77*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*9.93*		µg/kg wet		*13.3*		*74*	*30-150*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8081B										
Batch 2001088 - SW846 3546										
LCS (2001088-BS1)					Prepared: 13-Jul-20 Analyzed: 16-Jul-20					
alpha-BHC	**12.1**		µg/kg wet	5.00	13.3		90	40-140		
alpha-BHC [2C]	**12.5**		µg/kg wet	5.00	13.3		94	40-140		
beta-BHC	**12.4**		µg/kg wet	5.00	13.3		93	40-140		
beta-BHC [2C]	**13.9**		µg/kg wet	5.00	13.3		104	40-140		
delta-BHC	**8.43**		µg/kg wet	5.00	13.3		63	40-140		
delta-BHC [2C]	**8.82**		µg/kg wet	5.00	13.3		66	40-140		
gamma-BHC (Lindane)	**12.8**		µg/kg wet	3.00	13.3		96	40-140		
gamma-BHC (Lindane) [2C]	**12.7**		µg/kg wet	3.00	13.3		95	40-140		
Heptachlor	**12.2**		µg/kg wet	5.00	13.3		92	40-140		
Heptachlor [2C]	**13.0**		µg/kg wet	5.00	13.3		97	40-140		
Aldrin	**11.7**		µg/kg wet	5.00	13.3		88	40-140		
Aldrin [2C]	**12.1**		µg/kg wet	5.00	13.3		91	40-140		
Heptachlor epoxide	**11.7**		µg/kg wet	5.00	13.3		88	40-140		
Heptachlor epoxide [2C]	**12.3**		µg/kg wet	5.00	13.3		93	40-140		
Endosulfan I	**12.5**		µg/kg wet	5.00	13.3		94	40-140		
Endosulfan I [2C]	**13.2**		µg/kg wet	5.00	13.3		99	40-140		
Dieldrin	**12.0**		µg/kg wet	5.00	13.3		90	40-140		
Dieldrin [2C]	**13.2**		µg/kg wet	5.00	13.3		99	40-140		
4,4'-DDE (p,p')	**12.1**		µg/kg wet	5.00	13.3		91	40-140		
4,4'-DDE (p,p') [2C]	**13.1**		µg/kg wet	5.00	13.3		98	40-140		
Endrin	**15.1**		µg/kg wet	8.00	13.3		113	40-140		
Endrin [2C]	**16.1**		µg/kg wet	8.00	13.3		121	40-140		
Endosulfan II	**12.6**		µg/kg wet	8.00	13.3		95	40-140		
Endosulfan II [2C]	**14.1**		µg/kg wet	8.00	13.3		106	40-140		
4,4'-DDD (p,p')	**12.6**		µg/kg wet	8.00	13.3		95	40-140		
4,4'-DDD (p,p') [2C]	**13.7**		µg/kg wet	8.00	13.3		103	40-140		
Endosulfan sulfate	**12.9**		µg/kg wet	8.00	13.3		97	40-140		
Endosulfan sulfate [2C]	**14.3**		µg/kg wet	8.00	13.3		107	40-140		
4,4'-DDT (p,p')	**14.0**		µg/kg wet	8.00	13.3		105	40-140		
4,4'-DDT (p,p') [2C]	**14.4**		µg/kg wet	8.00	13.3		108	40-140		
Methoxychlor	**14.0**		µg/kg wet	8.00	13.3		105	40-140		
Methoxychlor [2C]	**14.1**		µg/kg wet	8.00	13.3		106	40-140		
Endrin ketone	**12.6**		µg/kg wet	8.00	13.3		94	40-140		
Endrin ketone [2C]	**14.0**		µg/kg wet	8.00	13.3		105	40-140		
Endrin aldehyde	**11.9**		µg/kg wet	8.00	13.3		89	40-140		
Endrin aldehyde [2C]	**14.0**		µg/kg wet	8.00	13.3		105	40-140		
alpha-Chlordane	**11.9**		µg/kg wet	5.00	13.3		89	40-140		
alpha-Chlordane [2C]	**13.2**		µg/kg wet	5.00	13.3		99	40-140		
gamma-Chlordane	**13.7**		µg/kg wet	5.00	13.3		103	40-140		
gamma-Chlordane [2C]	**13.5**		µg/kg wet	5.00	13.3		102	40-140		
Toxaphene	< 100		µg/kg wet	100				40-140		
Toxaphene [2C]	< 100		µg/kg wet	100				40-140		
Chlordane	< 20.0		µg/kg wet	20.0				40-140		
Chlordane [2C]	< 20.0		µg/kg wet	20.0				40-140		
Alachlor	**12.3**		µg/kg wet	5.00	13.3		92	40-140		
Alachlor [2C]	**12.7**		µg/kg wet	5.00	13.3		95	40-140		
Surrogate: Decachlorobiphenyl (Sr)	*11.1*		µg/kg wet		*13.3*		*83*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*11.3*		µg/kg wet		*13.3*		*85*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*10.3*		µg/kg wet		*13.3*		*77*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*10.4*		µg/kg wet		*13.3*		*78*	*30-150*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8081B										
Batch 2001088 - SW846 3546										
LCS Dup (2001088-BSD1)					Prepared: 13-Jul-20 Analyzed: 16-Jul-20					
alpha-BHC	**12.0**		µg/kg wet	5.00	13.3		90	40-140	0.4	30
alpha-BHC [2C]	**12.1**		µg/kg wet	5.00	13.3		91	40-140	3	30
beta-BHC	**12.6**		µg/kg wet	5.00	13.3		94	40-140	2	30
beta-BHC [2C]	**12.6**		µg/kg wet	5.00	13.3		95	40-140	10	30
delta-BHC	**8.57**		µg/kg wet	5.00	13.3		64	40-140	2	30
delta-BHC [2C]	**8.75**		µg/kg wet	5.00	13.3		66	40-140	0.8	30
gamma-BHC (Lindane)	**12.2**		µg/kg wet	3.00	13.3		92	40-140	4	30
gamma-BHC (Lindane) [2C]	**12.3**		µg/kg wet	3.00	13.3		93	40-140	3	30
Heptachlor	**12.4**		µg/kg wet	5.00	13.3		93	40-140	1	30
Heptachlor [2C]	**12.6**		µg/kg wet	5.00	13.3		95	40-140	3	30
Aldrin	**11.7**		µg/kg wet	5.00	13.3		88	40-140	0	30
Aldrin [2C]	**11.9**		µg/kg wet	5.00	13.3		89	40-140	2	30
Heptachlor epoxide	**12.0**		µg/kg wet	5.00	13.3		90	40-140	2	30
Heptachlor epoxide [2C]	**12.2**		µg/kg wet	5.00	13.3		92	40-140	1	30
Endosulfan I	**12.9**		µg/kg wet	5.00	13.3		97	40-140	3	30
Endosulfan I [2C]	**13.3**		µg/kg wet	5.00	13.3		100	40-140	0.6	30
Dieldrin	**12.4**		µg/kg wet	5.00	13.3		93	40-140	4	30
Dieldrin [2C]	**13.3**		µg/kg wet	5.00	13.3		100	40-140	0.5	30
4,4'-DDE (p,p')	**12.6**		µg/kg wet	5.00	13.3		95	40-140	4	30
4,4'-DDE (p,p') [2C]	**13.3**		µg/kg wet	5.00	13.3		99	40-140	1	30
Endrin	**15.6**		µg/kg wet	8.00	13.3		117	40-140	4	30
Endrin [2C]	**17.1**		µg/kg wet	8.00	13.3		128	40-140	6	30
Endosulfan II	**13.0**		µg/kg wet	8.00	13.3		98	40-140	3	30
Endosulfan II [2C]	**14.2**		µg/kg wet	8.00	13.3		107	40-140	0.7	30
4,4'-DDD (p,p')	**13.2**		µg/kg wet	8.00	13.3		99	40-140	4	30
4,4'-DDD (p,p') [2C]	**13.9**		µg/kg wet	8.00	13.3		104	40-140	1	30
Endosulfan sulfate	**13.5**		µg/kg wet	8.00	13.3		101	40-140	5	30
Endosulfan sulfate [2C]	**14.8**		µg/kg wet	8.00	13.3		111	40-140	4	30
4,4'-DDT (p,p')	**14.8**		µg/kg wet	8.00	13.3		111	40-140	5	30
4,4'-DDT (p,p') [2C]	**15.0**		µg/kg wet	8.00	13.3		113	40-140	4	30
Methoxychlor	**14.7**		µg/kg wet	8.00	13.3		111	40-140	5	30
Methoxychlor [2C]	**14.2**		µg/kg wet	8.00	13.3		107	40-140	1	30
Endrin ketone	**13.3**		µg/kg wet	8.00	13.3		100	40-140	6	30
Endrin ketone [2C]	**14.0**		µg/kg wet	8.00	13.3		105	40-140	0.02	30
Endrin aldehyde	**11.9**		µg/kg wet	8.00	13.3		90	40-140	0.6	30
Endrin aldehyde [2C]	**13.7**		µg/kg wet	8.00	13.3		103	40-140	3	30
alpha-Chlordane	**12.3**		µg/kg wet	5.00	13.3		92	40-140	3	30
alpha-Chlordane [2C]	**12.4**		µg/kg wet	5.00	13.3		93	40-140	6	30
gamma-Chlordane	**12.3**		µg/kg wet	5.00	13.3		92	40-140	10	30
gamma-Chlordane [2C]	**12.8**		µg/kg wet	5.00	13.3		96	40-140	6	30
Toxaphene	< 100		µg/kg wet	100				40-140		30
Toxaphene [2C]	< 100		µg/kg wet	100				40-140		30
Chlordane	< 20.0		µg/kg wet	20.0				40-140		30
Chlordane [2C]	< 20.0		µg/kg wet	20.0				40-140		30
Alachlor	**12.7**		µg/kg wet	5.00	13.3		95	40-140	3	30
Alachlor [2C]	**12.5**		µg/kg wet	5.00	13.3		94	40-140	1	30
Surrogate: Decachlorobiphenyl (Sr)	*10.8*		µg/kg wet		*13.3*		*81*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*11.3*		µg/kg wet		*13.3*		*85*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*9.68*		µg/kg wet		*13.3*		*73*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*9.74*		µg/kg wet		*13.3*		*73*	*30-150*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8081B										
Batch 2001088 - SW846 3546										
Duplicate (2001088-DUP1)			**Source: SC58794-02**		Prepared: 13-Jul-20 Analyzed: 16-Jul-20					
alpha-BHC	< 5.56		µg/kg dry	5.56		BRL				30
alpha-BHC [2C]	< 5.56		µg/kg dry	5.56		BRL				30
beta-BHC	< 5.56		µg/kg dry	5.56		BRL				30
beta-BHC [2C]	< 5.56		µg/kg dry	5.56		BRL				30
delta-BHC	< 5.56		µg/kg dry	5.56		BRL				30
delta-BHC [2C]	< 5.56		µg/kg dry	5.56		0.801				30
gamma-BHC (Lindane)	< 3.33		µg/kg dry	3.33		BRL				30
gamma-BHC (Lindane) [2C]	< 3.33		µg/kg dry	3.33		BRL				30
Heptachlor	< 5.56		µg/kg dry	5.56		BRL				30
Heptachlor [2C]	< 5.56		µg/kg dry	5.56		BRL				30
Aldrin	< 5.56		µg/kg dry	5.56		BRL				30
Aldrin [2C]	< 5.56		µg/kg dry	5.56		BRL				30
Heptachlor epoxide	**0.363**	J	µg/kg dry	5.56		0.382			5	30
Heptachlor epoxide [2C]	< 5.56		µg/kg dry	5.56		BRL				30
Endosulfan I	< 5.56		µg/kg dry	5.56		BRL				30
Endosulfan I [2C]	< 5.56		µg/kg dry	5.56		BRL				30
Dieldrin	< 5.56		µg/kg dry	5.56		BRL				30
Dieldrin [2C]	< 5.56		µg/kg dry	5.56		BRL				30
4,4'-DDE (p,p')	< 5.56		µg/kg dry	5.56		BRL				30
4,4'-DDE (p,p') [2C]	< 5.56		µg/kg dry	5.56		BRL				30
Endrin	< 8.89		µg/kg dry	8.89		BRL				30
Endrin [2C]	< 8.89		µg/kg dry	8.89		BRL				30
Endosulfan II	< 8.89		µg/kg dry	8.89		BRL				30
Endosulfan II [2C]	< 8.89		µg/kg dry	8.89		BRL				30
4,4'-DDD (p,p')	< 8.89		µg/kg dry	8.89		BRL				30
4,4'-DDD (p,p') [2C]	< 8.89		µg/kg dry	8.89		BRL				30
Endosulfan sulfate	< 8.89		µg/kg dry	8.89		BRL				30
Endosulfan sulfate [2C]	< 8.89		µg/kg dry	8.89		BRL				30
4,4'-DDT (p,p')	< 8.89		µg/kg dry	8.89		BRL				30
4,4'-DDT (p,p') [2C]	< 8.89		µg/kg dry	8.89		BRL				30
Methoxychlor	< 8.89		µg/kg dry	8.89		0.775				30
Methoxychlor [2C]	< 8.89		µg/kg dry	8.89		BRL				30
Endrin ketone	< 8.89		µg/kg dry	8.89		BRL				30
Endrin ketone [2C]	< 8.89		µg/kg dry	8.89		BRL				30
Endrin aldehyde	< 8.89		µg/kg dry	8.89		BRL				30
Endrin aldehyde [2C]	< 8.89		µg/kg dry	8.89		BRL				30
alpha-Chlordane	< 5.56		µg/kg dry	5.56		BRL				30
alpha-Chlordane [2C]	< 5.56		µg/kg dry	5.56		BRL				30
gamma-Chlordane	**0.637**	J	µg/kg dry	5.56		BRL				30
gamma-Chlordane [2C]	**0.370**	J	µg/kg dry	5.56		BRL				30
Toxaphene	< 111		µg/kg dry	111		BRL				30
Toxaphene [2C]	< 111		µg/kg dry	111		BRL				30
Chlordane	< 22.2		µg/kg dry	22.2		BRL				30
Chlordane [2C]	< 22.2		µg/kg dry	22.2		BRL				30
Alachlor	< 5.56		µg/kg dry	5.56		BRL				30
Alachlor [2C]	< 5.56		µg/kg dry	5.56		BRL				30
Surrogate: Decachlorobiphenyl (Sr)	*11.8*		µg/kg dry		*14.8*		*80*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*12.4*		µg/kg dry		*14.8*		*83*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*11.3*		µg/kg dry		*14.8*		*76*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*10.4*		µg/kg dry		*14.8*		*70*	*30-150*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8081B										
Batch 2001088 - SW846 3546										
Matrix Spike (2001088-MS1)			**Source: SC58794-02**		Prepared: 13-Jul-20 Analyzed: 16-Jul-20					
alpha-BHC	**11.9**		µg/kg dry	5.56	14.8	BRL	80	30-150		
alpha-BHC [2C]	**12.7**		µg/kg dry	5.56	14.8	BRL	86	30-150		
beta-BHC	**13.1**		µg/kg dry	5.56	14.8	BRL	88	30-150		
beta-BHC [2C]	**13.3**		µg/kg dry	5.56	14.8	BRL	89	30-150		
delta-BHC	**8.64**		µg/kg dry	5.56	14.8	BRL	58	30-150		
delta-BHC [2C]	**9.33**		µg/kg dry	5.56	14.8	0.801	57	30-150		
gamma-BHC (Lindane)	**12.5**		µg/kg dry	3.34	14.8	BRL	84	30-150		
gamma-BHC (Lindane) [2C]	**12.6**		µg/kg dry	3.34	14.8	BRL	85	30-150		
Heptachlor	**12.5**		µg/kg dry	5.56	14.8	BRL	84	30-150		
Heptachlor [2C]	**13.7**		µg/kg dry	5.56	14.8	BRL	93	30-150		
Aldrin	**12.1**		µg/kg dry	5.56	14.8	BRL	81	30-150		
Aldrin [2C]	**13.4**		µg/kg dry	5.56	14.8	BRL	90	30-150		
Heptachlor epoxide	**12.5**		µg/kg dry	5.56	14.8	0.382	82	30-150		
Heptachlor epoxide [2C]	**13.4**		µg/kg dry	5.56	14.8	BRL	91	30-150		
Endosulfan I	**13.1**		µg/kg dry	5.56	14.8	BRL	88	30-150		
Endosulfan I [2C]	**13.6**		µg/kg dry	5.56	14.8	BRL	92	30-150		
Dieldrin	**12.7**		µg/kg dry	5.56	14.8	BRL	86	30-150		
Dieldrin [2C]	**13.5**		µg/kg dry	5.56	14.8	BRL	91	30-150		
4,4'-DDE (p,p')	**12.8**		µg/kg dry	5.56	14.8	BRL	86	30-150		
4,4'-DDE (p,p') [2C]	**13.7**		µg/kg dry	5.56	14.8	BRL	92	30-150		
Endrin	**16.1**		µg/kg dry	8.90	14.8	BRL	109	30-150		
Endrin [2C]	**17.4**		µg/kg dry	8.90	14.8	BRL	117	30-150		
Endosulfan II	**12.8**		µg/kg dry	8.90	14.8	BRL	87	30-150		
Endosulfan II [2C]	**13.9**		µg/kg dry	8.90	14.8	BRL	94	30-150		
4,4'-DDD (p,p')	**13.2**		µg/kg dry	8.90	14.8	BRL	89	30-150		
4,4'-DDD (p,p') [2C]	**14.1**		µg/kg dry	8.90	14.8	BRL	95	30-150		
Endosulfan sulfate	**13.6**		µg/kg dry	8.90	14.8	BRL	91	30-150		
Endosulfan sulfate [2C]	**14.8**		µg/kg dry	8.90	14.8	BRL	100	30-150		
4,4'-DDT (p,p')	**15.4**		µg/kg dry	8.90	14.8	BRL	104	30-150		
4,4'-DDT (p,p') [2C]	**16.6**		µg/kg dry	8.90	14.8	BRL	112	30-150		
Methoxychlor	**15.0**		µg/kg dry	8.90	14.8	0.775	96	30-150		
Methoxychlor [2C]	**15.5**		µg/kg dry	8.90	14.8	BRL	105	30-150		
Endrin ketone	**13.2**		µg/kg dry	8.90	14.8	BRL	89	30-150		
Endrin ketone [2C]	**14.8**		µg/kg dry	8.90	14.8	BRL	100	30-150		
Endrin aldehyde	**11.3**		µg/kg dry	8.90	14.8	BRL	76	30-150		
Endrin aldehyde [2C]	**13.0**		µg/kg dry	8.90	14.8	BRL	88	30-150		
alpha-Chlordane	**12.4**		µg/kg dry	5.56	14.8	BRL	83	30-150		
alpha-Chlordane [2C]	**12.7**		µg/kg dry	5.56	14.8	BRL	86	30-150		
gamma-Chlordane	**21.6**		µg/kg dry	5.56	14.8	BRL	146	30-150		
gamma-Chlordane [2C]	**13.3**		µg/kg dry	5.56	14.8	BRL	90	30-150		
Toxaphene	< 111		µg/kg dry	111		BRL		30-150		
Toxaphene [2C]	< 111		µg/kg dry	111		BRL		30-150		
Chlordane	< 22.2		µg/kg dry	22.2		BRL		30-150		
Chlordane [2C]	< 22.2		µg/kg dry	22.2		BRL		30-150		
Alachlor	**14.7**		µg/kg dry	5.56	14.8	BRL	99	30-150		
Alachlor [2C]	**12.0**		µg/kg dry	5.56	14.8	BRL	81	30-150		
Surrogate: Decachlorobiphenyl (Sr)	*10.2*		µg/kg dry		*14.8*		*69*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*12.8*		µg/kg dry		*14.8*		*86*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*10.5*		µg/kg dry		*14.8*		*71*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*9.76*		µg/kg dry		*14.8*		*66*	*30-150*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8081B										
Batch 2001088 - SW846 3546										
Matrix Spike Dup (2001088-MSD1)			**Source: SC58794-02**		Prepared: 13-Jul-20 Analyzed: 16-Jul-20					
alpha-BHC	**12.5**		µg/kg dry	5.56	14.8	BRL	85	30-150	5	30
alpha-BHC [2C]	**13.2**		µg/kg dry	5.56	14.8	BRL	89	30-150	4	30
beta-BHC	**13.8**		µg/kg dry	5.56	14.8	BRL	93	30-150	6	30
beta-BHC [2C]	**13.8**		µg/kg dry	5.56	14.8	BRL	93	30-150	4	30
delta-BHC	**9.93**		µg/kg dry	5.56	14.8	BRL	67	30-150	14	30
delta-BHC [2C]	**9.81**		µg/kg dry	5.56	14.8	0.801	61	30-150	5	30
gamma-BHC (Lindane)	**13.3**		µg/kg dry	3.34	14.8	BRL	89	30-150	6	30
gamma-BHC (Lindane) [2C]	**13.2**		µg/kg dry	3.34	14.8	BRL	89	30-150	4	30
Heptachlor	**13.7**		µg/kg dry	5.56	14.8	BRL	92	30-150	9	30
Heptachlor [2C]	**13.8**		µg/kg dry	5.56	14.8	BRL	93	30-150	0.8	30
Aldrin	**13.2**		µg/kg dry	5.56	14.8	BRL	89	30-150	9	30
Aldrin [2C]	**13.0**		µg/kg dry	5.56	14.8	BRL	88	30-150	3	30
Heptachlor epoxide	**13.5**		µg/kg dry	5.56	14.8	0.382	88	30-150	7	30
Heptachlor epoxide [2C]	**13.8**		µg/kg dry	5.56	14.8	BRL	93	30-150	3	30
Endosulfan I	**13.9**		µg/kg dry	5.56	14.8	BRL	94	30-150	6	30
Endosulfan I [2C]	**14.5**		µg/kg dry	5.56	14.8	BRL	98	30-150	7	30
Dieldrin	**14.0**		µg/kg dry	5.56	14.8	BRL	94	30-150	10	30
Dieldrin [2C]	**14.3**		µg/kg dry	5.56	14.8	BRL	97	30-150	6	30
4,4'-DDE (p,p')	**13.9**		µg/kg dry	5.56	14.8	BRL	94	30-150	9	30
4,4'-DDE (p,p') [2C]	**14.7**		µg/kg dry	5.56	14.8	BRL	99	30-150	8	30
Endrin	**18.0**		µg/kg dry	8.90	14.8	BRL	121	30-150	11	30
Endrin [2C]	**18.6**		µg/kg dry	8.90	14.8	BRL	125	30-150	7	30
Endosulfan II	**14.4**		µg/kg dry	8.90	14.8	BRL	97	30-150	11	30
Endosulfan II [2C]	**14.8**		µg/kg dry	8.90	14.8	BRL	100	30-150	6	30
4,4'-DDD (p,p')	**14.8**		µg/kg dry	8.90	14.8	BRL	100	30-150	12	30
4,4'-DDD (p,p') [2C]	**15.4**		µg/kg dry	8.90	14.8	BRL	104	30-150	9	30
Endosulfan sulfate	**15.1**		µg/kg dry	8.90	14.8	BRL	102	30-150	11	30
Endosulfan sulfate [2C]	**15.3**		µg/kg dry	8.90	14.8	BRL	103	30-150	3	30
4,4'-DDT (p,p')	**17.3**		µg/kg dry	8.90	14.8	BRL	117	30-150	12	30
4,4'-DDT (p,p') [2C]	**17.4**		µg/kg dry	8.90	14.8	BRL	117	30-150	5	30
Methoxychlor	**14.9**		µg/kg dry	8.90	14.8	0.775	95	30-150	0.6	30
Methoxychlor [2C]	**16.3**		µg/kg dry	8.90	14.8	BRL	110	30-150	5	30
Endrin ketone	**14.7**		µg/kg dry	8.90	14.8	BRL	99	30-150	10	30
Endrin ketone [2C]	**16.2**		µg/kg dry	8.90	14.8	BRL	109	30-150	9	30
Endrin aldehyde	**12.8**		µg/kg dry	8.90	14.8	BRL	87	30-150	13	30
Endrin aldehyde [2C]	**13.8**		µg/kg dry	8.90	14.8	BRL	93	30-150	6	30
alpha-Chlordane	**13.4**		µg/kg dry	5.56	14.8	BRL	90	30-150	8	30
alpha-Chlordane [2C]	**13.6**		µg/kg dry	5.56	14.8	BRL	92	30-150	7	30
gamma-Chlordane	**15.5**		µg/kg dry	5.56	14.8	BRL	105	30-150	33	30
gamma-Chlordane [2C]	**13.8**		µg/kg dry	5.56	14.8	BRL	93	30-150	4	30
Toxaphene	< 111		µg/kg dry	111		BRL		30-150		30
Toxaphene [2C]	< 111		µg/kg dry	111		BRL		30-150		30
Chlordane	< 22.2		µg/kg dry	22.2		BRL		30-150		30
Chlordane [2C]	< 22.2		µg/kg dry	22.2		BRL		30-150		30
Alachlor	**14.2**		µg/kg dry	5.56	14.8	BRL	96	30-150	4	30
Alachlor [2C]	**12.7**		µg/kg dry	5.56	14.8	BRL	86	30-150	6	30
Surrogate: Decachlorobiphenyl (Sr)	*11.6*		µg/kg dry		*14.8*		*78*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*12.2*		µg/kg dry		*14.8*		*82*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*10.5*		µg/kg dry		*14.8*		*71*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*10.1*		µg/kg dry		*14.8*		*68*	*30-150*		

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8100Mod.										
Batch 2001092 - SW846 3546										
Blank (2001092-BLK1)					Prepared: 14-Jul-20 Analyzed: 15-Jul-20					
Total Petroleum Hydrocarbons	< 13.3		mg/kg wet	13.3						
Surrogate: o-Terphenyl	*5.32*		mg/kg wet		*6.67*		*80*	*40-140*		
Surrogate: 1-Chlorooctadecane	*7.04*		mg/kg wet		*6.67*		*106*	*40-140*		
LCS (2001092-BS1)					Prepared: 14-Jul-20 Analyzed: 15-Jul-20					
Total Petroleum Hydrocarbons	**276**		mg/kg wet	13.3	333		83	40-140		
Surrogate: o-Terphenyl	*5.97*		mg/kg wet		*6.67*		*90*	*40-140*		
Surrogate: 1-Chlorooctadecane	*7.88*		mg/kg wet		*6.67*		*118*	*40-140*		
Duplicate (2001092-DUP1)			**Source: SC58794-03**		Prepared: 14-Jul-20 Analyzed: 15-Jul-20					
Total Petroleum Hydrocarbons	**107**		mg/kg dry	16.4		109			2	50
Surrogate: o-Terphenyl	*6.79*		mg/kg dry		*8.23*		*82*	*40-140*		
Surrogate: 1-Chlorooctadecane	*8.75*		mg/kg dry		*8.23*		*106*	*40-140*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 6010C										
Batch 2001078 - SW846 3050B										
Blank (2001078-BLK1)					Prepared & Analyzed: 15-Jul-20					
Vanadium	< 1.47		mg/kg wet	1.47						
Nickel	< 0.977		mg/kg wet	0.977						
Zinc	< 2.93		mg/kg wet	2.93						
Selenium	< 1.47		mg/kg wet	1.47						
Lead	< 1.47		mg/kg wet	1.47						
Chromium	< 0.977		mg/kg wet	0.977						
Cadmium	< 0.488		mg/kg wet	0.488						
Antimony	< 4.88		mg/kg wet	4.88						
Beryllium	< 0.488		mg/kg wet	0.488						
Thallium	< 2.93		mg/kg wet	2.93						
Arsenic	< 1.47		mg/kg wet	1.47						
Silver	< 2.93		mg/kg wet	2.93						
Barium	< 0.977		mg/kg wet	0.977						
Duplicate (2001078-DUP1)			**Source: SC58794-02**		Prepared & Analyzed: 15-Jul-20					
Thallium	< 3.10		mg/kg dry	3.10		BRL				20
Vanadium	**23.9**		mg/kg dry	1.55		24.5			2	20
Selenium	< 1.55		mg/kg dry	1.55		BRL				20
Antimony	< 5.17		mg/kg dry	5.17		BRL				20
Lead	**21.4**		mg/kg dry	1.55		19.3			10	20
Nickel	**53.0**	QR6	mg/kg dry	1.03		71.4			30	20
Chromium	**19.8**		mg/kg dry	1.03		19.4			2	20
Cadmium	< 0.517		mg/kg dry	0.517		BRL				20
Beryllium	**0.264**	J	mg/kg dry	0.517		0.262			0.9	20
Arsenic	**49.0**		mg/kg dry	1.55		55.9			13	20
Silver	< 3.10		mg/kg dry	3.10		BRL				20
Zinc	**53.5**		mg/kg dry	3.10		58.5			9	20
Barium	**23.1**		mg/kg dry	1.03		22.5			3	20
Matrix Spike (2001078-MS1)			**Source: SC58794-02**		Prepared & Analyzed: 15-Jul-20					
Beryllium	**119**		mg/kg dry	0.528	132	0.262	90	75-125		
Vanadium	**156**		mg/kg dry	1.59	132	24.5	100	75-125		
Zinc	**171**		mg/kg dry	3.17	132	58.5	85	75-125		
Thallium	**117**		mg/kg dry	3.17	132	BRL	89	75-125		
Selenium	**104**		mg/kg dry	1.59	132	BRL	79	75-125		
Antimony	**67.7**	QM8	mg/kg dry	5.28	132	BRL	51	75-125		
Lead	**119**		mg/kg dry	1.59	132	19.3	76	75-125		
Nickel	**173**		mg/kg dry	1.06	132	71.4	77	75-125		
Cadmium	**106**		mg/kg dry	0.528	132	BRL	80	75-125		
Arsenic	**171**		mg/kg dry	1.59	132	55.9	87	75-125		
Silver	**104**		mg/kg dry	3.17	132	BRL	78	75-125		
Chromium	**150**		mg/kg dry	1.06	132	19.4	99	75-125		
Barium	**157**		mg/kg dry	1.06	132	22.5	102	75-125		
Matrix Spike Dup (2001078-MSD1)			**Source: SC58794-02**		Prepared & Analyzed: 15-Jul-20					
Selenium	**104**		mg/kg dry	1.60	134	BRL	78	75-125	0.2	20
Zinc	**170**		mg/kg dry	3.21	134	58.5	83	75-125	0.5	20
Antimony	**70.0**	QM8	mg/kg dry	5.35	134	BRL	52	75-125	3	20
Lead	**120**		mg/kg dry	1.60	134	19.3	75	75-125	0.4	20
Arsenic	**174**		mg/kg dry	1.60	134	55.9	89	75-125	2	20
Thallium	**117**		mg/kg dry	3.21	134	BRL	88	75-125	0.06	20
Silver	**104**		mg/kg dry	3.21	134	BRL	78	75-125	0.3	20
Nickel	**171**		mg/kg dry	1.07	134	71.4	75	75-125	1	20

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 6010C										
Batch 2001078 - SW846 3050B										
Matrix Spike Dup (2001078-MSD1)			**Source: SC58794-02**			Prepared & Analyzed: 15-Jul-20				
Chromium	**150**		mg/kg dry	1.07	134	19.4	98	75-125	0.1	20
Cadmium	**107**		mg/kg dry	0.535	134	BRL	80	75-125	1	20
Beryllium	**119**		mg/kg dry	0.535	134	0.262	89	75-125	0.3	20
Vanadium	**156**		mg/kg dry	1.60	134	24.5	98	75-125	0.003	20
Barium	**159**		mg/kg dry	1.07	134	22.5	102	75-125	1	20
Post Spike (2001078-PS1)			**Source: SC58794-02**			Prepared & Analyzed: 15-Jul-20				
Selenium	**120**		mg/kg dry	1.67	139	BRL	86	80-120		
Thallium	**130**		mg/kg dry	3.35	139	BRL	93	80-120		
Vanadium	**170**		mg/kg dry	1.67	139	24.5	105	80-120		
Antimony	**119**		mg/kg dry	5.58	139	BRL	86	80-120		
Lead	**134**		mg/kg dry	1.67	139	19.3	82	80-120		
Chromium	**157**		mg/kg dry	1.12	139	19.4	99	80-120		
Cadmium	**125**		mg/kg dry	0.558	139	BRL	89	80-120		
Beryllium	**133**		mg/kg dry	0.558	139	0.262	95	80-120		
Arsenic	**181**		mg/kg dry	1.67	139	55.9	90	80-120		
Silver	**113**		mg/kg dry	3.35	139	BRL	81	80-120		
Zinc	**177**		mg/kg dry	3.35	139	58.5	85	80-120		
Barium	**160**		mg/kg dry	1.12	139	22.5	99	80-120		
Reference (2001078-SRM1)						Prepared & Analyzed: 15-Jul-20				
Lead	**56.3**	QM9	mg/kg wet	1.50	68.4		82	82.9-117.1		
Antimony	**32.9**		mg/kg wet	5.00	83.1		40	25-196.4		
Selenium	**38.0**		mg/kg wet	1.50	46.3		82	79.2-120.6		
Thallium	**51.9**		mg/kg wet	3.00	54.2		96	80.7-119.5		
Zinc	**210**		mg/kg wet	3.00	245		86	80.7-119.3		
Beryllium	**83.5**		mg/kg wet	0.500	89.7		93	83.4-116.7		
Vanadium	**53.0**		mg/kg wet	1.50	54.0		98	79-121		
Nickel	**68.7**		mg/kg wet	1.00	82.9		83	82.4-117.4		
Cadmium	**113**		mg/kg wet	0.500	131		86	74-117		
Chromium	**148**		mg/kg wet	1.00	155		95	81.4-118		
Arsenic	**164**		mg/kg wet	1.50	187		88	82.7-117.3		
Silver	**55.8**		mg/kg wet	3.00	65.9		85	79.7-120.1		
Barium	**249**		mg/kg wet	1.00	250		99	82.6-117.8		
Reference (2001078-SRM2)						Prepared & Analyzed: 15-Jul-20				
Lead	**59.8**		mg/kg wet	1.50	69.1		86	82.9-117.1		
Antimony	**33.6**		mg/kg wet	5.00	83.9		40	25-196.4		
Nickel	**71.3**		mg/kg wet	1.00	83.7		85	82.4-117.4		
Selenium	**40.2**		mg/kg wet	1.50	46.7		86	79.2-120.6		
Vanadium	**55.8**		mg/kg wet	1.50	54.5		102	79-121		
Beryllium	**87.6**		mg/kg wet	0.500	90.6		97	83.4-116.7		
Zinc	**218**		mg/kg wet	3.00	247		88	80.7-119.3		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 6010C										
Batch 2001078 - SW846 3050B										
Reference (2001078-SRM2)					Prepared & Analyzed: 15-Jul-20					
Thallium	**55.0**		mg/kg wet	3.00	54.8		100	80.7-119.5		
Arsenic	**172**		mg/kg wet	1.50	189		91	82.7-117.3		
Silver	**57.6**		mg/kg wet	3.00	66.6		87	79.7-120.1		
Chromium	**154**		mg/kg wet	1.00	156		98	81.4-118		
Cadmium	**118**		mg/kg wet	0.500	132		89	74-117		
Barium	**259**		mg/kg wet	1.00	253		103	82.6-117.8		
SW846 7471B										
Batch 2001079 - EPA200/SW7000 Series										
Blank (2001079-BLK1)					Prepared & Analyzed: 13-Jul-20					
Mercury	< 0.114		mg/kg wet	0.114						
Duplicate (2001079-DUP1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Mercury	< 0.125		mg/kg dry	0.125		BRL				20
Matrix Spike (2001079-MS1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Mercury	**0.275**	QM7	mg/kg dry	0.0978	0.204	BRL	135	75-125		
Matrix Spike Dup (2001079-MSD1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Mercury	**0.241**		mg/kg dry	0.116	0.241	BRL	100	75-125	13	20
Post Spike (2001079-PS1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Mercury	**0.225**		mg/kg dry	0.115	0.241	BRL	94	80-120		
Reference (2001079-SRM1)					Prepared & Analyzed: 13-Jul-20					
Mercury	**1.79**	D	mg/kg wet	0.600	1.42		126	65-135		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SM2540 G (11) Mod.										
Batch 2001075 - General Preparation										
Duplicate (2001075-DUP1)			**Source: SC58794-01**			Prepared: 10-Jul-20 Analyzed: 14-Jul-20				
% Solids	**89.0**		%			89.3			0.4	5
Duplicate (2001075-DUP2)			**Source: SC58794-02**			Prepared: 10-Jul-20 Analyzed: 14-Jul-20				
% Solids	**90.1**		%			88.8			1	5
Duplicate (2001075-DUP3)			**Source: SC58794-03**			Prepared: 10-Jul-20 Analyzed: 14-Jul-20				
% Solids	**78.6**		%			80.1			2	5

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 9045D										
Batch 2001081 - General Preparation										
Duplicate (2001081-DUP1)			**Source: SC58794-01**			Prepared & Analyzed: 14-Jul-20				
pH	**5.96**		pH Units			5.99			0.5	5
Reference (2001081-SRM1)						Prepared & Analyzed: 14-Jul-20				
pH	**6.04**		pH Units		6.00		101	97.5-102.5		
Reference (2001081-SRM2)						Prepared & Analyzed: 14-Jul-20				
pH	**6.03**		pH Units		6.00		100	97.5-102.5		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW8151A										
Batch 537166A - SW8151A										
Blank (CG32331-BLK)					Prepared: 13-Jul-20 Analyzed: 14-Jul-20					
MCPP	**ND**		ug/kg	3300			ND	-		
MCPA	**ND**		ug/kg	3300			ND	-		
Dinoseb	**ND**		ug/kg	80			ND	-		
Dichloroprop	**ND**		ug/kg	80			ND	-		
Dicamba	**ND**		ug/kg	80			ND	-		
Dalapon	**ND**		ug/kg	80			ND	-		
2,4-DB	**ND**		ug/kg	80			ND	-		
2,4-D	**ND**		ug/kg	80			ND	-		
2,4,5-TP (Silvex)	**ND**		ug/kg	80			ND	-		
2,4,5-T	**ND**		ug/kg	80			ND	-		
Surrogate: % DCAA	*56*		ug/kg		*2000*		*56*	*30-150*		
LCS (CG32331-LCS)					Prepared: 13-Jul-20 Analyzed: 14-Jul-20					
2,4-D	**159.1**		ug/kg	80	200		80	40-140		30
Dicamba	**78.39**		ug/kg	80	100		78	40-140		30
2,4,5-TP (Silvex)	**78.41**		ug/kg	80	100		78	40-140		30
2,4-DB	**751.8**		ug/kg	80	1000		75	40-140		30
Dalapon	**65.02**		ug/kg	80	100		65	40-140		30
Dichloroprop	**184.8**		ug/kg	80	200		92	40-140		30
MCPP	**26120**		ug/kg	3300	30000		87	40-140		30
MCPA	**24560**		ug/kg	3300	30000		82	40-140		30
Dinoseb	**68.51**		ug/kg	80	100		69	10-110		20
2,4,5-T	**79.54**		ug/kg	80	100		80	40-140		30
Surrogate: % DCAA	*1286*		ug/kg		*2000*		*64*	*30-150*		
LCS Dup (CG32331-LCSD)			**Source: CG32331-LCS**		Prepared: 13-Jul-20 Analyzed: 14-Jul-20					
2,4-D	**180.3**		ug/kg	80	200		90	40-140	11.8	30
Dicamba	**78.02**		ug/kg	80	100		78	40-140	0.0	30
2,4,5-T	**87.28**		ug/kg	80	100		87	40-140	8.4	30
2,4,5-TP (Silvex)	**83.74**		ug/kg	80	100		84	40-140	7.4	30
Dalapon	**60.50**		ug/kg	80	100		60	40-140	8.0	30
2,4-DB	**826.8**		ug/kg	80	1000		83	40-140	10.1	30
Dichloroprop	**184.2**		ug/kg	80	200		92	40-140	0.0	30
Dinoseb	**70.63**		ug/kg	80	100		71	10-110	2.9	20
MCPA	**24850**		ug/kg	3300	30000		83	40-140	1.2	30
MCPP	**26980**		ug/kg	3300	30000		90	40-140	3.4	30
Surrogate: % DCAA	*1285*		ug/kg		*2000*		*64*	*30-150*		
Matrix Spike (CG32331-MS)			**Source: SC58794-06**		Prepared: 13-Jul-20 Analyzed: 14-Jul-20					
Dalapon	**65.39**		ug/kg	80	100	BRL	65	30-150		30
2,4,5-T	**83.50**		ug/kg	80	100	BRL	83	30-150		30
2,4,5-TP (Silvex)	**81.66**		ug/kg	80	100	BRL	82	30-150		30
2,4-DB	**848.8**		ug/kg	80	1000	BRL	85	30-150		30
Dicamba	**82.17**		ug/kg	80	100	BRL	82	30-150		30
Dichloroprop	**184.1**		ug/kg	80	200	BRL	92	30-150		30
Dinoseb	**75.89**		ug/kg	80	100	BRL	76	10-110		20
MCPA	**25340**		ug/kg	3300	30000	BRL	84	30-150		30
MCPP	**26510**		ug/kg	3300	30000	BRL	88	30-150		30
2,4-D	**169.9**		ug/kg	80	200	BRL	85	30-150		30
Surrogate: % DCAA	*1323*		ug/kg		*2000*		*66*	*30-150*		
Matrix Spike Dup (CG32331-MSD)			**Source: SC58794-06**		Prepared: 13-Jul-20 Analyzed: 14-Jul-20					
Dalapon	**65.78**		ug/kg	80	100	BRL	66	30-150	1.5	30

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW8151A										
Batch 537166A - SW8151A										
Matrix Spike Dup (CG32331-MSD)			**Source: SC58794-06**		Prepared: 13-Jul-20 Analyzed: 14-Jul-20					
2,4,5-T	**84.20**		ug/kg	80	100	BRL	84	30-150	1.2	30
MCPA	**25630**		ug/kg	3300	30000	BRL	85	30-150	1.2	30
Dinoseb	**78.86**		ug/kg	80	100	BRL	79	10-110	3.9	20
Dichloroprop	**195.8**		ug/kg	80	200	BRL	98	30-150	6.3	30
2,4-DB	**808.3**		ug/kg	80	1000	BRL	81	30-150	4.8	30
2,4-D	**171.1**		ug/kg	80	200	BRL	86	30-150	1.2	30
2,4,5-TP (Silvex)	**83.44**		ug/kg	80	100	BRL	83	30-150	1.2	30
MCPP	**27140**		ug/kg	3300	30000	BRL	90	30-150	2.2	30
Dicamba	**79.35**		ug/kg	80	100	BRL	79	30-150	3.7	30
Surrogate: % DCAA	*1320*		ug/kg		*2000*		*66*	*30-150*		
Batch 537320A - SW8151A										
Blank (CG33195-BLK)					Prepared: 14-Jul-20 Analyzed: 15-Jul-20					
2,4,5-T	**ND**		ug/kg	83			ND	-		
MCPA	**ND**		ug/kg	25000			ND	-		
Dinoseb	**ND**		ug/kg	83			ND	-		
Dichloroprop	**ND**		ug/kg	83			ND	-		
Dicamba	**ND**		ug/kg	83			ND	-		
Dalapon	**ND**		ug/kg	83			ND	-		
2,4-DB	**ND**		ug/kg	1700			ND	-		
2,4,5-TP (Silvex)	**ND**		ug/kg	83			ND	-		
MCPP	**ND**		ug/kg	25000			ND	-		
2,4-D	**ND**		ug/kg	170			ND	-		
Surrogate: % DCAA	*85*		ug/kg		*2000*		*85*	*30-150*		
LCS (CG33195-LCS)					Prepared: 14-Jul-20 Analyzed: 15-Jul-20					
2,4,5-T	**71.82**		ug/kg	83	100		72	40-140		30
2,4,5-TP (Silvex)	**68.89**		ug/kg	83	100		69	40-140		30
2,4-D	**142.4**		ug/kg	170	200		71	40-140		30
2,4-DB	**598.6**		ug/kg	1700	1000		60	40-140		30
Dalapon	**60.16**		ug/kg	83	100		60	40-140		30
Dicamba	**71.66**		ug/kg	83	100		72	40-140		30
Dichloroprop	**166.8**		ug/kg	83	200		83	40-140		30
Dinoseb	**39.15**	r	ug/kg	83	100		39	10-110		20
MCPP	**23770**		ug/kg	25000	30000		79	40-140		30
MCPA	**21880**		ug/kg	25000	30000		73	40-140		30
Surrogate: % DCAA	*1161*		ug/kg		*2000*		*58*	*30-150*		
LCS Dup (CG33195-LCSD)			**Source: CG33195-LCS**		Prepared: 14-Jul-20 Analyzed: 15-Jul-20					
2,4,5-TP (Silvex)	**82.44**		ug/kg	83	100		82	40-140	17.2	30
MCPP	**24500**		ug/kg	25000	30000		82	40-140	3.7	30
2,4,5-T	**87.03**		ug/kg	83	100		87	40-140	18.9	30
2,4-D	**164.0**		ug/kg	170	200		82	40-140	14.4	30
Dalapon	**61.29**		ug/kg	83	100		61	40-140	1.7	30
Dicamba	**82.87**		ug/kg	83	100		83	40-140	14.2	30
Dichloroprop	**189.0**		ug/kg	83	200		94	40-140	12.4	30
2,4-DB	**802.5**		ug/kg	1700	1000		80	40-140	28.6	30
MCPA	**25310**		ug/kg	25000	30000		84	40-140	14.0	30
Dinoseb	**75.51**	r	ug/kg	83	100		76	10-110	64.3	20
Surrogate: % DCAA	*1357*		ug/kg		*2000*		*68*	*30-150*		
SW846 7.3.3.1/90										

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 7.3.3.1/90										
Batch 537292A - SW846 7.3.3.1/90										
Blank (CG32326-BLK)						Prepared & Analyzed: 14-Jul-20				
Reactivity Cyanide	< 5		mg/kg	5			BRL	-		
Duplicate (CG32326-DUP)			**Source: SC58794-01**			Prepared & Analyzed: 14-Jul-20				
Reactivity Cyanide	< 6.0		mg/kg	6.0		BRL		-	NC	20
LCS (CG32326-LCS)						Prepared & Analyzed: 14-Jul-20				
Reactivity Cyanide	**0.4460**		mg/kg	5	0.44		101	80-120		20
Batch 537434A - SW846 7.3.3.1/90										
Blank (CG30622-BLK)						Prepared & Analyzed: 15-Jul-20				
Reactivity Cyanide	< 5		mg/kg	5			BRL	-		
LCS (CG30622-LCS)						Prepared & Analyzed: 15-Jul-20				
Reactivity Cyanide	**0.4390**		mg/kg	5	0.44		99.8	80-120		20
SW846 CH7										
Batch 537292B - SW846 7.3.3.1/90										
Blank (CG32326-BLK)						Prepared & Analyzed: 14-Jul-20				
Reactivity Sulfide	< 20		mg/kg	20			BRL	-		
Duplicate (CG32326-DUP)			**Source: SC58794-01**			Prepared & Analyzed: 14-Jul-20				
Reactivity Sulfide	< 20		mg/kg	20		BRL		-	NC	20
LCS (CG32326-LCS)						Prepared & Analyzed: 14-Jul-20				
Reactivity Sulfide	**0**		mg/kg	20	40		95.0	80-120		20
Batch 537434B - SW846 7.3.3.1/90										
Blank (CG30622-BLK)						Prepared & Analyzed: 15-Jul-20				
Reactivity Sulfide	< 20		mg/kg	20			BRL	-		
LCS (CG30622-LCS)						Prepared & Analyzed: 15-Jul-20				
Reactivity Sulfide	**0**		mg/kg	20	40		95.0	80-120		20

Analyte(s)	Column	% Breakdown	Limit

Notes and Definitions

D	Data reported from a dilution
QC2	Analyte out of acceptance range in QC spike but no reportable concentration present in sample.
QC6	Analyte is out of acceptance range in the QC spike but the total number of out of range analytes is within overall method criteria.
QM7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QM8	The spike recovery exceeded the QC control limits for the MS and/or MSD. The batch was accepted based upon acceptable PS and /or LCS recovery.
QM9	The spike recovery for this QC sample is outside the established control limits. The sample results for the QC batch were accepted based on LCS/LCSD or SRM recoveries within the control limits.
QR6	The RPD exceeded the QC control limits; however precision is demonstrated with acceptable RPD values for MS/MSD.
r	This parameter is outside laboratory rpd specified recovery limits.
Z-2	The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.
dry	Sample results reported on a dry weight basis
NR	Not Reported
RPD	Relative Percent Difference
[2C]	Indicates concentration was reported from the secondary, confirmation column.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
pH	The method for pH does not stipulate a specific holding time other than to state that the samples should be analyzed as soon as possible. For aqueous samples the 40 CFR 136 specifies a holding time of 15 minutes from sampling to analysis. Therefore all aqueous pH samples not analyzed in the field are considered out of hold time at the time of sample receipt. All soil samples are analyzed as soon as possible after sample receipt.

Interpretation of Total Petroleum Hydrocarbon Report

Petroleum identification is determined by comparing the GC fingerprint obtained from the sample with a library of GC fingerprints obtained from analyses of various petroleum products. Possible match categories are as follows:

Gasoline - includes regular, unleaded, premium, etc.
Fuel Oil #2 - includes home heating oil, #2 fuel oil, and diesel
Fuel Oil #4 - includes #4 fuel oil
Fuel Oil #6 - includes #6 fuel oil and bunker "C" oil
Motor Oil - includes virgin and waste automobile oil
Ligroin - includes mineral spirits, petroleum naphtha, vm&p naphtha
Aviation Fuel - includes kerosene, Jet A and JP-4
Other Oil - includes lubricating and cutting oil, and silicon oil

At times, the unidentified petroleum product is quantified using a calibration that most closely approximates the distribution of compounds in the sample. When this occurs, the result is qualified as Calculated as.

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Continuing Calibration Verification: The calibration relationship established during the initial calibration must be verified at periodic intervals. Concentrations, intervals, and criteria are method specific.

SC58794 EM

COC # 4610

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CHAIN OF CUSTODY RECORD

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Special Handling:

☑ Standard TAT - 7 to 10 business days
☐ Rush TAT - Date Needed:
- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report to: Kevin Kavanaugh
ECMS, Inc.
288 Grove St. #391
Braintree, MA 02184

Project Mgr.: Kevin Kavanaugh

Invoice to: Kevin Kavanaugh
ECMS, Inc.
288 Grove St. #391
Braintree, MA 02184

P.O. No: RQN: 9802

Project No.: 1009.073
Site Name: Cashman School
Location: Amesbury, MA
Sampler(s): Kevin Kavanaugh

G=Grab C=Composite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: 8 oz Amber Glass (none)	VOA Vial CH3OH	4 oz Amber Glass (none)	Analyses: 8081 Pesticides	8082 PCBs	8151 Herbicides	8260 Full List	8270 Full List	Ignitability-1030	MCP 14 Metals Total	pH	Reactivity Cyanide/Sulfide	TPH 8100 by GC	QA Reporting Notes: (check if needed)
SC58794-01	SS-1	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1
-02	SS-2	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1
-03	SSS-10	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1
-04	SSS-11	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1
-05	SSS-12	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1
-06	SSS-13	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1
-07	SSS-14	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1
-08	SSS-16	7/9/2020		G	Soil		2	••	X	X	X	X	X	X	X	X	X	X	MA RCS-1
-09	SSS-17	7/9/2020		G	Soil		2	••	X	X	X	X	X	X	X	X	X	X	MA RCS-1
-10	SSS-3	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1
-11	SSS-4	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1

QA Reporting Notes: (check if needed)
☑ Provide MA DEP MCP CAM Report
☐ Provide CT DPH RCP Report

QA/QC Reporting Levels
Standard

State specific reporting standards:
Mass RCS-1

☐ E-mail to:
EDD Format:

Condition upon receipt:
☐ Ambient ☒ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Relinquished by:	Received by:	Date:	Time:	Temp °C
[signature]	Storage Office 4°C	7/9/20	2:30 pm	3.3
[signature]	David Dec	7/10/20	13:16	-1
David Dec	[signature]	7/10/20	~~3.3/-1/2.3~~ 15:28	2.3

126 Myron Street · West Springfield, Massachusetts 01089 · 413-789-9018 · www.eurofinsus.com/Spectrum

#6

SC 38794 EM

COC # 4610

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CHAIN OF CUSTODY RECORD

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Special Handling:

☑ Standard TAT - 7 to 10 business days
☐ Rush TAT - Date Needed:
- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

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P.O. No: RQN: 9802

Project No.: 1009.073
Site Name: Cashman School
Location: Amesbury, MA
Sampler(s): Kevin Kavanaugh

G=Grab C=Composite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: 8 oz Amber Glass (none)	VOA Vial CH3OH	4 oz Amber Glass (none)						Analyses: 8081 Pesticides	8082 PCBs	8151 Herbicides	8260 Full List	8270 Full List	Ignitability-1030	MCP 14 Metals Total	pH	Reactivity Cyanide/Sulfide	TPH 8100 by GC			QA Reporting Notes: (check if needed)
-12	SSS-5	7/9/2020		G	Soil	2	2							X	X	X	X	X	X	X	X	X	X			MA RCS-1
-13	SSS-6	7/9/2020		G	Soil	2	2							X	X	X	X	X	X	X	X	X	X			MA RCS-1
-14	SSS-7	7/9/2020		G	Soil	2	2							X	X	X	X	X	X	X	X	X	X			MA RCS-1
-15	SSS-8	7/9/2020		G	Soil	2	2							X	X	X	X	X	X	X	X	X	X			MA RCS-1
-16	SSS-9	7/9/2020		G	Soil	2	2							X	X	X	X	X	X	X	X	X	X			MA RCS-1
-17	SSS-15	7/9/2020		G	Soil	1	2	2						X	X	X	X	X	X	X	X	X	X			MA RCS-1

QA Reporting Notes (check if needed):
☑ Provide MA DEP MCP CAM Report
☐ Provide CT DPH RCP Report

QA/QC Reporting Levels
Standard

State specific reporting standards:
Mass RCS-1

☐ E-mail to:
EDD Format:

Condition upon receipt:
☐ Ambient ☒ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Relinquished by:	Received by:	Date:	Time:	Temp °C
	Storage offsite 4°C	7/10/20	2:30 pm	3.3
		7/10/20	13:16	-1
		7/10/20	15:28	2.3

Batch Summary

'[none]'

Subcontracted Analyses

SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001074

Toxicity Characteristics

2001074-DUP1
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001075

General Chemistry Parameters

2001075-DUP1
2001075-DUP2
2001075-DUP3
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001076

Volatile Organic Compounds

2001076-BLK1
2001076-BS1
2001076-BSD1
2001076-DUP1
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001078

Total Metals by EPA 6000/7000 Series Methods

2001078-BLK1
2001078-DUP1
2001078-MS1
2001078-MSD1
2001078-PS1
2001078-SRM1
2001078-SRM2
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001079

Total Metals by EPA 6000/7000 Series Methods

2001079-BLK1
2001079-DUP1
2001079-MS1
2001079-MSD1
2001079-PS1
2001079-SRM1
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001081

Toxicity Characteristics

2001081-DUP1
2001081-SRM1
2001081-SRM2
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001083

Semivolatile Organic Compounds by GCMS

2001083-BLK1
2001083-BS1
2001083-BSD1
2001083-DUP1
2001083-MS1
2001083-MSD1
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001087

Semivolatile Organic Compounds by GC

2001087-BLK1
2001087-BS1
2001087-BSD1
2001087-DUP1
2001087-MS1
2001087-MSD1
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001088

Pesticides

2001088-BLK1
2001088-BS1
2001088-BSD1
2001088-DUP1
2001088-MS1
2001088-MSD1
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001092

Extractable Petroleum Hydrocarbons

2001092-BLK1
2001092-BS1
2001092-DUP1
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

537166A

Subcontracted Analyses

CG32331-BLK
CG32331-LCS
CG32331-LCSD
CG32331-MS
CG32331-MSD
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)

537292A

Subcontracted Analyses

CG32326-BLK
CG32326-DUP
CG32326-LCS
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)

537292B

Subcontracted Analyses

CG32326-BLK
CG32326-DUP
CG32326-LCS
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)

537320A

Subcontracted Analyses

CG33195-BLK
CG33195-LCS
CG33195-LCSD
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

537434A

Subcontracted Analyses

CG30622-BLK
CG30622-LCS
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

537434B

Subcontracted Analyses

CG30622-BLK
CG30622-LCS
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

APPENDIX B

QUALIFICATIONS/LIMITATIONS

QUALIFICATIONS/LIMITATIONS

Environmental & Construction Management Services, Inc. (ECMS) professional services have been performed, our findings obtained, and our recommendations prepared in accordance with customary principles and practices in the fields of environmental science and engineering. This warranty is in lieu of all other warranties either expressed or implied. *ECMS* is not responsible for the independent conclusions, opinions or recommq1endations made by others based on the records review, site inspection, field exploration, and laboratory test data presented in this report.

Factual information regarding on-site business operations, conditions, and historical data provided to *ECMS* is assumed to be correct and complete. *ECMS* assumes no responsibility for hidden or latent conditions or misrepresentation by the property owner, its representatives, public information officials or any authority consulted in connection with the compilation of this report.

The findings set forth in the attached Site assessment report are strictly limited in time and scope to the date of the evaluation(s). The conclusions presented in the Report are based solely on the services described therein, and not on scientific tasks or procedures beyond the scope of agreed upon services or the time and budgeting restraints imposed by the client.

The purpose of this report was to assess the physical characteristics of the subject Site with respect to the presence in the environment of hazardous material or oil. No specific attempt was made to check on the compliance of present or past owners or operators or of the Site with Federal, State or local laws and regulations, environmental, or otherwise.

Partial findings of this investigation are based on data provided by others. No warranty is expressed or implied with the usage of such data. Much of the information provided in this report is based upon personal interviews and research of all available documents, records and maps held by the appropriate government and private agencies. This is subject to the limitations of historical documentation, availability and accuracy of pertinent records, and the personal recollection of those persons contacted by *ECMS* personnel. *ECMS* is not a professional title insurance firm and makes no guarantee, explicit or implied that the listing, which was reviewed, represented a comprehensive delineation of past Site ownership or tenancy for legal purposes.

Observations were made of the Site and of structures on the Site as indicated within the Report. Where access to portions of the Site or to structures on the Site was unavailable or limited, *ECMS* is unable to render an opinion as to the presence of hazardous material or oil, or to the presence if indirect evidence relating to hazardous material or oil, in that portion of the Site or structure. In addition, *ECMS* renders no opinion as to the presence of hazardous material or oil, where direct observation of the interior walls, floor, or ceiling of a structure on a Site was obstructed by objects or coverings on or over these surfaces.

The initial site investigation took into account the natural and man-made features of the Site, including any unusual or suspect phenomenon. These factors combined with the Site's geology,

hydrology, topography, and past and present land uses served as a basis for choosing a methodology and location for subsurface exploration as well as ground water and subsurface sampling, if done. The subsurface data, if provided, is meant as a representative overview of the Site.

The conclusions and recommendations contained in this report may be based in part upon various types of chemical data and are contingent upon their validity. As indicated within the Report, some of these data are preliminary "screening" level data, and should be confirmed with quantitative analyses if more specific information is necessary. It should be noted that variations in the types and concentrations of contaminants and variations in their flow paths may occur due to seasonal water table fluctuations, past disposal practices, the passage of time, and other factors. Should additional data or variations of current data become available in the future, these data should be reviewed, and the conclusions and recommendations presented herein modified accordingly.

Chemical analyses may have been performed for specific parameters during the course of this Site assessment, as described in the text. However, it should be noted that additional chemical constituents not searched for during the current study might be present in soil and/or ground water at the Site.

IMMINENT HAZARD EVALUATION

For

Charles C. Cashman Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts 01913

Prepared for:

DiNisco Design, Inc.
99 Chauncy Street
Boston, Massachusetts 02111

Prepared by:

Environmental & Construction Management Services, Inc.
288 Grove Street #391
Braintree, Massachusetts 02184
(617) 338-2121

July 28, 2020

ECMS Project No. 1009.073

This report has been prepared for the exclusive use of DiNisco Design and their client the City of Amesbury, Massachusetts. Environmental & Construction Management Services, Inc. acknowledges that DiNisco Design and the City of Amesbury may rely on this report. Photocopying of this document by parties other than those designated by DiNisco Design and the City of Amesbury, or use of this document for purposes other than intended, is prohibited without the prior written consent of Environmental & Construction Management Services, Inc

Environmental & Construction Management Services, Inc.

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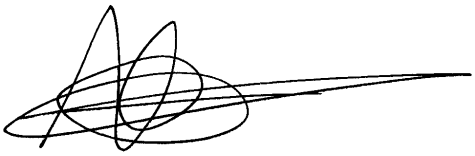
CERTIFICATION OF RESULTS

The evaluation was conducted on behalf of and for the exclusive use of *DiNisco Design* and their client, the *City of Amesbury, Massachusetts* and all its successors and assigns, solely for use in an environmental evaluation of the Site. This report and the findings contained herein shall not, in whole or in part, be disseminated or conveyed to any other party, nor used by any other party, in whole or in part, other than *DiNisco Design* or the *City of Amesbury* and all its successors and assigns, without the prior written consent of *Environmental & Construction Management Services, Inc. (ECMS).*

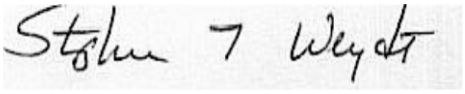
ECMS professional services have been performed, our findings obtained, and our recommendations prepared by an environmental professional and customary principles and practices in the fields of environmental science and engineering. This warranty is in lieu of all other warranties either expressed or implied. *ECMS* is not responsible for the independent conclusions, opinions or recommendations made by others based on the records review, site inspection, field exploration, and laboratory test data presented in this report.

Respectfully submitted this 28th day of July 2020.

For ***Environmental & Construction Management Services, Inc.*** by



Kevin J. Kavanaugh, L.S.P., CHMM
Principal Environmental Engineer



Stephen T. Weydt
Principal Environmental Scientist

1.0 INTRODUCTION

An Imminent Hazard Evaluation (IHE) is presented in this report for the Cashman Elementary School, located at 193 Lions Mouth Road in Amesbury, Massachusetts [Release Tracking Number (RTN) 3-31833]. This IHE was performed in accordance with requirements of the Massachusetts Contingency Plan (MCP, 310 CMR 40.0000) and other relevant guidance developed by the Massachusetts Department of Environmental Protection (MassDEP).

2.0 PROPERTY DESCRIPTION

2.1 Location and Legal Description of the Site

The Site is an irregularly-shaped 35.32-acre parcel of land located at 193 Lions Mouth Road in Amesbury, Essex County, Massachusetts 01913. According to the City of Amesbury Assessor, the property is listed as parcel 50/6. The Site is occupied by the Charles C. Cashman Elementary School and associated athletic fields, playground, parking lots and landscaped areas. Refer to Figure 2 entitled Lot Location Plan.

The Site is depicted on the 7.5 x 15-minute U.S.G.S. topographic quadrangle for Newburyport, Massachusetts dated 1987. The Universal Transverse Mercator (UTM) coordinates of the Site within zone 19 are approximately 4,746,558 meters north latitude and 340,818.9 meters east longitude or 42° 51' 26.06'' north latitude and 70° 56' 54.07'' west longitude. Elevation at the site is approximately 105 feet above mean sea level (amsl). Figure 1 includes both a Site Locus Plan and a Street Location Map of the Site. The Site and surrounding properties are shown on Figure 2, Lot Location Plan attached to this report.

2.2 Site and Vicinity Characteristics

The Site is currently occupied by the City of Amesbury Cashman Elementary School housing grades Pre-kindergarten through 4 (approximately 458 children). The Site is located within OSC – Open Space Conservancy. The school building is surrounded by a driveway and associated paved parking lots, a playground area and grass athletic field. Woodsom Farm to the west, and is accessed from Lions Mouth Road to the South. The north edge of the site is steeply sloping forested hill with an intermittent steam at the base. The Site is surrounded with pockets of densely settled residential neighborhoods.

No existing commercial printing facilities, gasoline filling/service stations, industrial properties or fuel depots were identified in the immediate vicinity of the

subject site. The past uses of these surrounding properties do not pose recognized environmental concerns to the Site.

2.3 Descriptions of Structures, Roads, Other Improvements on the Site

The 2-story school building is 61,472 gross square feet (GSF). The building is constructed of masonry block with brick veneer on slab on grade construction.

Assessor Office records indicate that the main Site building construction was completed in 1975. The school building is currently heated by natural gas and heated through forced air ducts. The roof is asphalt and on the roof are several HVAC units. Records indicate, the building is and always has been heated by natural gas. A copy of the Assessor Property Card is attached as Appendix D.

The nearest surface water bodies to the Site is Lake Gardner that is located approximately 2,500 feet to the north-northeast. According to the City of Amesbury Health Department, there are no know public or private potable water supply wells in the vicinity of the Site.

The City of Amesbury obtains its drinking water from its watershed area that encompasses about 55 square miles; most of which reside in New Hampshire. Tuxbury Pond feeds the Powow River, which the treatment plant draws from. Lake Attitash and Meadowbrook also supplement the water source seasonally and in times of drought. All of Amesbury's wastewater empties into their municipal sewer system. The wastewater treatment facility is located at 19 Merrimac Street.

The site is currently supplied with natural gas and serviced by the municipal water and sewer systems.

The existing school building has a sewage ejector system that was observed along the entrance driveway area south of the school.

2.4 Site Ownership

According to City of Amesbury Assessor's records, the subject site is owned by the City of Amesbury as of December 30, 1971 (Book 5833, Page 124).

A Title Search was not supplied to *ECMS*, and therefore additional ownership information was not available.

2.5 Current Uses of the Site

The Site is currently utilized as the City of Amesbury Cashman Elementary School for grades Pre-K through Grade 4.

2.6 Current Uses of Surrounding Properties

The Site is located within an area primarily used for single-family residential homes, farmland and undeveloped wooded vacant land. There were no visual indications observed during *ECMS* visual inspection of nearby or abutting properties of conditions that would indicate a release or threat of release of oil and/or hazardous substances on, at, in, or to the Site.

2.7 Past Uses of the Site and Vicinity

Historical information was obtained from a review of the historical topographs (1932, 1934, 1943, 1944, 1947, 1950, 1956, 1952, 1968, 1973, 1979, 1971, 1985, 1987 and 2012), historical aerial photos (1953, 1960, 1966, 1973, 1978, 1986, 1992, 1998, 2006, 2009, 2012 and 2016), City Directory (1961, 1965, 1968, 1973, 1977, 1982, 1987, 1992, 1995, 2000, 2005, 2010 and 2014). Refer to Appendix A for copies of the above historic documents.

The historical aerial photo from 1978 shows the school building. Prior to construction of the school building, the Site land area was undeveloped and appears to be farmland as depicted in the aerial photographs from 1953 through 1973.

Properties surrounding the Site to the north, south, east and west were developed with sporadic residential properties and some may have been farmland.

The past uses of these surrounding properties do not pose recognized environmental concerns to the Site.

3.0 EVALUATION OF IMMINENT HAZARDS

The purpose of an IHE is to evaluate whether an immediate response action (IRA) is needed to control or reduce short-term exposure to a release of oil and/or hazardous material while comprehensive investigations and response actions are being evaluated. The need for comprehensive response actions (i.e., the ultimate actions for the release) is determined (in part) by a Risk Characterization, which is performed after all site investigations are completed.

For this IHE *ECMS* engaged *Mr. Peter LaGoy of LaGoy Risk Analysis, Inc. (LaGoy)* in Hopkinton, Massachusetts as a professional risk assessor to evaluate the recently obtained soil sample analytical results for samples collected on July 9, 2020. Excerpts from the *LaGoy* "Evaluation of Soil Data from the Charles C. Cashman Elementary School, 193 Lions Mouth Road, Amesbury, Massachusetts dated July 27, 2020" and attached as Appendix A are included in the ECMS IHE presented herein.

The MCP requires that IHEs be conducted separately for human health, the environment, and safety. These evaluations are presented in the following subsections.

3.1 Human Health Imminent Hazard Evaluation

According to 310 CMR 40.0321(1)(d) and (f), a release of oil and/or hazardous material that poses a significant risk of harm to human health when present even for a short period of time, or a release to the environment that produces readily apparent effects to human health, including respiratory distress or dermal irritation, constitutes an imminent hazard. A short period of time is defined as five (5) years, unless site circumstances indicate that a shorter period of time is appropriate [40 CMR 40.0953(1)]. Human health IHEs consider actual or likely exposures of humans under current site conditions and uses (§40.0953). IHEs are expected to be conservative [(§40.0953(7)], to consider "hot spots" [§40.0953(4)], to focus on soil between 0 and 1 foot in depth [§40.0953(2)], and can focus on the constituents that are likely to dominate the IHE [§40.0953(5)].

The MCP and MassDEP guidance specify criteria for identifying the presence of an imminent hazard to human health. For non-carcinogenic constituents, the Hazard Index (HI) defining an imminent hazard is greater than:

- one (1) for oil or hazardous materials that have the potential to cause serious effects (including but not limited to lethal, developmental, or neurological effects) following short-term exposures; or
- ten (10) for all other oil or hazardous materials [MCP 310 CMR 40.0955(2)(c)(1)].

For carcinogenic constituents, the excess lifetime cancer risk defining an imminent hazard is:

- greater than a risk of 1 in 100,000 (denoted as 1x10-5) for a short exposure period (e.g., a 5-year exposure period) [MCP 310 CMR 40.0995(2)(b)]; and,
- greater than a risk of 1 in 10,000 (denoted as 1x10-4) over a long exposure period (MassDEP 1995).

3.1.1 Compounds of Concern (COCs)

The recent subject sampling event consisted of collecting 15 soil samples from beneath the grass (2-6 inches in depth), and two additional samples of slightly deeper soil (2 feet in depth). Soil was analyzed for the presence of metals, total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs, including the polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and pesticides and herbicides. The results of the sampling are presented in Table 1 of Appendix A.

Only arsenic was present at a concentration above a reportable concentration. TPH was also detected in most samples (concentrations around 100 mg/kg) but could be present as a result of it use as a binder (waxes) in various lawn care products. Maximum metal concentrations were compared with expected concentrations in soil in Massachusetts (Table 2 of Appendix A), and chromium, nickel, and vanadium were present at levels above expected background. The four metals, arsenic, chromium, nickel, and vanadium will be considered in the imminent hazard calculations.

3.1.2 Receptors and Exposure Pathways

Potentially exposed humans at the site under current site use include children including students, non-student users of the playing fields and adults including commercial (school) workers, construction/utility workers (potentially), and visitors (including parents attending sporting event games). Because intermittently exposed individuals, such visitors, will be exposed to a lesser extent (shorter duration of exposure and/or less frequently) than students, non-student users of the playing field, and school workers, visitor exposure is not assessed. School worker exposure conservatively represents potential visitor exposure.

3.1.3 Exposure Point Concentrations

Students, school workers, and non-student users of the playing fields are assumed exposed only to shallow soil (depths of 0-1 foot), per MCP guidance for performing IHEs. The soil exposure point concentration (EPC) for arsenic in soil applied to the IHE is the 95th percentile upper confidence limit (95% UCL) of the mean concentration of arsenic in shallow soil.

Construction/utility workers are assumed exposed to both shallow and deeper soil, consistent with the type of activities (e.g., soil excavation) potentially performed. The soil EPC for arsenic is the 95% UCL of the mean concentration of arsenic in shallow and deeper soil.

Maximum concentrations were used as EPCs for chromium, nickel, and vanadium. For this site, concentrations of arsenic in shallow soil were detected in a narrow range (21.9 mg/kg – 82.3 mg/kg), and the 95% Upper Confidence Limit (UCL) calculated using the EPA's ProUCL model version 5.1 was used to calculate an EPC of 46.4 mg/kg for arsenic, based on a normal distribution of data and the Student t-test.

3.1.4 Quantitative Exposure Assessment

In general, individuals are exposed to materials released into the environment in varying quantities and proportions via a wide variety of possible exposure routes. The actual amount of material to which an individual is exposed depends on the

individual's frequency, extent, and duration of exposure, which in turn depend on many factors, including location of residence, age, body weight, sex, and activity patterns. Patterns of exposure are highly variable among individuals. This large potential variation in exposure to environmental conditions implies that a certain amount of uncertainty is inherent in risk assessment. This exposure assessment uses standard approaches and assumptions that are designed to be health protective, i.e., they are designed to produce estimates of exposure that overestimate, rather than underestimate, actual exposure and risk.

The purpose of a quantitative exposure assessment is to estimate the Chronic Daily Intake (CDI) of each contaminant of concern by an individual for each exposure route. For carcinogens, the CDI is averaged over the full lifetime (by convention, assumed to be 70 years; MassDEP 2008) and is termed the Lifetime Average Daily Dose or LADD for oral and dermal exposures. For noncarcinogens, the dose is only averaged over the period of exposure and is noted as the Average Daily Dose or ADD for oral and dermal exposure.

Soil Exposure – Children

Children are at school 180 days per year, and can also use the school facilities during the summer (roughly 70 days; end of June to end of August) but will use the outdoor play fields for only a fraction of that time and for short periods. Very young children (less than 2 year of age) are considered unlikely to be present on a regular basis. For the purposes of this assessment, contact by children is assumed for 109 days per year, which is the outdoor time assumed by MassDEP (1994) in initially establishing the S-1 soil standards. Exposure for a third of a year to a single outdoor play area is unlikely but provides a conservative estimate of exposure potential. People who contact soil may be exposed to constituents present in the soil by direct contact and subsequent ingestion of contaminated soil or by dermal absorption of constituents in soils adhering to the skin. Younger children are of greatest concern for soil contact, and therefore, assessment of exposure to younger children can be used to conservatively evaluate the potential for risks to older students. For this IHE, children are estimated to weigh an average of 15 kg (33 lbs.) based on the median weight for 5-year-old children (the youngest age likely to be regularly out on their own) determined in the NHANES II study for the US population in 1980 (MassDEP 1994). USEPA has reviewed more current data and has indicated average weights for humans have increased since that study.

Soil Ingestion: Children in regular contact with site soil are estimated to ingest 100 mg of soil per day (MassDEP 2002). All constituents in soil are assumed to be as available from the soil as from the media used in the toxicity studies and, consequently, a relative absorption factor or RAF of one is used for these constituents. Using this assumption and the others noted above, the ADD and LADD for soil ingestion by children can be estimated using the formula:

$$ADD/LADD = \frac{CS \times IR \times RAF \times EF \times ED}{BW \times 106\ (mg/kg) \times AT}$$

Where:

ADD = Average daily intake of the constituent (mg/kg/day),
LADD= Lifetime average daily dose (mg/kg/day),
CS = Constituent concentration in soil (mg/kg),
IR = Soil ingestion rate (100 mg/day; MassDEP 1995),
RAF = Relative absorption factor (1),
EF = Frequency of ingestion (109 days/year; MassDEP 1995),
ED = Exposure Duration (5 years; MassDEP 1995),
BW = Body weight (15 kg; EPA 1989), and
AT = Averaging Time (365 days x 5 yrs. (ADD) or 365 x 70 (LADD) days).

The calculated ADD for children exposed to lead detected in soil at the property based on this equation is provided in Table 3 for ingestion exposure to the soil at the school.

Dermal Contact: Dermal exposure to constituents in soil can occur through direct physical contact with soil. The same assumptions as for soil ingestion are used, with the exceptions that in place of an ingestion rate, a soil adherence factor of 0.2 mg soil/cm2 of skin, an exposed skin surface area of 3000 cm2 (roughly a third of the body surface area for this age child; MassDEP 1994) and constituent-specific relative absorption factors were used. Using these assumptions, the ADD and LADD can be estimated using the formula:

$$ADD/LADD = \frac{CS \times AD \times SA \times RAF \times EF \times ED}{BW \times 106\ (mg/kg) \times AT}$$

Where:

ADD = Average daily intake of the constituent (mg/kg/day),
LADD= Lifetime average daily dose (mg/kg/day),
CS = Constituent concentration in soil (mg/kg),
AD = Soil adherence to skin (0.2 mg/cm2; MassDEP 1995),
SA = Exposed skin surface area (3000 cm2; MassDEP 1995),
RAF = Relative absorption factor (constituent-specific; MassDEP 2006),
EF = Frequency of contact (109 days/year),
ED = Exposure Duration (5 years),
BW = Body weight (15 kg; EPA 1989), and
AT = Averaging Time (365 days x 5 yrs. (ADD) or 365 days x 70 days (LADD)).

The calculated ADD for children exposed to lead in soil at the site based on this equation is provided in Table 3 for exposure via dermal contact to the soil EPCs.

While the primary purpose of this assessment is to calculate whether an imminent hazard exists, the same approach can be modified slightly to assess overall site risks, given the continued use of the school and playground for current purposes. The assumption that children are unlikely to use the facility for more than 109 days per year, and for more than 5 years seems likely, given the grades (pre-K to 4th) that currently use the school. However, as a conservative measure, risks are also assessed assuming that children play at the school for 100 days per year over the course of a 10-year period and that they weigh 24 kg (average body weight for 2-12 years) over this period. This exposure and risk are calculated in Table 4.

Soil Exposure - Adults

Adults that may use the area would include school landscape workers, teachers, and parents attending games. Of these groups, landscapers would be expected to have the highest potential for regular contact. In order to determine if such soil contact is safe, exposure and risks to landscapers were evaluated quantitatively, using the previously-established EPCs.

Landscapers who work site soil may be exposed to constituents present in the soil by direct contact and subsequent ingestion of contaminated soil or by dermal absorption of constituents in soils adhering to the skin. Workers may also be exposed to constituents that become airborne as a component of windborne dust. Exposure for these people is assumed to occur for 100 days over the course of a year, assuming that during the roughly 8-month landscaping season, these workers are outdoors roughly 3 days per week over the 240-day period. Adults are estimated to weigh 70 kg. It should be noted that these calculations are particularly conservative in that exposure estimates are compared with toxicity values designed to be protective for chronic (long-term) exposures; toxicity values for short-term exposure are generally lower by a factor of 10.

Soil Ingestion: Workers in frequent contact with site soil are estimated to ingest 100 mg of soil per day (MassDEP 2002) and this value will be used for landscape workers. Using these assumptions and the others noted above, the ADD and LADD for soil ingestion by workers can be estimated using the formula for soil ingestion noted above. The calculated ADD for the constituents in soil at the property based on this equation is provided in Table 5 in Appendix A for soil ingestion exposure to the site-wide exposure point concentration.

Dermal Contact: Dermal exposure to constituents in soil can occur through direct physical contact with soil. The same assumptions as for soil ingestion are used, with the exceptions that in place of an ingestion rate, a soil adherence factor of 0.29 mg soil/cm2 of skin, an exposed skin surface area of 3,500 cm^2, and constituent-specific relative absorption factors were used. Using these assumptions, the ADD and LADD can be estimated using the formula for dermal contact noted above. The calculated ADD for the constituents in soil at the property based on this equation is

provided in Table 5 in Appendix A for exposure via dermal contact to the EPCs in soil.

Inhalation. Although unlikely considering the small area of uncovered soil, landscapers could be exposed via inhalation to constituents entrained in soil-derived dust (MassDEP 2002). To estimate exposure, the same assumptions provided above for body weight, lifetime exposure duration and frequency were used. It was assumed that the gardener inhaled 20 cubic meters (m3) of air during the time on site (essentially equal to the daily inhalation rate of 20 m^3/day; EPA, 1989 and corresponding to a full workday at an average moderate to heavy level of exertion; MassDEP 1995a).

In order to evaluate the potential for inhalation exposure to constituents entrained in the dust, it is necessary to estimate the amount of dust that would be present in the air, and the amount of air inhaled during the period that dust is present in the air. MassDEP (2002) suggests a value of 60 ug/m^3 for excavations and this value will be used in this evaluation, which is a conservative approach since excavation work would be expected to generate more dust than gardening. The value of 60 ug/m3 is based on the assumption that gardeners will only receive intermittent exposure to visible dust but that the average exposure level will be above that used by EPA for undisturbed sites.

MassDEP notes that exposure to constituents on airborne particulates can occur through either direct inhalation or via inhalation followed by movement of the particles from the upper respiratory tract to the gastrointestinal tract. For direct inhalation, MassDEP indicates that only approximately half of the inhaled particulate matter will actually reach the lungs. However, for this evaluation, it is assumed that all the agent inhaled is of concern, as many inhaled constituents act at sites along the respiratory tract and do not need to reach the lungs to have adverse effects. For the inhalation-to-oral pathway, the ingested dose is estimated to be twice the measured PM10 dose of 60 ug/m3. However, the total soil intake via this pathway (2 x 60 ug/m3 x 20 m3/day x 1 mg/1000 ug = 2.4 mg soil) is so low as to not add significantly to the soil dose calculated for direct ingestion and is not considered further in this assessment.

Exposure can be calculated using the equation:

$$ADE/LADE = \frac{EPC \times IF \times PM10 \times RAF \times EF \times ED}{BW \times AT}$$

Where:

ADE = Average daily exposure to the constituent (mg/m3),
LADE= Lifetime average daily dose (mg/m3),
EPC = Constituent concentration in soil (mg/kg),
IF = Inhalation Fraction (20 m3 / 20 m3day; MassDEP 2002),
PM10 = Particulate air concentration (60 ug/m3; MassDEP 2002).

RAF = Relative absorption factor (1 used to be conservative),
EF = Frequency of contact (100 days/year),
ED = Exposure Duration (5 years), and
AT = Averaging Time (365 days x 5 or 70 years).

Table 5 in Appendix A provides the estimated exposure and risk values for inhalation exposure to an adult landscaper, assuming no dust suppression measures are implemented. Exposure to other site users, including teachers and parents, would be expected to be lower.

3.1.5 Human Health Imminent Hazard Evaluation Results

Using the EPCs, exposure factors, and toxicity values discussed above, and using conventional risk characterization models, imminent hazard calculations were performed. The calculations are contained in *LaGoy Risk Analysis, Inc. (LaGoy)* "Evaluation of Soil Data from the Charles C. Cashman Elementary School, 193 Lions Mouth Road, Amesbury, Massachusetts dated July 27, 2020" and attached as Appendix A.

For noncarcinogenic (systemic) effects, EPA and MassDEP assume that there is a level below which no effects will occur (a threshold no effect concentration). To evaluate possible risk from exposure to noncarcinogenic contaminants, the average daily dose (ADD) is divided by the health criterion value [the reference dose (RfD)]. If the ADD:RfD ratio, also termed the hazard index or HI, is less than ten for all constituents (i.e., if the daily intake is below the health criterion), then the contaminant is considered unlikely to pose an Imminent Hazard (i.e., a significant risk under conditions of short-term exposure) to individuals exposed under the given scenario. If the HI is less than ten, the site does not pose an Imminent Hazard. For cancer risk, the exposure, termed the lifetime average daily dose or LADD is multiplied by the cancer slope factor to estimate cancer risk, and this risk is compared with a target risk level of 1 in 100,000 or 10-5.

Imminent hazards associated with short term exposure to site constituents in soil are estimated in Table 3 for children and in Table 5 for landscapers (and other adults). Based on these calculations, exposure by children to soil concentrations of site constituents results in a hazard index of 0.5 (soil ingestion plus dermal absorption risks combined) and a cancer risk of 1 x 10-5. Exposure by adults to soil concentrations of site constituents results in a hazard index of 0.08 (soil ingestion, dermal absorption, and inhalation exposures combined) and a cancer risk of 3 x 10-6. These levels do not exceed the Imminent Hazard criterion of an HI of ten and a cancer risk level of 10^{-5}, indicating that continued use of this site does not pose an imminent hazard.

Hazards and risks associated with longer term exposure to site constituents in soil are estimated in Table 4 in Appendix A for children and in Table 6 in Appendix A for

landscapers (and other adults). Based on these calculations, exposure by children to soil concentrations of site constituents results in a hazard index of 0.3 and a cancer risk of 1 x 10-5. Exposure by adults to soil concentrations of site constituents results in a hazard index of 0.08 and a cancer risk of 1×10^{-5}. These levels do not exceed the long-term risk targets of a cancer risk of 10^{-5} and an HI of 1, indicating that continued long term exposure at these concentrations would not pose a significant risk.

Based on these results, an imminent hazard to human health does not exist at the site.

3.2 Environmental Imminent Hazard Evaluation

The site property is developed for educational use and is partially paved or built on and partially uncovered. The developed areas of the site possess little potential environmental habitat because of human use; however, undeveloped portions of the site may serve as habitat for native flora and fauna. According to 40 CMR 40.0955(3), the following conditions constitute an imminent hazard to the environment:

- evidence of stressed biota attributable to the release at the disposal site, including, without limitation, fish kills or abiotic conditions; or

- a release to the environment of oil or hazardous material which produces immediate or acute adverse impacts to freshwater or saltwater fish populations.

No such conditions are known to exist as a result of arsenic in site soil. Therefore, it is concluded that the site poses no imminent hazard to the environment.

3.3 Safety Imminent Hazard Evaluation

An imminent hazard to safety is evaluated by identifying conditions that could pose a threat of physical harm or bodily injury to existing receptors under current site conditions. Examples include the presence of an explosive environment or insecurely containerized waste.

No conditions representative of an imminent hazard to safety exist on the site. Based on these factors, it is concluded that no imminent hazard to safety exists at the site.

4.0 SUMMARY, CONCLUSION & RECOMMENDATIONS

An IHE was performed for the presence of arsenic in soil of the Cashman school property. The IHE examined potential imminent hazards to the health of students, non-student users of the playing fields, commercial (school) workers, and construction/utility workers not protected by conditions of an adequate Health and Safety Plan. The IHE also evaluated potential imminent hazards to the environment and safety. The IHE concludes the following:

- The site poses no imminent hazard to students, non-student users of the playing fields, school workers, and construction/utility workers.
- The site poses no imminent hazard to the environment.
- The site poses no imminent hazard to safety.

Soil was recently sampled by *ECMS* and analyzed with respect to the Cashman Elementary School property located at 193 Lions Mouth Road in Amesbury, Massachusetts. Arsenic and several other metals were detected at levels above a reportable concentration (arsenic) and above levels expected in background soil. However, no anthropogenic source of arsenic was present, the Amesbury area is known to have naturally-elevated arsenic levels in soil, and the source appears most likely to be natural. Further assessment will be required to determine if the source of arsenic detected on the Site is naturally occurring and presented with lines of evidence as part of the development of a Conceptual Site Model (CSM) for this "release". While the arsenic is assumed to be naturally occurring, calculations were performed to assess if a calculated risk was present for either short-term (IH) or longer-term exposure. Evaluation of the concentrations detected and of site-specific factors indicates that an Imminent Hazard condition does not exist at the site. Use of the site would also not pose a Significant Risks.

It should be noted that calculated risks did not exceed but were at the target risk levels. Therefore, although the area does not pose an Imminent Hazard or Significant Risk for current use, considering the use of the site as a school, it may be prudent to take measures to mitigate the potential for exposure. Such measures could include replacing natural soil in areas of exposed soil with imported soil containing lower levels of natural arsenic.

In order to ensure that public health is adequately protected, conservative assumptions (i.e., those unlikely to underestimate risk) were used in deriving both the exposure estimates and the toxicity values that are included in this letter report. Because of the use of these conservative assumptions, it is likely that the actual potential for non-cancer and cancer risks is lower than as is estimated in this report.

5.0 REFERENCES

Massachusetts Department of Environmental Protection (MADEP). 1994. Background Documentation for the Development of MCP Numerical Standards. April 1994.

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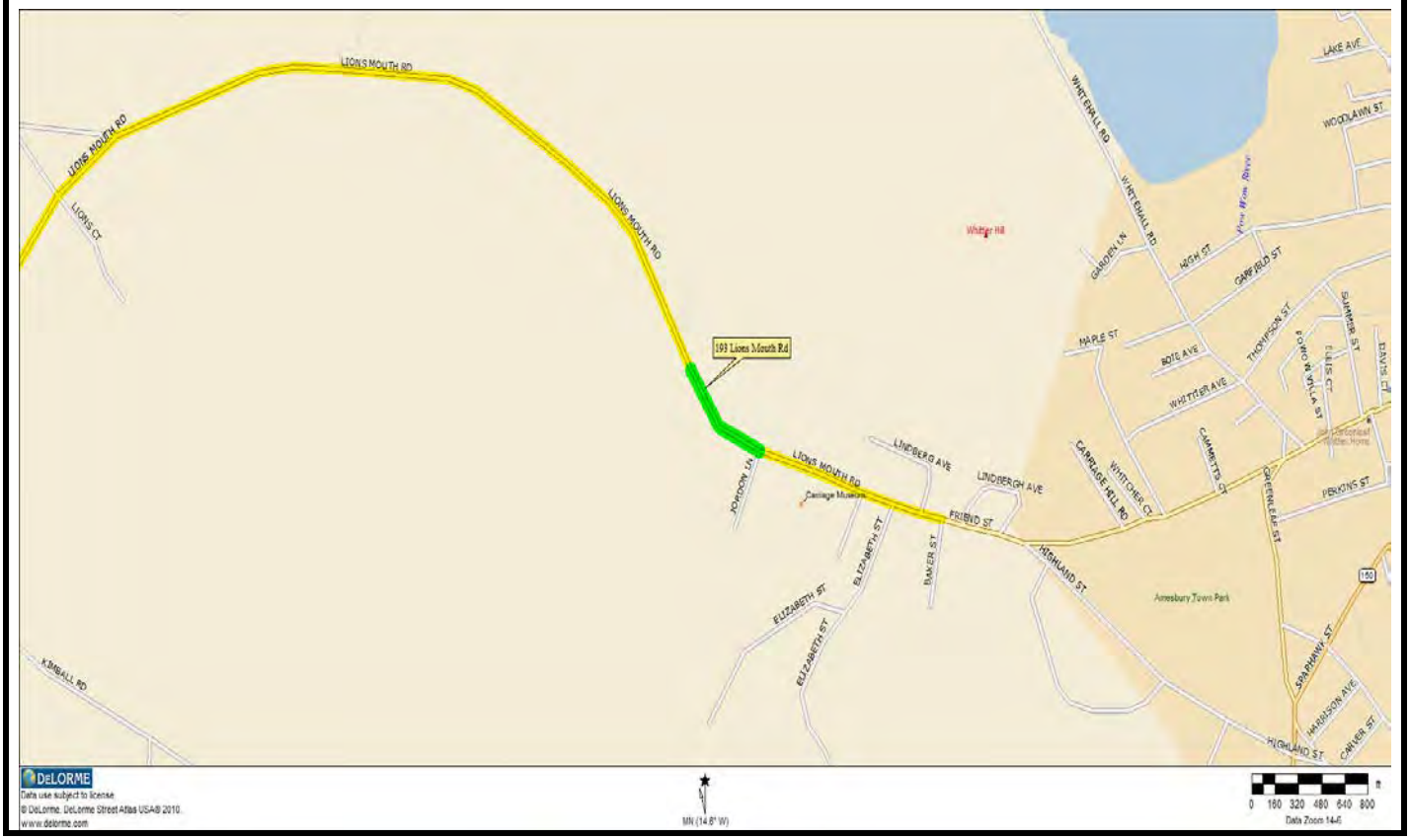
McBride, M.B.Shayler, H.A., Russell-Anelli, J.M., Spliethoff,, H.M., and Marquez-Bravo, L.G., 2015. Arsenic and Lead Uptake by Vegetable Crops Grown on an Old Orchard Site Amended with Compost. Water Air Soil Pollut. 2015 Aug; 226(8): 265

FIGURES





Cashman Elementary School **193 Lions Mouth Road** **Amesbury, Massachusetts** **01913**	**Environmental & Construction Management Services, Inc.**	**Project No.** 1009.073	**Figure 1**
		Site Locus / Street Location Plan	
		Drawn By: KJK	**Date:** 8/24/18

N

CITY OF AMESBURY, MASS.

Assessor Maps

LEGEND

- Parcel Line
- Building Footprints
- Prior Parcel Line with Common Ownership
- 5 Condo Unit Number
- Right of Way
- Map Index
- Town Boundaries
- Easements
- Hydrographic Features
- Streams
- Wetlands

Exempt Lands

- Federal
- State
- Municipal
- Private

N

SCALE: 1" = 100'

100 0 100 200 300 400

NOTE:
THE AREAS, BOUNDARIES, AND DIMENSIONS SHOWN ON THIS TAX MAP ARE DERIVED FROM AERIAL PHOTOGRAPHS, GROUND SURVEYS, AND RECORDED PLANS, MAPS, DEEDS, AND WILLS, AND ARE INTENDED TO BE USED FOR PROPERTY ASSESSMENT PURPOSES ONLY AND NOT FOR CONVEYANCE.

MAP REVISION DATE		
As of January 1, 2018		

Data Sources: The data for this map was supplied by the Merrimack Valley Planning Commission, the Town of Amesbury and the Executive Office of Environmental Affairs/MassGIS.

Merrimack Valley Planning Commission
plan • develop • promote

J:\ArcGIS\Amesbury\AmesburyAssessorMap_24x36.mxd

INDEX

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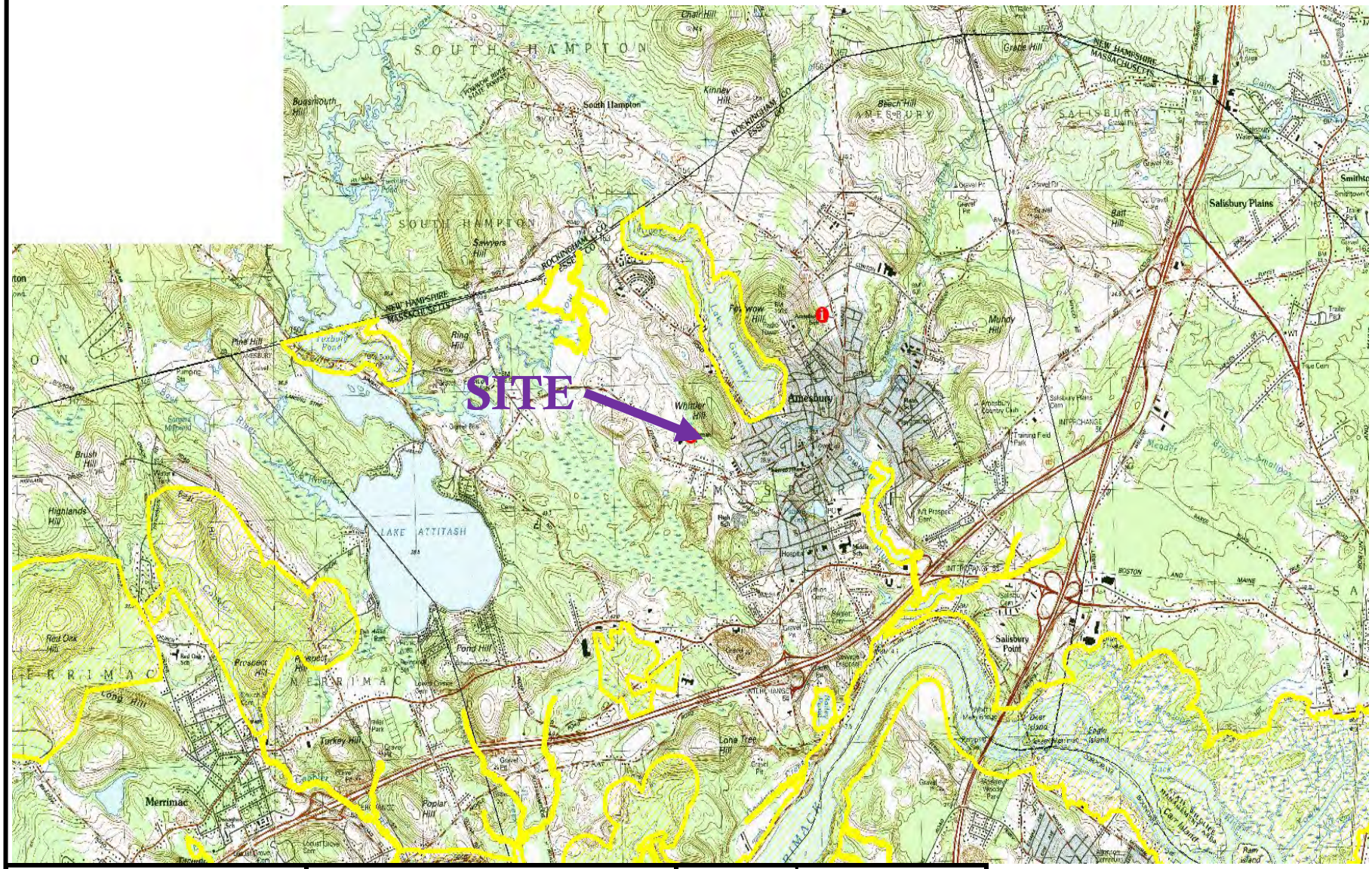
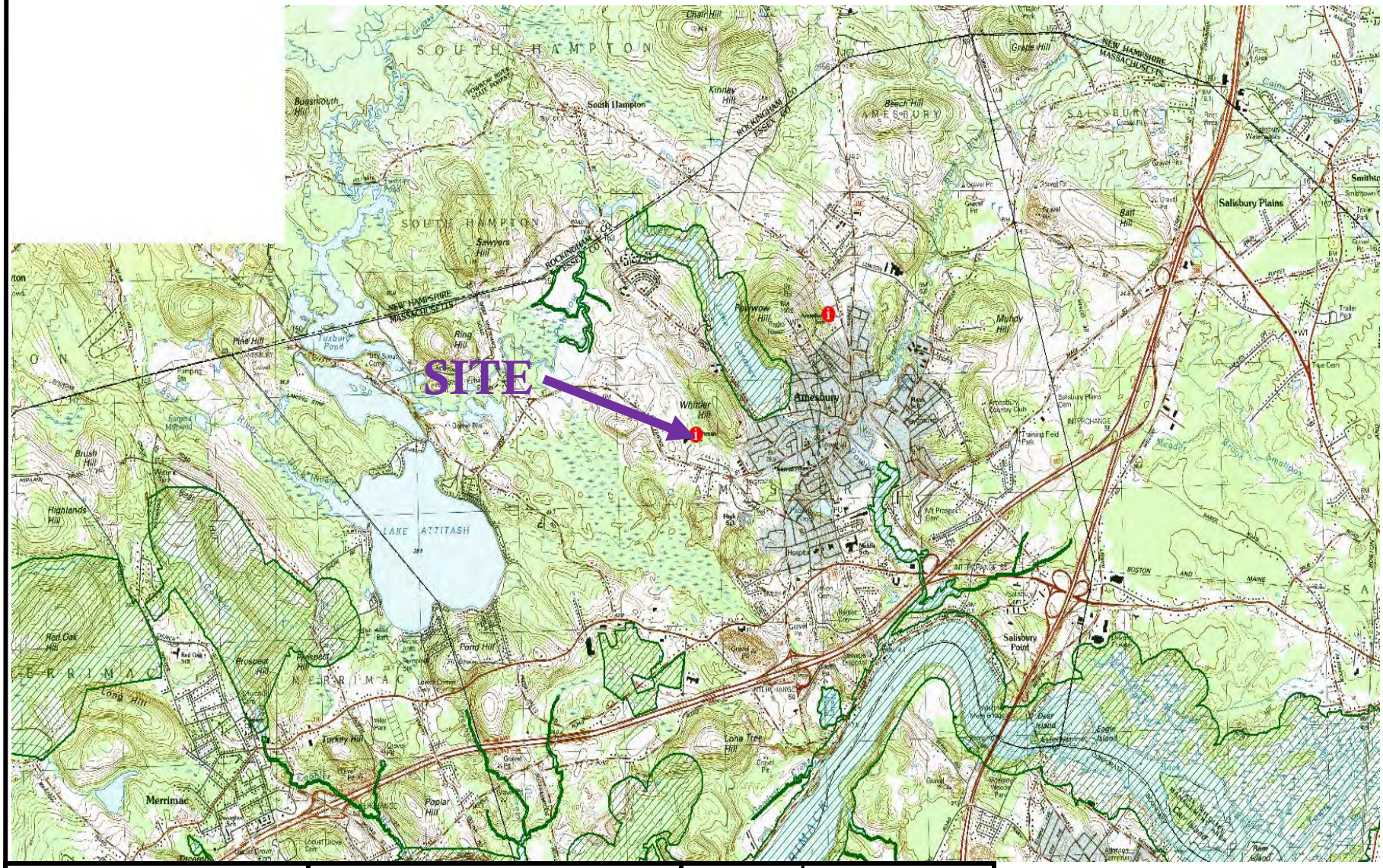


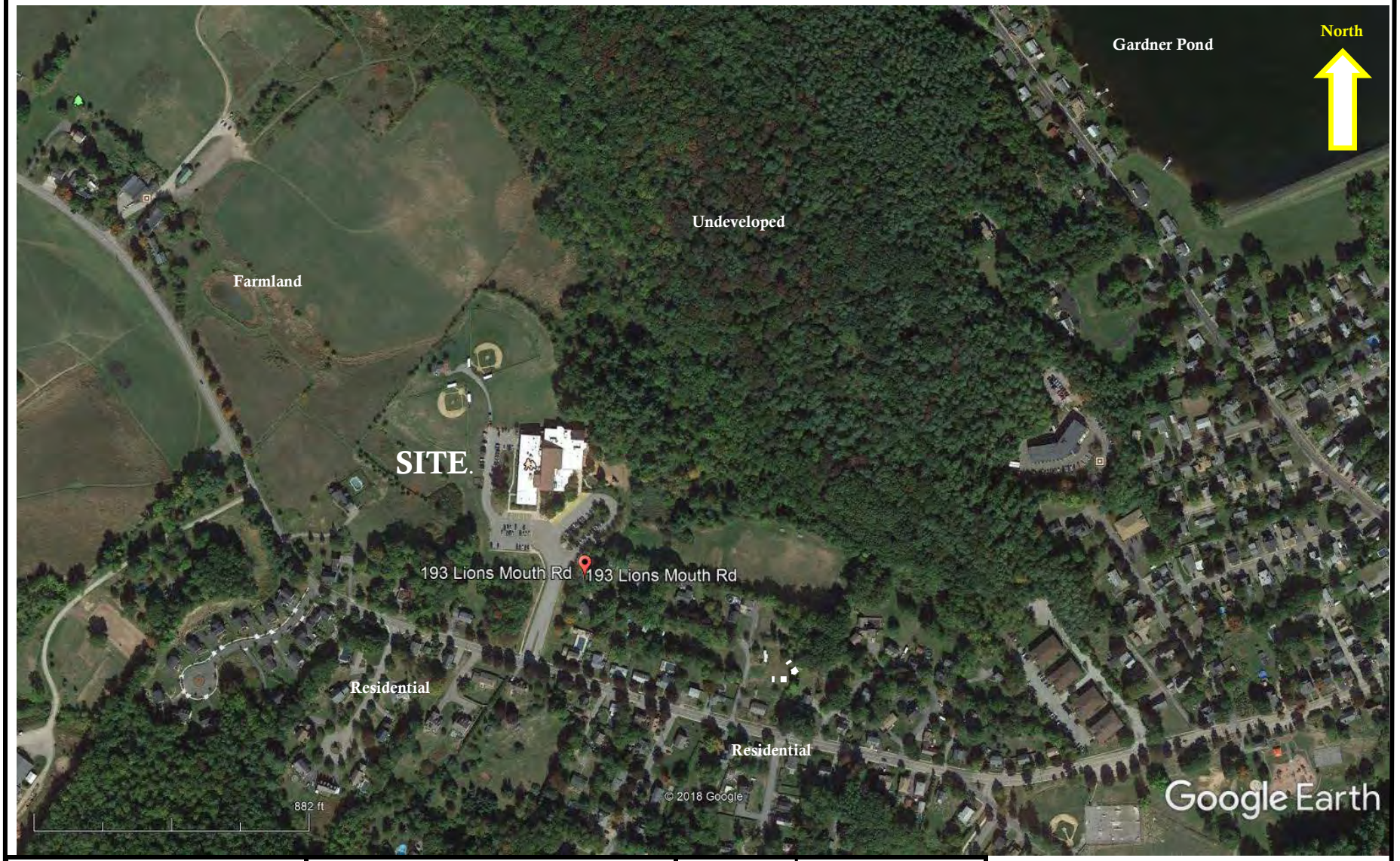
Cashman Elementary School **193 Lions Mouth Road** **Amesbury, Massachusetts** **01913**	**Environmental & Construction Management Services, Inc.**	**Project No.** 1009.073	**Figure 3**
		Priority Habitats of Rare Species Plan	
		Drawn By: KJK	**Date:** 8/23/18



Cashman Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts
01913

Environmental & Construction Management Services, Inc.

Project No. 1009.073	**Figure 4**
Map of Estimated Habitats of Rare Wildlife and Certified Vernal Pools	
Drawn By: KJK	**Date:** 8/23/18



Cashman Elementary School **193 Lions Mouth Road** **Amesbury, Massachusetts** **01913**	**Environmental & Construction Management Services, Inc.**	**Project No.** 1009.073	**Figure 5**
		Aerial Photograph Site Location Plan	
		Drawn By: KJK	**Date:** 8/24/2018

MassDEP - Bureau of Waste Site Cleanup

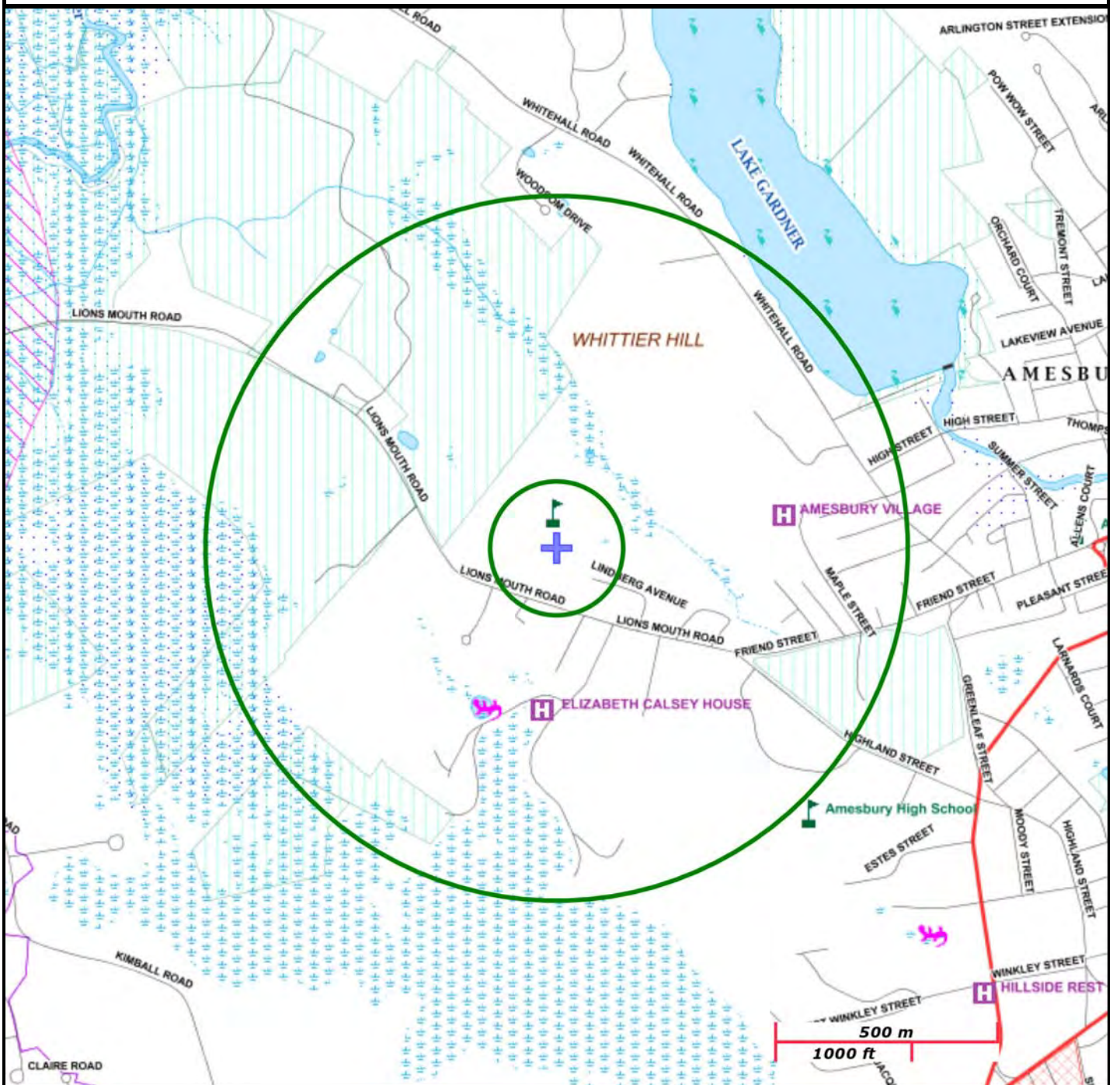
Phase 1 Site Assessment Map: 500 feet & 0.5 Mile Radii

Site Information:
CAHSMAN ELEMENTARY SCHOOL
193 LIONS MOUTH ROAD AMESBURY, MA

NAD83 UTM Meters:
4746679mN , 340744mE (Zone: 19)
September 13, 2018

The information shown is the best available at the date of printing. However, it may be incomplete. The responsible party and LSP are ultimately responsible for ascertaining the true conditions surrounding the site. Metadata for data layers shown on this map can be found at: http://www.mass.gov/mgis/.

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection



Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail

Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct

Basins: Major, PWS; Streams: Perennial, Intermittent, Man Made Shore, Dam

Aquifers: Medium Yield, High Yield, EPA Sole Source

Non Potential Drinking Water Source Area: Medium, High (Yield)

PWS Protection Areas: Zone II, IWPA, Zone A

Hydrography: Open Water, PWS Reservoir, Tidal Flat

Wetlands: Freshwater, Saltwater, Cranberry Bog

FEMA 100yr Floodplain; Protected Open Space; ACEC

Est. Rare Wetland Wildlife Hab; Vernal Pool: Cert., Potential

Solid Waste Landfill; PWS: Com.GW,SW, Emerg., Non-Com.

National Flood Hazard Layer FIRMette

FEMA

42°51'31.27"N

70°57'17.71"W



70°56'40.25"W

42°51'4.90"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Legend

FIGURE 7

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/13/2018 at 3:39:51 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



Cashman Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts
01913

Environmental & Construction Management Services, Inc.

Project No. 1009.073	**Figure 8**
Site Plan	
Drawn By: KJK	**Date:** 8/23/18

GENERAL NOTES

1. SEE SHEETS 1.3.01 AND 1.3.02 FOR ALL EROSION AND SEDIMENT CONTROL BARRIER INSTALLATIONS.
2. SEE SHEETS 1.3.01 AND 1.3.02 FOR ALL AREAS OF FUTURE STORMWATER MANAGEMENT. ALSO SEE NOTE 3 ON SHEET 1.3.01.
3. FOR TREES TO BE PROTECTED AND TO REMAIN, SEE LANDSCAPE PLANS.

Soil Sample Legend

- Surface Loam Sample
- Subsoil Sample
  - 24" Depth at Smaple 1
  - 22" Depth at Sample 2

STRIP EXISTING LOAM TOPSOIL AND STOCKPILE IN THE AREA DESIGNATED FOR STOCKPILING (AREA SHOWN CROSS HATCHED)

STRIP EXISTING LOAM TOPSOIL AND STOCKPILE IN THE AREA DESIGNATED FOR STOCKPILING (AREA SHOWN CROSS HATCHED)

STRIP EXISTING LOAM TOPSOIL AND STOCKPILE IN THE AREA DESIGNATED FOR STOCKPILING (AREA SHOWN CROSS HATCHED)

STRIP EXISTING LOAM TOPSOIL AND STOCKPILE IN THE AREA DESIGNATED FOR STOCKPILING (AREA SHOWN CROSS HATCHED)

WITHIN THE AREA OF THE EXISTING LOW SPOT, DO NOT REMOVE THE VEGETATIVE COVER OR TOPSOIL.

LOAM TOPSOIL STOCKPILE AREA WITHIN THE LIMIT SHOWN FOR LOAM TOPSOIL STOCKPILE. DO NOT REMOVE THE VEGETATIVE COVER OR TOPSOIL.

DO NOT REMOVE THE VEGETATIVE COVER OR TOPSOIL WITHIN THIS AREA.

LION'S MOUTH ROAD

LINDBERGH AVENUE (PUBLIC - 50' WIDE)

LINDBERGH AVENUE (DISCONTINUED)

MASSACHUSETTS STATE PLANE COORDINATES (NAD83 - GEOID 12A)

AMESBURY ELEMENTARY SCHOOL

EARLY SITE PREPARATION

AMESBURY, MA

DINISCO DESIGN
architects + planners

99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2858

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

Thompson Engineering Company, Inc.
Electrical Engineers
89 Newbury Street, Suite 103
Danvers, MA 01923
(617) 866-9066

Hancock Associates
Surveyor
185 Centre Street
Danvers, MA 09123
(978) 777-3050

ECMS Figure 9
Soil Sample Location Plan

KEY PLAN

NORTH ARROW — STAMP

Date: 6 JULY 2020

Drawn By: KMR

Scale: 0 40 80

Revisions

Number	Date	Description

90% EARLY SITE PACKAGE

Proposed Topsoil Removal Limit Plan

1.3.06

G:\Condocs\ahdr\12526\Dwg\12526_Exp_Rtn.dwg

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TABLES

TABLE 1

SUMMARY OF TOPSOIL/LOAM/SUBSOIL SAMPLES FOR pH, REACTIVITY, IGNITABILITY, MASSDEP 14 METALS, POLCHLORINATED BIPHENYLS (PCBs) & TOTAL PETROLEUM HYDROCARBONS (TPH)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SS-1	SS-2	SSS-3	SSS-4	SSS-5	SSS-6	SSS-7	SSS-8	SSS-9	MassDEP	MassDEP
Laboratory ID		SC58794-01	SC58794-02	SC58794-10	SC58794-11	SC58794-12	SC58794-13	SC58794-14	SC58794-15	SC58794-16	Reportable Concentrations	Imminent Hazard
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020		
Sample Depth		24"	22"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1	
SM2540 G (11) Mod. (%)												
solids	% Solids	89.3	88.8	82.7	88.9	85.8	92.6	83.4	86.1	78.7	NA	
SW846 9045D (pH Units)												
pH		5.99	6.08	6.13	5.58	5.57	5.74	5.71	5.56	5.41	NA	
SW846 Ch. 7.3 (mg/kg dry)												
Reactivity		Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative		
Reactive Cyanide		<6	<7	<7	<6	<6	<6	<7	<6	<7	30	
Reactive Sulfide		< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20		
SW846 1030 (N/A)												
NA	Ignitability by Definition	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	NA	
MassDEP 14 Metals - SW846 6010C (mg/kg)												
7440-36-0	Antimony	<5.59	<5.58	<5.98	<5.41	<6.27	<5.63	<6.01	<6.24	<6.28	20	
7440-38-2	Arsenic	**39.9**	**55.9**	**36.6**	**20.5**	**53.4**	**29.6**	**48.6**	**48.7**	**82.3**	**20**	**40**
7440-41-7	Beryllium	<0.559	<0.558	<0.598	<0.541	<0.627	<0.563	<0.601	<0.624	<0.628	90	
7440-43-9	Cadmium	<0.559	<0.558	<0.598	<0.541	<0.627	<0.563	<0.601	<0.624	<0.628	70	
7440-47-3	Chromium	22.6	19.4	21.8	18.8	25.0	30.0	65.9	31.6	24.7	100	
7439-92-1	Lead	8.42	19.3	17.0	18.6	17.0	15.8	28.6	21.0	22.9	200	
7440-02-0	Nickel	39.7	71.4	33.2	20.3	46.2	25.6	44.8	47.7	76.0	600	
7782-49-2	Selenium	<1.68	<1.67	<1.80	<1.62	<1.88	<1.69	<1.80	<1.87	<1.88	400	
7440-22-4	Silver	<3.35	<3.35	<3.59	<3.25	<3.76	<3.38	<3.60	<3.75	<3.77	100	
7440-28-0	Thallium	<3.35	<3.35	<3.59	<3.25	<3.76	<3.38	<3.60	<3.75	<3.77	8	
7440-62-2	Vanadium	22.7	24.5	30.1	24.5	33.9	35.8	46.7	36.0	39.4	400	
7440-66-6	Zinc	36.3	58.5	107	36.0	52.1	43.2	56.2	52.3	64.7	1000	
7440-39-3	Barium	18.4	22.5	30.0	29.5	30.3	28.6	34.6	33.0	29.1	1000	
RCRA Metals - SW846 7471B (mg/kg)												
7439-97-6	Mercury	<0.115	<0.127	<0.110	<0.116	<0.103	<0.120	<0.128	<0.115	<0.120	20	
Polychlorinated biphenyls (PCBs) - SW846 8082A (µg/kg)												
12674-11-2	Aroclor-1016	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
11104-28-2	Aroclor-1221	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
11141-16-5	Aroclor-1232	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
53469-21-9	Aroclor-1242	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
12672-29-6	Aroclor-1248	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
11097-69-1	Aroclor-1254	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
11096-82-5	Aroclor-1260	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
37324-23-5	Aroclor-1262	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	-	
11100-14-4	Aroclor-1268	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	-	
Total Petroleum Hydrocarbons (TPH) 8100 by GC (mg/kg)												
PH(TOT)	Total Petroleum Hydrocarbons	24.9	38.7	113	118	106	134	170	111	129	1000	

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazrdous Materials List (MOHML) revised (effective) 2014

Environmental & Construction Management Services, Inc.

TABLE 1

SUMMARY OF TOPSOIL/LOAM/SUBSOIL SAMPLES FOR pH, REACTIVITY, IGNITABILITY, MASSDEP 14 METALS, POLCHLORINATED BIPHENYLS (PCBs) & TOTAL PETROLEUM HYDROCARBONS (TPH)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location Laboratory ID Sample Date Sample Depth		SSS-10 SC58794-03 7/9/2020 2-6"	SSS-11 SC58794-04 7/9/2020 2-6"	SSS-12 SC58794-05 7/9/2020 2-6"	SSS-13 SC58794-06 7/9/2020 2-6"	SSS-14 SC58794-07 7/9/2020 2-6"	SSS-15 SC58794-17 7/9/2020 2-6"	SSS-16 SC58794-08 7/9/2020 2-6"	SSS-17 SC58794-09 7/9/2020 2-6"	MassDEP Reportable Concentrations RCS-1	MassDEP Imminent Hazard
SM2540 G (11) Mod. (%)											
solids	% Solids	80.1	80.6	83.3	79.0	86.9	79.8	90.3	89.6	NA	
SW846 9045D (pH Units)											
pH		6.17	5.47	5.71	6.35	6.03	5.69	6.08	6.11		
SW846 Ch. 7.3 (mg/kg dry)											
Reactivity		Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative		
Reactive Cyanide		<7	<9	<6	<7	<6	<7	<6	<6	30	
Reactive Sulfide		< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20		
SW846 1030 (N/A)											
NA	Ignitability by Definition	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	NA	
MassDEP 14 Metals - SW846 6010C (mg/kg)											
7440-36-0	Antimony	<5.89	<6.24	<5.56	<6.11	<5.63	<6.33	<5.58	<5.33	20	
7440-38-2	Arsenic	**25.4**	**33.6**	**39.2**	**49.1**	**23.7**	**37.8**	**36.6**	**21.9**	**20**	**40**
7440-41-7	Beryllium	<0.589	<0.624	<0.556	<0.611	<0.563	<0.633	<0.558	<0.533	90	
7440-43-9	Cadmium	<0.589	<0.624	<0.556	<0.611	<0.563	<0.633	<0.558	<0.533	70	
7440-47-3	Chromium	22.9	23.2	17.4	23.3	36.0	31.5	21.7	19.4	100	
7439-92-1	Lead	13.7	18.9	19.6	22.7	13.7	25.9	17.5	12.1	200	
7440-02-0	Nickel	28.2	30.4	26.9	37.2	26.1	37.7	30.6	27.9	600	
7782-49-2	Selenium	<1.77	<1.87	<1.67	<1.83	<1.69	<1.90	<1.67	<1.60	400	
7440-22-4	Silver	<3.53	<3.74	<3.34	<3.67	<3.38	<3.80	<3.35	<3.20	100	
7440-28-0	Thallium	<3.53	<3.74	<3.34	<3.67	<3.38	<3.80	<3.35	<3.20	8	
7440-62-2	Vanadium	29.6	38.3	33.5	34.6	41.9	36.3	30.6	8.48	400	
7440-66-6	Zinc	60.8	43.2	37.9	49.2	44.6	60.7	44.3	61.8	1000	
7440-39-3	Barium	26.5	24.8	21.7	28.9	44.1	46.3	24.0	113	1000	
RCRA Metals - SW846 7471B (mg/kg)											
7439-97-6	Mercury	<0.117	<0.126	<0.129	<0.133	<0.118	<0.123	<0.119	<0.116	20	
Polychlorinated biphenyls (PCBs) - SW846 8082A (µg/kg)											
12674-11-2	Aroclor-1016	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
11104-28-2	Aroclor-1221	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
11141-16-5	Aroclor-1232	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
53469-21-9	Aroclor-1242	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
12672-29-6	Aroclor-1248	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
11097-69-1	Aroclor-1254	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
11096-82-5	Aroclor-1260	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
37324-23-5	Aroclor-1262	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	-	
11100-14-4	Aroclor-1268	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	-	
Total Petroleum Hydrocarbons (TPH) 8100 by GC (mg/kg)											
PH(TOT)	Total Petroleum Hydrocarbons	109	184	180	93.0	116	168	93.6	49.7	1000	

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazrdous Materials List (MOHML) revised (effective) 2014

Environmental & Construction Management Services, Inc.

TABLE 2

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR VOLATILE ORGANIC COMPOUNDS (VOCs)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SS-1	SS-2	SSS-3	SSS-4	SSS-5	SSS-6	SSS-7	SSS-8	SSS-9	MassDEP Reportable Concentrations
Laboratory ID		SC58794-01	SC58794-02	SC58794-10	SC58794-11	SC58794-12	SC58794-13	SC58794-14	SC58794-15	SC58794-16	
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	
Sample Depth		24"	22"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Volatile Organic Compounds (VOCs) - SW846 8260B (µg/kg)											
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
67-64-1	Acetone	<532	<573	<711	<643	<662	<521	<594	<605	<760	6000
107-13-1	Acrylonitrile	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
71-43-2	Benzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	2000
108-86-1	Bromobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
74-97-5	Bromochloromethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
75-27-4	Bromodichloromethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
75-25-2	Bromoform	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
74-83-9	Bromomethane	<106	<115	<142	<129	<132	<104	<119	<121	<152	500
78-93-3	2-Butanone (MEK)	<106	<115	<142	<129	<132	<104	<119	<121	<152	4000
104-51-8	n-Butylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
135-98-8	sec-Butylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
98-06-6	tert-Butylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
75-15-0	Carbon disulfide	<106	<115	<142	<129	<132	<104	<119	<121	<152	100000
56-23-5	Carbon tetrachloride	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	5000
108-90-7	Chlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000
75-00-3	Chloroethane	<106	<115	<142	<129	<132	<104	<119	<121	<152	100000
67-66-3	Chloroform	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	200
74-87-3	Chloromethane	<106	<115	<142	<129	<132	<104	<119	<121	<152	100000
95-49-8	2-Chlorotoluene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
106-43-4	4-Chlorotoluene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
96-12-8	1,2-Dibromo-3-chloropropane	<106	<115	<142	<129	<132	<104	<119	<121	<152	10000
124-48-1	Dibromochloromethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	5
106-93-4	1,2-Dibromoethane (EDB)	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
74-95-3	Dibromomethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	500000
95-50-1	1,2-Dichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	9000
541-73-1	1,3-Dichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	3000
106-46-7	1,4-Dichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	700
75-71-8	Dichlorodifluoromethane (Freon12)	<106	<115	<142	<129	<132	<104	<119	<121	<152	1000000
75-34-3	1,1-Dichloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	400
107-06-2	1,2-Dichloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
75-35-4	1,1-Dichloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	3000
156-59-2	cis-1,2-Dichloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	300
156-60-5	trans-1,2-Dichloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000
78-87-5	1,2-Dichloropropane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
142-28-9	1,3-Dichloropropane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	500000
594-20-7	2,2-Dichloropropane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
563-58-6	1,1-Dichloropropene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
10061-01-5	cis-1,3-Dichloropropene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	10
10061-02-6	trans-1,3-Dichloropropene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	10
100-41-4	Ethylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	40000
87-68-3	Hexachlorobutadiene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	30000
591-78-6	2-Hexanone (MBK)	<106	<115	<142	<129	<132	<104	<119	<121	<152	100000
98-82-8	Isopropylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000000
99-87-6	4-Isopropyltoluene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
1634-04-4	Methyl tert-butyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
108-10-1	4-Methyl-2-pentanone (MIBK)	<106	<115	<142	<129	<132	<104	<119	<121	<152	400
75-09-2	Methylene chloride	<106	<115	<142	<129	<132	<104	<119	<121	<152	100
91-20-3	Naphthalene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	4000
103-65-1	n-Propylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
100-42-5	Styrene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	3000
630-20-6	1,1,1,2-Tetrachloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
79-34-5	1,1,2,2-Tetrachloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	5
127-18-4	Tetrachloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000
108-88-3	Toluene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	30000
87-61-6	1,2,3-Trichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
120-82-1	1,2,4-Trichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	2000
108-70-3	1,3,5-Trichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	30000
71-55-6	1,1,1-Trichloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
79-00-5	1,1,2-Trichloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
79-01-6	Trichloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	300
75-69-4	Trichlorofluoromethane (Freon 11)	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000000
96-18-4	1,2,3-Trichloropropane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
95-63-6	1,2,4-Trimethylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000000
108-67-8	1,3,5-Trimethylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	10000
75-01-4	Vinyl chloride	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	700
179601-23-1	m,p-Xylene	<106	<115	<142	<129	<132	<104	<119	<121	<152	300000
95-47-6	o-Xylene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	500000
109-99-9	Tetrahydrofuran	<106	<115	<142	<129	<132	<104	<119	<121	<152	500000
60-29-7	Ethyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
994-05-8	Tert-amyl methyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
637-92-3	Ethyl tert-butyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
108-20-3	Di-isopropyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
75-65-0	Tert-Butanol / butyl alcohol	<1060	<1150	<1420	<1290	<1320	<1040	<1190	<1210	<1520	100000
123-91-1	1,4-Dioxane	<1060	<1150	<1420	<1290	<1320	<1040	<1190	<1210	<1520	10000
110-57-6	trans-1,4-Dichloro-2-butene	<266	<286	<356	<321	<331	<261	<297	<302	<380	200
64-17-5	Ethanol	<10600	<11500	<14200	<12900	<13200	<10400	<11900	<12100	<15200	100000

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazrdous Materials List (MOHML) revised (effective) February 14, 2008

Environmental & Construction Management Services, Inc.

TABLE 2

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR VOLATILE ORGANIC COMPOUNDS (VOCs)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SSS-10	SSS-11	SSS-12	SSS-13	SSS-14	SSS-15	SSS-16	SSS-17	MassDEP Reportable Concentrations
Laboratory ID		SC58794-03	SC58794-04	SC58794-05	SC58794-06	SC58794-07	SC58794-17	SC58794-08	SC58794-09	
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	
Sample Depth		2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Volatile Organic Compounds (VOCs) - SW846 8260B (µg/kg)										
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
67-64-1	Acetone	<686	<693	<637	<695	<585	<695	<540	<529	6000
107-13-1	Acrylonitrile	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
71-43-2	Benzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	2000
108-86-1	Bromobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
74-97-5	Bromochloromethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
75-27-4	Bromodichloromethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
75-25-2	Bromoform	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
74-83-9	Bromomethane	<137	<139	<127	<139	<117	<139	<108	<106	500
78-93-3	2-Butanone (MEK)	<137	<139	<127	<139	<117	<139	<108	<106	4000
104-51-8	n-Butylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
135-98-8	sec-Butylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
98-06-6	tert-Butylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
75-15-0	Carbon disulfide	<137	<139	<127	<139	<117	<139	<108	<106	100000
56-23-5	Carbon tetrachloride	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	5000
108-90-7	Chlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000
75-00-3	Chloroethane	<137	<139	<127	<139	<117	<139	<108	<106	100000
67-66-3	Chloroform	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	200
74-87-3	Chloromethane	<137	<139	<127	<139	<117	<139	<108	<106	100000
95-49-8	2-Chlorotoluene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
106-43-4	4-Chlorotoluene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
96-12-8	1,2-Dibromo-3-chloropropane	<137	<139	<127	<139	<117	<139	<108	<106	10000
124-48-1	Dibromochloromethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	5
106-93-4	1,2-Dibromoethane (EDB)	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
74-95-3	Dibromomethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	500000
95-50-1	1,2-Dichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	9000
541-73-1	1,3-Dichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	3000
106-46-7	1,4-Dichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	700
75-71-8	Dichlorodifluoromethane (Freon12)	<137	<139	<127	<139	<117	<139	<108	<106	1000000
75-34-3	1,1-Dichloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	400
107-06-2	1,2-Dichloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
75-35-4	1,1-Dichloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	3000
156-59-2	cis-1,2-Dichloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	300
156-60-5	trans-1,2-Dichloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000
78-87-5	1,2-Dichloropropane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
142-28-9	1,3-Dichloropropane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	500000
594-20-7	2,2-Dichloropropane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
563-58-6	1,1-Dichloropropene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
10061-01-5	cis-1,3-Dichloropropene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	10
10061-02-6	trans-1,3-Dichloropropene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	10
100-41-4	Ethylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	40000
87-68-3	Hexachlorobutadiene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	30000
591-78-6	2-Hexanone (MBK)	<137	<139	<127	<139	<117	<139	<108	<106	100000
98-82-8	Isopropylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000000
99-87-6	4-Isopropyltoluene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
1634-04-4	Methyl tert-butyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
108-10-1	4-Methyl-2-pentanone (MIBK)	<137	<139	<127	<139	<117	<139	<108	<106	400
75-09-2	Methylene chloride	<137	<139	<127	<139	<117	<139	<108	<106	100
91-20-3	Naphthalene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	4000
103-65-1	n-Propylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
100-42-5	Styrene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	3000
630-20-6	1,1,1,2-Tetrachloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
79-34-5	1,1,2,2-Tetrachloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	5
127-18-4	Tetrachloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000
108-88-3	Toluene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	30000
87-61-6	1,2,3-Trichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
120-82-1	1,2,4-Trichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	2000
108-70-3	1,3,5-Trichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	30000
71-55-6	1,1,1-Trichloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
79-00-5	1,1,2-Trichloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
79-01-6	Trichloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	300
75-69-4	Trichlorofluoromethane (Freon 11)	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000000
96-18-4	1,2,3-Trichloropropane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
95-63-6	1,2,4-Trimethylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000000
108-67-8	1,3,5-Trimethylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	10000
75-01-4	Vinyl chloride	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	700
179601-23-1	m,p-Xylene	<137	<139	<127	<139	<117	<139	<108	<106	300000
95-47-6	o-Xylene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	500000
109-99-9	Tetrahydrofuran	<137	<139	<127	<139	<117	<139	<108	<106	500000
60-29-7	Ethyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
994-05-8	Tert-amyl methyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
637-92-3	Ethyl tert-butyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
108-20-3	Di-isopropyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
75-65-0	Tert-Butanol / butyl alcohol	<1370	<1390	<1270	<1390	<1170	<1390	<1080	<1060	100000
123-91-1	1,4-Dioxane	<1370	<1390	<1270	<1390	<1170	<1390	<1080	<1060	10000
110-57-6	trans-1,4-Dichloro-2-butene	<343	<347	<318	<348	<292	<347	<270	<264	200
64-17-5	Ethanol	<13700	<13900	<12700	<13900	<11700	<13900	<10800	<10600	100000

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazrdous Materials List (MOHML) revised (effective) February 14, 2008

Environmental & Construction Management Services, Inc.

TABLE 3

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SS-1	SS-2	SSS-3	SSS-4	SSS-5	SSS-6	SSS-7	SSS-8	SSS-9	MassDEP Reportable Concentrations
Laboratory ID		SC58794-01	SC58794-02	SC58794-10	SC58794-11	SC58794-12	SC58794-13	SC58794-14	SC58794-15	SC58794-16	
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	
Sample Depth		24"	22"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Semi-Volatile Organic Compounds (SVOCs) - SW846 8270D (µg/kg)											
83-32-9	Acenaphthene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	4000
208-96-8	Acenaphthylene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000
62-53-3	Aniline	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
120-12-7	Anthracene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
103-33-3	Azobenzene/Diphenyldiazene	<368	<369	<396	<367	<379	<352	<394	<379	<415	50000
92-87-5	Benzidine	<736	<738	<792	<735	<759	<704	<787	<757	<829	10000
56-55-3	Benzo (a) anthracene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	7000
50-32-8	Benzo (a) pyrene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	2000
205-99-2	Benzo (b) fluoranthene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	7000
191-24-2	Benzo (g,h,i) perylene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
207-08-9	Benzo (k) fluoranthene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
65-85-0	Benzoic acid	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
100-51-6	Benzyl alcohol	<368	<369	<396	<367	<379	<352	<394	<379	<415	-
111-91-1	Bis(2-chloroethoxy)methane	<368	<369	<396	<367	<379	<352	<394	<379	<415	500000
111-44-4	Bis(2-chloroethyl)ether	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
108-60-1	Bis(2-chloroisopropyl)ether	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
117-81-7	Bis(2-ethylhexyl)phthalate	<186	<187	<201	<186	<192	<178	<199	<192	<210	200000
101-55-3	4-Bromophenyl phenyl ether	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
85-68-7	Butyl benzyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
86-74-8	Carbazole	<186	<187	<201	<186	<192	<178	<199	<192	<210	-
59-50-7	4-Chloro-3-methylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
106-47-8	4-Chloroaniline	<186	<187	<201	<186	<192	<178	<199	<192	<210	1000
91-58-7	2-Chloronaphthalene	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
95-57-8	2-Chlorophenol	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
7005-72-3	4-Chlorophenyl phenyl ether	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
218-01-9	Chrysene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	70000
53-70-3	Dibenzo (a,h) anthracene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	700
132-64-9	Dibenzofuran	<186	<187	<201	<186	<192	<178	<199	<192	<210	100000
95-50-1	1,2-Dichlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	9000
541-73-1	1,3-Dichlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000
106-46-7	1,4-Dichlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	700
91-94-1	3,3´-Dichlorobenzidine	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000
120-83-2	2,4-Dichlorophenol	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
84-66-2	Diethyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	10000
131-11-3	Dimethyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	30000
105-67-9	2,4-Dimethylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	700
84-74-2	Di-n-butyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	50000
534-52-1	4,6-Dinitro-2-methylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	50000
51-28-5	2,4-Dinitrophenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	3000
121-14-2	2,4-Dinitrotoluene	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
606-20-2	2,6-Dinitrotoluene	<186	<187	<201	<186	<192	<178	<199	<192	<210	100000
117-84-0	Di-n-octyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
206-44-0	Fluoranthene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
86-73-7	Fluorene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
118-74-1	Hexachlorobenzene	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
87-68-3	Hexachlorobutadiene	<186	<187	<201	<186	<192	<178	<199	<192	<210	6000
77-47-4	Hexachlorocyclopentadiene	<186	<187	<201	<186	<192	<178	<199	<192	<210	50000
67-72-1	Hexachloroethane	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
193-39-5	Indeno (1,2,3-cd) pyrene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	7000
78-59-1	Isophorone	<186	<187	<201	<186	<192	<178	<199	<192	<210	100000
91-57-6	2-Methylnaphthalene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	700
95-48-7	2-Methylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	500000
108-39-4, 106-44-5	3 & 4-Methylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	500000
91-20-3	Naphthalene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	4000
88-74-4	2-Nitroaniline	<368	<369	<396	<367	<379	<352	<394	<379	<415	-
99-09-2	3-Nitroaniline	<368	<369	<396	<367	<379	<352	<394	<379	<415	-
100-01-6	4-Nitroaniline	<186	<187	<201	<186	<192	<178	<199	<192	<210	1000000
98-95-3	Nitrobenzene	<186	<187	<201	<186	<192	<178	<199	<192	<210	500000
88-75-5	2-Nitrophenol	<186	<187	<201	<186	<192	<178	<199	<192	<210	100000
100-02-7	4-Nitrophenol	<1470	<1480	<1580	<1470	<1520	<1410	<1570	<1510	<1660	100000
62-75-9	N-Nitrosodimethylamine	<186	<187	<201	<186	<192	<178	<199	<192	<210	50000
621-64-7	N-Nitrosodi-n-propylamine	<186	<187	<201	<186	<192	<178	<199	<192	<210	50000
86-30-6	N-Nitrosodiphenylamine	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
87-86-5	Pentachlorophenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	3000
85-01-8	Phenanthrene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	10000
108-95-2	Phenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000
129-00-0	Pyrene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
110-86-1	Pyridine	<368	<369	<396	<367	<379	<352	<394	<379	<415	500000
120-82-1	1,2,4-Trichlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	2000
90-12-0	1-Methylnaphthalene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	-
95-95-4	2,4,5-Trichlorophenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	3000
88-06-2	2,4,6-Trichlorophenol	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
82-68-8	Pentachloronitrobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
95-94-3	1,2,4,5-Tetrachlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Boldfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

Environmental & Construction Management Services, Inc.

TABLE 3

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SSS-10	SSS-11	SSS-12	SSS-13	SSS-14	SSS-15	SSS-16	SSS-17	MassDEP Reportable Concentrations
Laboratory ID		SC58794-03	SC58794-04	SC58794-05	SC58794-06	SC58794-07	SC58794-17	SC58794-08	SC58794-09	
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	
Sample Depth		2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Semi-Volatile Organic Compounds (SVOCs) - SW846 8270D (µg/kg)										
83-32-9	Acenaphthene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	4000
208-96-8	Acenaphthylene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000
62-53-3	Aniline	<407	<405	<385	<414	<375	<407	<361	<356	100000
120-12-7	Anthracene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
103-33-3	Azobenzene/Diphenyldiazene	<407	<405	<385	<414	<375	<407	<361	<356	50000
92-87-5	Benzidine	<815	<809	<771	<828	<750	<814	<722	<713	10000
56-55-3	Benzo (a) anthracene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	7000
50-32-8	Benzo (a) pyrene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	2000
205-99-2	Benzo (b) fluoranthene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	7000
191-24-2	Benzo (g,h,i) perylene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
207-08-9	Benzo (k) fluoranthene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
65-85-0	Benzoic acid	<407	<405	<385	<414	<375	<407	<361	<356	1000000
100-51-6	Benzyl alcohol	<407	<405	<385	<414	<375	<407	<361	<356	-
111-91-1	Bis(2-chloroethoxy)methane	<407	<405	<385	<414	<375	<407	<361	<356	500000
111-44-4	Bis(2-chloroethyl)ether	<206	<205	<195	<210	<190	<206	<183	<180	700
108-60-1	Bis(2-chloroisopropyl)ether	<206	<205	<195	<210	<190	<206	<183	<180	700
117-81-7	Bis(2-ethylhexyl)phthalate	305	<205	<195	<210	<190	<206	<183	<180	200000
101-55-3	4-Bromophenyl phenyl ether	<407	<405	<385	<414	<375	<407	<361	<356	100000
85-68-7	Butyl benzyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	100000
86-74-8	Carbazole	<206	<205	<195	<210	<190	<206	<183	<180	-
59-50-7	4-Chloro-3-methylphenol	<407	<405	<385	<414	<375	<407	<361	<356	1000000
106-47-8	4-Chloroaniline	<206	<205	<195	<210	<190	<206	<183	<180	1000
91-58-7	2-Chloronaphthalene	<407	<405	<385	<414	<375	<407	<361	<356	1000000
95-57-8	2-Chlorophenol	<206	<205	<195	<210	<190	<206	<183	<180	700
7005-72-3	4-Chlorophenyl phenyl ether	<407	<405	<385	<414	<375	<407	<361	<356	1000000
218-01-9	Chrysene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	70000
53-70-3	Dibenzo (a,h) anthracene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	700
132-64-9	Dibenzofuran	<206	<205	<195	<210	<190	<206	<183	<180	100000
95-50-1	1,2-Dichlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	9000
541-73-1	1,3-Dichlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	1000
106-46-7	1,4-Dichlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	700
91-94-1	3,3´-Dichlorobenzidine	<407	<405	<385	<414	<375	<407	<361	<356	1000
120-83-2	2,4-Dichlorophenol	<206	<205	<195	<210	<190	<206	<183	<180	700
84-66-2	Diethyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	10000
131-11-3	Dimethyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	30000
105-67-9	2,4-Dimethylphenol	<407	<405	<385	<414	<375	<407	<361	<356	700
84-74-2	Di-n-butyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	50000
534-52-1	4,6-Dinitro-2-methylphenol	<407	<405	<385	<414	<375	<407	<361	<356	50000
51-28-5	2,4-Dinitrophenol	<407	<405	<385	<414	<375	<407	<361	<356	3000
121-14-2	2,4-Dinitrotoluene	<206	<205	<195	<210	<190	<206	<183	<180	700
606-20-2	2,6-Dinitrotoluene	<206	<205	<195	<210	<190	<206	<183	<180	100000
117-84-0	Di-n-octyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	1000000
206-44-0	Fluoranthene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
86-73-7	Fluorene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
118-74-1	Hexachlorobenzene	<206	<205	<195	<210	<190	<206	<183	<180	700
87-68-3	Hexachlorobutadiene	<206	<205	<195	<210	<190	<206	<183	<180	6000
77-47-4	Hexachlorocyclopentadiene	<206	<205	<195	<210	<190	<206	<183	<180	50000
67-72-1	Hexachloroethane	<206	<205	<195	<210	<190	<206	<183	<180	700
193-39-5	Indeno (1,2,3-cd) pyrene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	7000
78-59-1	Isophorone	<206	<205	<195	<210	<190	<206	<183	<180	100000
91-57-6	2-Methylnaphthalene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	700
95-48-7	2-Methylphenol	<407	<405	<385	<414	<375	<407	<361	<356	500000
108-39-4, 106-44-5	3 & 4-Methylphenol	<407	<405	<385	<414	<375	<407	<361	<356	500000
91-20-3	Naphthalene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	4000
88-74-4	2-Nitroaniline	<407	<405	<385	<414	<375	<407	<361	<356	-
99-09-2	3-Nitroaniline	<407	<405	<385	<414	<375	<407	<361	<356	-
100-01-6	4-Nitroaniline	<206	<205	<195	<210	<190	<206	<183	<180	1000000
98-95-3	Nitrobenzene	<206	<205	<195	<210	<190	<206	<183	<180	500000
88-75-5	2-Nitrophenol	<206	<205	<195	<210	<190	<206	<183	<180	100000
100-02-7	4-Nitrophenol	<1630	<1620	<1540	<1660	<1500	<1630	<1440	<1430	100000
62-75-9	N-Nitrosodimethylamine	<206	<205	<195	<210	<190	<206	<183	<180	50000
621-64-7	N-Nitrosodi-n-propylamine	<206	<205	<195	<210	<190	<206	<183	<180	50000
86-30-6	N-Nitrosodiphenylamine	<407	<405	<385	<414	<375	<407	<361	<356	100000
87-86-5	Pentachlorophenol	<407	<405	<385	<414	<375	<407	<361	<356	3000
85-01-8	Phenanthrene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	10000
108-95-2	Phenol	<407	<405	<385	<414	<375	<407	<361	<356	1000
129-00-0	Pyrene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
110-86-1	Pyridine	<407	<405	<385	<414	<375	<407	<361	<356	500000
120-82-1	1,2,4-Trichlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	2000
90-12-0	1-Methylnaphthalene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	-
95-95-4	2,4,5-Trichlorophenol	<407	<405	<385	<414	<375	<407	<361	<356	3000
88-06-2	2,4,6-Trichlorophenol	<206	<205	<195	<210	<190	<206	<183	<180	700
82-68-8	Pentachloronitrobenzene	<407	<405	<385	<414	<375	<407	<361	<356	100000
95-94-3	1,2,4,5-Tetrachlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	1000000

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Boldfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

TABLE 4

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR PESTICIDES AND HERBICIDES

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location Laboratory ID Sample Date Sample Depth		SS-1 SC58794-01 7/9/2020 24"	SS-2 SC58794-02 7/9/2020 22"	SSS-3 SC58794-10 7/9/2020 2-6"	SSS-4 SC58794-11 7/9/2020 2-6"	SSS-5 SC58794-12 7/9/2020 2-6"	SSS-6 SC58794-13 7/9/2020 2-6"	SSS-7 SC58794-14 7/9/2020 2-6"	SSS-8 SC58794-15 7/9/2020 2-6"	SSS-9 SC58794-16 7/9/2020 2-6"	MCP Reportable Concentrations RCS-1
Pesticides - SW846 8081B (µg/kg)											
319-84-6	a-BHC	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	50000
319-85-7	b-BHC	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	10000
319-86-8	d-BHC	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	10000
58-89-9	g-BHC (Lindane)	<3.32	<3.34	<3.46	<3.23	<3.46	<3.22	<3.57	<3.45	<3.80	3000
76-44-8	Heptachlor	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	200
309-00-2	Aldrin	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	100000
1024-57-3	Heptachlor epoxide	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	90
959-98-8	Endosulfan I	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	500
60-57-1	Dieldrin	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	50
72-55-9	4,4' -DDE	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	3000
72-20-8	Endrin	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	8000
33213-65-9	Endosulfan II	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	500
72-54-8	4,4' -DDD	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	4000
1031-07-8	Endosulfan sulfate	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	-
50-29-3	4,4' -DDT	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	-
72-43-5	Methoxychlor	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	200000
53494-70-5	Endrin ketone	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	8000
7421-93-4	Endrin aldehyde	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	10000
5103-71-9	alpha-Chlordane	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	-
5103-74-2	gamma-Chlordane	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	-
8001-35-2	Toxaphene	<111	<111	<115	<108	<115	<107	<119	<115	<127	10000
57-74-9	Chlordane	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	700
15972-60-8	Alachlor	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	100
Herbicides - SW846 8151A (µg/kg)											
93-76-5	2,4,5-T	<80	<80	<80	<80	<80	<80	<80	<80	<80	100000
93-72-1	2,4,5-TP (Silvex)	<80	<80	<80	<80	<80	<80	<80	<80	<80	100000
94-75-7	2,4-D	<80	<80	<80	<80	<80	<80	<80	<80	<80	100000
94-82-6	2,4-DB	<80	<80	<80	<80	<80	<80	<80	<80	<80	100000
75-99-0	Dalapon	<80	<80	<80	<80	<80	<80	<80	<80	<80	1000000
1918-00-9	Dicamba	<80	<80	<80	<80	<80	<80	<80	<80	<80	500000
120-36-5	Dichloroprop	<80	<80	<80	<80	<80	<80	<80	<80	<80	-
88-85-7	Dinoseb	<80	<80	<80	<80	<80	<80	<80	<80	<80	500000
94-74-6	MCPA	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	100000
7085-19-0	MCPP	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	-

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Boldfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

TABLE 4

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR PESTICIDES AND HERBICIDES

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SSS-10	SSS-11	SSS-12	SSS-13	SSS-14	SSS-15	SSS-16	SSS-17	MCP
Laboratory ID		SC58794-03	SC58794-04	SC58794-05	SC58794-06	SC58794-07	SC58794-17	SC58794-08	SC58794-09	Reportable
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	Concentrations
Sample Depth		2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Pesticides - SW846 8081B (µg/kg)										
319-84-6	a-BHC	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	4000
319-85-7	b-BHC	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	3000
319-86-8	d-BHC	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	3000
58-89-9	g-BHC (Lindane)	<3.64	<3.69	<3.51	<3.78	<3.38	<3.73	<3.26	<3.34	50000
76-44-8	Heptachlor	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	100
309-00-2	Aldrin	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	100000
1024-57-3	Heptachlor epoxide	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	10000
959-98-8	Endosulfan I	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	700
60-57-1	Dieldrin	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	10000
72-55-9	4,4' -DDE	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	50
72-20-8	Endrin	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	500
33213-65-9	Endosulfan II	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	500
72-54-8	4,4' -DDD	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	-
1031-07-8	Endosulfan sulfate	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	8000
50-29-3	4,4' -DDT	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	10000
72-43-5	Methoxychlor	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	8000
53494-70-5	Endrin ketone	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	3000
7421-93-4	Endrin aldehyde	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	200
5103-71-9	alpha-Chlordane	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	90
5103-74-2	gamma-Chlordane	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	700
8001-35-2	Toxaphene	<121	<123	<117	<126	<113	<124	<109	<111	200000
57-74-9	Chlordane	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	10000
15972-60-8	Alachlor	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	-
Herbicides - SW846 8151A (µg/kg)										
93-76-5	2,4,5-T	<80	<80	<80	<80	<80	<80	<80	<80	100000
93-72-1	2,4,5-TP (Silvex)	<80	<80	<80	<80	<80	<80	<80	<80	100000
94-75-7	2,4-D	<80	<80	<80	<80	<80	<80	<80	<80	100000
94-82-6	2,4-DB	<80	<80	<80	<80	<80	<80	<80	<80	100000
75-99-0	Dalapon	<80	<80	<80	<80	<80	<80	<80	<80	1000000
1918-00-9	Dicamba	<80	<80	<80	<80	<80	<80	<80	<80	500000
120-36-5	Dichloroprop	<80	<80	<80	<80	<80	<80	<80	<80	-
88-85-7	Dinoseb	<80	<80	<80	<80	<80	<80	<80	<80	500000
94-74-6	MCPA	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	100000
7085-19-0	MCPP	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	-

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Boldfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

APPENDIX A

LAGOY RISK ANALYSIS "EVALUATION OF SOIL DATA FROM THE CHARLES C. CASHMAN ELEMENTARY SCHOOL, 193 LIONS MOUTH ROAD, AMESBURY, MASSACHUSETTS DATED JULY 27, 2020

LaGoy Risk Analysis, Inc.
P.O. Box 498
Hopkinton, MA 01748
(508) 208-9299
Peter_LaGoy@msn.com

July 27, 2020

Kevin Kavanaugh
ECMS, Inc.
288 Grove Street, #391
Braintree, MA 02184

RE: Evaluation of Soil Data from the Charles C. Cashman Elementary School, 193 Lions Mouth Road, Amesbury, Massachusetts

Dear Kevin:

I reviewed the soil data collected by Environmental & Construction Management Services, Inc. (ECMS) on July 9, 2020, from the Charles C. Cashman Elementary School property at 193 Lions Mouth Road in Amesbury, Massachusetts. I understand that samples were collected from loam and shallow (2 feet deep) subsoil near an existing baseball field on the property.

Based on my review and using standard calculations following the methodology required by the Massachusetts Department of Environmental Protection (MassDEP), the detected constituents do not pose an Imminent Hazard under the Massachusetts Contingency Plan (MCP), which is the relevant state regulatory program. Using the average concentration of arsenic and the maximum value of other metals that were detected above state-wide background levels for natural soil in Massachusetts as an exposure point concentration (EPC; the level of a constituent that an individual could regularly contact) and site-specific exposure assumptions provided on children and adults likely to use this field, the constituents that were detected do not pose an Imminent Hazard. I would also note that the use does not pose a calculated Significant Risk as that term is defined under the MCP, and that the arsenic appears to be present as a result of its presence in native soil. Although the site does not pose an Imminent Hazard under the MCP, steps to reduce or eliminate the potential for contact with these constituents and the associated soil at the site may still be prudent from both a risk management and MCP perspective.

Initial Evaluation

The Cashman school property in Amesbury, Massachusetts consists of a roughly 35-acre parcel that is currently used for pre-K through 4th grade students. The results of explorations performed at the property indicate that fill material identified at the site contains varying amounts of ash and cinders and may also contain remnants of the former residential building that had occupied the property prior to the garden.

The recent subject sampling event consisted of collecting 15 soil samples from beneath the grass (2-6 inches in depth), and two additional samples of slightly deeper soil (2 feet in depth). Soil was analyzed for the presence of metals, total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs, including the polycyclic aromatic hydrocarbons (PAHs), and pesticides and herbicides. The results of the sampling are presented in Table 1.

Only arsenic was present at a concentration above a reportable concentration. TPH was also detected in most samples (concentrations around 100 mg/kg) but could be present as a result of it use as a binder (waxes) in various lawn care products. Maximum metal concentrations were compared with expected concentrations in soil in Massachusetts (Table 2), and chromium, nickel, and vanadium were present at levels above expected background. The four metals, arsenic, chromium, nickel, and vanadium will be considered in the imminent hazard calculations.

The source of the arsenic is site soils does not appear to be associated with anthropogenic use but rather as a result of naturally-elevated arsenic concentrations. While arsenic was used widely for industrial purposes (e.g., for preservation of hides in tanning; as a pesticide as lead arsenates) the past use of the property is not consistent with these uses, and if the arsenic was present as a result of agricultural pesticide use, lead levels would be expected to be higher. Amesbury is in an area of Massachusetts known to have naturally elevated arsenic levels and consequently, its present is considered most likely to be attributable to natural sources. As such, its presence would not be regulated under the MCP but considering its location at a school, further assessment is prudent.

Imminent Hazard Calculations

An Imminent Hazard Evaluation (IHE) performed in accordance with the MCP evaluates whether constituents that are detected at a site could pose a risk of harm to human health, safety, public welfare, and the environment under current site conditions or for a short period of time (5 years, unless site conditions indicate a shorter time period is appropriate). For this site, the constituent of greatest concern, arsenic appears to be present as a result of natural background, and as such does not pose an imminent hazard. However, because of the use of the property as a school, further calculations are warranted to determine if some mitigation of the presence of even these natural soils may be warranted.

An Imminent Hazard does not exist if the cumulative cancer risk calculated for the short time period is below one in one hundred thousand (1×10^{-5} or 1E-05), the "hazard index" is below ten (10) for most constituents or below one (1) for constituents that have the potential to cause serious effects (specifically lead and cyanide, per a discussion with Nancy Bettinger of MassDEP BWSC ORS in January 2007, and trichloroethylene, per a discussion with Paul Locke of MassDEP in November 2012) following short-term exposures, and the site does not pose a risk to safety, public welfare, or the environment based on a consideration of site conditions and applicable standards. The results of the Imminent Hazard Risk Characterization are used as the basis for a decision as to whether or not an Immediate Response Action is necessary at the site.

This Imminent Hazard Evaluation has been conducted to specifically evaluate metals detected in soil at the Cashman Elementary School in Amesbury, Massachusetts. The purpose of this evaluation is to determine if a calculated Imminent Hazard to human health, as defined by the MCP, currently exists for the area for short-term exposure. Past exposure is likely to have been similar, so this IHE also provides information about possible past risks associated with use of the area.

This IHE focuses on human health. A consideration of site conditions indicates that the presence of the identified constituents does not pose an Imminent Hazard to public welfare, the environment, or safety.

Toxicity Assessment

The toxicity values for the metals are presented in Tables 3 and 5. Further description of the toxicity of arsenic, the metal of primary concern, is presented below.

Arsenic is a metalloid that has been shown to cause skin, bladder, and perhaps other cancers in individuals exposed through drinking water from wells with high arsenic levels. Arsenic has also been associated with an increased risk of lung cancer in exposed workers. Chronic exposure to arsenic at high levels causes adverse effects on the gastrointestinal tract. In addition, there is some evidence that exposure causes polyneuropathy. EPA has established an oral reference dose of 0.0003 mg/kg/day and an inhalation reference concentration of 2.5×10^{-5} mg/m^3. EPA has also established an oral cancer potency factor of 1.5 $(mg/kg/day)^{-1}$ and an inhalation unit risk of 0.003 $(ug/m^3)^{-1}$ and MassDEP uses these values.

Exposure Evaluation

As part of an IHE, concentrations of constituents detected in accessible surface soil can be used to evaluate the potential for actual exposure and risk with respect to current site uses and activities. The MCP defines accessible surface soil as soil that extends to a depth of 6 inches below the ground surface. As noted in MassDEP guidance, for an IHE, the focus is on short term risks, and maximum concentrations are typically used in the assessment as exposure point concentrations (EPCs; the concentration an individual could be exposed to on a regular basis). Maximum concentrations were used as EPCs for chromium, nickel, and vanadium. For this site, concentrations of arsenic in shallow soil

were detected in a narrow range (21.9 mg/kg – 82.3 mg/kg), and the 95% Upper Confidence Limit (UCL) calculated using the EPA's ProUCL model version 5.1 was used to calculate an EPC of 46.4 mg/kg for arsenic, based on a normal distribution of data and the Student t-test.

Quantitative Exposure Assessment

In general, individuals are exposed to materials released into the environment in varying quantities and proportions via a wide variety of possible exposure routes. The actual amount of material to which an individual is exposed depends on the individual's frequency, extent, and duration of exposure, which in turn depend on many factors, including location of residence, age, body weight, sex, and activity patterns. Patterns of exposure are highly variable among individuals. This large potential variation in exposure to environmental conditions implies that a certain amount of uncertainty is inherent in risk assessment. This exposure assessment uses standard approaches and assumptions that are designed to be health protective, i.e., they are designed to produce estimates of exposure that overestimate, rather than underestimate, actual exposure and risk.

The purpose of a quantitative exposure assessment is to estimate the Chronic Daily Intake (CDI) of each contaminant of concern by an individual for each exposure route. For carcinogens, the CDI is averaged over the full lifetime (by convention, assumed to be 70 years; MassDEP 2008) and is termed the Lifetime Average Daily Dose or LADD for oral and dermal exposures. For noncarcinogens, the dose is only averaged over the period of exposure and is noted as the Average Daily Dose or ADD for oral and dermal exposure.

Soil Exposure - Children

Children are at school 180 days per year, and can also use the school facilities during the summer (roughly 70 days; end of June to end of August) but will use the outdoor play fields for only a fraction of that time and for short periods. Very young children (less than 2 year of age) are considered unlikely to be present on a regular basis. For the purposes of this assessment, contact by children is assumed for 109 days per year, which is the outdoor time assumed by MassDEP (1994) in initially establishing the S-1 soil standards. Exposure for a third of a year to a single outdoor play area is unlikely but provides a conservative estimate of exposure potential. People who contact soil may be exposed to constituents present in the soil by direct contact and subsequent ingestion of contaminated soil or by dermal absorption of constituents in soils adhering to the skin. Younger children are of greatest concern for soil contact, and therefore, assessment of exposure to younger children can be used to conservatively evaluate the potential for risks to older students. For this IHE, children are estimated to weigh an average of 15 kg (33 lbs) based on the median weight for 5-year-old children (the youngest age likely to be regularly out on their own) determined in the NHANES II study for the US population in 1980 (MassDEP 1994). USEPA has reviewed more current data and has indicated average weights for humans have increased since that study.

Soil Ingestion: Children in regular contact with site soil are estimated to ingest 100 mg of soil per day (MassDEP 2002). All constituents in soil are assumed to be as available

from the soil as from the media used in the toxicity studies and, consequently, a relative absorption factor or RAF of one is used for these constituents. Using this assumption and the others noted above, the ADD and LADD for soil ingestion by children can be estimated using the formula:

$$\text{ADD/LADD} = \frac{\text{CS x IR x RAF x EF x ED}}{\text{BW x } 10^6 \text{ (mg/kg) x AT}}$$

Where:

ADD	=	Average daily intake of the constituent (mg/kg/day),
LADD	=	Lifetime average daily dose (mg/kg/day),
CS	=	Constituent concentration in soil (mg/kg),
IR	=	Soil ingestion rate (100 mg/day; MassDEP 1995),
RAF	=	Relative absorption factor (1),
EF	=	Frequency of ingestion (109 days/year; MassDEP 1995),
ED	=	Exposure Duration (5 years; MassDEP 1995),
BW	=	Body weight (15 kg; EPA 1989), and
AT	=	Averaging Time (365 days x 5 yrs (ADD) or 365 x 70 (LADD) days).

The calculated ADD for children exposed to lead detected in soil at the property based on this equation is provided in Table 3 for ingestion exposure to the soil at the school.

Dermal Contact: Dermal exposure to constituents in soil can occur through direct physical contact with soil. The same assumptions as for soil ingestion are used, with the exceptions that in place of an ingestion rate, a soil adherence factor of 0.2 mg soil/cm^2 of skin, an exposed skin surface area of 3000 cm^2 (roughly a third of the body surface area for this age child; MassDEP 1994) and constituent-specific relative absorption factors were used. Using these assumptions, the ADD and LADD can be estimated using the formula:

$$\text{ADD/LADD} = \frac{\text{CS x AD x SA x RAF x EF x ED}}{\text{BW x } 10^6 \text{ (mg/kg) x AT}}$$

Where:

ADD	=	Average daily intake of the constituent (mg/kg/day),
LADD	=	Lifetime average daily dose (mg/kg/day),
CS	=	Constituent concentration in soil (mg/kg),
AD	=	Soil adherence to skin (0.2 mg/cm^2; MassDEP 1995),
SA	=	Exposed skin surface area (3000 cm^2; MassDEP 1995),
RAF	=	Relative absorption factor (constituent-specific; MassDEP 2006),
EF	=	Frequency of contact (109 days/year),
ED	=	Exposure Duration (5 years),
BW	=	Body weight (15 kg; EPA 1989), and
AT	=	Averaging Time (365 days x 5 yrs (ADD) or 365 days x 70 days (LADD)).

The calculated ADD for children exposed to lead in soil at the site based on this equation is provided in Table 3 for exposure via dermal contact to the soil EPCs.

While the primary purpose of this assessment is to calculate whether an imminent hazard exists, the same approach can be modified slightly to assess overall site risks, given the continued use of the school and playground for current purposes. The assumption that children are unlikely to use the facility for more than 109 days per year, and for more than 5 years seems likely, given the grades (pre-K to 4th) that currently use the school. However, as a conservative measure, risks are also assessed assuming that children play at the school for 100 days per year over the course of a 10-year period and that they weigh 24 kg (average body weight for 2-12 years) over this period. This exposure and risk are calculated in Table 4.

Soil Exposure - Adults

Adults that may use the area would include school landscape workers, teachers, and parents attending games. Of these groups, landscapers would be expected to have the highest potential for regular contact. In order to determine if such soil contact is safe, exposure and risks to landscapers were evaluated quantitatively, using the previously-established EPCs.

Landscapers who work site soil may be exposed to constituents present in the soil by direct contact and subsequent ingestion of contaminated soil or by dermal absorption of constituents in soils adhering to the skin. Workers may also be exposed to constituents that become airborne as a component of windborne dust. Exposure for these people is assumed to occur for 100 days over the course of a year, assuming that during the roughly 8-month landscaping season, these workers are outdoors roughly 3 days per week over the 240-day period. Adults are estimated to weigh 70 kg. It should be noted that these calculations are particularly conservative in that exposure estimates are compared with toxicity values designed to be protective for chronic (long-term) exposures; toxicity values for short-term exposure are generally lower by a factor of 10.

Soil Ingestion: Workers in frequent contact with site soil are estimated to ingest 100 mg of soil per day (MassDEP 2002) and this value will be used for landscape workers. Using these assumptions and the others noted above, the ADD and LADD for soil ingestion by workers can be estimated using the formula for soil ingestion noted above. The calculated ADD for the constituents in soil at the property based on this equation is provided in Table 5 for soil ingestion exposure to the site-wide exposure point concentration.

Dermal Contact: Dermal exposure to constituents in soil can occur through direct physical contact with soil. The same assumptions as for soil ingestion are used, with the exceptions that in place of an ingestion rate, a soil adherence factor of 0.29 mg soil/cm^2 of skin, an exposed skin surface area of 3500 cm^2, and constituent-specific relative

absorption factors were used. Using these assumptions, the ADD and LADD can be estimated using the formula for dermal contact noted above. The calculated ADD for the constituents in soil at the property based on this equation is provided in Table 5 for exposure via dermal contact to the EPCs in soil.

Inhalation. Although unlikely considering the small area of uncovered soil, landscapers could be exposed via inhalation to constituents entrained in soil-derived dust (MassDEP 2002). To estimate exposure, the same assumptions provided above for body weight, lifetime exposure duration and frequency were used. It was assumed that the gardener inhaled 20 cubic meters (m^3) of air during the time on site (essentially equal to the daily inhalation rate of 20 m^3/day; EPA, 1989 and corresponding to a full workday at an average moderate to heavy level of exertion; MassDEP 1995a).

In order to evaluate the potential for inhalation exposure to constituents entrained in the dust, it is necessary to estimate the amount of dust that would be present in the air, and the amount of air inhaled during the period that dust is present in the air. MassDEP (2002) suggests a value of 60 ug/m^3 for excavations and this value will be used in this evaluation, which is a conservative approach since excavation work would be expected to generate more dust than gardening. The value of 60 ug/m^3 is based on the assumption that gardeners will only receive intermittent exposure to visible dust but that the average exposure level will be above that used by EPA for undisturbed sites.

MassDEP notes that exposure to constituents on airborne particulates can occur through either direct inhalation or via inhalation followed by movement of the particles from the upper respiratory tract to the gastrointestinal tract. For direct inhalation, MassDEP indicates that only approximately half of the inhaled particulate matter will actually reach the lungs. However, for this evaluation, it is assumed that all the agent inhaled is of concern, as many inhaled constituents act at sites along the respiratory tract and do not need to reach the lungs to have adverse effects. For the inhalation-to-oral pathway, the ingested dose is estimated to be twice the measured PM_{10} dose of 60 ug/m^3. However, the total soil intake via this pathway (2 x 60 ug/m^3 x 20 m^3/day x 1 mg/1000 ug = 2.4 mg soil) is so low as to not add significantly to the soil dose calculated for direct ingestion and is not considered further in this assessment.

Exposure can be calculated using the equation:

$$ADE/LADE = \frac{EPC \times IF \times PM10 \times RAF \times EF \times ED}{BW \times AT}$$

Where:

ADE = Average daily exposure to the constituent (mg/m^3),
LADE= Lifetime average daily dose (mg/m^3),
EPC = Constituent concentration in soil (mg/kg),
IF = Inhalation Fraction (20 m^3 / 20 m^3day; MassDEP 2002),
PM10 = Particulate air concentration (60 ug/m^3; MassDEP 2002).
RAF = Relative absorption factor (1 used to be conservative),

EF	=	Frequency of contact (100 days/year),
ED	=	Exposure Duration (5 years), and
AT	=	Averaging Time (365 days x 5 or 70 years).

Table 5 provides the estimated exposure and risk values for inhalation exposure to an adult landscaper, assuming no dust suppression measures are implemented. Exposure to other site users, including teachers and parents, would be expected to be lower.

Health Risks at the Site

In this section, information concerning the potential levels of exposure to contaminants is combined with information concerning the toxicity of the contaminants in order to determine the potential health risks at the property. For noncarcinogenic (systemic) effects, EPA and MassDEP assume that there is a level below which no effects will occur (a threshold no effect concentration). To evaluate possible risk from exposure to noncarcinogenic contaminants, the average daily dose (ADD) is divided by the health criterion value [the reference dose (RfD)]. If the ADD:RfD ratio, also termed the hazard index or HI, is less than ten for all constituents (i.e., if the daily intake is below the health criterion), then the contaminant is considered unlikely to pose an Imminent Hazard (i.e., a significant risk under conditions of short-term exposure) to individuals exposed under the given scenario. If the HI is less than ten, the site does not pose an Imminent Hazard. For cancer risk, the exposure, termed the lifetime average daily dose or LADD is multiplied by the cancer slope factor to estimate cancer risk, and this risk is compared with a target risk level of 1 in 100,000 or 10^{-5}.

Imminent hazards associated with short term exposure to site constituents in soil are estimated in Table 3 for children and in Table 5 for landscapers (and other adults). Based on these calculations, exposure by children to soil concentrations of site constituents results in a hazard index of 0.5 (soil ingestion plus dermal absorption risks combined) and a cancer risk of 1×10^{-5}. Exposure by adults to soil concentrations of site constituents results in a hazard index of 0.08 (soil ingestion, dermal absorption, and inhalation exposures combined) and a cancer risk of 3×10^{-6}. These levels do not exceed the Imminent Hazard criterion of an HI of ten and a cancer risk level of 10^{-5}, indicating that continued use of this site does not pose an imminent hazard.

Hazards and risks associated with longer term exposure to site constituents in soil are estimated in Table 4 for children and in Table 6 for landscapers (and other adults). Based on these calculations, exposure by children to soil concentrations of site constituents results in a hazard index of 0.3 and a cancer risk of 1×10^{-5}. Exposure by adults to soil concentrations of site constituents results in a hazard index of 0.08 and a cancer risk of 1×10^{-5}. These levels do not exceed the long-term risk targets of a cancer risk of 10^{-5} and an HI of 1, indicating that continued long term exposure at these concentrations would not pose a significant risk.

A number of assumptions were used in deriving the exposure estimates and toxicity criteria. While there is some uncertainty in the resulting hazard and risk estimates, conservative (health protective) assumptions were made so actual hazards and risks are likely to be lower than the calculated hazards and risks.

Conclusions and Recommendations

Soil was recently sampled by ECMS and analyzed with respect to the Cashman Elementary School property located at 193 Lions Mouth Road in Amesbury, Massachusetts. Arsenic and several other metals were detected at levels above a reportable concentration (arsenic) and above levels expected in background soil. However, no anthropogenic source of arsenic was present, the Amesbury area is known to have naturally-elevated arsenic levels in soil, and the source appears most likely to be natural. While the arsenic is assumed to be naturally occurring, calculations were performed to assess if a calculated risk was present for either short-term (IH) or longer-term exposure. Evaluation of the concentrations detected and of site-specific factors indicates that an Imminent Hazard condition does not exist at the site. Use of the site would also not pose a Significant Risks.

It should be noted that calculated risks did not exceed but were at the target risk levels. Therefore, although the area does not pose an Imminent Hazard or Significant Risk for current use, considering the use of the site as a school, it may be prudent to take measures to mitigate the potential for exposure. Such measures could include replacing natural soil in areas of exposed soil with imported soil containing lower levels of natural arsenic.

In order to ensure that public health is adequately protected, conservative assumptions (i.e., those unlikely to underestimate risk) were used in deriving both the exposure estimates and the toxicity values that are included in this letter report. Because of the use of these conservative assumptions, it is likely that the actual potential for non-cancer and cancer risks is lower than as is estimated in this report.

If you have any questions, please give me a call.

Sincerely,

Peter K. LaGoy
Principal

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Table 1
Exposure Point Concentrations for Soil
Cashman School
Amesbury, Massachusetts

	Number of Samples	Soil Average/a (mg/kg)	Soil Maximum (mg/kg)	EPC (mg/kg)	MCP RCS-1 Reportable Concentration (mg/kg)
Metals					
Antimony	17		ND	NC	20
Arsenic (0-1 ft)	15	46.4	82.3	46.4	20
Arsenic (2 ft)	2		55.9	NC	20
Barium	17		34.6	NC	1000
Beryllium	17		ND	NC	90
Cadmium	17		ND	NC	70
Chromium	17		65.9	66	100
Lead	17		28.6	NC	200
Mercury	17		ND	NC	20
Nickel	17		76	76	600
Selenium	17		ND	NC	400
Silver	17		ND	NC	100
Thallium	17		ND	NC	8
Vanadium	17		46.7	47	400
Zinc	17		107	NC	1000
TPH	17		184	NC	
VOCs	17		ND	NC	
SVOCs	17		ND	NC	
Pesticides/Herbicides	17		ND	NC	

Table 2
Comparison of Maximum Site Concentrations with Background Levels in Massachusetts Soil
Cashman School
Amesbury, Massachusetts

ANALYTE	Soil Maximum	Background Levels in MA/a Natural Soil	Fill Soil	Urban Maximum
Metals (mg/kg)/a				
Antimony	ND	1	7	160
Arsenic	**82.3**	20	20	99
Barium	34.6	50	50	680
Beryllium	ND	0.4	0.9	7.5
Cadmium	ND	2	3	25
Chromium	**65.9**	30	40	530
Lead	28.6	100	600	11000
Mercury	ND	0.3	1	23
Nickel	**76**	20	30	220
Selenium	ND	0.5	1	57
Silver	ND	0.6	5	82
Thallium	ND	0.6	5	50
Vanadium	**46.7**	30	30	47
Zinc	107	100	300	5000

a/ "Natural soil" represent soils from non-urban areas with no visible ash.
"Fill soils" represent soils that have visible coal or wood ash and are associated with fill.
Maximum values are the maximum detected in several studies
Background values derived from MADEP 2002 Technical update: Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil.
Values in bold exceed the "fill soil" background value.

Table 3
Exposure and Risk of Imminent Hazard for Children
Cashman School
Amesbury, Massachusetts

SOIL INGESTION	Soil EPC				Oral	Oral		
			ADD	LADD	RfD	CSF	Hazard	Risk
ANALYTE	mg/kg		mg/kg/day	mg/kg/day	mg/kg/day	1/(mg/kg/day)	ADD/RfD	LADD x CSF
Arsenic	46.4		9.24E-05	6.60E-06	0.0003	1.5	3.1E-01	9.9E-06
Chromium	66		1.31E-04		0.003		4.4E-02	
Nickel	76		1.51E-04		0.02		7.6E-03	
Vanadium	47		9.36E-05		0.009		1.0E-02	

DERMAL CONTACT	Soil EPC	Dermal RAF			Oral	Oral		
			ADD	LADD	RfD	CSF	Hazard	Risk
	mg/kg		mg/kg/day	mg/kg/day	mg/kg/day	1/(mg/kg/day)	ADD/RfD	LADD x CSF
Arsenic	46.4	0.03	1.66E-05	1.19E-06	0.0003	1.5	5.5E-02	1.8E-06
Chromium	66	0.1	7.88E-05		0.003		2.6E-02	
Nickel	76	0.2	1.82E-04		0.02		9.1E-03	
Vanadium	47	0.1	5.61E-05		0.009		6.2E-03	
						SUM	**0.5**	**1E-05**

Table 3
Exposure and Risk of Imminent Hazard for Children
Cashman School
Amesbury, Massachusetts

SOIL INGESTION	Soil EPC				Oral	Oral		
			ADD	LADD	RfD	CSF	Hazard	Risk
ANALYTE	mg/kg		mg/kg/day	mg/kg/day	mg/kg/day	1/(mg/kg/day)	ADD/RfD	LADD x CSF
Arsenic	46.4		5.30E-05	7.57E-06	0.0003	1.5	1.8E-01	1.1E-05
Chromium	66		7.53E-05		0.003		2.5E-02	
Nickel	76		8.68E-05		0.02		4.3E-03	
Vanadium	47		5.37E-05		0.009		6.0E-03	

DERMAL CONTACT	Soil EPC	Dermal RAF			Oral	Oral		
			ADD	LADD	RfD	CSF	Hazard	Risk
	mg/kg		mg/kg/day	mg/kg/day	mg/kg/day	1/(mg/kg/day)	ADD/RfD	LADD x CSF
Arsenic	46.4	0.03	9.53E-06	1.36E-06	0.0003	1.5	3.2E-02	2.0E-06
Chromium	66	0.1	4.52E-05		0.003		1.5E-02	
Nickel	76	0.2	1.04E-04		0.02		5.2E-03	
Vanadium	47	0.1	3.22E-05		0.009		3.6E-03	
						SUM	**0.3**	**1E-05**

Table 4
Exposure and Risk for Adult Gardeners
Cashman School
Amesbury, Massachusetts

ANALYTE	EPC		ADD	LADD	Oral RfD	Oral CSF	Hazard	Risk
SOIL INGESTION	**mg/kg**		**mg/kg/day**	**mg/kg/day**	**mg/kg/day**	**1/(mg/kg/day)**	**ADD/RfD**	**LADD x CSF**
Arsenic	46.4		1.91E-06	1.36E-06	0.0003	1.5	6.4E-03	2.0E-06
Chromium	66		2.71E-06		0.003		9.0E-04	
Nickel	76		3.12E-06		0.02		1.6E-04	
Vanadium	47		1.93E-06		0.009		2.1E-04	

	EPC	Dermal			Oral	Oral		
DERMAL CONTACT	**mg/kg**	**RAF**	**ADD**	**LADD**	**RfD**	**CSF**	**Hazard**	**Risk**
Arsenic	46.4	0.03	5.81E-06	4.15E-07	0.0003	1.5	1.9E-02	6.2E-07
Chromium	66	0.1	2.75E-05		0.003		9.2E-03	
Nickel	76	0.2	6.34E-05		0.02		3.2E-03	
Vanadium	47	0.1	1.96E-05		0.009		2.2E-03	

	EPC		ADE	LADE	Inhalation RfC	Inhalation URF	Hazard	Risk
DUST INHALATION	**mg/kg**		**mg/m3**	**ug/m3/a**	**mg/m3**	**1/(ug/m3)**	**ADE/RfC**	**LADE x URF**
Arsenic	46.4		8.01E-07	5.72E-08	0.000025	0.003	3.2E-02	1.7E-10
Chromium	66		1.14E-06	8.14E-08	0.0004	0.012	2.8E-03	9.8E-10
Nickel	76		1.31E-06	9.37E-08	0.001	0.00048	1.3E-03	4.5E-11
Vanadium	47		8.11E-07		0.001		8.1E-04	

						SUM	**0.08**	**2.7E-06**

Table 4
Exposure and Risk for Adult Gardeners
Cashman School
Amesbury, Massachusetts

ANALYTE					Oral	Oral		
	EPC		ADD	LADD	RfD	CSF	Hazard	Risk
SOIL INGESTION	**mg/kg**		**mg/kg/day**	**mg/kg/day**	**mg/kg/day**	**1/(mg/kg/day)**	**ADD/RfD**	**LADD x CSF**
Arsenic	46.4		1.91E-06	6.49E-06	0.0003	1.5	6.4E-03	9.7E-06
Chromium	66		2.71E-06		0.003		9.0E-04	
Nickel	76		3.12E-06		0.02		1.6E-04	
Vanadium	47		1.93E-06		0.009		2.1E-04	

	EPC	Dermal			Oral	Oral		
DERMAL CONTACT	**mg/kg**	**RAF**	**ADD**	**LADD**	**RfD**	**CSF**	**Hazard**	**Risk**
Arsenic	46.4	0.03	5.81E-06	1.97E-06	0.0003	1.5	1.9E-02	3.0E-06
Chromium	66	0.1	2.75E-05		0.003		9.2E-03	
Nickel	76	0.2	6.34E-05		0.02		3.2E-03	
Vanadium	47	0.1	1.96E-05		0.009		2.2E-03	

					Inhalation	Inhalation		
	EPC		ADE	LADE	RfC	URF	Hazard	Risk
DUST INHALATION	**mg/kg**		**mg/m3**	**ug/m3/a**	**mg/m3**	**1/(ug/m3)**	**ADE/RfC**	**LADE x URF**
Arsenic	46.4		8.01E-07	2.72E-07	0.000025	0.003	3.2E-02	8.2E-10
Chromium	66		1.14E-06	3.87E-07	0.0004	0.012	2.8E-03	4.6E-09
Nickel	76		1.31E-06	4.46E-07	0.001	0.00048	1.3E-03	2.1E-10
Vanadium	47		8.11E-07		0.001		8.1E-04	

						SUM	**0.08**	**1E-05**

APPENDIX B

QUALIFICATIONS/LIMITATIONS

QUALIFICATIONS/LIMITATIONS

Environmental & Construction Management Services, Inc. (ECMS) professional services have been performed, our findings obtained, and our recommendations prepared in accordance with customary principles and practices in the fields of environmental science and engineering. This warranty is in lieu of all other warranties either expressed or implied. *ECMS* is not responsible for the independent conclusions, opinions or recommendations made by others based on the records review, site inspection, field exploration, and laboratory test data presented in this report.

Factual information regarding on-site business operations, conditions, and historical data provided to *ECMS* is assumed to be correct and complete. *ECMS* assumes no responsibility for hidden or latent conditions or misrepresentation by the property owner, its representatives, public information officials or any authority consulted in connection with the compilation of this report.

The findings set forth in the attached Site assessment report are strictly limited in time and scope to the date of the evaluation(s). The conclusions presented in the Report are based solely on the services described therein, and not on scientific tasks or procedures beyond the scope of agreed upon services or the time and budgeting restraints imposed by the client.

The purpose of this report was to assess the physical characteristics of the subject Site with respect to the presence in the environment of hazardous material or oil. No specific attempt was made to check on the compliance of present or past owners or operators or of the Site with Federal, State or local laws and regulations, environmental, or otherwise.

Partial findings of this investigation are based on data provided by others. No warranty is expressed or implied with the usage of such data. Much of the information provided in this report is based upon personal interviews and research of all available documents, records and maps held by the appropriate government and private agencies. This is subject to the limitations of historical documentation, availability and accuracy of pertinent records, and the personal recollection of those persons contacted by *ECMS* personnel. *ECMS* is not a professional title insurance firm and makes no guarantee, explicit or implied that the listing, which was reviewed, represented a comprehensive delineation of past Site ownership or tenancy for legal purposes.

Observations were made of the Site and of structures on the Site as indicated within the Report. Where access to portions of the Site or to structures on the Site was unavailable or limited, *ECMS* is unable to render an opinion as to the presence of hazardous material or oil, or to the presence if indirect evidence relating to hazardous material or oil, in that portion of the Site or structure. In addition, *ECMS* renders no opinion as to the presence of hazardous material or oil, where direct observation of the interior walls, floor, or ceiling of a structure on a Site was obstructed by objects or coverings on or over these surfaces.

The initial site investigation took into account the natural and man-made features of the Site, including any unusual or suspect phenomenon. These factors combined with the Site's geology, hydrology, topography, and past and present land uses served as a basis for choosing a methodology and location for subsurface exploration as well as ground water and subsurface sampling, if done. The subsurface data, if provided, is meant as a representative overview of the Site.

The conclusions and recommendations contained in this report may be based in part upon various types of chemical data and are contingent upon their validity. As indicated within the Report, some

of these data are preliminary "screening" level data, and should be confirmed with quantitative analyses if more specific information is necessary. It should be noted that variations in the types and concentrations of contaminants and variations in their flow paths may occur due to seasonal water table fluctuations, past disposal practices, the passage of time, and other factors. Should additional data or variations of current data become available in the future, these data should be reviewed, and the conclusions and recommendations presented herein modified accordingly.

Chemical analyses may have been performed for specific parameters during the course of this Site assessment, as described in the text. However, it should be noted that additional chemical constituents not searched for during the current study might be present in soil and/or ground water at the Site.

RELEASE NOTIFICATION RETRACTION

For

Charles C. Cashman Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts 01913
MassDEP RTN 3-36397

Prepared for:

DiNisco Design, Inc.
99 Chauncy Street
Boston, Massachusetts 02111

Prepared by:

Environmental & Construction Management Services, Inc.
288 Grove Street #391
Braintree, Massachusetts 02184
(617) 338-2121

September 17, 2020

ECMS Project No. 1009.073

This report has been prepared for the exclusive use of DiNisco Design and their client the City of Amesbury, Massachusetts. Environmental & Construction Management Services, Inc. acknowledges that DiNisco Design and the City of Amesbury may rely on this report. Photocopying of this document by parties other than those designated by DiNisco Design and the City of Amesbury, or use of this document for purposes other than intended, is prohibited without the prior written consent of Environmental & Construction Management Services, Inc

Environmental & Construction
Management Services, Inc.

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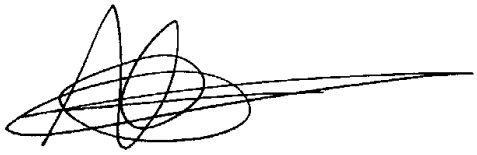
CERTIFICATION OF RESULTS

The evaluation was conducted on behalf of and for the exclusive use of *DiNisco Design* and their client, the *City of Amesbury, Massachusetts* and all its successors and assigns, solely for use in an environmental evaluation of the Site. This report and the findings contained herein shall not, in whole or in part, be disseminated or conveyed to any other party, nor used by any other party, in whole or in part, other than *DiNisco Design* or the *City of Amesbury* and all its successors and assigns, without the prior written consent of *Environmental & Construction Management Services, Inc. (ECMS).*

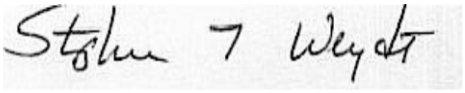
ECMS professional services have been performed, our findings obtained, and our recommendations prepared by an environmental professional and customary principles and practices in the fields of environmental science and engineering. This warranty is in lieu of all other warranties either expressed or implied. *ECMS* is not responsible for the independent conclusions, opinions or recommendations made by others based on the records review, site inspection, field exploration, and laboratory test data presented in this report.

Respectfully submitted this 17th day of September 2020.

For ***Environmental & Construction Management Services, Inc.*** by



Kevin J. Kavanaugh, L.S.P., CHMM
Principal Environmental Engineer



Stephen T. Weydt
Principal Environmental Scientist

1.0 INTRODUCTION

This Release Notification Retraction (retraction) was prepared based upon an evaluation of additional site data and discussions with Massachusetts Department of Environmental Protection (MassDEP) regarding elevated concentrations of arsenic detected in the soils at the Cashman Elementary School Site, located at 193 Lions Mouth Road in Amesbury, Massachusetts. The release is identified by the MassDEP as Release Tracking Number (RTN) 3-36397. This retraction was prepared in accordance with the requirements of the Massachusetts Contingency Plan (MCP) 310 CMR 40.0000, Section 40.0335 and other relevant guidance developed by the MassDEP.

A Release Notification Transmittal Form (RNF) BWSC-103 for the retraction has been submitted to the MassDEP via eDEP. A copy of the RNF Transmittal Form BWSC-103 is attached as Appendix A.

2.0 PROPERTY DESCRIPTION

2.1 Location and Legal Description of the Site

The Site is an irregularly-shaped 35.32-acre parcel of land located at 193 Lions Mouth Road in Amesbury, Essex County, Massachusetts 01913. According to the City of Amesbury Assessor, the property is listed as three (3) parcels including 50/6, 50/16 and 50/42. In addition, a portion of the Woodsom Farm (Parcel 37/4) is part of the proposed project. The Site is occupied by the Charles C. Cashman Elementary School and associated athletic fields, playground, parking lots and landscaped areas. Refer to Figure 2 entitled Lot Location Plan.

The Site is depicted on the 7.5 x 15-minute U.S.G.S. topographic quadrangle for Newburyport, Massachusetts dated 1987. The Universal Transverse Mercator (UTM) coordinates of the Site within zone 19 are approximately 4,746,558 meters north latitude and 340,818.9 meters east longitude or 42° 51' 26.06'' north latitude and 70° 56' 54.07'' west longitude. Elevation at the site is approximately 105 feet above mean sea level (amsl). Figure 1 includes both a Site Locus Plan and a Street Location Map of the Site. The Site and surrounding properties are shown on Figure 2, Lot Location Plan attached to this report.

2.2 Site and Vicinity Characteristics

The Site is currently occupied by the City of Amesbury Cashman Elementary School housing grades Pre-kindergarten through 4 (approximately 458 children). The Site is located within OSC – Open Space Conservancy. The school building is surrounded by a driveway and associated paved parking lots, a playground area and grass athletic fields and two (2) little league baseball fields (Randall and Packer Fields).

Woodsom Farm to the west, and is accessed from Lions Mouth Road to the South. The north edge of the site is steeply sloping forested hill with an intermittent stream at the base. The Site is surrounded with pockets of densely settled residential neighborhoods.

No existing commercial printing facilities, gasoline filling/service stations, industrial properties or fuel depots were identified in the immediate vicinity of the subject site. The past uses of these surrounding properties do not pose recognized environmental concerns to the Site.

2.3 Descriptions of Structures, Roads, Other Improvements on the Site

The 2-story school building is 61,472 gross square feet (GSF). The building is constructed of masonry block with brick veneer on slab on grade construction.

Assessor Office records indicate that the main Site building construction was completed in 1975. The school building is currently heated by natural gas and heated through forced air ducts. The roof is asphalt and on the roof are several HVAC units. Records indicate, the building is and always has been heated by natural gas. Copies of the City of Amesbury Assessor Property Record Cards for the project are attached as Appendix B.

The nearest surface water bodies to the Site is Lake Gardner that is located approximately 2,500 feet to the north-northeast. According to the City of Amesbury Health Department, there are no know public or private potable water supply wells in the vicinity of the Site.

The City of Amesbury obtains its drinking water from its watershed area that encompasses about 55 square miles; most of which reside in New Hampshire. Tuxbury Pond feeds the Powow River, which the treatment plant draws from. Lake Attitash and Meadowbrook also supplement the water source seasonally and in times of drought. All of Amesbury's wastewater empties into their municipal sewer system. The wastewater treatment facility is located at 19 Merrimac Street.

The site is currently supplied with natural gas and serviced by the municipal water and sewer systems.

The existing school building has a sewage ejector system that was observed along the entrance driveway area south of the school.

2.4 Site Ownership

According to City of Amesbury Assessor's records, the subject site is owned by the City of Amesbury as of December 30, 1971 (Book 5833, Page 124).

2.5 Current Uses of the Site

The Site is currently utilized as the City of Amesbury Cashman Elementary School for grades Pre-K through Grade 4.

2.6 Current Uses of Surrounding Properties

The Site is located within an area primarily used for single-family residential homes, farmland and undeveloped wooded vacant land. There were no visual indications observed during *ECMS* visual inspection of nearby or abutting properties of conditions that would indicate a release or threat of release of oil and/or hazardous substances on, at, in, or to the Site.

2.7 Past Uses of the Site and Vicinity

Prior to the site investigation, *ECMS* prepared a Phase I Environmental Site Assessment (ESA) dated September 13, 2018 included interviews with officials from the City of Amesbury and review of readily available information on site history. Historical information was obtained from a review of the historical topographs (1932, 1934, 1943, 1944, 1947, 1950, 1956, 1952, 1968, 1973, 1979, 1971, 1985, 1987 and 2012), historical aerial photos (1953, 1960, 1966, 1973, 1978, 1986, 1992, 1998, 2006, 2009, 2012 and 2016), City Directory (1961, 1965, 1968, 1973, 1977, 1982, 1987, 1992, 1995, 2000, 2005, 2010 and 2014). Refer to Appendix C for copies of the above historic documents.

The historical aerial photo from 1978 shows the school building. Prior to construction of the school building, the Site land area was undeveloped and appears to be farmland as depicted in the aerial photographs from 1953 through 1973. The farm was used as a dairy farm and for the growing of hay.

Properties surrounding the Site to the north, south, east and west were developed with sporadic residential properties and some may have been farmland.

The past uses of these surrounding properties do not pose recognized environmental concerns to the Site.

3.0 SENSITIVE RECEPTORS

3.1 Human Receptors

The property consists of Cashman Elementary School, which enrolls approximately 443 students and employs approximately 50 full- and part-time staff. Human receptors at the property include children, adult staff, and visitors (adult and child).

Under reasonably foreseeable future exposure scenarios, subsurface utility or construction workers on the site would also be potential human receptors.

The property is located within a residential area of Amesbury. Numerous residential properties were identified within 500 feet of the property. The property itself is a public school. No other public schools or "institutions," as defined by the MCP, have been identified within 500 feet of the property. An "institution" is defined in the MCP as a hospital, health care facility, orphanage, nursing home, convalescent home, educational facility, or correctional facility, where such facility in whole or in part provides overnight housing. Consistent with 310 CMR 40.0361, reporting category RCS-1 is applicable to the property based upon the presence of residential properties within 500 feet.

According to an on-line MassDEP MCP Numerical Ranking System (NRS) map of the property and vicinity, the property is not located within 500 feet of any public drinking water sources, including Potentially Productive Aquifers, Zone II areas, Interim Wellhead Protection Areas, Zone A areas, or private wells. Consistent with 310 CMR 40.0361, reporting category RCGW-2 is applicable to the property because it is not within a current or potential drinking water source area. Refer to Figure 6 for a copy of the MassDEP Priority Resource (21E) Map.

3.2 Environmental Receptors

Sensitive environmental receptors at the property include wetlands associated with Cashman Elementary School, located on the northern and western side of the property approximately 250 feet north and northwest of the school building. According to the NRS map, wetlands associated with an unnamed brook to the east. No other surface waters (including wetlands, vernal pools, ponds, lakes, streams, rivers, and reservoirs) have been documented within 500 feet. A wetland area located within 0.5 mile to the southwest of the property is designated a Natural Heritage and Endangered Species Program (NHESP) Potential Vernal Pool.

According to information in the *Massachusetts Natural Heritage Atlas* (updated August 1, 2017), no certified vernal pools, priority habitats of rare species or estimated habitats of rare wildlife were identified within a 500-foot radius of the site. Refer to Figures 3 for a Map of Priority Habitats of Rare Species and Figure 4 for a Map of Estimated Habitats of Rare Wildlife and Certified Vernal Pools.

4.0 INITIAL SITE INVESTIGATION – PRE-CONSTRUCTION SOIL SAMPLING

At the request of the Project Architect *DiNisco Design, Inc. (DiNisco)*, *ECMS* completed the collection of loam/topsoil and subsoils samples from representative areas proximate to the Cashman Elementary School and from the field adjacent to the school for laboratory analysis for potential oil and/or hazardous material (OHM) prior to proposed site construction activities. Photographs were taken by *ECMS* personnel and are attached as Appendix D.

In Massachusetts, the regulatory program that concerns releases of OHM to the environment is the MCP 310 CMR 40.0000. This program is implemented by the MassDEP and includes specific provisions regarding releases of OHM to the environment that must be reported to the MassDEP.

4.1 Initial Soil Sampling and Analysis

On July 9, 2020, *ECMS* personnel collected fifteen (15) surficial loam/topsoil and two (2) subsoil samples. The samples were collected from areas identified by *DiNisco Design (DiNisco)* in "Proposed Topsoil Removal Limit Plan (Markup)" dated May 15, 2020. Refer to Figure 9, Soil Sample Location Plan for the location of the soil samples. Loam/topsoil samples were collected below the grass surface from 2 to 6 inches below surface grade and subsurface soil samples were collected approximately 2 feet below grade at refusal.

All soil samples were analyzed under chain of custody (COC) by Massachusetts approved laboratory *Eurofins Spectrum Analytical* (*Eurofins Spectrum*) of North Kingstown, Rhode Island for Comm97 Soil Laboratory Analysis plus additional analysis for Mass Reclamation Facilities which includes: Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) Method 8260, Semi Volatile Organic Compounds (SVOCs) by EPA Method 8270, Polychlorinated Biphenyls (PCBs) by EPA Method 8082 and Total Petroleum Hydrocarbons (TPH) by Gas Chromatograph (GC), MassDEP 14 Metals, Herbicides and Pesticides by EPA Method 8151A and Method 8151B. Additionally, all soil samples were further characterized by the analysis of pH, flashpoint and reactivity (cyanide and sulfide).

4.2 Initial Soil Sampling Results

No concentrations of OHM in any of the fifteen (15) loam/topsoil and/or two (2) subsoil samples analyzed were detected above their applicable reportable concentration RCS-1 specified in Massachusetts Oil and Hazardous Materials List (MOHML) 310 CMR 40.1600 and 310 CMR 40.0300 with the exception of arsenic. Concentrations of arsenic in all 17 soil samples submitted were detected above their RCS-1 of 20 milligrams per kilogram (mg/kg). The concentrations of arsenic ranged between 20.5 mg/kg and 82.3 mg/kg with an RCS-1 of 20 mg/kg. No concentrations

of arsenic were detected above their applicable upper concentration limit (UCL) of 500 mg/kg. A copy of the laboratory results and their respective MCP RCS-1 reporting concentrations (RCs) are presented in Tables 1 through 4.

In addition, several SVOC compounds were above their applicable MCP RCS-1 310 CMR 40.0300 and 40.1600 criteria. The method detection limits (MDLs) for these compounds are generally less than one order magnitude over their respective MDL and the past use of the site does not include the past use, storage of application of any OHM and therefore these compounds are not considered to be compounds of concern (COC).

In accordance with the MCP 310 CMR 40.0361: Reportable Concentrations of Oil and Hazardous Material in Soil:

> (1) For the purpose of determining whether a notification obligation exists under 310 CMR 40.0315, measured concentrations of any oil or hazardous material listed at 310 CMR 40.1600 shall be compared to the Reportable Concentration value in the reporting category that best characterizes the current use of the site under evaluation, as described below:
>
> > (a) Reporting Category RCS-1. Reporting category RCS-1 shall be applied to all soil samples obtained at or within 500 feet of a residential dwelling, a residentially-zoned property, school, playground, recreational area or park.

The detection of arsenic collected on July 9, 2020 in the site soils at concentrations exceeding their applicable RCS-1 triggers a 120-day notification requirement to the MassDEP under MCP 310 CMR 40.0315: Releases Which Require Notification Within 120 Days.

Additionally, since five (5) of the 17 soil samples exceeded a concentration of arsenic over 40 mg/kg the criteria for a release that could pose an Imminent Hazard to human health in accordance with MCP 310 CMR 40.0321(2) which is "a release to the environment indicated by the measurement of concentrations of hazardous material, equal to or greater than any of the following concentrations at the ground surface or within a depth of twelve (12) inches below the ground surface, at any location within 500 feet of a residential dwelling, school, playground, recreation area or park, unless access by children is controlled or prevented by means of bituminous pavement, concrete, fence, or other physical barrier". A release that could pose an Imminent Hazard to human health requires a "Two Hour" release notification obligation to the MassDEP.

4.3 Initial Recommendations

Due to the limited time to properly evaluate whether the detection of the concentrations of arsenic from the soil results from the July 9, 2020 soil precharacterization sampling prior to construction are naturally occurring as believed, *ECMS* recommended that the MassDEP be notified of a release that could pose an Imminent Hazard to human health requires a "Two Hour" release notification obligation.

As stated in MCP 310 CMR 40.0321(3) Notwithstanding the provisions of 310 CMR 40.0321(2) and 40.0321(3), a person required to notify under 310 CMR 40.0331 may demonstrate to the Department by a preponderance of the evidence that release or site conditions specified in 310 CMR 40.0321(2) and/or (3) do not constitute an actual Imminent Hazard to human health, in conformance with the Imminent Hazard Evaluation process described in 310 CMR 40.0426, and in consideration of the site-specific factors and the risk assessment and risk management criteria contained in 310 CMR 40.0950. No such demonstration, however, shall relieve any person of the obligation to notify the Department of a release or threat of release under the provisions of 310 CMR 40.0311 or 40.0312.

ECMS also recommended that an Imminent Hazard Evaluation (IHE) be completed to ensure that an Imminent Hazard did not exist.

ECMS prepared an IHE dated July 28, 2020 that was submitted to MassDEP on behalf of the City of Amesbury on August 14, 2020. Details and results of the IHE are including in Section 5.0 of this report.

4.4 MassDEP Notification and Oral IRA Approval

On July 24, 2020, Kevin J. Kavanaugh, LSP, CHMM of *ECMS* called the MassDEP-NERO, Bureau of Waste Site Cleanup on behalf of the City of Amesbury to report the 2-hour release condition in accordance with the requirements of the MCP 310 CMR 40.0313 for a release that could pose an Imminent Hazard to human health in accordance with MCP 310 CMR 40.0321(2) which is "a release to the environment indicated by the measurement of concentrations of hazardous material, equal to or greater than any of the following concentrations at the ground surface or within a depth of twelve (12) inches below the ground surface, at any location within 500 feet of a residential dwelling, school, playground, recreation area or park, unless access by children is controlled or prevented by means of bituminous pavement, concrete, fence, or other physical barrier".

Mr. Kenneth Sanderson of the MassDEP-NERO, Bureau of Waste Site Cleanup orally approved the proposed "assessment only" subsurface investigation to determine the nature and extent of the detection of arsenic. Other recommendations

included the restrictive fencing, posting warning signage and covering exposed soil with Polyethylene sheeting. A copy of the MassDEP Release Log Form (RLF) BWSC-101 is attached as Appendix E.

A Release Notification Form (RNF) BWSC-103 prepared by *ECMS* was electronically signed by Mr. Kevin J. Kavanaugh, LSP, CHMM for *ECMS* on behalf of the City of Amesbury and was submitted to the MassDEP on July 31, 2020 via eDEP. A copy of the RNF is also attached in Appendix F.

5.0 IMMEDIATE RESPONSE ACTION (IRA) ASSESSMENT ACTIVITIES

5.1 Imminent Hazard Evaluation (IHE)

ECMS prepared an IHE dated July 28, 2020 that was submitted to MassDEP on behalf of the City of Amesbury on August 14, 2020.

The purpose of an IHE was to evaluate whether an IRA is needed to control or reduce short-term exposure to a release of oil and/or hazardous material while comprehensive investigations and response actions are being evaluated. The need for comprehensive response actions (i.e., the ultimate actions for the release) is determined (in part) by a Risk Characterization, which is performed after all site investigations are completed.

For this IHE *ECMS* engaged *Mr. Peter LaGoy of LaGoy Risk Analysis, Inc. (LaGoy)* in Hopkinton, Massachusetts as a professional risk assessor to evaluate the recently obtained soil sample analytical results for samples collected on July 9, 2020.

The conclusions from the *LaGoy* "Evaluation of Soil Data from the Charles C. Cashman Elementary School, 193 Lions Mouth Road, Amesbury, Massachusetts dated July 27, 2020" are as follows:

- The site poses no imminent hazard to students, non-student users of the playing fields, school workers, and construction/utility workers.
- The site poses no imminent hazard to the environment.
- The site poses no imminent hazard to safety.

A copy of the *ECMS* IHE dated July 28, 2020 is attached as Appendix G.

5.2 Additional Soil Sampling, Analysis and Results

5.2.1 Baseball Field Infield Surface Sampling – July 31, 2020

On July 31, 2020, *ECMS* personnel collected four (4) surface soil samples from the infield of Randall Field (1st base, 2nd base, 3rd base and home plate) and four (4) surface soil samples from the infield of Packer Field (1st base, 2nd base, 3rd base and home plate). The soil appeared to be imported (noting its reddish color as well as its greater content of clay) and visually unlike the native soils encountered during the previous sampling of soils on July 9, 2020 by *ECMS*. Refer to Figure 9, Soil Sample Location Plan for the location of the soil samples.

All soil samples were analyzed under chain of custody (COC) by Massachusetts approved laboratory *Eurofins Spectrum* for MassDEP 14 Metals (including antimony, arsenic, beryllium, cadmium, chromium, lead, nickel, selenium, silver, thallium, vanadium, zinc, barium and mercury).

No concentrations of any of the MassDEP 14 Metals in any of the eight (8) infield surface samples analyzed were detected above their applicable reportable concentration RCS-1 specified in MOHML 310 CMR 40.1600 and 310 CMR 40.0300.

5.2.2 Packer Field Sampling and Background Sampling on the Woodsom Farm Property – August 12, 2020

On August 12, 2020, *ECMS* Licensed Site Professional (LSP) Kevin J. Kavanaugh met with Mr. Paul Giddings of the MassDEP Northeast Regional Office (NERO), Bureau of Waste Site Cleanup to collected additional soil samples for laboratory analysis for the presence of arsenic in an area that was previously found to have the highest concentration of arsenic in soils by *ECMS* on July 9, 2020 and in background areas in order to determine if the presence of arsenic on the Cashman School property is from a release at the Site or is consistently present in the environment at and in the vicinity of the sampling location that is solely attributable to natural geologic or ecologic conditions; and has not been mobilized or transferred to another environmental medium or increased in concentration in an environmental medium as a result of anthropogenic activities.

Mr. Giddings collected four (4) samples from two (2) different areas at depths between surface and 6 inches and increased depth approximately 16-18 inches below grade. *ECMS* collected eight (8) additional soil samples from the "background" areas on the Cashman School field property as well as from the Woodsom Farm property located west of the school property. All soils

appeared to be similar to those soils (dense light brown glacial till) encountered during the *ECMS* sampling on July 9, 2020 with the exception of the soil sample (designated as SSS-28) that was collected at a depth of between 18 and 20 inches in the outfield of Randall Field. This soil was found below approximately 6 inches of grass and loam and consisted of a more uniform brown medium to fine sand and was well graded and considered to be imported fill.

All *ECMS* collected soil samples were analyzed under proper COC by Massachusetts approved laboratory *Eurofins Spectrum* for MassDEP 14 Metals. Concentrations of arsenic was detected in 7 of the 8 soil samples submitted by *ECMS* above their RCS-1 of 20 mg/kg and 5 samples were also above the MassDEP IH concentration of 40 mg/kg. The concentrations of arsenic ranged between 4.89 mg/kg and 89.6 mg/kg. No concentrations of arsenic were detected above their applicable UCL of 500 mg/kg. Concentrations of the other 13 metals analyzed were all below their applicable RCS-1 concentration. A copy of the laboratory results and their respective MCP RCS-1 reporting concentrations (RCs) are presented in Table 6 and a copy of the *Eurofins Spectrum* Laboratory Report is attached as Appendix H.

All MassDEP collected soil samples were analyzed under proper COC by Massachusetts approved laboratory *Alpha Analytical* of Westborough, Massachusetts for arsenic and lead.

Concentrations of arsenic was detected in 4 of the 4 soil samples submitted by *MassDEP* were detected above their RCS-1 of 20 mg/kg and all samples were also above the MassDEP IH concentration of 40 mg/kg. The concentrations of arsenic ranged between 45.2 mg/kg and 66.6 mg/kg. No concentrations of arsenic were detected above their applicable UCL of 500 mg/kg. Concentrations of lead ranging between 10.9 and 38.8 mg/kg analyzed were all below their applicable RCS-1 concentration of 200 mg/kg. Refer to Figure 9, Soil Sample Location Plan for the location of the soil samples. A copy of the laboratory results and their respective MCP RCS-1 reporting concentrations (RCs) are presented in Table 7 and a copy of the Alpha Laboratory Report is attached as Appendix I.

6.0 SITE CONCEPTUAL MODEL & LINES OF EVIDENCE - ORIGIN OF ARSENIC IN SITE SOIL

6.1 Historical Documentation

The historical aerial photo from 1978 shows the school building. Prior to construction of the school building, the Site land area was undeveloped and appears to be farmland as depicted in the aerial photographs from 1953 through 1973.

Properties surrounding the Site to the north, south, east and west were developed with sporadic residential properties and some may have been farmland.

Woodsom Farm which lies adjacent to the northern and northwestern side of the Cashman School property is 365 acres in size and was purchased by the City of Amesbury in 1989 and is listed as a City Park (article 97). Note that not all of the 365 acres Woodsom Farm is article 97 as the corner where the proposed project egress drive will be located was designated "General Municipal Purposes" - Woodsom Farm Book: 9963, Page 317.

According to the Essex National Heritage Area society information Woodsom Farm was farmed as early as 1790, and at one time, was the largest dairy farm in Essex County. Hayfields, wetlands, woods, marshes and drumlins stretch across these 370 acres, bordered by the Powow River, and make the farm a scenic spot for walking, hiking, cross-country skiing and biking. Woodsom Farm is home to a diverse population of birds, including bobolinks, barn swallows, rock doves and meadowlarks. Species of Note include Bobolinks, rock doves, redwing blackbirds, mourning doves, meadowlarks and barn swallows. There were 41 different species (including unidentified warblers) seen on a June bird count. Habitats include grasslands, marsh, hayfields, drumlin hills and pasture land. There is no account that the farmland was utilized for anything else but a dairy farm and hayfields which would eliminate the historical use of herbicides and pesticides, particularly lead arsenate.

6.2 Arsenic Distribution

The distribution of arsenic in surface (depths from just below the grass to a maximum depth achieved of 24 inches) soil is heterogeneous, possibly reflecting perturbations by some reworking of the native soils. Twenty-nine (29) total soil samples were collected from a depth between just below the grass surface to a maximum of 24 inches below grade on both the Cashman School property and on the neighboring City of Amesbury owned Woodsom Farm property. Of the 29 samples collected 28 samples had arsenic concentrations greater than its applicable RCS-1 of 20 mg/kg and of those 28 samples, 15 had an arsenic concentration above its IH of 40 mg/kg. The one sample (designated SSS-28) that did not have an arsenic concentration over RCS-1 was collected from the outfield of Randall Field at a depth of 18-24 inches and consisted of a well-graded area that appeared to be fill related to the construction of the baseball field.

The highest arsenic found in site soils is in the deepest samples, and at several locations the arsenic concentration increases with increasing depth. This was noted in the samples collected by *ECMS* and MassDEP in what was considered to be a "background" or unworked portion of the Cashman School property (listed as samples "SSS-26" and "SSS-27" collected by *ECMS* and "DEP S-3 Background" and

"DEP S-4 Background" collected by MassDEP). Surficial application of arsenic would yield a concentration gradient that is the opposite of that observed at the site.

Elevated soil arsenic was also found at on the Woodsom Farm property at the same depth range as found on the Cashman School property. Soils appeared to be the same on both properties consisting of dry, brown, fine to coarse sand with little silt and trace gravel and trace root fibers in the top 6 inches below the grass cover.

No evidence has been found for the existence of a historical "point source" for arsenic at the school site, such as a pesticide manufacturer, tannery, or other industry using large quantities of arsenic. Historic and aerial maps also do not indicate the presence of any apple orchards in the area in the late 19th century, where arsenical pesticides (e.g., lead arsenate) may have been used on the Site and adjoining Woodsom farm property. Concentrations of lead were not found to be elevated beyond typical background levels thus eliminating the application of lead arsenate.

6.3 Soil Appearance

Soils sampled by *ECMS* within the first 6 inches consisted of dry, brown, fine to coarse sand with little silt and trace gravel and trace root fibers. In the areas sampled, little to no loam was observed. Soils sampled below 6 inches to a maximum of 24 inches were similar to those observed in the first 6 inches and deemed as subsoils.

The subsurface samples of unconsolidated deposits at the site contained arsenic-bearing minerals and elevated concentrations of arsenic. Although bedrock was not sampled, descriptions of bedrock, as observed in subsurface samples from the site, are consistent with published regional data indicating elevated arsenic levels in rock as published in the studies of the Merrimack and Nashoba formations.

6.4 Conclusions

Based on the data collected by *ECMS*, presented here and within the Retraction to which this memorandum is appended, along with the foregoing discussion, arsenic in the Cashman Elementary School soils is naturally occurring. This conclusion is supported by: the location of the site in a known and documented arsenic belt, appearance of site soils, the distribution of arsenic in the site soils; the comparison of site soil analytical results to arsenic concentrations off the property and in "background" locations; and the occurrence of the highest arsenic samples at depth.

7.0 RETRACTION OF RELEASE NOTIFICATION

Consistent with the provisions of 310 CMR 40.0335(1)(c), this release notification is being retracted on the basis that the subject release did not meet one or more of the sets of notification criteria specified in 310 CMR 40.0300. Specifically, releases of arsenic do not require notification pursuant to 310 CMR 40.0317(22) if they are in areas that are documented to have elevated arsenic measured in soil or groundwater that:

- is consistently present in the environment at and in the vicinity of the sampling location;
- is solely attributable to natural geologic or ecologic conditions; and
- has not been mobilized or transferred to another environmental medium or increased in concentration in an environmental medium as a result of anthropogenic activities.

The City of Amesbury lies within an area of Massachusetts that has been identified in studies by the United States Geological Survey (USGS) as being underlain by bedrock units, particularly the Merrimack and Nashoba formations, containing elevated arsenic concentrations (see *Arsenic and Uranium in Water from Private Well Completed in Bedrock of East-Central Massachusetts – Concentrations, Correlations with Bedrock Units, and Estimated Probability Maps*, John A. Colman, USGS, Scientific Investigations Report 2011-5013). Refer to Appendix J for a copy of the *Arsenic and Uranium in Water from Private Well Completed in Bedrock of East-Central Massachusetts – Concentrations, Correlations with Bedrock Units, and Estimated Probability Maps*, John A. Colman, USGS, Scientific Investigations Report 2011-5013.

Elevated concentrations of arsenic were detected in native soil across the site at all depths sampled, with the most elevated concentration detected just below the grass cover to a depth of 2 feet below grade. No field evidence was encountered that indicated soil had been disturbed or mobilized, or that an anthropogenic activity might have resulted in the elevated arsenic concentrations. As a result, *ECMS*, on behalf the City of Amesbury submitting this retraction in accordance MCP 310 MR 40.0335.

8.0 PROPOSED CONSTRUCTION OVERSIGHT

As stated in MCP 310 CMR 40.0335(6) *"*Nothing in 310 CMR 40.0335 shall limit the Department's authority to initiate, oversee, or order the performance of any response action deemed necessary by the Department to protect health, safety, public welfare, or the environment."

The presence of the arsenic detected on the Cashman School property should be properly managed to prevent exposure of arsenic present in the site's soils to protect health, safety, public welfare, and the environment.

ECMS proposed that a Health and Safety Plan (HASP) for use by construction workers and ancillary construction support staff during construction of a new school building and a Soil and Groundwater Management Plan that will provides a plan for the management of metals-impacted soil and groundwater that may be encountered during construction of a new elementary school building be prepared for the construction activities that will occur during the construction of the new school.

9.0 PUBLIC INVOLVEMENT

Although not required, a letter regarding this release notification retraction has been provided to the appropriate municipal officials. A copy of the letter is provided in Appendix K.

10.0 LIMITATIONS

This evaluation is based on the conditions existing at the property on the dates of property visits and field investigation activities. Past conditions are considered on the basis of readily available records, interviews, and recollections. Property conditions are subject to variations and changes over time. This report is based on the current fully-implemented environmental regulations.

Future regulatory modifications, agency interpretations, and/or attitude changes may affect the environmental status of the site.

Environmental & Construction Management Services, Inc. (*ECMS*) professional services have been performed, our findings obtained, and our recommendations prepared in accordance with customary principles and practices in the fields of environmental science and engineering. This warranty is in lieu of all other warranties either expressed or implied. *ECMS* is not responsible for the independent conclusions, opinions or recommendations made by others based on the records review, site inspection, field exploration, and laboratory test data presented in this report.

The findings set forth in the attached Site assessment report are strictly limited in time and scope to the date of the evaluation(s). The conclusions presented in the Report are based solely on the services described therein and not on scientific tasks or procedures beyond the scope of agreed upon services or the time and budgeting restraints imposed by the client.

The purpose of this report was to assess the physical characteristics of the subject Site with respect to the presence in the environment of hazardous material or oil. No specific attempt was made to check on the compliance of present or past owners or operators or of the Site with Federal, State or local laws and regulations, environmental, or otherwise.

Partial findings of this investigation are based on data provided by others. No warranty is expressed or implied with the usage of such data. Much of the information provided in this report is based upon personal interviews and research of all available documents, records, and maps held by the appropriate government and private agencies. This is subject to the limitations of historical documentation, availability and accuracy of pertinent records, and the personal recollection of those persons contacted by *ECMS* personnel. *ECMS* is not a professional title insurance firm and makes no guarantee, explicit or implied that the listing, which was reviewed, represented a comprehensive delineation of past Site ownership or tenancy for legal purposes.

Observations were made of the Site and of structures on the Site as indicated within the Report. Where access to portions of the Site or to structures on the Site was unavailable or limited, *ECMS* is unable to render an opinion as to the presence of hazardous material or oil, or to the presence if indirect evidence relating to hazardous material or oil, in that portion of the Site or structure. In addition, *ECMS* renders no opinion as to the presence of hazardous material or oil, where direct observation of the interior walls, floor, or ceiling of a structure on a Site was obstructed by objects or coverings on or over these surfaces.

The initial site investigation took into account the natural and man-made features of the Site, including any unusual or suspect phenomenon. These factors combined with the Site's geology, hydrology, topography, and past and present land uses served as a basis for choosing a methodology and location for subsurface exploration as well as ground water and subsurface sampling, if done. The subsurface data, if provided, is meant as a representative overview of the Site.

The conclusions and recommendations contained in this report May be based in part upon various types of chemical data and are contingent upon their validity. As indicated within the Report, some of these data are preliminary "screening" level data, and should be confirmed with quantitative analyses if more specific information is necessary. It should be noted that variations in the types and concentrations of contaminants and variations in their flow paths May occur due to seasonal water table fluctuations, past disposal practices, the passage of time, and other factors. Should additional data or variations of current data become available in the future, these data should be reviewed, and the conclusions and recommendations presented herein modified accordingly.

Chemical analyses May have been performed for specific parameters during the course of this Site assessment, as described in the text. However, it should be noted that additional chemical constituents not searched for during the current study might be present in soil and/or ground water at the Site.

ATTACHMENT TO OPINION OF MASSACHUSETTS LICENSED SITE PROFESSIONAL (LSP)

Name of Licensed Site Professional:	Kevin J. Kavanaugh
LSP Registration Number:	7610
Date of Opinion:	September 18, 2020
Client to Whom Opinion was Rendered:	DiNisco Design, Inc. and their client the City of Amesbury Massachusetts
Acceptance date of Agreement between *ECMS, Inc.* and *Client* pursuant to which Opinion was Rendered:	May 20, 2020
Release Tracking Number/Site No.:	3-36397

This Statement of Limitations and Conditions is an integral part of, and is incorporated by reference into, the Opinion of Massachusetts Licensed Site Professional referenced above.

LIMITATIONS

1. Purpose of Opinion

A. This Opinion is being provided in compliance with the requirements set forth in the Massachusetts Contingency Plan (MCP), 310 CMR 40.0000 et seq. Specifically, the LSP has prepared this Opinion at the request of the Client identified above as part of a Permanent Solution Statement. This stated purpose has been a significant factor in determining the scope and level of services required to render this Opinion.

B. Should the purpose for which this Opinion is to be used change, this Opinion shall no longer be valid.

2. General

A. This Opinion was prepared for the sole and exclusive use of *DiNisco Design* and their Client *the City of Amesbury* (Owner), subject to the provisions of the MCP. Except for Client, their attorneys, banker, or insurance carriers, no other party is entitled to rely in any way on the conclusions, observations, specifications, or data contained herein without the express written consent of *ECMS* and the LSP who rendered this opinion. Any use of this Opinion by anyone other than the Client, or any use of this Opinion by the Client or others for any purpose other than the stated purpose set forth above, without the LSP's review and the written authorization of *ECMS* and

the LSP, shall be at the user's sole risk, and neither *ECMS*, nor the LSP shall have any liability or responsibility therefore.

B. This Opinion was prepared pursuant to an Agreement between *ECMS* and the Client referenced above which defines the scope of work and sets out agreements regarding waivers of consequential damages, limitations on liability, and other important conditions and restrictions pursuant to which the Opinion is rendered. All uses of the Opinions are subject to and deemed acceptance of the conditions and restrictions contained in such Agreement.

3. Scope of Services

The observations and conclusions described in this Opinion are based solely on the Services provided pursuant to the Agreement with the Client and any approved additional services authorized by the Client. Without limitation of any other applicable limitations or conditions, neither *ECMS*, nor the LSP shall be liable for the existence of any condition, the discovery of which would have required the performance of services not authorized under this Agreement. To the best knowledge and behalf of *ECMS* and the LSP who signed this Opinion, no inquiry of an attorney-at-law having being made, no laws, regulations, orders, permits or approvals are applicable to the response actions to which this opinion relates except, if and to the extent applicable, M.G.L. c. 21A, Sections 19-19J, 309 CMR, M.G.L. c. 21E and 310 CMR 40.0000. Accordingly, this opinion is not intended to and does not address compliance with any other laws, regulations, orders, permits or approvals.

4. Changed Circumstances

The passage of time may result in changed technology, economic conditions or regulatory standards, manifestations of latent conditions, or the occurrence of future events, which would render this Opinion inaccurate or otherwise inapplicable. Neither *ECMS* nor the LSP shall be liable or responsible for the consequences of any such changed circumstances or conditions on the accuracy of this Opinion. In addition, under no circumstances shall the Client nor any other persons or entity rely on the information or conclusions contained in this Opinion after five (5) months from its date of submission without the express written consent of *ECMS* and the LSP. Reliance on the Opinion after such period of time shall be at the user's sole risk.

5. Should *ECMS* or the LSP be required or requested to review or authorize others to use this Opinion after its date of submission, *ECMS* shall be entitled to additional compensation at then existing rates or such other terms as may be agreed upon by *ECMS* and the Client. Nothing herein contained shall be deemed to require *ECMS* or the LSP to undertake any such review or authorize others to use this Opinion.

6. The conclusions stated in this Opinion are based upon [check and initial appropriate boxes]:

☑ KJK Visual inspection of existing physical conditions;

☑ KJK Review and interpretation of Site history and Site usage information which was made available or obtained within the scope of work authorized by the Client;

☑ KJK Information provided by the Client;

☑ KJK Information and/or analyses for designated substances or parameters provided by an independent testing service or laboratory on a limited number of samples;

☑ KJK A limited number of subsurface explorations made on dates indicated in documentation supporting this Opinion;

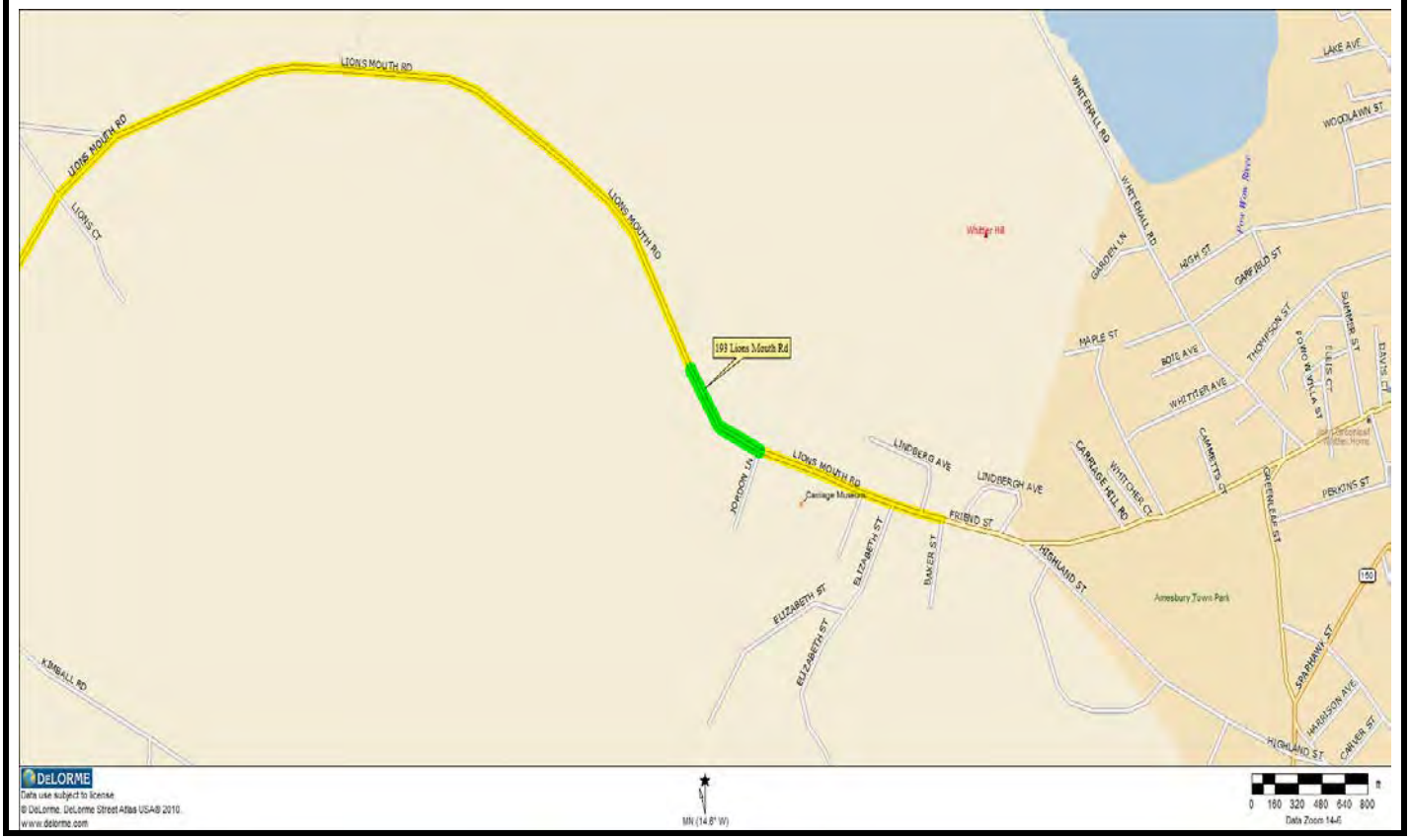
☐ _____ Other _____

Upon which the LSP has relied and presumed accurate, and upon which the LSP is entitled to reasonably rely. The LSP was not authorized and did not attempt to independently verify the accuracy or completeness of information or materials received from the Client and/or from laboratories and other third parties during the performance of its services. Neither *ECMS* nor the LSP shall be liable for any condition, information, or conclusion, the discovery of which required information available to the LSP or the independent investigation of information provided to the LSP by the Client and/or independent third parties.

This Opinion is rendered for the limited purpose stated above, and is not and should not be deemed to be an opinion concerning the compliance of any past or present owner or operator of the Site with any federal, state or local law or regulation. **No warranty or guarantee, whether expressed or implied, is made by the opinion, and any implied warranties of merchantability or fitness for a particular purpose are expressly disclaimed.** Without limiting the generality of the foregoing, no warranty is made that all contamination at a Site or sources of contamination has been detected or identified, that any action or recommended action will achieve all of its objectives, or that this opinion or any action as to which this Opinion relates will be upheld by any audit conducted by the Massachusetts Department of Environmental Protection (MassDEP) or any other party.

FIGURES





Cashman Elementary School **193 Lions Mouth Road** **Amesbury, Massachusetts** **01913**	**Environmental & Construction Management Services, Inc.**	**Project No.** 1009.073	**Figure 1**
		Site Locus / Street Location Plan	
		Drawn By: KJK	**Date:** 8/24/18

N

CITY OF AMESBURY, MASS.

Assessor Maps

LEGEND

- Parcel Line
- Building Footprints
- Prior Parcel Line with Common Ownership
- 5 Condo Unit Number
- Right of Way
- Map Index
- Town Boundaries
- Easements
- Hydrographic Features
- Streams
- Wetlands

Exempt Lands

- Federal
- State
- Municipal
- Private

N

SCALE: 1" = 100'

100 0 100 200 300 400

NOTE:
THE AREAS, BOUNDARIES, AND DIMENSIONS SHOWN ON THIS TAX MAP ARE DERIVED FROM AERIAL PHOTOGRAPHS, GROUND SURVEYS, AND RECORDED PLANS, MAPS, DEEDS, AND WILLS, AND ARE INTENDED TO BE USED FOR PROPERTY ASSESSMENT PURPOSES ONLY AND NOT FOR CONVEYANCE.

MAP REVISION DATE		
As of January 1, 2018		

Data Sources: The data for this map was supplied by the Merrimack Valley Planning Commission, the Town of Amesbury and the Executive Office of Environmental Affairs/MassGIS.

Merrimack Valley Planning Commission
plan • develop • promote

J:\ArcGIS\Amesbury\AmesburyAssessorMap_24x36.mxd

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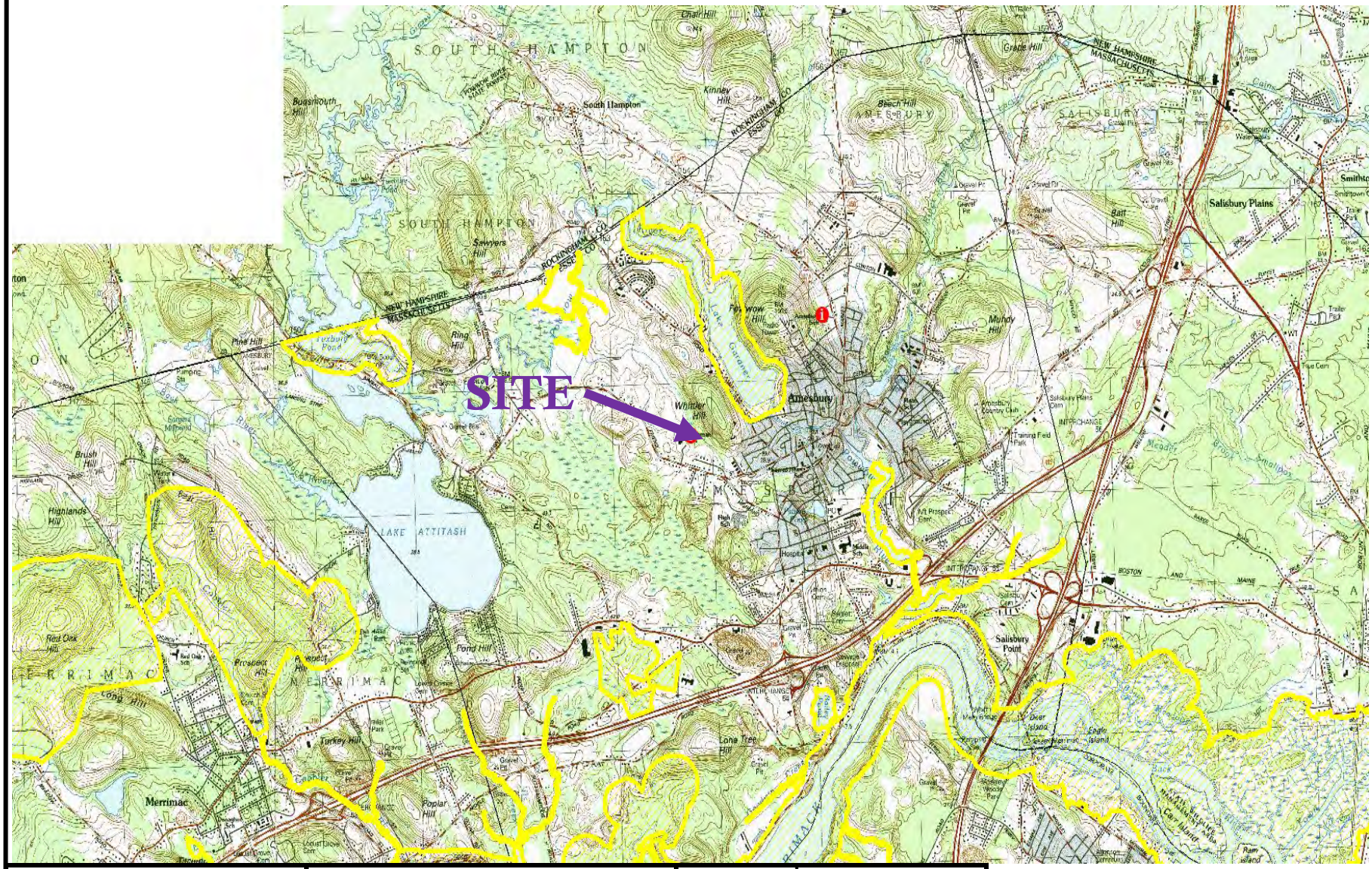
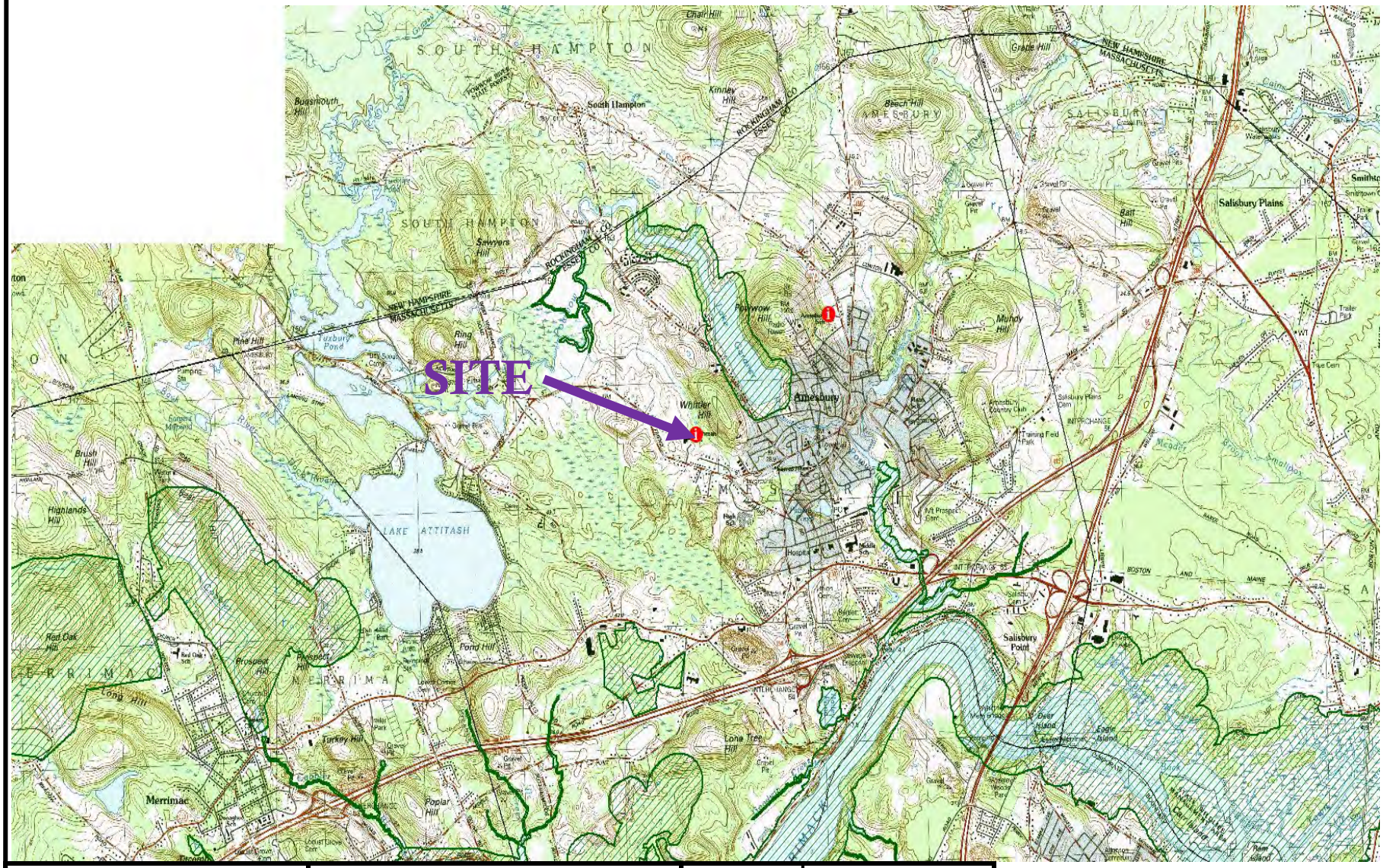


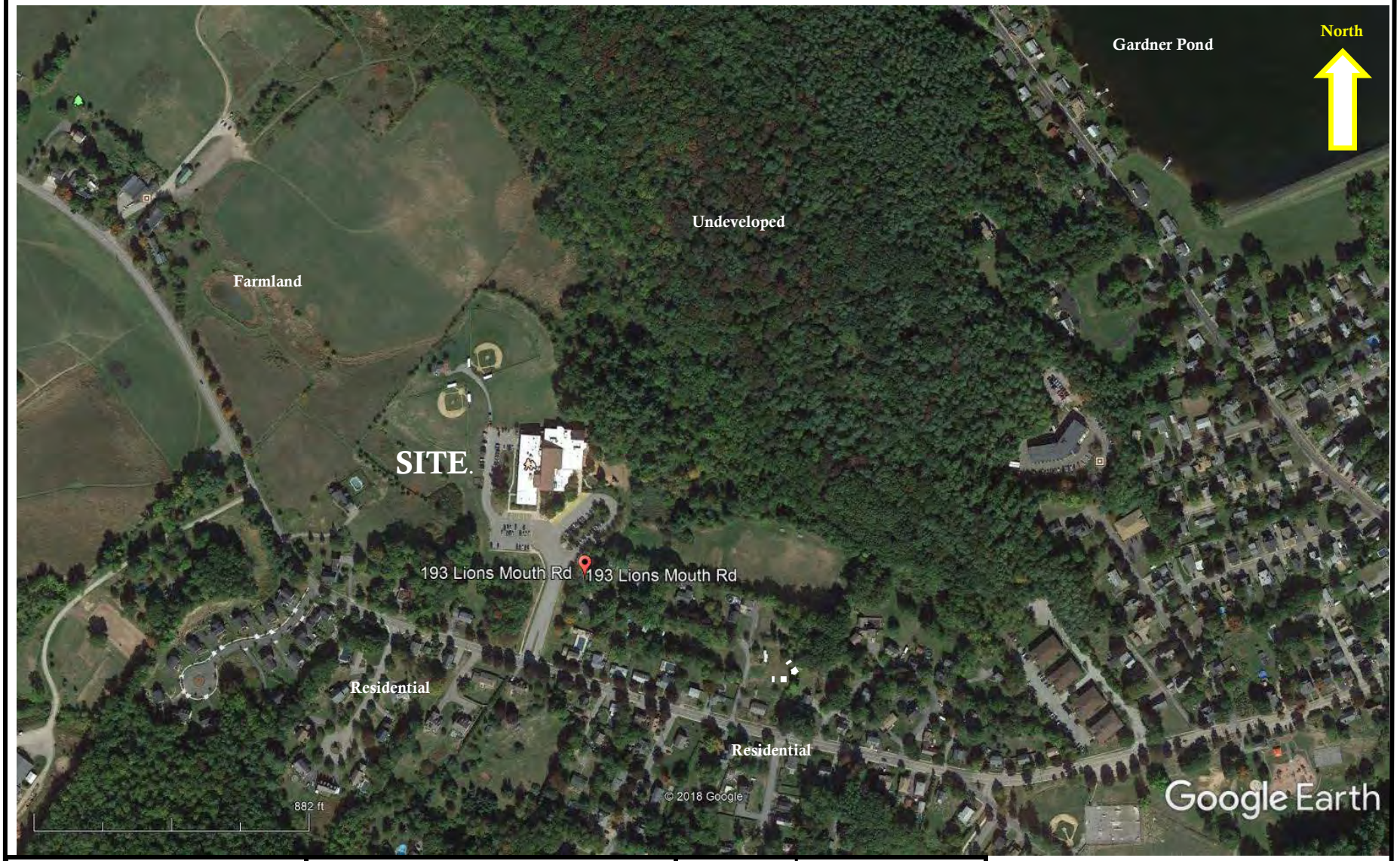
Cashman Elementary School **193 Lions Mouth Road** **Amesbury, Massachusetts** **01913**	**Environmental & Construction Management Services, Inc.**	**Project No.** 1009.073	**Figure 3**
		Priority Habitats of Rare Species Plan	
		Drawn By: KJK	**Date:** 8/23/18



Cashman Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts
01913

Environmental & Construction Management Services, Inc.

Project No. 1009.073	**Figure 4**
Map of Estimated Habitats of Rare Wildlife and Certified Vernal Pools	
Drawn By: KJK	**Date:** 8/23/18



Cashman Elementary School **193 Lions Mouth Road** **Amesbury, Massachusetts** **01913**	**Environmental & Construction Management Services, Inc.**	**Project No.** 1009.073	**Figure 5**
		Aerial Photograph Site Location Plan	
		Drawn By: KJK	**Date:** 8/24/2018

MassDEP - Bureau of Waste Site Cleanup

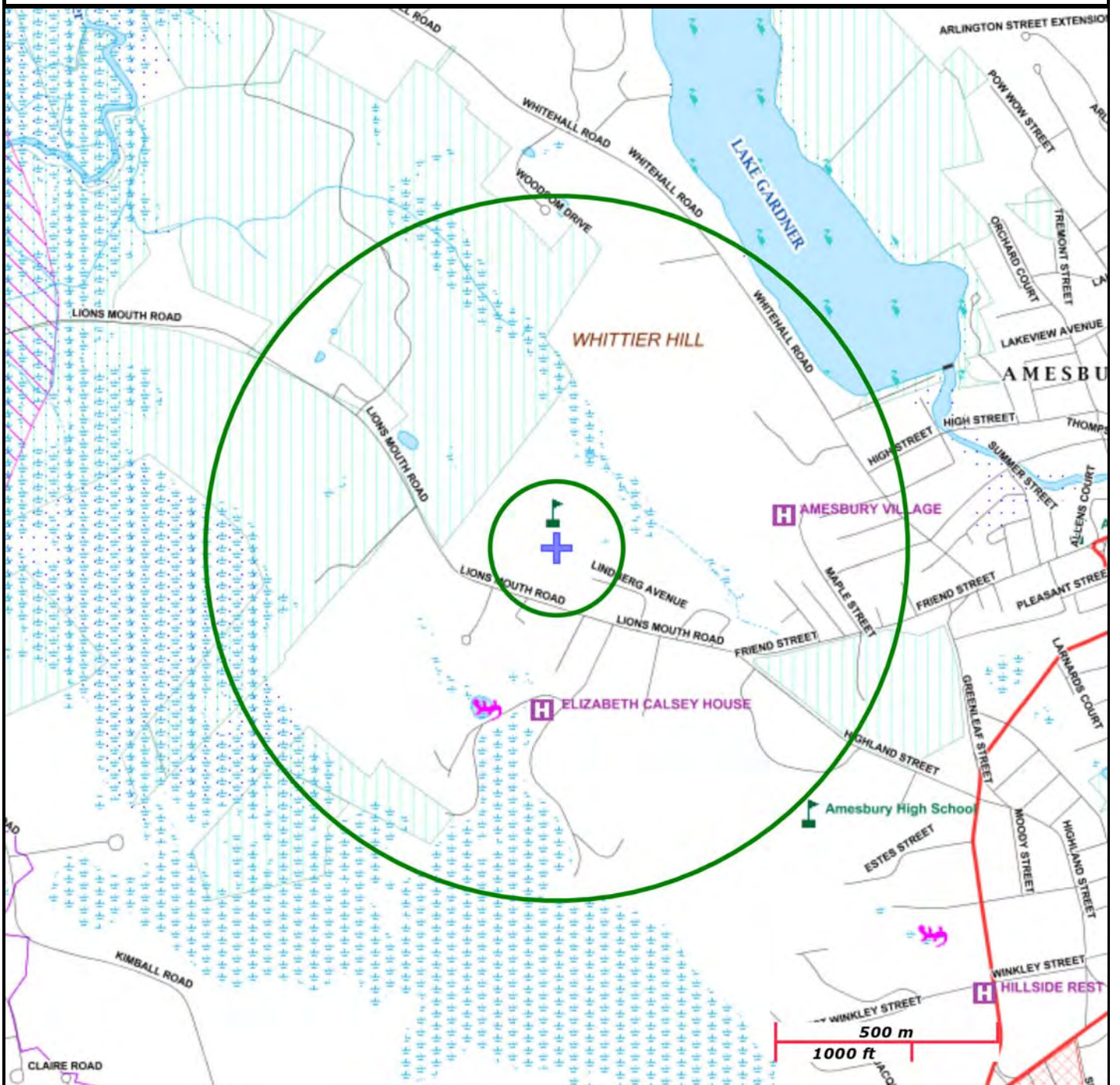
Phase 1 Site Assessment Map: 500 feet & 0.5 Mile Radii

Site Information:
CAHSMAN ELEMENTARY SCHOOL
193 LIONS MOUTH ROAD AMESBURY, MA

NAD83 UTM Meters:
4746679mN , 340744mE (Zone: 19)
September 13, 2018

The information shown is the best available at the date of printing. However, it may be incomplete. The responsible party and LSP are ultimately responsible for ascertaining the true conditions surrounding the site. Metadata for data layers shown on this map can be found at: http://www.mass.gov/mgis/.

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection



Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail

Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct

Basins: Major, PWS; Streams: Perennial, Intermittent, Man Made Shore, Dam

Aquifers: Medium Yield, High Yield, EPA Sole Source

Non Potential Drinking Water Source Area: Medium, High (Yield)

PWS Protection Areas: Zone II, IWPA, Zone A

Hydrography: Open Water, PWS Reservoir, Tidal Flat

Wetlands: Freshwater, Saltwater, Cranberry Bog

FEMA 100yr Floodplain; Protected Open Space; ACEC

Est. Rare Wetland Wildlife Hab; Vernal Pool: Cert., Potential

Solid Waste Landfill; PWS: Com.GW,SW, Emerg., Non-Com.

National Flood Hazard Layer FIRMette

FEMA

42°51'31.27"N

70°57'17.71"W



70°56'40.25"W

42°51'4.90"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Legend

FIGURE 7

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/13/2018 at 3:39:51 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



Cashman Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts
01913

Environmental & Construction Management Services, Inc.

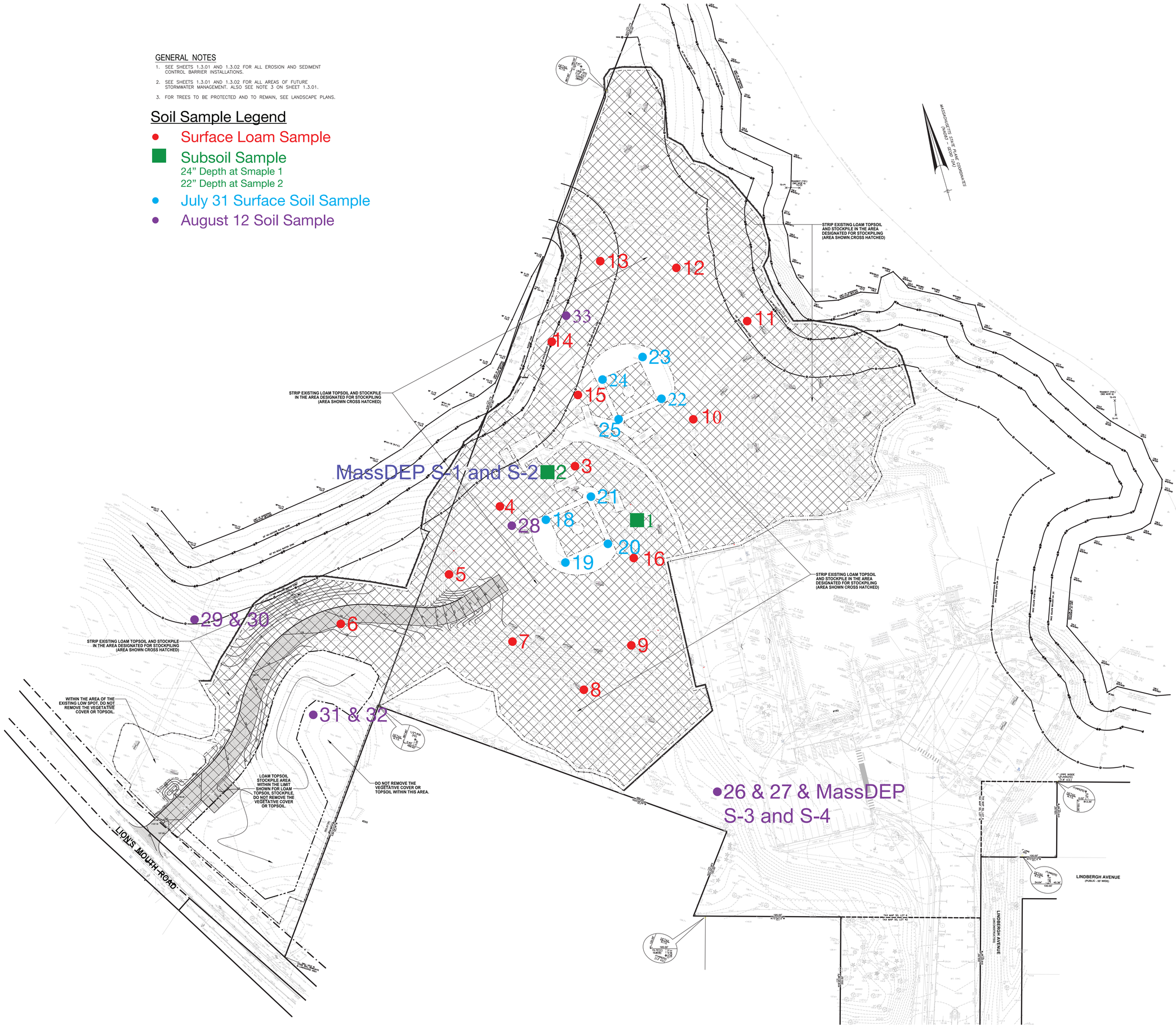
Project No. 1009.073	**Figure 8**
Site Plan	
Drawn By: KJK	**Date:** 8/23/18

GENERAL NOTES

1. SEE SHEETS 1.3.01 AND 1.3.02 FOR ALL EROSION AND SEDIMENT CONTROL BARRIER INSTALLATIONS.
2. SEE SHEETS 1.3.01 AND 1.3.02 FOR ALL AREAS OF FUTURE STORMWATER MANAGEMENT. ALSO SEE NOTE 3 ON SHEET 1.3.01.
3. FOR TREES TO BE PROTECTED AND TO REMAIN, SEE LANDSCAPE PLANS.

Soil Sample Legend

- Surface Loam Sample
- Subsoil Sample
  - 24" Depth at Smaple 1
  - 22" Depth at Sample 2
- July 31 Surface Soil Sample
- August 12 Soil Sample



AMESBURY ELEMENTARY SCHOOL

EARLY SITE PREPARATION

AMESBURY, MA

DINISCO DESIGN architects + planners
99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2858

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

Thompson Engineering Company, Inc.
Electrical Engineers
89 Newbury Street, Suite 103
Danvers, MA 01923
(617) 866-9066

Hancock Associates
Surveyor
185 Centre Street
Danvers, MA 09123
(978) 777-3050

KEY PLAN

NORTH ARROW (Called North) STAMP

Date: 6 JULY 2020

Drawn By: KMR

Scale: 0 40 80

Revisions

Number	Date	Description

Figure 8 - Soil Sample Location Plan

G:\Contract Jobs\12526\Dwg\12526_Fig 8.dwg

© 2020 DiNisco Design

TABLES

TABLE 1

SUMMARY OF TOPSOIL/LOAM/SUBSOIL SAMPLES FOR pH, REACTIVITY, IGNITABILITY, MASSDEP 14 METALS, POLCHLORINATED BIPHENYLS (PCBs) & TOTAL PETROLEUM HYDROCARBONS (TPH)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**
MassDEP RTN 3-36397

Sample Location		**SS-1**	**SS-2**	**SSS-3**	**SSS-4**	**SSS-5**	**SSS-6**	**SSS-7**	**SSS-8**	**SSS-9**	**MassDEP**	**MassDEP**
Laboratory ID		**SC58794-01**	**SC58794-02**	**SC58794-10**	**SC58794-11**	**SC58794-12**	**SC58794-13**	**SC58794-14**	**SC58794-15**	**SC58794-16**	**Reportable**	**Imminent**
Sample Date		**7/9/2020**	**7/9/2020**	**7/9/2020**	**7/9/2020**	**7/9/2020**	**7/9/2020**	**7/9/2020**	**7/9/2020**	**7/9/2020**	**Concentrations**	**Hazard**
Sample Depth		**24"**	**22"**	**2-6"**	**2-6"**	**2-6"**	**2-6"**	**2-6"**	**2-6"**	**2-6"**	**RCS-1**	
SM2540 G (11) Mod. (%)												
solids	% Solids	89.3	88.8	82.7	88.9	85.8	92.6	83.4	86.1	78.7	NA	
SW846 9045D (pH Units)												
pH		5.99	6.08	6.13	5.58	5.57	5.74	5.71	5.56	5.41	NA	
SW846 Ch. 7.3 (mg/kg dry)												
Reactivity		Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative		
Reactive Cyanide		<6	<7	<7	<6	<6	<6	<7	<6	<7	30	
Reactive Sulfide		< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20		
SW846 1030 (N/A)												
NA	Ignitability by Definition	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	NA	
MassDEP 14 Metals - SW846 6010C (mg/kg)												
7440-36-0	Antimony	<5.59	<5.58	<5.98	<5.41	<6.27	<5.63	<6.01	<6.24	<6.28	20	
7440-38-2	Arsenic	**39.9**	**55.9**	**36.6**	**20.5**	**53.4**	**29.6**	**48.6**	**48.7**	**82.3**	**20**	**40**
7440-41-7	Beryllium	<0.559	<0.558	<0.598	<0.541	<0.627	<0.563	<0.601	<0.624	<0.628	90	
7440-43-9	Cadmium	<0.559	<0.558	<0.598	<0.541	<0.627	<0.563	<0.601	<0.624	<0.628	70	
7440-47-3	Chromium	22.6	19.4	21.8	18.8	25.0	30.0	65.9	31.6	24.7	100	
7439-92-1	Lead	8.42	19.3	17.0	18.6	17.0	15.8	28.6	21.0	22.9	200	
7440-02-0	Nickel	39.7	71.4	33.2	20.3	46.2	25.6	44.8	47.7	76.0	600	
7782-49-2	Selenium	<1.68	<1.67	<1.80	<1.62	<1.88	<1.69	<1.80	<1.87	<1.88	400	
7440-22-4	Silver	<3.35	<3.35	<3.59	<3.25	<3.76	<3.38	<3.60	<3.75	<3.77	100	
7440-28-0	Thallium	<3.35	<3.35	<3.59	<3.25	<3.76	<3.38	<3.60	<3.75	<3.77	8	
7440-62-2	Vanadium	22.7	24.5	30.1	24.5	33.9	35.8	46.7	36.0	39.4	400	
7440-66-6	Zinc	36.3	58.5	107	36.0	52.1	43.2	56.2	52.3	64.7	1000	
7440-39-3	Barium	18.4	22.5	30.0	29.5	30.3	28.6	34.6	33.0	29.1	1000	
RCRA Metals - SW846 7471B (mg/kg)												
7439-97-6	Mercury	<0.115	<0.127	<0.110	<0.116	<0.103	<0.120	<0.128	<0.115	<0.120	20	
Polychlorinated biphenyls (PCBs) - SW846 8082A (µg/kg)												
12674-11-2	Aroclor-1016	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
11104-28-2	Aroclor-1221	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
11141-16-5	Aroclor-1232	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
53469-21-9	Aroclor-1242	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
12672-29-6	Aroclor-1248	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
11097-69-1	Aroclor-1254	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
11096-82-5	Aroclor-1260	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
37324-23-5	Aroclor-1262	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	-	
11100-14-4	Aroclor-1268	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	-	
Total Petroleum Hydrocarbons (TPH) 8100 by GC (mg/kg)												
PH(TOT)	Total Petroleum Hydrocarbons	24.9	38.7	113	118	106	134	170	111	129	1000	

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazrdous Materials List (MOHML) revised (effective) 2014

Environmental & Construction Management Services, Inc.

TABLE 1

SUMMARY OF TOPSOIL/LOAM/SUBSOIL SAMPLES FOR pH, REACTIVITY, IGNITABILITY, MASSDEP 14 METALS, POLCHLORINATED BIPHENYLS (PCBs) & TOTAL PETROLEUM HYDROCARBONS (TPH)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**
MassDEP RTN 3-36397

Sample Location Laboratory ID Sample Date Sample Depth		SSS-10 SC58794-03 7/9/2020 2-6"	SSS-11 SC58794-04 7/9/2020 2-6"	SSS-12 SC58794-05 7/9/2020 2-6"	SSS-13 SC58794-06 7/9/2020 2-6"	SSS-14 SC58794-07 7/9/2020 2-6"	SSS-15 SC58794-17 7/9/2020 2-6"	SSS-16 SC58794-08 7/9/2020 2-6"	SSS-17 SC58794-09 7/9/2020 2-6"	MassDEP Reportable Concentrations RCS-1	MassDEP Imminent Hazard
SM2540 G (11) Mod. (%)											
solids	% Solids	80.1	80.6	83.3	79.0	86.9	79.8	90.3	89.6	NA	
SW846 9045D (pH Units)											
pH		6.17	5.47	5.71	6.35	6.03	5.69	6.08	6.11		
SW846 Ch. 7.3 (mg/kg dry)											
Reactivity		Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative		
Reactive Cyanide		<7	<9	<6	<7	<6	<7	<6	<6	30	
Reactive Sulfide		< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20		
SW846 1030 (N/A)											
NA	Ignitability by Definition	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	NA	
MassDEP 14 Metals - SW846 6010C (mg/kg)											
7440-36-0	Antimony	<5.89	<6.24	<5.56	<6.11	<5.63	<6.33	<5.58	<5.33	20	
7440-38-2	Arsenic	**25.4**	**33.6**	**39.2**	**49.1**	**23.7**	**37.8**	**36.6**	**21.9**	**20**	**40**
7440-41-7	Beryllium	<0.589	<0.624	<0.556	<0.611	<0.563	<0.633	<0.558	<0.533	90	
7440-43-9	Cadmium	<0.589	<0.624	<0.556	<0.611	<0.563	<0.633	<0.558	<0.533	70	
7440-47-3	Chromium	22.9	23.2	17.4	23.3	36.0	31.5	21.7	19.4	100	
7439-92-1	Lead	13.7	18.9	19.6	22.7	13.7	25.9	17.5	12.1	200	
7440-02-0	Nickel	28.2	30.4	26.9	37.2	26.1	37.7	30.6	27.9	600	
7782-49-2	Selenium	<1.77	<1.87	<1.67	<1.83	<1.69	<1.90	<1.67	<1.60	400	
7440-22-4	Silver	<3.53	<3.74	<3.34	<3.67	<3.38	<3.80	<3.35	<3.20	100	
7440-28-0	Thallium	<3.53	<3.74	<3.34	<3.67	<3.38	<3.80	<3.35	<3.20	8	
7440-62-2	Vanadium	29.6	38.3	33.5	34.6	41.9	36.3	30.6	8.48	400	
7440-66-6	Zinc	60.8	43.2	37.9	49.2	44.6	60.7	44.3	61.8	1000	
7440-39-3	Barium	26.5	24.8	21.7	28.9	44.1	46.3	24.0	113	1000	
RCRA Metals - SW846 7471B (mg/kg)											
7439-97-6	Mercury	<0.117	<0.126	<0.129	<0.133	<0.118	<0.123	<0.119	<0.116	20	
Polychlorinated biphenyls (PCBs) - SW846 8082A (µg/kg)											
12674-11-2	Aroclor-1016	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
11104-28-2	Aroclor-1221	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
11141-16-5	Aroclor-1232	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
53469-21-9	Aroclor-1242	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
12672-29-6	Aroclor-1248	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
11097-69-1	Aroclor-1254	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
11096-82-5	Aroclor-1260	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
37324-23-5	Aroclor-1262	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	-	
11100-14-4	Aroclor-1268	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	-	
Total Petroleum Hydrocarbons (TPH) 8100 by GC (mg/kg)											
PH(TOT)	Total Petroleum Hydrocarbons	109	184	180	93.0	116	168	93.6	49.7	1000	

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazrdous Materials List (MOHML) revised (effective) 2014

Environmental & Construction Management Services, Inc.

TABLE 2

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR VOLATILE ORGANIC COMPOUNDS (VOCs)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**
MassDEP RTN 3-36397

Sample Location		SS-1	SS-2	SSS-3	SSS-4	SSS-5	SSS-6	SSS-7	SSS-8	SSS-9	MassDEP Reportable Concentrations
Laboratory ID		SC58794-01	SC58794-02	SC58794-10	SC58794-11	SC58794-12	SC58794-13	SC58794-14	SC58794-15	SC58794-16	
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	
Sample Depth		24"	22"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Volatile Organic Compounds (VOCs) - SW846 8260B (µg/kg)											
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
67-64-1	Acetone	<532	<573	<711	<643	<662	<521	<594	<605	<760	6000
107-13-1	Acrylonitrile	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
71-43-2	Benzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	2000
108-86-1	Bromobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
74-97-5	Bromochloromethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
75-27-4	Bromodichloromethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
75-25-2	Bromoform	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
74-83-9	Bromomethane	<106	<115	<142	<129	<132	<104	<119	<121	<152	500
78-93-3	2-Butanone (MEK)	<106	<115	<142	<129	<132	<104	<119	<121	<152	4000
104-51-8	n-Butylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
135-98-8	sec-Butylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
98-06-6	tert-Butylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
75-15-0	Carbon disulfide	<106	<115	<142	<129	<132	<104	<119	<121	<152	100000
56-23-5	Carbon tetrachloride	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	5000
108-90-7	Chlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000
75-00-3	Chloroethane	<106	<115	<142	<129	<132	<104	<119	<121	<152	100000
67-66-3	Chloroform	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	200
74-87-3	Chloromethane	<106	<115	<142	<129	<132	<104	<119	<121	<152	100000
95-49-8	2-Chlorotoluene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
106-43-4	4-Chlorotoluene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
96-12-8	1,2-Dibromo-3-chloropropane	<106	<115	<142	<129	<132	<104	<119	<121	<152	10000
124-48-1	Dibromochloromethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	5
106-93-4	1,2-Dibromoethane (EDB)	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
74-95-3	Dibromomethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	500000
95-50-1	1,2-Dichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	9000
541-73-1	1,3-Dichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	3000
106-46-7	1,4-Dichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	700
75-71-8	Dichlorodifluoromethane (Freon12)	<106	<115	<142	<129	<132	<104	<119	<121	<152	1000000
75-34-3	1,1-Dichloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	400
107-06-2	1,2-Dichloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
75-35-4	1,1-Dichloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	3000
156-59-2	cis-1,2-Dichloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	300
156-60-5	trans-1,2-Dichloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000
78-87-5	1,2-Dichloropropane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
142-28-9	1,3-Dichloropropane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	500000
594-20-7	2,2-Dichloropropane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
563-58-6	1,1-Dichloropropene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
10061-01-5	cis-1,3-Dichloropropene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	10
10061-02-6	trans-1,3-Dichloropropene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	10
100-41-4	Ethylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	40000
87-68-3	Hexachlorobutadiene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	30000
591-78-6	2-Hexanone (MBK)	<106	<115	<142	<129	<132	<104	<119	<121	<152	100000
98-82-8	Isopropylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000000
99-87-6	4-Isopropyltoluene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
1634-04-4	Methyl tert-butyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
108-10-1	4-Methyl-2-pentanone (MIBK)	<106	<115	<142	<129	<132	<104	<119	<121	<152	400
75-09-2	Methylene chloride	<106	<115	<142	<129	<132	<104	<119	<121	<152	100
91-20-3	Naphthalene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	4000
103-65-1	n-Propylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
100-42-5	Styrene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	3000
630-20-6	1,1,1,2-Tetrachloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
79-34-5	1,1,2,2-Tetrachloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	5
127-18-4	Tetrachloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000
108-88-3	Toluene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	30000
87-61-6	1,2,3-Trichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
120-82-1	1,2,4-Trichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	2000
108-70-3	1,3,5-Trichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	30000
71-55-6	1,1,1-Trichloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
79-00-5	1,1,2-Trichloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
79-01-6	Trichloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	300
75-69-4	Trichlorofluoromethane (Freon 11)	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000000
96-18-4	1,2,3-Trichloropropane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
95-63-6	1,2,4-Trimethylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000000
108-67-8	1,3,5-Trimethylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	10000
75-01-4	Vinyl chloride	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	700
179601-23-1	m,p-Xylene	<106	<115	<142	<129	<132	<104	<119	<121	<152	300000
95-47-6	o-Xylene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	500000
109-99-9	Tetrahydrofuran	<106	<115	<142	<129	<132	<104	<119	<121	<152	500000
60-29-7	Ethyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
994-05-8	Tert-amyl methyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
637-92-3	Ethyl tert-butyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
108-20-3	Di-isopropyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
75-65-0	Tert-Butanol / butyl alcohol	<1060	<1150	<1420	<1290	<1320	<1040	<1190	<1210	<1520	100000
123-91-1	1,4-Dioxane	<1060	<1150	<1420	<1290	<1320	<1040	<1190	<1210	<1520	10000
110-57-6	trans-1,4-Dichloro-2-butene	<266	<286	<356	<321	<331	<261	<297	<302	<380	200
64-17-5	Ethanol	<10600	<11500	<14200	<12900	<13200	<10400	<11900	<12100	<15200	100000

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazrdous Materials List (MOHML) revised (effective) February 14, 2008

Environmental & Construction Management Services, Inc.

TABLE 2

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR VOLATILE ORGANIC COMPOUNDS (VOCs)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**
MassDEP RTN 3-36397

Sample Location		SSS-10	SSS-11	SSS-12	SSS-13	SSS-14	SSS-15	SSS-16	SSS-17	MassDEP Reportable Concentrations
Laboratory ID		SC58794-03	SC58794-04	SC58794-05	SC58794-06	SC58794-07	SC58794-17	SC58794-08	SC58794-09	
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	
Sample Depth		2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Volatile Organic Compounds (VOCs) - SW846 8260B (µg/kg)										
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
67-64-1	Acetone	<686	<693	<637	<695	<585	<695	<540	<529	6000
107-13-1	Acrylonitrile	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
71-43-2	Benzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	2000
108-86-1	Bromobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
74-97-5	Bromochloromethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
75-27-4	Bromodichloromethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
75-25-2	Bromoform	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
74-83-9	Bromomethane	<137	<139	<127	<139	<117	<139	<108	<106	500
78-93-3	2-Butanone (MEK)	<137	<139	<127	<139	<117	<139	<108	<106	4000
104-51-8	n-Butylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
135-98-8	sec-Butylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
98-06-6	tert-Butylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
75-15-0	Carbon disulfide	<137	<139	<127	<139	<117	<139	<108	<106	100000
56-23-5	Carbon tetrachloride	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	5000
108-90-7	Chlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000
75-00-3	Chloroethane	<137	<139	<127	<139	<117	<139	<108	<106	100000
67-66-3	Chloroform	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	200
74-87-3	Chloromethane	<137	<139	<127	<139	<117	<139	<108	<106	100000
95-49-8	2-Chlorotoluene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
106-43-4	4-Chlorotoluene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
96-12-8	1,2-Dibromo-3-chloropropane	<137	<139	<127	<139	<117	<139	<108	<106	10000
124-48-1	Dibromochloromethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	5
106-93-4	1,2-Dibromoethane (EDB)	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
74-95-3	Dibromomethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	500000
95-50-1	1,2-Dichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	9000
541-73-1	1,3-Dichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	3000
106-46-7	1,4-Dichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	700
75-71-8	Dichlorodifluoromethane (Freon12)	<137	<139	<127	<139	<117	<139	<108	<106	1000000
75-34-3	1,1-Dichloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	400
107-06-2	1,2-Dichloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
75-35-4	1,1-Dichloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	3000
156-59-2	cis-1,2-Dichloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	300
156-60-5	trans-1,2-Dichloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000
78-87-5	1,2-Dichloropropane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
142-28-9	1,3-Dichloropropane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	500000
594-20-7	2,2-Dichloropropane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
563-58-6	1,1-Dichloropropene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
10061-01-5	cis-1,3-Dichloropropene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	10
10061-02-6	trans-1,3-Dichloropropene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	10
100-41-4	Ethylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	40000
87-68-3	Hexachlorobutadiene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	30000
591-78-6	2-Hexanone (MBK)	<137	<139	<127	<139	<117	<139	<108	<106	100000
98-82-8	Isopropylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000000
99-87-6	4-Isopropyltoluene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
1634-04-4	Methyl tert-butyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
108-10-1	4-Methyl-2-pentanone (MIBK)	<137	<139	<127	<139	<117	<139	<108	<106	400
75-09-2	Methylene chloride	<137	<139	<127	<139	<117	<139	<108	<106	100
91-20-3	Naphthalene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	4000
103-65-1	n-Propylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
100-42-5	Styrene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	3000
630-20-6	1,1,1,2-Tetrachloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
79-34-5	1,1,2,2-Tetrachloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	5
127-18-4	Tetrachloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000
108-88-3	Toluene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	30000
87-61-6	1,2,3-Trichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
120-82-1	1,2,4-Trichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	2000
108-70-3	1,3,5-Trichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	30000
71-55-6	1,1,1-Trichloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
79-00-5	1,1,2-Trichloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
79-01-6	Trichloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	300
75-69-4	Trichlorofluoromethane (Freon 11)	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000000
96-18-4	1,2,3-Trichloropropane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
95-63-6	1,2,4-Trimethylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000000
108-67-8	1,3,5-Trimethylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	10000
75-01-4	Vinyl chloride	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	700
179601-23-1	m,p-Xylene	<137	<139	<127	<139	<117	<139	<108	<106	300000
95-47-6	o-Xylene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	500000
109-99-9	Tetrahydrofuran	<137	<139	<127	<139	<117	<139	<108	<106	500000
60-29-7	Ethyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
994-05-8	Tert-amyl methyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
637-92-3	Ethyl tert-butyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
108-20-3	Di-isopropyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
75-65-0	Tert-Butanol / butyl alcohol	<1370	<1390	<1270	<1390	<1170	<1390	<1080	<1060	100000
123-91-1	1,4-Dioxane	<1370	<1390	<1270	<1390	<1170	<1390	<1080	<1060	10000
110-57-6	trans-1,4-Dichloro-2-butene	<343	<347	<318	<348	<292	<347	<270	<264	200
64-17-5	Ethanol	<13700	<13900	<12700	<13900	<11700	<13900	<10800	<10600	100000

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazrdous Materials List (MOHML) revised (effective) February 14, 2008

Environmental & Construction Management Services, Inc.

TABLE 3

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**
MassDEP RTN 3-36397

Sample Location		SS-1	SS-2	SSS-3	SSS-4	SSS-5	SSS-6	SSS-7	SSS-8	SSS-9	MassDEP Reportable Concentrations
Laboratory ID		SC58794-01	SC58794-02	SC58794-10	SC58794-11	SC58794-12	SC58794-13	SC58794-14	SC58794-15	SC58794-16	
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	
Sample Depth		24"	22"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Semi-Volatile Organic Compounds (SVOCs) - SW846 8270D (µg/kg)											
83-32-9	Acenaphthene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	4000
208-96-8	Acenaphthylene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000
62-53-3	Aniline	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
120-12-7	Anthracene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
103-33-3	Azobenzene/Diphenyldiazene	<368	<369	<396	<367	<379	<352	<394	<379	<415	50000
92-87-5	Benzidine	<736	<738	<792	<735	<759	<704	<787	<757	<829	10000
56-55-3	Benzo (a) anthracene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	7000
50-32-8	Benzo (a) pyrene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	2000
205-99-2	Benzo (b) fluoranthene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	7000
191-24-2	Benzo (g,h,i) perylene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
207-08-9	Benzo (k) fluoranthene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
65-85-0	Benzoic acid	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
100-51-6	Benzyl alcohol	<368	<369	<396	<367	<379	<352	<394	<379	<415	-
111-91-1	Bis(2-chloroethoxy)methane	<368	<369	<396	<367	<379	<352	<394	<379	<415	500000
111-44-4	Bis(2-chloroethyl)ether	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
108-60-1	Bis(2-chloroisopropyl)ether	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
117-81-7	Bis(2-ethylhexyl)phthalate	<186	<187	<201	<186	<192	<178	<199	<192	<210	200000
101-55-3	4-Bromophenyl phenyl ether	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
85-68-7	Butyl benzyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
86-74-8	Carbazole	<186	<187	<201	<186	<192	<178	<199	<192	<210	-
59-50-7	4-Chloro-3-methylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
106-47-8	4-Chloroaniline	<186	<187	<201	<186	<192	<178	<199	<192	<210	1000
91-58-7	2-Chloronaphthalene	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
95-57-8	2-Chlorophenol	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
7005-72-3	4-Chlorophenyl phenyl ether	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
218-01-9	Chrysene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	70000
53-70-3	Dibenzo (a,h) anthracene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	700
132-64-9	Dibenzofuran	<186	<187	<201	<186	<192	<178	<199	<192	<210	100000
95-50-1	1,2-Dichlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	9000
541-73-1	1,3-Dichlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000
106-46-7	1,4-Dichlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	700
91-94-1	3,3´-Dichlorobenzidine	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000
120-83-2	2,4-Dichlorophenol	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
84-66-2	Diethyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	10000
131-11-3	Dimethyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	30000
105-67-9	2,4-Dimethylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	700
84-74-2	Di-n-butyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	50000
534-52-1	4,6-Dinitro-2-methylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	50000
51-28-5	2,4-Dinitrophenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	3000
121-14-2	2,4-Dinitrotoluene	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
606-20-2	2,6-Dinitrotoluene	<186	<187	<201	<186	<192	<178	<199	<192	<210	100000
117-84-0	Di-n-octyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
206-44-0	Fluoranthene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
86-73-7	Fluorene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
118-74-1	Hexachlorobenzene	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
87-68-3	Hexachlorobutadiene	<186	<187	<201	<186	<192	<178	<199	<192	<210	6000
77-47-4	Hexachlorocyclopentadiene	<186	<187	<201	<186	<192	<178	<199	<192	<210	50000
67-72-1	Hexachloroethane	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
193-39-5	Indeno (1,2,3-cd) pyrene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	7000
78-59-1	Isophorone	<186	<187	<201	<186	<192	<178	<199	<192	<210	100000
91-57-6	2-Methylnaphthalene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	700
95-48-7	2-Methylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	500000
108-39-4, 106-44-5	3 & 4-Methylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	500000
91-20-3	Naphthalene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	4000
88-74-4	2-Nitroaniline	<368	<369	<396	<367	<379	<352	<394	<379	<415	-
99-09-2	3-Nitroaniline	<368	<369	<396	<367	<379	<352	<394	<379	<415	-
100-01-6	4-Nitroaniline	<186	<187	<201	<186	<192	<178	<199	<192	<210	1000000
98-95-3	Nitrobenzene	<186	<187	<201	<186	<192	<178	<199	<192	<210	500000
88-75-5	2-Nitrophenol	<186	<187	<201	<186	<192	<178	<199	<192	<210	100000
100-02-7	4-Nitrophenol	<1470	<1480	<1580	<1470	<1520	<1410	<1570	<1510	<1660	100000
62-75-9	N-Nitrosodimethylamine	<186	<187	<201	<186	<192	<178	<199	<192	<210	50000
621-64-7	N-Nitrosodi-n-propylamine	<186	<187	<201	<186	<192	<178	<199	<192	<210	50000
86-30-6	N-Nitrosodiphenylamine	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
87-86-5	Pentachlorophenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	3000
85-01-8	Phenanthrene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	10000
108-95-2	Phenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000
129-00-0	Pyrene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
110-86-1	Pyridine	<368	<369	<396	<367	<379	<352	<394	<379	<415	500000
120-82-1	1,2,4-Trichlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	2000
90-12-0	1-Methylnaphthalene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	-
95-95-4	2,4,5-Trichlorophenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	3000
88-06-2	2,4,6-Trichlorophenol	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
82-68-8	Pentachloronitrobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
95-94-3	1,2,4,5-Tetrachlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Boldfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

Environmental & Construction Management Services, Inc.

TABLE 3

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**
MassDEP RTN 3-36397

Sample Location		SSS-10	SSS-11	SSS-12	SSS-13	SSS-14	SSS-15	SSS-16	SSS-17	MassDEP Reportable Concentrations
Laboratory ID		SC58794-03	SC58794-04	SC58794-05	SC58794-06	SC58794-07	SC58794-17	SC58794-08	SC58794-09	
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	
Sample Depth		2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Semi-Volatile Organic Compounds (SVOCs) - SW846 8270D (µg/kg)										
83-32-9	Acenaphthene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	4000
208-96-8	Acenaphthylene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000
62-53-3	Aniline	<407	<405	<385	<414	<375	<407	<361	<356	100000
120-12-7	Anthracene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
103-33-3	Azobenzene/Diphenyldiazene	<407	<405	<385	<414	<375	<407	<361	<356	50000
92-87-5	Benzidine	<815	<809	<771	<828	<750	<814	<722	<713	10000
56-55-3	Benzo (a) anthracene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	7000
50-32-8	Benzo (a) pyrene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	2000
205-99-2	Benzo (b) fluoranthene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	7000
191-24-2	Benzo (g,h,i) perylene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
207-08-9	Benzo (k) fluoranthene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
65-85-0	Benzoic acid	<407	<405	<385	<414	<375	<407	<361	<356	1000000
100-51-6	Benzyl alcohol	<407	<405	<385	<414	<375	<407	<361	<356	-
111-91-1	Bis(2-chloroethoxy)methane	<407	<405	<385	<414	<375	<407	<361	<356	500000
111-44-4	Bis(2-chloroethyl)ether	<206	<205	<195	<210	<190	<206	<183	<180	700
108-60-1	Bis(2-chloroisopropyl)ether	<206	<205	<195	<210	<190	<206	<183	<180	700
117-81-7	Bis(2-ethylhexyl)phthalate	305	<205	<195	<210	<190	<206	<183	<180	200000
101-55-3	4-Bromophenyl phenyl ether	<407	<405	<385	<414	<375	<407	<361	<356	100000
85-68-7	Butyl benzyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	100000
86-74-8	Carbazole	<206	<205	<195	<210	<190	<206	<183	<180	-
59-50-7	4-Chloro-3-methylphenol	<407	<405	<385	<414	<375	<407	<361	<356	1000000
106-47-8	4-Chloroaniline	<206	<205	<195	<210	<190	<206	<183	<180	1000
91-58-7	2-Chloronaphthalene	<407	<405	<385	<414	<375	<407	<361	<356	1000000
95-57-8	2-Chlorophenol	<206	<205	<195	<210	<190	<206	<183	<180	700
7005-72-3	4-Chlorophenyl phenyl ether	<407	<405	<385	<414	<375	<407	<361	<356	1000000
218-01-9	Chrysene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	70000
53-70-3	Dibenzo (a,h) anthracene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	700
132-64-9	Dibenzofuran	<206	<205	<195	<210	<190	<206	<183	<180	100000
95-50-1	1,2-Dichlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	9000
541-73-1	1,3-Dichlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	1000
106-46-7	1,4-Dichlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	700
91-94-1	3,3'-Dichlorobenzidine	<407	<405	<385	<414	<375	<407	<361	<356	1000
120-83-2	2,4-Dichlorophenol	<206	<205	<195	<210	<190	<206	<183	<180	700
84-66-2	Diethyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	10000
131-11-3	Dimethyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	30000
105-67-9	2,4-Dimethylphenol	<407	<405	<385	<414	<375	<407	<361	<356	700
84-74-2	Di-n-butyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	50000
534-52-1	4,6-Dinitro-2-methylphenol	<407	<405	<385	<414	<375	<407	<361	<356	50000
51-28-5	2,4-Dinitrophenol	<407	<405	<385	<414	<375	<407	<361	<356	3000
121-14-2	2,4-Dinitrotoluene	<206	<205	<195	<210	<190	<206	<183	<180	700
606-20-2	2,6-Dinitrotoluene	<206	<205	<195	<210	<190	<206	<183	<180	100000
117-84-0	Di-n-octyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	1000000
206-44-0	Fluoranthene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
86-73-7	Fluorene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
118-74-1	Hexachlorobenzene	<206	<205	<195	<210	<190	<206	<183	<180	700
87-68-3	Hexachlorobutadiene	<206	<205	<195	<210	<190	<206	<183	<180	6000
77-47-4	Hexachlorocyclopentadiene	<206	<205	<195	<210	<190	<206	<183	<180	50000
67-72-1	Hexachloroethane	<206	<205	<195	<210	<190	<206	<183	<180	700
193-39-5	Indeno (1,2,3-cd) pyrene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	7000
78-59-1	Isophorone	<206	<205	<195	<210	<190	<206	<183	<180	100000
91-57-6	2-Methylnaphthalene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	700
95-48-7	2-Methylphenol	<407	<405	<385	<414	<375	<407	<361	<356	500000
108-39-4, 106-44-5	3 & 4-Methylphenol	<407	<405	<385	<414	<375	<407	<361	<356	500000
91-20-3	Naphthalene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	4000
88-74-4	2-Nitroaniline	<407	<405	<385	<414	<375	<407	<361	<356	-
99-09-2	3-Nitroaniline	<407	<405	<385	<414	<375	<407	<361	<356	-
100-01-6	4-Nitroaniline	<206	<205	<195	<210	<190	<206	<183	<180	1000000
98-95-3	Nitrobenzene	<206	<205	<195	<210	<190	<206	<183	<180	500000
88-75-5	2-Nitrophenol	<206	<205	<195	<210	<190	<206	<183	<180	100000
100-02-7	4-Nitrophenol	<1630	<1620	<1540	<1660	<1500	<1630	<1440	<1430	100000
62-75-9	N-Nitrosodimethylamine	<206	<205	<195	<210	<190	<206	<183	<180	50000
621-64-7	N-Nitrosodi-n-propylamine	<206	<205	<195	<210	<190	<206	<183	<180	50000
86-30-6	N-Nitrosodiphenylamine	<407	<405	<385	<414	<375	<407	<361	<356	100000
87-86-5	Pentachlorophenol	<407	<405	<385	<414	<375	<407	<361	<356	3000
85-01-8	Phenanthrene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	10000
108-95-2	Phenol	<407	<405	<385	<414	<375	<407	<361	<356	1000
129-00-0	Pyrene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
110-86-1	Pyridine	<407	<405	<385	<414	<375	<407	<361	<356	500000
120-82-1	1,2,4-Trichlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	2000
90-12-0	1-Methylnaphthalene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	-
95-95-4	2,4,5-Trichlorophenol	<407	<405	<385	<414	<375	<407	<361	<356	3000
88-06-2	2,4,6-Trichlorophenol	<206	<205	<195	<210	<190	<206	<183	<180	700
82-68-8	Pentachloronitrobenzene	<407	<405	<385	<414	<375	<407	<361	<356	100000
95-94-3	1,2,4,5-Tetrachlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	1000000

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Boldfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

Environmental & Construction Management Services, Inc.

TABLE 4

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR PESTICIDES AND HERBICIDES

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**
MassDEP RTN 3-36397

Sample Location		SS-1	SS-2	SSS-3	SSS-4	SSS-5	SSS-6	SSS-7	SSS-8	SSS-9	MCP
Laboratory ID		SC58794-01	SC58794-02	SC58794-10	SC58794-11	SC58794-12	SC58794-13	SC58794-14	SC58794-15	SC58794-16	Reportable
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	Concentrations
Sample Depth		24"	22"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Pesticides - SW846 8081B (µg/kg)											
319-84-6	a-BHC	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	50000
319-85-7	b-BHC	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	10000
319-86-8	d-BHC	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	10000
58-89-9	g-BHC (Lindane)	<3.32	<3.34	<3.46	<3.23	<3.46	<3.22	<3.57	<3.45	<3.80	3000
76-44-8	Heptachlor	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	200
309-00-2	Aldrin	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	100000
1024-57-3	Heptachlor epoxide	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	90
959-98-8	Endosulfan I	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	500
60-57-1	Dieldrin	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	50
72-55-9	4,4' -DDE	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	3000
72-20-8	Endrin	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	8000
33213-65-9	Endosulfan II	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	500
72-54-8	4,4' -DDD	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	4000
1031-07-8	Endosulfan sulfate	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	-
50-29-3	4,4' -DDT	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	-
72-43-5	Methoxychlor	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	200000
53494-70-5	Endrin ketone	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	8000
7421-93-4	Endrin aldehyde	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	10000
5103-71-9	alpha-Chlordane	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	-
5103-74-2	gamma-Chlordane	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	-
8001-35-2	Toxaphene	<111	<111	<115	<108	<115	<107	<119	<115	<127	10000
57-74-9	Chlordane	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	700
15972-60-8	Alachlor	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	100
Herbicides - SW846 8151A (µg/kg)											
93-76-5	2,4,5-T	<80	<80	<80	<80	<80	<80	<80	<80	<80	100000
93-72-1	2,4,5-TP (Silvex)	<80	<80	<80	<80	<80	<80	<80	<80	<80	100000
94-75-7	2,4-D	<80	<80	<80	<80	<80	<80	<80	<80	<80	100000
94-82-6	2,4-DB	<80	<80	<80	<80	<80	<80	<80	<80	<80	100000
75-99-0	Dalapon	<80	<80	<80	<80	<80	<80	<80	<80	<80	1000000
1918-00-9	Dicamba	<80	<80	<80	<80	<80	<80	<80	<80	<80	500000
120-36-5	Dichloroprop	<80	<80	<80	<80	<80	<80	<80	<80	<80	-
88-85-7	Dinoseb	<80	<80	<80	<80	<80	<80	<80	<80	<80	500000
94-74-6	MCPA	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	100000
7085-19-0	MCPP	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	-

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Boldfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

TABLE 4

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR PESTICIDES AND HERBICIDES

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**
MassDEP RTN 3-36397

Sample Location Laboratory ID Sample Date Sample Depth		SSS-10 SC58794-03 7/9/2020 2-6"	SSS-11 SC58794-04 7/9/2020 2-6"	SSS-12 SC58794-05 7/9/2020 2-6"	SSS-13 SC58794-06 7/9/2020 2-6"	SSS-14 SC58794-07 7/9/2020 2-6"	SSS-15 SC58794-17 7/9/2020 2-6"	SSS-16 SC58794-08 7/9/2020 2-6"	SSS-17 SC58794-09 7/9/2020 2-6"	MCP Reportable Concentrations RCS-1
Pesticides - SW846 8081B (µg/kg)										
319-84-6	a-BHC	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	4000
319-85-7	b-BHC	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	3000
319-86-8	d-BHC	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	3000
58-89-9	g-BHC (Lindane)	<3.64	<3.69	<3.51	<3.78	<3.38	<3.73	<3.26	<3.34	50000
76-44-8	Heptachlor	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	100
309-00-2	Aldrin	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	100000
1024-57-3	Heptachlor epoxide	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	10000
959-98-8	Endosulfan I	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	700
60-57-1	Dieldrin	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	10000
72-55-9	4,4' -DDE	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	50
72-20-8	Endrin	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	500
33213-65-9	Endosulfan II	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	500
72-54-8	4,4' -DDD	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	-
1031-07-8	Endosulfan sulfate	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	8000
50-29-3	4,4' -DDT	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	10000
72-43-5	Methoxychlor	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	8000
53494-70-5	Endrin ketone	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	3000
7421-93-4	Endrin aldehyde	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	200
5103-71-9	alpha-Chlordane	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	90
5103-74-2	gamma-Chlordane	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	700
8001-35-2	Toxaphene	<121	<123	<117	<126	<113	<124	<109	<111	200000
57-74-9	Chlordane	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	10000
15972-60-8	Alachlor	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	-
Herbicides - SW846 8151A (µg/kg)										
93-76-5	2,4,5-T	<80	<80	<80	<80	<80	<80	<80	<80	100000
93-72-1	2,4,5-TP (Silvex)	<80	<80	<80	<80	<80	<80	<80	<80	100000
94-75-7	2,4-D	<80	<80	<80	<80	<80	<80	<80	<80	100000
94-82-6	2,4-DB	<80	<80	<80	<80	<80	<80	<80	<80	100000
75-99-0	Dalapon	<80	<80	<80	<80	<80	<80	<80	<80	1000000
1918-00-9	Dicamba	<80	<80	<80	<80	<80	<80	<80	<80	500000
120-36-5	Dichloroprop	<80	<80	<80	<80	<80	<80	<80	<80	-
88-85-7	Dinoseb	<80	<80	<80	<80	<80	<80	<80	<80	500000
94-74-6	MCPA	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	100000
7085-19-0	MCPP	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	-

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Boldfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

TABLE 5

SUMMARY OF BASEBALL INFIELD SOIL SAMPLES FOR MASSDEP 14 METALS

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**
MassDEP RTN 3-36397

Sample Location		SSS-18	SSS-19	SSS-20	SSS-21	SSS-22	SSS-23	SSS-24	SSS-25	MassDEP Reportable Concentrations	MassDEP Imminent Hazard
Laboratory ID		SC58954-01	SC58954-02	SC58954-03	SC58954-04	SC58954-05	SC58954-06	SC58954-07	SC58954-08		
Sample Date		7/31/2020	7/31/2020	7/31/2020	7/31/2020	7/31/2020	7/31/2020	7/31/2020	7/31/2020		
Sample Location		Randall Field - 1st Base	Randall Field - 2nd Base	Randall Field - 3rd Base	Randall Field - Home Plate	Packer Field - 1st Base	Packer Field - 2nd Base	Packer Field - 3rd Base	Packer Field - Home Plate	RCS-1	
Sample Depth		Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	(mg/kg)	
SM2540 G (11) Mod. (%)											
solids	% Solids	86.9	90.9	90.9	86.7	90.1	90.2	87.5	90.0	NA	
MassDEP 14 Metals - SW846 6010C (mg/kg)											
7440-36-0	Antimony	<5.90	<5.43	<5.43	<6.07	<5.13	<5.45	<5.68	<5.61	20	
7440-38-2	Arsenic	10.9	11.6	10.7	15.8	13.6	14.8	13.4	15.3	20	40
7440-41-7	Beryllium	<0.590	<0.543	<0.543	<0.607	<0.513	<0.545	<0.568	<0.561	90	
7440-43-9	Cadmium	<0.590	<0.543	<0.543	<0.607	<0.513	<0.545	<0.568	<0.561	70	
7440-47-3	Chromium	10.8	14.6	11.1	11.8	9.20	7.74	9.07	8.99	100	
7439-92-1	Lead	6.88	7.03	6.04	8.03	6.24	7.26	6.72	6.88	200	
7440-02-0	Nickel	5.65	6.67	6.73	6.81	5.25	5.20	4.90	5.42	600	
7782-49-2	Selenium	<1.77	<1.63	<1.63	<1.82	<1.54	<1.63	<1.70	<1.68	400	
7440-22-4	Silver	<3.54	<3.26	<3.26	<3.64	<3.08	<3.27	<3.41	<3.37	100	
7440-28-0	Thallium	<3.54	<3.26	<3.26	<3.64	<3.08	<3.27	<3.41	<3.37	8	
7440-62-2	Vanadium	13.6	14.4	14.6	17.2	15.6	15.8	16.2	15.5	400	
7440-66-6	Zinc	25.3	24.6	22.6	28.1	26.0	27.0	27.8	27.6	1000	
7440-39-3	Barium	31.4	33.2	27.0	45.7	29.4	25.4	31.5	29.2	1000	
RCRA Metals - SW846 7471B (mg/kg)											
7439-97-6	Mercury	<0.0323	<0.0363	<0.0310	<0.0305	<0.0388	<0.0321	<0.0319	<0.0330	20	

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

Environmental & Construction Management Services, Inc.

TABLE 6

SUMMARY OF BACKGROUND SOIL SAMPLES FOR MASSDEP 14 METALS

Cashman School & Woodsom Farm Property
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**
MassDEP RTN 3-36397

Sample Location		SSS-26**	SSS-27**	SSS-28	SSS-29	SSS-30	SSS-31	SSS-32	SSS-33	MassDEP Reportable Concentrations	MassDEP Imminent Hazard
Laboratory ID		SC59063-01	SC59063-02	SC59063-03	SC59063-04	SC59063-05	SC59063-06	SC59063-07	SC59063-08		
Sample Date		8/12/2020	8/12/2020	8/12/2020	8/12/2020	8/12/2020	8/12/2020	8/12/2020	8/12/2020		
Sample Location		Background-Woods	Background-Woods	Randall Field - Outfield	Background-Woodsom Farm	Background-Woodsom Farm	Background-Woodsom Farm	Background-Woodsom Farm	Packer Field - Outfield	RCS-1	
Sample Depth		0-6"	12"	18-24"	6"	18-22"	6"	18-22"	14-18"	(mg/kg)	
SM2540 G (11) Mod. (%)											
solids	% Solids	93.3	93.1	95.6	89.8	84.7	90.2	94.9	89.6	NA	
MassDEP 14 Metals - SW846 6010C (mg/kg)											
7440-36-0	Antimony	<5.34	<5.50	<4.92	<5.21	<5.68	<5.70	<5.25	<5.56	20	
7440-38-2	Arsenic	**56.1**	**65.5**	4.89	**27.7**	**31.2**	**74.8**	**89.6**	**62.3**	20	40
7440-41-7	Beryllium	<0.534	<0.550	<0.492	0.590	<0.568	<0.570	<0.525	<0.556	90	
7440-43-9	Cadmium	<0.534	<0.550	<0.492	<0.521	<0.568	<0.570	<0.525	<0.556	70	
7440-47-3	Chromium	32.0	32.8	7.71	35.6	32.3	60.3	50.5	24.7	100	
7439-92-1	Lead	40.0	35.4	2.80	29.6	25.9	32.3	30.7	13.7	200	
7440-02-0	Nickel	52.2	61.9	4.15	25.4	25.6	41.3	41.2	52.9	600	
7782-49-2	Selenium	<1.60	<1.65	<1.48	<1.56	<1.70	<1.71	<1.58	<1.67	400	
7440-22-4	Silver	<3.20	<3.30	<2.95	<3.13	<3.41	<3.42	<3.15	<3.33	100	
7440-28-0	Thallium	<3.20	<3.30	<2.95	<3.13	<3.41	<3.42	<3.15	<3.33	8	
7440-62-2	Vanadium	33.5	29.4	7.97	33.9	29.7	23.6	24.2	23.4	400	
7440-66-6	Zinc	56.6	57.7	7.36	44.5	38.6	66.2	62.2	64.5	1000	
7440-39-3	Barium	24.6	26.8	16.4	37.3	33.3	32.1	26.2	27.9	1000	
RCRA Metals - SW846 7471B (mg/kg)											
7439-97-6	Mercury	0.0764	0.0655	<0.0337	0.0650	0.0583	0.541	0.471	<0.0305	20	

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014
** MassDEP also collectd soil samples for laboratory analysis

Environmental & Construction Management Services, Inc.

TABLE 7

SUMMARY OF MASSDEP COLLECTED BACKGROUND SOIL SAMPLES FOR ARSENIC AND LEAD

Cashman School & Woodsom Farm Property
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**
MassDEP RTN 3-36397

Sample Location		DEP S-1 Little League Field	DEP S-2 Little League Field	DEP S-3 Background	DEP S-4 Background	MassDEP Reportable Concentrations	MassDEP Imminent Hazard
Laboratory ID		L2033028-01	L2033028-02	L2033028-03	L2033028-04		
Sample Date		8/12/2020	8/12/2020	8/12/2020	8/12/2020		
Sample Location		Little League Field	Background-Woods	Background	Background		
Sample Depth		0-6"	12"	18-24"	14-18"	RCS-1 (mg/kg)	
SM2540 G (11) Mod. (%)							
solids	% Solids	97	94	90	94	NA	
Metals - SW846 6010C (mg/kg)							
7440-38-2	Arsenic	**46.1**	**45.2**	**57.3**	**66.6**	20	40
7439-92-1	Lead	14.2	10.9	38.8	29.5	200	

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014
** MassDEP collected and Alpha Analytical analyzed the above soil samples for laboratory analysis

Environmental & Construction Management Services, Inc.

APPENDIX A

COPY OF RELEASE NOTIFICATION FORM (RNF) BWSC-103 FOR "RETRACTION"

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

RELEASE NOTIFICATION & NOTIFICATION RETRACTION FORM

Pursuant to 310 CMR 40.0335 and 310 CMR 40.0371 (Subpart C)

BWSC 103

Release Tracking Number
3 - 36397

A. RELEASE OR THREAT OF RELEASE LOCATION:

1. Release Name/Location Aid: CHARLES C. CASHMAN ELEMENTARY SCHOOL
2. Street Address: 193 LIONS MOUTH ROAD
3. City/Town: AMESBURY 4. ZIP Code: 019130000
5. Coordinates: a. Latitude: N 42.85723 b. Longitude: W 70.94835

B. THIS FORM IS BEING USED TO: (check one)

- ☐ 1. Submit a **Release Notification**
- ☐ 2. Submit a **Revised Release Notification**
- ☑ 3. Submit a **Retraction of a Previously Reported Notification** of a release or threat of release including supporting documentation required pursuant to 310 CMR 40.0335 (Section C is not required)

(All sections of this transmittal form must be filled out unless otherwise noted above)

C. INFORMATION DESCRIBING THE RELEASE OR THREAT OF RELEASE (TOR):

1. Date and time of Oral Notification, if applicable: _____ (mm/dd/yyyy) Time: _____ (hh:mm) ☐ AM ☐ PM
2. Date and time you obtained knowledge of the Release or TOR: _____ (mm/dd/yyyy) Time: _____ (hh:mm) ☐ AM ☐ PM
3. Date and time release or TOR occurred, if known: _____ (mm/dd/yyyy) Time: _____ (hh:mm) ☐ AM ☐ PM

Check all Notification Thresholds that apply to the Release or Threat of Release:
(for more information see 310 CMR 40.0310 - 40.0315)

4. 2 HOUR REPORTING CONDITIONS

- ☐ a. Sudden Release
- ☐ b. Threat of Sudden Release
- ☐ c. Oil Sheen on Surface Water
- ☐ d. Poses Imminent Hazard
- ☐ e. Could Pose Imminent Hazard
- ☐ f. Release Detected in Private Well
- ☐ g. Release to Storm Drain
- ☐ h. Sanitary Sewer Release (Imminent Hazard Only)

5. 72 HOUR REPORTING CONDITIONS

- ☐ a. Subsurface Non-Aqueous Phase Liquid (NAPL) Equal to or Greater than 1/2 Inch (.04 feet)
- ☐ b. Underground Storage Tank (UST) Release
- ☐ c. Threat of UST Release
- ☐ d. Release to Groundwater near Water Supply
- ☐ e. Substantial Release Migration

6. 120 DAY REPORTING CONDITIONS

- ☐ a. Release of Hazardous Material(s) to Soil or Groundwater Exceeding Reportable Concentration(s)
- ☐ b. Release of Oil to Soil Exceeding Reportable Concentration(s) and Affecting More than 2 Cubic Yards
- ☐ c. Release of Oil to Groundwater Exceeding Reportable Concentration(s)
- ☐ d. Subsurface Non-Aqueous Phase Liquid (NAPL) Equal to or Greater than 1/8 Inch (.01 feet) and Less than 1/2 Inch (.04 feet)

C. INFORMATION DESCRIBING THE RELEASE OR THREAT OF RELEASE (TOR): (cont.)

7. List below the Oils (O) or Hazardous Materials (HM) that exceed their Reportable Concentration (RC) or Reportable Quantity (RQ) by the greatest amount.

☐ Check here if an amount or concentration is unknown or less than detectable.

O or HM Released	CAS Number, if known	O or HM	Amount or Concentration	Units	RCs Exceeded, if Applicable (RCS-1, RCS-2,RCGW-1, RCGW-2)

☐ Check here if a list of additional Oil and Hazardous Materials subject to reporting, or any other documentation relating to this notification is attached.

D. PERSON REQUIRED TO NOTIFY:

1. Check all that apply: ☐ a. change in contact name ☐ b. change of address ☐ c. change in the person notifying

2. Name of Organization: CITY OF AMESBURY

3. Contact First Name: KASSANDRA 4. Last Name: GOVE

5. Street: 62 FRIEND STREET 6. Title:

7. City/Town: AMESBURY 8. State: MA 9. ZIP Code: 019130000

10. Telephone: 978-388-8121 11. Ext.: 12. Email: GoveK@AmesburyMA.Gov

☐ 13. Check here if attaching names and addresses of owners of properties affected by the Release or Threat of Release, other than an owner who is submitting this Release Notification (required).

E. RELATIONSHIP OF PERSON TO RELEASE OR THREAT OF RELEASE: ☐ Check here to change relationship

☑ 1. RP or PRP ☐ a. Owner ☐ b. Operator ☐ c. Generator ☐ d. Transporter

☑ e. Other RP or PRP Specify: NON-SPECIFIED PRP

☐ 2. Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)

☐ 3. Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))

☐ 4. Any Other Person Otherwise Required to Notify Specify Relationship:

F. CERTIFICATION OF PERSON REQUIRED TO NOTIFY:

1. I, KEVIN J KAVANAUGH, attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form, (ii) that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

2. By : KEVIN J KAVANAUGH (Signature) 3. Title: _____

4. For: CITY OF AMESBURY (Name of person or entity recorded in Section D) 5. Date : 9/17/2020 (mm/dd/yyyy)

☐ 6. Check here if the address of the person providing certification is different from address recorded in Section D.

7. Street: _____

8. City/Town: _____ 9. State: _____ 10. ZIP Code: _____

11. Telephone: _____ 12. Ext.: _____ 13. Email: _____

YOU ARE SUBJECT TO ANNUAL COMPLIANCE ASSURANCE FEES FOR EACH BILLABLE YEAR FOR TIER CLASSIFIED DISPOSAL SITES. YOU MUST LEGIBLY COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE.

Date Stamp (DEP USE ONLY:)

Received by DEP on 9/17/2020 12:31:24 PM

Amesbury
Mayor Kassandra Gove

Office of the Mayor
City Hall, 62 Friend Street
Amesbury, MA 01913-2884

(978) 388-8121
Fax: (978) 388-6727
govek@amesburyma.gov

August 5, 2020

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup
205B Lowell Street
Wilmington, MA 01887

Re: LSP Authorized Signature for MassDEP RTN 3-36397
Charles C. Cashman Elementary School
193 Lions Mouth Road
Amesbury, MA 01913

To Whom It May Concern:

As Mayor of the City of Amesbury, I authorize Kevin J. Kavanaugh, LSP, CHMM for Environmental & Construction Management Services, Inc. (ECMS) to sign and hereby submit Bureau of Waste Site Cleanup (BWSC) forms in eDEP as necessary on my behalf for the release of petroleum at 193 Lion's Mouth Road, Amesbury, MA as listed as Massachusetts Department of Environmental Protection (MassDEP) Release Tracking Number (RTN) 3-36397.

Sincerely,

Kassandra Gove (KG)

Kassandra Gove
Mayor

APPENDIX B

COPY OF CITY OF AMESBURY ASSESSOR PROPERTY RECORD CARD

193 LIONS MOUTH RD

Location	193 LIONS MOUTH RD	**Mblu**	50/ / 6/ /
Acct#		**Owner**	AMESBURY CITY OF
Assessment	$8,061,100	**PID**	4685
Building Count	1		

Current Value

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$6,545,400	$1,515,700	$8,061,100

Owner of Record

Owner	AMESBURY CITY OF	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	TOWN HALL AMESBURY, MA 01913	**Book & Page**	05833/0124
		Sale Date	12/30/1971

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
AMESBURY CITY OF	$0		05833/0124	12/30/1971

Building Information

Building 1 : Section 1

Year Built:	1975
Living Area:	61,320
Replacement Cost:	$9,437,102
Building Percent Good:	65
Replacement Cost Less Depreciation:	$6,134,100

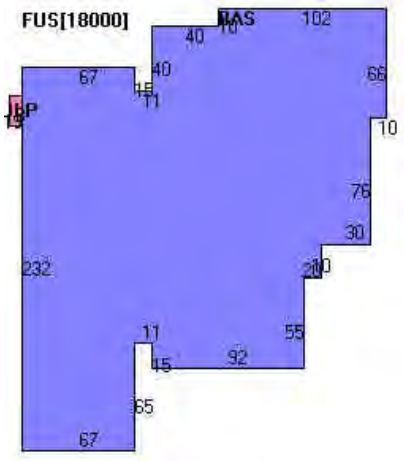
Building Attributes	
Field	**Description**
STYLE	High School
MODEL	Commercial
Grade	Average +10
Stories:	2
Occupancy	2
Exterior Wall 1	Brick/Masonry
Exterior Wall 2	
Roof Structure	Gable/Hip
Roof Cover	Asph/F Gls/Cmp
Interior Wall 1	Drywall/Sheet
Interior Wall 2	Minim/Masonry
Interior Floor 1	Vinyl/Asphalt
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Forced Air-Duc
AC Type	None
Bldg Use	PUB-SCHOOL
Total Rooms	
Total Bedrms	00
Total Baths	2
1st Floor Use:	9033
Heat/AC	NONE
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	SUS-CEIL & WL
Rooms/Prtns	AVERAGE
Wall Height	14
% Comn Wall	0

Building Photo



(http://images.vgsi.com/photos/AmesburyMAPhotos//\00\01\57/55.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	43,320	43,320
FUS	Upper Story, Finished	18,000	18,000
ULP	Loading Platform, Unfinished	152	0
		61,472	61,320

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
SPR2	WET CONCEALED	56760 S.F.	$129,100	1
ELV2	COMM/AVG	4 UNIT	$104,000	1

Land

Land Use

Use Code	9340
Description	Education C
Zone	OSC
Neighborhood	0200
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	35.32
Frontage	180
Depth	1200
Assessed Value	$1,515,700

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV1	PAV ASPH			74574 S.F.	$138,000	1
LT1	LIGHTS INC 1			7 UNITS	$2,400	1
LT2	LIGHTS INC 2			2 UNITS	$1,100	1
	BLEACHR			1	$1,000	1
CAB2	W/PLUMB			576 S.F.	$16,100	1
LT12	LIGHTS SOD 4			4 UNITS	$13,300	1
WDDK	WOOD DECK			559 S.F.	$6,000	1
SGN1	SIGN 1 SIDE			16 SF+HT	$300	1

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193 LIONS MOUTH RD

Location	193 LIONS MOUTH RD	**Mblu**	50/ / 42/ /
Acct#		**Owner**	AMESBURY CITY OF
Assessment	$172,700	**PID**	5531
Building Count	1		

Current Value

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$31,100	$141,600	$172,700

Owner of Record

Owner	AMESBURY CITY OF	**Sale Price**	$0
Co-Owner	CASHMAN SCHOOL-ELEMENTARY	**Certificate**	
Address	TOWN HALL AMESBURY, MA 01913	**Book & Page**	05843/0244
		Sale Date	02/15/1972

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
AMESBURY CITY OF	$0		05843/0244	02/15/1972

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0
Building Percent Good:
Replacement Cost Less Depreciation: $0

Building Attributes	
Field	**Description**
Style	Vacant Land
Model	
Grade:	
Stories:	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Bath Style:	
Kitchen Style:	

Building Photo



(http://images.vgsi.com/photos/AmesburyMAPhotos//default.jpg)

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	9300
Description	Town V
Zone	R20
Neighborhood	
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	0.86
Frontage	110
Depth	325
Assessed Value	$141,600

Outbuildings

Outbuildings — **Legend**

Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
PAV1	PAV ASPH			10112 S.F.	$28,100	1
LT5	LIGHTS MER 1			4 UNITS	$3,000	1

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193 LIONS MOUTH RD

Location	193 LIONS MOUTH RD	**Mblu**	50/ / 16/ /
Acct#		**Owner**	AMESBURY CITY OF
Assessment	$105,800	**PID**	5504
Building Count	1		

Current Value

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$0	$105,800	$105,800

Owner of Record

Owner	AMESBURY CITY OF	**Sale Price**	$0
Co-Owner	CASHMAN SCHOOL-ELEMENTARY	**Certificate**	
Address	TOWN HALL AMESBURY, MA 01913	**Book & Page**	05833/0124
		Sale Date	12/30/1971

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
AMESBURY CITY OF	$0		05833/0124	12/30/1971

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0
Building Percent Good:
Replacement Cost Less Depreciation: $0

Building Attributes	
Field	**Description**
Style	Vacant Land
Model	
Grade:	
Stories:	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Bath Style:	
Kitchen Style:	

Building Photo



(http://images.vgsi.com/photos/AmesburyMAPhotos//default.jpg)

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	9300
Description	Town V
Zone	R20
Neighborhood	
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	0.23
Frontage	100
Depth	100
Assessed Value	$105,800

Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

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219 LIONS MOUTH RD #RR

Location	219 LIONS MOUTH RD #RR	**Mblu**	37/ / 4/ /
Acct#		**Owner**	AMESBURY CITY OF
Assessment	$804,600	**PID**	4579
Building Count	1		

Current Value

Assessment			
Valuation Year	**Improvements**	**Land**	
2020	$35,800	$768,800	

Owner of Record

Owner	AMESBURY CITY OF	**Sale Price**	$5,000,000
Co-Owner		**Certificate**	
Address	TOWN HALL AMESBURY, MA 01913	**Book & Page**	9963/0317
		Sale Date	04/14/1989
		Instrument	1E

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**
AMESBURY CITY OF	$5,000,000		9963/0317	1E
WOODSOM TRUST	$0		05342/049-	

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0
Building Percent Good:
Replacement Cost Less Depreciation: $0

Building Attributes	
Field	**Description**
Style	Outbuildings
Model	
Grade:	
Stories:	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Bath Style:	
Kitchen Style:	

Building Photo



(http://images.vgsi.com/photos/AmesburyMAP

Building Layout

Building Layout (http://images.vgsi.com/photos
//Sketches/4579_4217.jpg)

Building Sub-Areas (sq ft
No Data for Building Sub-A

Extra Features

Extra Features
No Data for Extra Features

Land

Land Use

Use Code	9300
Description	Town V
Zone	OSC
Neighborhood	
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	79.1
Frontage	0
Depth	690
Assessed Value	$768,800

Outbuildings

Outbuildings					
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**V**
BRN2	1 STY W/BSMNT			1250 S.F.	
SLO1	SILO WD/CONCR			400 DIAx HT	

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APPENDIX C

COPY OF HISTORICAL DOCUMENTS

Cashman Elementary School

193 Lions Mouth Rd

Amesbury, MA 01913

Inquiry Number: 5397483.8

August 17, 2018

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

08/17/18

Site Name:

Cashman Elementary School
193 Lions Mouth Rd
Amesbury, MA 01913
EDR Inquiry # 5397483.8

Client Name:

ECMS, Inc.
288 Grove Street #391
Braintree, MA 02184
Contact: Kevin Kavanaugh

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2016	1"=500'	Flight Year: 2016	USDA/NAIP
2012	1"=500'	Flight Year: 2012	USDA/NAIP
2009	1"=500'	Flight Year: 2009	USDA/NAIP
2006	1"=500'	Flight Year: 2006	USDA/NAIP
1998	1"=500'	Acquisition Date: April 11, 1998	USGS/DOQQ
1992	1"=500'	Flight Date: April 29, 1992	USGS
1986	1"=500'	Flight Date: April 01, 1986	USDA
1978	1"=500'	Flight Date: January 23, 1978	USGS
1973	1"=500'	Flight Date: April 16, 1973	USGS
1966	1"=500'	Flight Date: April 15, 1966	USGS
1960	1"=500'	Flight Date: May 01, 1960	USGS
1953	1"=500'	Flight Date: May 03, 1953	USGS
1938	1"=500'	Flight Date: November 01, 1938	USGS

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INQUIRY #: 5397483.8
YEAR: 2016
= 500'
N
EDR


INQUIRY #: 5397483.8
YEAR: 2012
= 500'
N
EDR


INQUIRY #: 5397483.8
YEAR: 2009
= 500'
N
EDR


INQUIRY #: 5397483.8
YEAR: 2006
= 500'
N
EDR


INQUIRY #: 5397483.8
YEAR: 1998
= 500'
N
EDR


INQUIRY #: 5397483.8
YEAR: 1992
= 500'
N
EDR


INQUIRY #: 5397483.8
YEAR: 1986
= 500'
N
EDR



INQUIRY #: 5397483.8

YEAR: 1978

= 500'

N

EDR



INQUIRY #: 5397483.8

YEAR: 1973

= 500'

N

EDR



INQUIRY #: 5397483.8

YEAR: 1966

= 500'

N

EDR



INQUIRY #: 5397483.8

YEAR: 1960

= 500'

N

EDR


INQUIRY #: 5397483.8
YEAR: 1953
= 500'
N
EDR


INQUIRY #: 5397483.8
YEAR: 1938
= 500'
N
EDR

APPENDIX D

SITE PHOTOGRAPHS

Cashman Elementary School -193 Lions Mouth Road in Amesbury, Massachusetts

Photo 1 – View of athletic and Little League Baseball Fields from the Cashman School



Photo 2 – View from parking lot of Randall Little League Baseball Field.



Cashman Elementary School -193 Lions Mouth Road in Amesbury, Massachusetts

Photo 3 – View of Randall Little League Baseball Field



Photo 4 – View of concession stand and bathroom for little league baseball fields.



Photo 5 – View of Packer Little League Baseball Field.

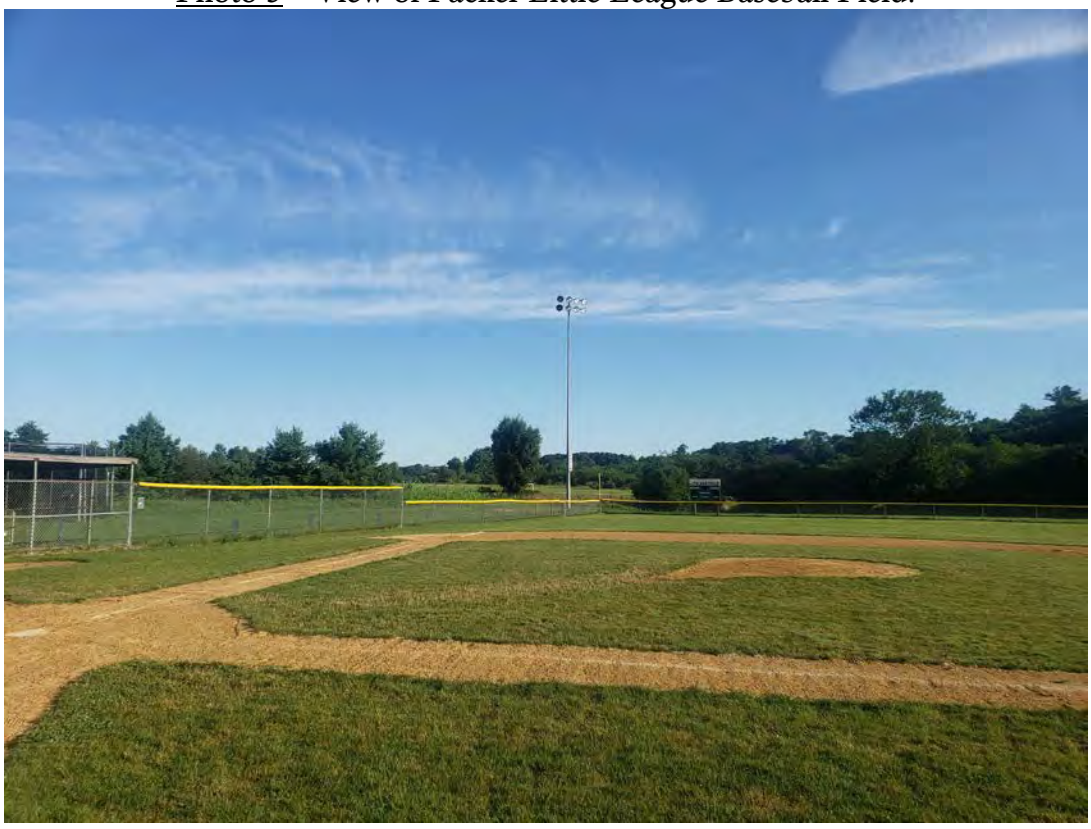

Photo 6 – View of the Woodsom Farm property to the north.



Photo 7 – View of soils from SSS-31 and SSS-32 on the Woodsom Farm Property.



Photo 8 – Photo of soil sample SSS-33 (18-24 inches below grade).



Cashman Elementary School -193 Lions Mouth Road in Amesbury, Massachusetts

Photo 9 – View of loading dock area.



Photo 10 – View of natural gas fired boiler units.



Environmental & Construction Management Services, Inc.

Cashman Elementary School -193 Lions Mouth Road in Amesbury, Massachusetts

Photo 11 – View of loading dock area.



Photo 12 – Photo of soil sample location SSS-26 and SSS-27 and MassDEP DE_ S-3 Background and DEP S-4 Background.



APPENDIX E

COPY OF RELEASE LOG FORM (RLF) BWSC-101

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

RELEASE LOG FORM

BWSC 101

Release Tracking Number
3 - 36397

A. THIS FORM IS BEING USED TO: (check one)

1. Log Date: 7/24/2020 (mm/dd/yyyy) Log Time: 01:57 (hh:mm) ☐ AM ☑ PM

☑ 2. Assign a Release Tracking Number (RTN) to a Release or TOR Report.
- ☑ a. **Reportable Release or TOR.**
- ☐ b. **Release that is Less Than the Reporting Thresholds.**

☐ 3. Amend a Previously Recorded Release or TOR Report (RTN Assigned) .
- ☐ a. The Release is a **Reportable Release or TOR.**
- ☐ b. The Release is a **Release that is Less Than the Reporting Thresholds.**
- ☐ c. The Release or TOR is **Retracted**. (BWSC103 must be submitted, as well)
- ☐ d. The Release or TOR is **not a Release under M.G.L. c. 21E.**

B. REPORTING PERSON:

1. Name of Organization: ENVIRONMENTAL & CONSTRUCTION MANAGEMENT SERVICES
2. First Name: KEVIN
3. Last Name: KAVANAUGH
4. Telephone: 6172129255
5. Ext.:
6. Relationship of Person to Release: ☐ PRP ☑ Other c. Type, if known (e.g. Current Owner): Licensed Site Professional

C. RELEASE OR THREAT OF RELEASE (TOR) /SITE LOCATION:

1. Location Aid/Site Name: CHARLES C. CASHMAN ELEMENTARY SCHOOL
2. Street Address: 193 LIONS MOUTH ROAD
3. 2nd Address Line:
4. City/Town: AMESBURY, AMESBURY
5. Zip Code (if known): 019130000
6. Type of Location: (check all that apply) ☑ a. School ☐ b. Water Body ☐ c. Right of Way ☐ d. Utility Easement ☐ e. Roadway ☐ f. Municipal ☐ g. State ☐ h. Residential ☑ i. Open Space ☐ j. Private Property ☐ k. Industrial ☐ l. Commercial ☐ m. Federal ☐ n. Other Describe:

D. RELEASE OR TOR INFORMATION:

1. Date and Time of **Notification**: 7/24/2020 (mm/dd/yyyy) Time: 01:57 (hh:mm) ☐ AM ☑ PM
2. Date and Time Reporting Person obtained **Knowledge of Release or TOR**: 7/24/2020 (mm/dd/yyyy) Time: 12:00 (hh:mm) ☐ AM ☑ PM
3. Date and Time **Release or TOR occurred**, if known: (mm/dd/yyyy) Time: (hh:mm) ☐ AM ☐ PM
4. **Sources of the Release or TOR**: (check all that apply) ☐ a. Transformer ☐ b. Fuel Tank ☐ c. Pipe ☐ d. OHM Delivery ☐ e. AST ☐ f. Drums ☐ g. Tanker Truck ☐ h. Hose ☐ i. Line ☐ j. UST Describe ☐ k. Vehicle ☐ l. Boat/Vessel ☐ m. Unknown ☑ n. Other: UNDER INVESTIGATION
5. **Federal LUST Eligible**: ☐ Yes ☑ No ☐ Unknown

Check all Notification Thresholds that apply to the Release or TOR:

6. 2 Hour Reporting Conditions:

- ☐ a. Sudden Release
- ☐ b. Threat of Sudden Release
- ☐ c. Oil Sheen on Surface Water
- ☐ d. Poses Imminent Hazard
- ☑ e. Could Pose Imminent Hazard
- ☐ f. Release Detected in Private Well
- ☐ g. Release to Storm Drain
- ☐ h. Sanitary Sewer Release (Imminent Hazard Only)

7. 72 Hour Reporting Conditions:

- ☐ a. Subsurface Non-Aqueous Phase Liquid (NAPL) Equal to or Greater than 1/2 Inch
- ☐ b. Underground Storage Tank (UST) Release
- ☐ c. Threat of UST Release
- ☐ d. Release to Groundwater near Water Supply
- ☐ e. Release to Groundwater near School or Residence
- ☐ f. Substantial Release Migration

8. 120 Day Reporting Conditions:

- ☐ a. Release of Hazardous Material(s) to Soil or Groundwater Exceeding Reportable Concentration(s)
- ☐ b. Release of Oil to Soil Exceeding Reportable Concentration(s) and Affecting More than 2 Cubic Yards
- ☐ c. Release of Oil to Groundwater Exceeding Reportable Concentration(s)
- ☐ d. Subsurface Non-Aqueous Phase Liquid(NAPL) Equal to or Greater than 1/8 Inch and Less than 1/2 Inch

9. Type of Release or TOR: (check all that apply) ☐ a. Dumping ☐ b. Fire ☐ c. AST Removal ☐ d. Overfill ☐ e. rupture ☐ f. Vehicle Accident ☐ g. Leak ☐ h. Spill ☐ i. Test Failure ☐ j. TOR Only ☐ k. UST Removal Describe ☐ l. Unknown ☑ m. Other: UNDER INVESTIGATION

10. Media Impacted and Receptors Affected: (check all that apply) ☐ a. Paved Surface ☐ b. Basement ☐ c. School ☐ d. Public Water Supply ☐ e. Surface Water ☐ f. Zone 2 ☐ g. Private Well ☐ h. Residence ☑ i. Soil ☐ j. Ground Water ☐ k. Sediments ☐ l. Wetland ☐ m. Storm Drain ☐ n. Indoor Air ☐ o. Air ☐ p. Soil Gas ☐ q. Sub-Slab Soil Gas ☐ r. Critical Exposure Pathway ☐ s. NAPL ☐ t. Unknown ☐ u. Others Specify:

11. List below the Oils (O) or Hazardous Materials (HM) that exceed their Reportable Concentration (RC) or Reportable Quantity (RQ) by the greatest amount.

☐ Check here if an amount or concentration is unknown or less than detectable.

O or HM Released	CAS Number, if known	O or HM	Amount or Concentration	Units	RCs Exceeded, if Applicable
ARSENIC		HM	82.3	MG/KG	N/A
					N/A
					N/A

12. Description of Release or Threat of Release (if additional space is needed, attach additional information in H17)

LSP KAVANAUGH REPORTED THAT HE MEASURE ELEVATED LEVELS OF ARSENIC UP TO 82.3 MG/KG IN SOIL FROM ZERO TO TWELVE INCHES AT THE CHARLES C. CASHMAN ELEMENTARY SCHOOL 193 LIONS MOUTH ROAD IN AMESBURY. HE STATED THAT THE ARSENIC IS FOUND IN THE FIELDS OF THE ELEMENTARY SCHOOL. HE INDICATED THAT THE SCHOOL IS CURRENTLY VACANT HOWEVER THE FIELDS ARE BEING USED FOR SOCIAL ACTIVITIES. HE INDICATED THAT FURTHER IRA ASSESSMENT IS NEEDED TO HELP DETERMINE THE NATURE AND EXTENT OF THIS RELEASE.

E. INVOLVED PARTIES SUMMARY :

1. PRP Status (check one): ☐ a. PRP Unknown ☐ b. PRP unwilling, unable or has not committed to Perform Response Actions
☑ c. PRP Performing Response Actions ☐ d. Release is Adequated Regulated by the US Coast Guard

2. If PRP is not Performing Response Actions, who is?

☐ a. MassDEP State Contractor ☐ b. Other Person

3. Contractor:	a. Name of Organization:		b. Telephone:	
	c. Contact First Name:		d. Last Name:	
4. LSP:	a. Name:	KAVANAUGH KEVIN J	b. LSP #:	7610
	c. Telephone:	6173382121		

F. PRP OR PERSON PERFORMING RESPONSE ACTIONS:

1. Name of Organization: CITY OF AMESBURY, CITY HALL
2. Contact First Name: MAYOR KASSANDRA
3. Last Name: GOVE
4. Street: 62 FRIEND STREET
5. Title: MAYOR
6. City/Town: AMESBURY
7. State: MA
8. ZIP Code: 019130000
9. Telephone: 9783888121
10. Ext:
11. Email: GoveK@AmesburyMA.Gov
12. Relationship of Person to Release: ☑ PRP ☐ Other c. Type (e.g. Current Owner): Non-specified PRP

☐ 13. Check here if this PRP received a field NOR ☑ 14. Check here if an RNF was requested from this PRP

☑ 15. Check here if Provisions of 21E were explained to this PRP.

G. RECORD ORAL RESPONSE ACTIVITIES:

☐ 1. IRA Completed Pre-notification
☐ 2. No IRA Approved at Notification
☐ 3. IRA Assessment Only.
☑ 4. IRA Oral Plan Approved
☐ 5. IRA Oral Modified Plan Approved
☐ 6. IRA Oral Plan Denied and/or Request for Written Plan
☐ 7. Notice of Intent to Conduct a URAM
☐ 8 IRA-D Oral Plan Approved
☐ 9. IRA-D Oversight Work Started

10. Date of Action: 7/24/2020

11. Soil Previously Excavated: ☐ a. Excavated prior to notification. ☐ b. Excavated as part of an UST closure.

c. Quantity of contaminated soil previously excavated and destination, if applicable:

12. Specify any Regional Specific Code (Regional Use):

H. ORAL RESPONSE ACTION PLAN: (check all that apply)

☐ 1. Assessment and/or Monitoring Only
☑ 2. Temporary Covers or Caps
☐ 3. Deployment of Absorbent or Containment Materials
☐ 4. Temporary Water Supplies
☐ 5. Structure Venting System
☐ 6. Temporary Evacuation or Relocation of Residents
☐ 7. Product or NAPL Recovery
☑ 8. Fencing and Sign Posting
☐ 9. Groundwater Treatment Systems
☐ 10. Soil Vapor Extraction
☐ 11. Bioremediation
☐ 12. Air Sparging
☐ 13. Excavation of Contaminated Soils

☐ a. Re-use, Recycling or Treatment ☐ i. On Site ☐ ii. Off Site Authorized volume in cubic yards:
☐ b. Store ☐ i. On Site ☐ ii. Off Site Authorized volume in cubic yards:
☐ c. Landfill ☐ i. Cover ☐ ii. Disposal Authorized volume in cubic yards:

☐ 14. Removal of Drums, Tanks or Containers:

Describe Quantity and Amount: _____

☐ 15. Removal of Other Contaminated Media:

Specify Type and Volume: _____

☑ 16 Other Response Actions and Additional Comments (describe):

I PROVIDED ORAL IRA APPROVAL TO LSP KAVANAUGH AND RECOMMENDED INSTALLATION OF RESTRICTIVE FENCING, POSTING WARNING SIGNAGE, AND COVERING EXPOSED SOIL WITH POLYETHYLENE SHEETING. IRA ASSESSMENT MUST BE PERFORMED TO DETERMINE THE NATURE AND EXTENT OF THIS RELEASE. 21E RESPONSIBILITIES AND THE NEED TO SUBMIT A RELEASE NOTIFICATION FORM TO MASSDEP IN SIXTY DAYS WERE EXPLAINED TO LSP KAVANAUGH ON BEHALF OF THE CITY OF AMESBURY.

☐ 17. Check here if Additional Information is Provided in an Attachment

I. DEP STAFF AND FORM PREPARER:

1. DEP Staff: a. Name: GIDDINGS PAUL ☐ b. Check here, if Unassigned (or staff name not applicable).

2 . Preparer : a. Name: SANDERSON KENNETH

b. Signature: KENNETH SANDERSON c. Date: 7/24/2020

APPENDIX F

COPY OF RELEASE NOTIFICATION FORM (RNF) BWSC-103

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

RELEASE NOTIFICATION & NOTIFICATION RETRACTION FORM

Pursuant to 310 CMR 40.0335 and 310 CMR 40.0371 (Subpart C)

BWSC 103

Release Tracking Number
3 - 36397

A. RELEASE OR THREAT OF RELEASE LOCATION:

1. Release Name/Location Aid: CHARLES C. CASHMAN ELEMENTARY SCHOOL
2. Street Address: 193 LIONS MOUTH ROAD
3. City/Town: AMESBURY 4. ZIP Code: 019130000
5. Coordinates: a. Latitude: N 42.85723 b. Longitude: W 70.94835

B. THIS FORM IS BEING USED TO: (check one)

- [x] 1. Submit a **Release Notification**
- [ ] 2. Submit a **Revised Release Notification**
- [ ] 3. Submit a **Retraction of a Previously Reported Notification** of a release or threat of release including supporting documentation required pursuant to 310 CMR 40.0335 (Section C is not required)

(All sections of this transmittal form must be filled out unless otherwise noted above)

C. INFORMATION DESCRIBING THE RELEASE OR THREAT OF RELEASE (TOR):

1. Date and time of Oral Notification, if applicable: 7/24/2020 (mm/dd/yyyy) Time: 01:57 (hh:mm) [ ] AM [x] PM
2. Date and time you obtained knowledge of the Release or TOR: 7/24/2020 (mm/dd/yyyy) Time: 12:00 (hh:mm) [ ] AM [x] PM
3. Date and time release or TOR occurred, if known: (mm/dd/yyyy) Time: (hh:mm) [ ] AM [ ] PM

Check all Notification Thresholds that apply to the Release or Threat of Release:
(for more information see 310 CMR 40.0310 - 40.0315)

4. 2 HOUR REPORTING CONDITIONS

- [ ] a. Sudden Release
- [ ] b. Threat of Sudden Release
- [ ] c. Oil Sheen on Surface Water
- [ ] d. Poses Imminent Hazard
- [x] e. Could Pose Imminent Hazard
- [ ] f. Release Detected in Private Well
- [ ] g. Release to Storm Drain
- [ ] h. Sanitary Sewer Release (Imminent Hazard Only)

5. 72 HOUR REPORTING CONDITIONS

- [ ] a. Subsurface Non-Aqueous Phase Liquid (NAPL) Equal to or Greater than 1/2 Inch (.04 feet)
- [ ] b. Underground Storage Tank (UST) Release
- [ ] c. Threat of UST Release
- [ ] d. Release to Groundwater near Water Supply
- [ ] e. Substantial Release Migration

6. 120 DAY REPORTING CONDITIONS

- [x] a. Release of Hazardous Material(s) to Soil or Groundwater Exceeding Reportable Concentration(s)
- [ ] b. Release of Oil to Soil Exceeding Reportable Concentration(s) and Affecting More than 2 Cubic Yards
- [ ] c. Release of Oil to Groundwater Exceeding Reportable Concentration(s)
- [ ] d. Subsurface Non-Aqueous Phase Liquid (NAPL) Equal to or Greater than 1/8 Inch (.01 feet) and Less than 1/2 Inch (.04 feet)

C. INFORMATION DESCRIBING THE RELEASE OR THREAT OF RELEASE (TOR): (cont.)

7. List below the Oils (O) or Hazardous Materials (HM) that exceed their Reportable Concentration (RC) or Reportable Quantity (RQ) by the greatest amount.

☐ Check here if an amount or concentration is unknown or less than detectable.

O or HM Released	CAS Number, if known	O or HM	Amount or Concentration	Units	RCs Exceeded, if Applicable (RCS-1, RCS-2,RCGW-1, RCGW-2)
ARSENIC		HM	82.3	MG/KG	RCS-1

☐ Check here if a list of additional Oil and Hazardous Materials subject to reporting, or any other documentation relating to this notification is attached.

D. PERSON REQUIRED TO NOTIFY:

1. Check all that apply: ☐ a. change in contact name ☐ b. change of address ☑ c. change in the person notifying

2. Name of Organization: CITY OF AMESBURY

3. Contact First Name: KASSANDRA 4. Last Name: GOVE

5. Street: 62 FRIEND STREET 6. Title: MAYOR

7. City/Town: AMESBURY 8. State: MA 9. ZIP Code: 019130000

10. Telephone: 978-388-8121 11. Ext.: 12. Email: govek@amesburyma.gov

☐ 13. Check here if attaching names and addresses of owners of properties affected by the Release or Threat of Release, other than an owner who is submitting this Release Notification (required).

E. RELATIONSHIP OF PERSON TO RELEASE OR THREAT OF RELEASE: ☐ Check here to change relationship

☑ 1. RP or PRP ☑ a. Owner ☐ b. Operator ☐ c. Generator ☐ d. Transporter

☐ e. Other RP or PRP Specify:

☐ 2. Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)

☐ 3. Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))

☐ 4. Any Other Person Otherwise Required to Notify Specify Relationship:

F. CERTIFICATION OF PERSON REQUIRED TO NOTIFY:

1. I, KEVIN J KAVANAUGH, attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form, (ii) that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

2. By : KEVIN J KAVANAUGH (Signature) 3. Title: MAYOR

4. For: CITY OF AMESBURY (Name of person or entity recorded in Section D) 5. Date : 7/31/2020 mm/dd/yyyy

☐ 6. Check here if the address of the person providing certification is different from address recorded in Section D.

7. Street:

8. City/Town: 9. State: 10. ZIP Code:

11. Telephone: 12. Ext.: 13. Email:

YOU ARE SUBJECT TO ANNUAL COMPLIANCE ASSURANCE FEES FOR EACH BILLABLE YEAR FOR TIER CLASSIFIED DISPOSAL SITES. YOU MUST LEGIBLY COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE.

Date Stamp (DEP USE ONLY:)

Received by DEP on 7/31/2020 11:06:17 AM

APPENDIX G

ECMS IMMINENT HAZARD EVALUATION (IHE) DATED JULY 28, 2020

IMMINENT HAZARD EVALUATION

For

Charles C. Cashman Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts 01913

Prepared for:

DiNisco Design, Inc.
99 Chauncy Street
Boston, Massachusetts 02111

Prepared by:

Environmental & Construction Management Services, Inc.
288 Grove Street #391
Braintree, Massachusetts 02184
(617) 338-2121

July 28, 2020

ECMS Project No. 1009.073

This report has been prepared for the exclusive use of DiNisco Design and their client the City of Amesbury, Massachusetts. Environmental & Construction Management Services, Inc. acknowledges that DiNisco Design and the City of Amesbury may rely on this report. Photocopying of this document by parties other than those designated by DiNisco Design and the City of Amesbury, or use of this document for purposes other than intended, is prohibited without the prior written consent of Environmental & Construction Management Services, Inc

Environmental & Construction Management Services, Inc.

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ATTACHMENTS, CONTINUED:

Figures

Figure 1 Site Locus Map
Figure 2 Lot Location Plan
Figure 3 Priority Habitats of Rare Species Plan
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Figure 5 Aerial Photograph Site Location Plan
Figure 6 MassDEP Priority Resource (21E) Map
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Appendices

Appendix A *LaGoy* Risk Analysis, Inc. "Evaluation of Soil Data from the Charles C. Cashman Elementary School, 193 Lions Mouth Road, Amesbury, Massachusetts" dated July 27, 2020
Appendix B Qualifications/Limitations

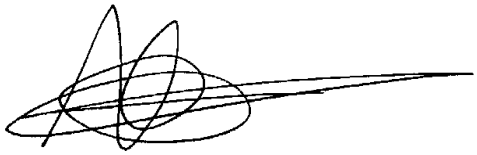
CERTIFICATION OF RESULTS

The evaluation was conducted on behalf of and for the exclusive use of *DiNisco Design* and their client, the *City of Amesbury, Massachusetts* and all its successors and assigns, solely for use in an environmental evaluation of the Site. This report and the findings contained herein shall not, in whole or in part, be disseminated or conveyed to any other party, nor used by any other party, in whole or in part, other than *DiNisco Design* or the *City of Amesbury* and all its successors and assigns, without the prior written consent of *Environmental & Construction Management Services, Inc. (ECMS).*

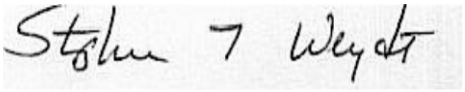
ECMS professional services have been performed, our findings obtained, and our recommendations prepared by an environmental professional and customary principles and practices in the fields of environmental science and engineering. This warranty is in lieu of all other warranties either expressed or implied. *ECMS* is not responsible for the independent conclusions, opinions or recommendations made by others based on the records review, site inspection, field exploration, and laboratory test data presented in this report.

Respectfully submitted this 28th day of July 2020.

For ***Environmental & Construction Management Services, Inc.*** by



Kevin J. Kavanaugh, L.S.P., CHMM
Principal Environmental Engineer



Stephen T. Weydt
Principal Environmental Scientist

1.0 INTRODUCTION

An Imminent Hazard Evaluation (IHE) is presented in this report for the Cashman Elementary School, located at 193 Lions Mouth Road in Amesbury, Massachusetts [Release Tracking Number (RTN) 3-31833]. This IHE was performed in accordance with requirements of the Massachusetts Contingency Plan (MCP, 310 CMR 40.0000) and other relevant guidance developed by the Massachusetts Department of Environmental Protection (MassDEP).

2.0 PROPERTY DESCRIPTION

2.1 Location and Legal Description of the Site

The Site is an irregularly-shaped 35.32-acre parcel of land located at 193 Lions Mouth Road in Amesbury, Essex County, Massachusetts 01913. According to the City of Amesbury Assessor, the property is listed as parcel 50/6. The Site is occupied by the Charles C. Cashman Elementary School and associated athletic fields, playground, parking lots and landscaped areas. Refer to Figure 2 entitled Lot Location Plan.

The Site is depicted on the 7.5 x 15-minute U.S.G.S. topographic quadrangle for Newburyport, Massachusetts dated 1987. The Universal Transverse Mercator (UTM) coordinates of the Site within zone 19 are approximately 4,746,558 meters north latitude and 340,818.9 meters east longitude or 42° 51' 26.06'' north latitude and 70° 56' 54.07'' west longitude. Elevation at the site is approximately 105 feet above mean sea level (amsl). Figure 1 includes both a Site Locus Plan and a Street Location Map of the Site. The Site and surrounding properties are shown on Figure 2, Lot Location Plan attached to this report.

2.2 Site and Vicinity Characteristics

The Site is currently occupied by the City of Amesbury Cashman Elementary School housing grades Pre-kindergarten through 4 (approximately 458 children). The Site is located within OSC – Open Space Conservancy. The school building is surrounded by a driveway and associated paved parking lots, a playground area and grass athletic field. Woodsom Farm to the west, and is accessed from Lions Mouth Road to the South. The north edge of the site is steeply sloping forested hill with an intermittent steam at the base. The Site is surrounded with pockets of densely settled residential neighborhoods.

No existing commercial printing facilities, gasoline filling/service stations, industrial properties or fuel depots were identified in the immediate vicinity of the

subject site. The past uses of these surrounding properties do not pose recognized environmental concerns to the Site.

2.3 Descriptions of Structures, Roads, Other Improvements on the Site

The 2-story school building is 61,472 gross square feet (GSF). The building is constructed of masonry block with brick veneer on slab on grade construction.

Assessor Office records indicate that the main Site building construction was completed in 1975. The school building is currently heated by natural gas and heated through forced air ducts. The roof is asphalt and on the roof are several HVAC units. Records indicate, the building is and always has been heated by natural gas. A copy of the Assessor Property Card is attached as Appendix D.

The nearest surface water bodies to the Site is Lake Gardner that is located approximately 2,500 feet to the north-northeast. According to the City of Amesbury Health Department, there are no know public or private potable water supply wells in the vicinity of the Site.

The City of Amesbury obtains its drinking water from its watershed area that encompasses about 55 square miles; most of which reside in New Hampshire. Tuxbury Pond feeds the Powow River, which the treatment plant draws from. Lake Attitash and Meadowbrook also supplement the water source seasonally and in times of drought. All of Amesbury's wastewater empties into their municipal sewer system. The wastewater treatment facility is located at 19 Merrimac Street.

The site is currently supplied with natural gas and serviced by the municipal water and sewer systems.

The existing school building has a sewage ejector system that was observed along the entrance driveway area south of the school.

2.4 Site Ownership

According to City of Amesbury Assessor's records, the subject site is owned by the City of Amesbury as of December 30, 1971 (Book 5833, Page 124).

A Title Search was not supplied to *ECMS*, and therefore additional ownership information was not available.

2.5 Current Uses of the Site

The Site is currently utilized as the City of Amesbury Cashman Elementary School for grades Pre-K through Grade 4.

2.6 Current Uses of Surrounding Properties

The Site is located within an area primarily used for single-family residential homes, farmland and undeveloped wooded vacant land. There were no visual indications observed during *ECMS* visual inspection of nearby or abutting properties of conditions that would indicate a release or threat of release of oil and/or hazardous substances on, at, in, or to the Site.

2.7 Past Uses of the Site and Vicinity

Historical information was obtained from a review of the historical topographs (1932, 1934, 1943, 1944, 1947, 1950, 1956, 1952, 1968, 1973, 1979, 1971, 1985, 1987 and 2012), historical aerial photos (1953, 1960, 1966, 1973, 1978, 1986, 1992, 1998, 2006, 2009, 2012 and 2016), City Directory (1961, 1965, 1968, 1973, 1977, 1982, 1987, 1992, 1995, 2000, 2005, 2010 and 2014). Refer to Appendix A for copies of the above historic documents.

The historical aerial photo from 1978 shows the school building. Prior to construction of the school building, the Site land area was undeveloped and appears to be farmland as depicted in the aerial photographs from 1953 through 1973.

Properties surrounding the Site to the north, south, east and west were developed with sporadic residential properties and some may have been farmland.

The past uses of these surrounding properties do not pose recognized environmental concerns to the Site.

3.0 EVALUATION OF IMMINENT HAZARDS

The purpose of an IHE is to evaluate whether an immediate response action (IRA) is needed to control or reduce short-term exposure to a release of oil and/or hazardous material while comprehensive investigations and response actions are being evaluated. The need for comprehensive response actions (i.e., the ultimate actions for the release) is determined (in part) by a Risk Characterization, which is performed after all site investigations are completed.

For this IHE *ECMS* engaged *Mr. Peter LaGoy of LaGoy Risk Analysis, Inc. (LaGoy)* in Hopkinton, Massachusetts as a professional risk assessor to evaluate the recently obtained soil sample analytical results for samples collected on July 9, 2020. Excerpts from the *LaGoy* "Evaluation of Soil Data from the Charles C. Cashman Elementary School, 193 Lions Mouth Road, Amesbury, Massachusetts dated July 27, 2020" and attached as Appendix A are included in the ECMS IHE presented herein.

The MCP requires that IHEs be conducted separately for human health, the environment, and safety. These evaluations are presented in the following subsections.

3.1 Human Health Imminent Hazard Evaluation

According to 310 CMR 40.0321(1)(d) and (f), a release of oil and/or hazardous material that poses a significant risk of harm to human health when present even for a short period of time, or a release to the environment that produces readily apparent effects to human health, including respiratory distress or dermal irritation, constitutes an imminent hazard. A short period of time is defined as five (5) years, unless site circumstances indicate that a shorter period of time is appropriate [40 CMR 40.0953(1)]. Human health IHEs consider actual or likely exposures of humans under current site conditions and uses (§40.0953). IHEs are expected to be conservative [(§40.0953(7)], to consider "hot spots" [§40.0953(4)], to focus on soil between 0 and 1 foot in depth [§40.0953(2)], and can focus on the constituents that are likely to dominate the IHE [§40.0953(5)].

The MCP and MassDEP guidance specify criteria for identifying the presence of an imminent hazard to human health. For non-carcinogenic constituents, the Hazard Index (HI) defining an imminent hazard is greater than:

- one (1) for oil or hazardous materials that have the potential to cause serious effects (including but not limited to lethal, developmental, or neurological effects) following short-term exposures; or
- ten (10) for all other oil or hazardous materials [MCP 310 CMR 40.0955(2)(c)(1)].

For carcinogenic constituents, the excess lifetime cancer risk defining an imminent hazard is:

- greater than a risk of 1 in 100,000 (denoted as 1x10-5) for a short exposure period (e.g., a 5-year exposure period) [MCP 310 CMR 40.0995(2)(b)]; and,
- greater than a risk of 1 in 10,000 (denoted as 1x10-4) over a long exposure period (MassDEP 1995).

3.1.1 Compounds of Concern (COCs)

The recent subject sampling event consisted of collecting 15 soil samples from beneath the grass (2-6 inches in depth), and two additional samples of slightly deeper soil (2 feet in depth). Soil was analyzed for the presence of metals, total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs, including the polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and pesticides and herbicides. The results of the sampling are presented in Table 1 of Appendix A.

Only arsenic was present at a concentration above a reportable concentration. TPH was also detected in most samples (concentrations around 100 mg/kg) but could be present as a result of it use as a binder (waxes) in various lawn care products. Maximum metal concentrations were compared with expected concentrations in soil in Massachusetts (Table 2 of Appendix A), and chromium, nickel, and vanadium were present at levels above expected background. The four metals, arsenic, chromium, nickel, and vanadium will be considered in the imminent hazard calculations.

3.1.2 Receptors and Exposure Pathways

Potentially exposed humans at the site under current site use include children including students, non-student users of the playing fields and adults including commercial (school) workers, construction/utility workers (potentially), and visitors (including parents attending sporting event games). Because intermittently exposed individuals, such visitors, will be exposed to a lesser extent (shorter duration of exposure and/or less frequently) than students, non-student users of the playing field, and school workers, visitor exposure is not assessed. School worker exposure conservatively represents potential visitor exposure.

3.1.3 Exposure Point Concentrations

Students, school workers, and non-student users of the playing fields are assumed exposed only to shallow soil (depths of 0-1 foot), per MCP guidance for performing IHEs. The soil exposure point concentration (EPC) for arsenic in soil applied to the IHE is the 95th percentile upper confidence limit (95% UCL) of the mean concentration of arsenic in shallow soil.

Construction/utility workers are assumed exposed to both shallow and deeper soil, consistent with the type of activities (e.g., soil excavation) potentially performed. The soil EPC for arsenic is the 95% UCL of the mean concentration of arsenic in shallow and deeper soil.

Maximum concentrations were used as EPCs for chromium, nickel, and vanadium. For this site, concentrations of arsenic in shallow soil were detected in a narrow range (21.9 mg/kg – 82.3 mg/kg), and the 95% Upper Confidence Limit (UCL) calculated using the EPA's ProUCL model version 5.1 was used to calculate an EPC of 46.4 mg/kg for arsenic, based on a normal distribution of data and the Student t-test.

3.1.4 Quantitative Exposure Assessment

In general, individuals are exposed to materials released into the environment in varying quantities and proportions via a wide variety of possible exposure routes. The actual amount of material to which an individual is exposed depends on the

individual's frequency, extent, and duration of exposure, which in turn depend on many factors, including location of residence, age, body weight, sex, and activity patterns. Patterns of exposure are highly variable among individuals. This large potential variation in exposure to environmental conditions implies that a certain amount of uncertainty is inherent in risk assessment. This exposure assessment uses standard approaches and assumptions that are designed to be health protective, i.e., they are designed to produce estimates of exposure that overestimate, rather than underestimate, actual exposure and risk.

The purpose of a quantitative exposure assessment is to estimate the Chronic Daily Intake (CDI) of each contaminant of concern by an individual for each exposure route. For carcinogens, the CDI is averaged over the full lifetime (by convention, assumed to be 70 years; MassDEP 2008) and is termed the Lifetime Average Daily Dose or LADD for oral and dermal exposures. For noncarcinogens, the dose is only averaged over the period of exposure and is noted as the Average Daily Dose or ADD for oral and dermal exposure.

Soil Exposure – Children

Children are at school 180 days per year, and can also use the school facilities during the summer (roughly 70 days; end of June to end of August) but will use the outdoor play fields for only a fraction of that time and for short periods. Very young children (less than 2 year of age) are considered unlikely to be present on a regular basis. For the purposes of this assessment, contact by children is assumed for 109 days per year, which is the outdoor time assumed by MassDEP (1994) in initially establishing the S-1 soil standards. Exposure for a third of a year to a single outdoor play area is unlikely but provides a conservative estimate of exposure potential. People who contact soil may be exposed to constituents present in the soil by direct contact and subsequent ingestion of contaminated soil or by dermal absorption of constituents in soils adhering to the skin. Younger children are of greatest concern for soil contact, and therefore, assessment of exposure to younger children can be used to conservatively evaluate the potential for risks to older students. For this IHE, children are estimated to weigh an average of 15 kg (33 lbs.) based on the median weight for 5-year-old children (the youngest age likely to be regularly out on their own) determined in the NHANES II study for the US population in 1980 (MassDEP 1994). USEPA has reviewed more current data and has indicated average weights for humans have increased since that study.

Soil Ingestion: Children in regular contact with site soil are estimated to ingest 100 mg of soil per day (MassDEP 2002). All constituents in soil are assumed to be as available from the soil as from the media used in the toxicity studies and, consequently, a relative absorption factor or RAF of one is used for these constituents. Using this assumption and the others noted above, the ADD and LADD for soil ingestion by children can be estimated using the formula:

$$ADD/LADD = \frac{CS \times IR \times RAF \times EF \times ED}{BW \times 106\ (mg/kg) \times AT}$$

Where:

ADD = Average daily intake of the constituent (mg/kg/day),
LADD= Lifetime average daily dose (mg/kg/day),
CS = Constituent concentration in soil (mg/kg),
IR = Soil ingestion rate (100 mg/day; MassDEP 1995),
RAF = Relative absorption factor (1),
EF = Frequency of ingestion (109 days/year; MassDEP 1995),
ED = Exposure Duration (5 years; MassDEP 1995),
BW = Body weight (15 kg; EPA 1989), and
AT = Averaging Time (365 days x 5 yrs. (ADD) or 365 x 70 (LADD) days).

The calculated ADD for children exposed to lead detected in soil at the property based on this equation is provided in Table 3 for ingestion exposure to the soil at the school.

Dermal Contact: Dermal exposure to constituents in soil can occur through direct physical contact with soil. The same assumptions as for soil ingestion are used, with the exceptions that in place of an ingestion rate, a soil adherence factor of 0.2 mg soil/cm2 of skin, an exposed skin surface area of 3000 cm2 (roughly a third of the body surface area for this age child; MassDEP 1994) and constituent-specific relative absorption factors were used. Using these assumptions, the ADD and LADD can be estimated using the formula:

$$ADD/LADD = \frac{CS \times AD \times SA \times RAF \times EF \times ED}{BW \times 106\ (mg/kg) \times AT}$$

Where:

ADD = Average daily intake of the constituent (mg/kg/day),
LADD= Lifetime average daily dose (mg/kg/day),
CS = Constituent concentration in soil (mg/kg),
AD = Soil adherence to skin (0.2 mg/cm2; MassDEP 1995),
SA = Exposed skin surface area (3000 cm2; MassDEP 1995),
RAF = Relative absorption factor (constituent-specific; MassDEP 2006),
EF = Frequency of contact (109 days/year),
ED = Exposure Duration (5 years),
BW = Body weight (15 kg; EPA 1989), and
AT = Averaging Time (365 days x 5 yrs. (ADD) or 365 days x 70 days (LADD)).

The calculated ADD for children exposed to lead in soil at the site based on this equation is provided in Table 3 for exposure via dermal contact to the soil EPCs.

While the primary purpose of this assessment is to calculate whether an imminent hazard exists, the same approach can be modified slightly to assess overall site risks, given the continued use of the school and playground for current purposes. The assumption that children are unlikely to use the facility for more than 109 days per year, and for more than 5 years seems likely, given the grades (pre-K to 4th) that currently use the school. However, as a conservative measure, risks are also assessed assuming that children play at the school for 100 days per year over the course of a 10-year period and that they weigh 24 kg (average body weight for 2-12 years) over this period. This exposure and risk are calculated in Table 4.

Soil Exposure - Adults

Adults that may use the area would include school landscape workers, teachers, and parents attending games. Of these groups, landscapers would be expected to have the highest potential for regular contact. In order to determine if such soil contact is safe, exposure and risks to landscapers were evaluated quantitatively, using the previously-established EPCs.

Landscapers who work site soil may be exposed to constituents present in the soil by direct contact and subsequent ingestion of contaminated soil or by dermal absorption of constituents in soils adhering to the skin. Workers may also be exposed to constituents that become airborne as a component of windborne dust. Exposure for these people is assumed to occur for 100 days over the course of a year, assuming that during the roughly 8-month landscaping season, these workers are outdoors roughly 3 days per week over the 240-day period. Adults are estimated to weigh 70 kg. It should be noted that these calculations are particularly conservative in that exposure estimates are compared with toxicity values designed to be protective for chronic (long-term) exposures; toxicity values for short-term exposure are generally lower by a factor of 10.

Soil Ingestion: Workers in frequent contact with site soil are estimated to ingest 100 mg of soil per day (MassDEP 2002) and this value will be used for landscape workers. Using these assumptions and the others noted above, the ADD and LADD for soil ingestion by workers can be estimated using the formula for soil ingestion noted above. The calculated ADD for the constituents in soil at the property based on this equation is provided in Table 5 in Appendix A for soil ingestion exposure to the site-wide exposure point concentration.

Dermal Contact: Dermal exposure to constituents in soil can occur through direct physical contact with soil. The same assumptions as for soil ingestion are used, with the exceptions that in place of an ingestion rate, a soil adherence factor of 0.29 mg soil/cm2 of skin, an exposed skin surface area of 3,500 cm^2, and constituent-specific relative absorption factors were used. Using these assumptions, the ADD and LADD can be estimated using the formula for dermal contact noted above. The calculated ADD for the constituents in soil at the property based on this equation is

provided in Table 5 in Appendix A for exposure via dermal contact to the EPCs in soil.

Inhalation. Although unlikely considering the small area of uncovered soil, landscapers could be exposed via inhalation to constituents entrained in soil-derived dust (MassDEP 2002). To estimate exposure, the same assumptions provided above for body weight, lifetime exposure duration and frequency were used. It was assumed that the gardener inhaled 20 cubic meters (m3) of air during the time on site (essentially equal to the daily inhalation rate of 20 m^3/day; EPA, 1989 and corresponding to a full workday at an average moderate to heavy level of exertion; MassDEP 1995a).

In order to evaluate the potential for inhalation exposure to constituents entrained in the dust, it is necessary to estimate the amount of dust that would be present in the air, and the amount of air inhaled during the period that dust is present in the air. MassDEP (2002) suggests a value of 60 ug/m^3 for excavations and this value will be used in this evaluation, which is a conservative approach since excavation work would be expected to generate more dust than gardening. The value of 60 ug/m3 is based on the assumption that gardeners will only receive intermittent exposure to visible dust but that the average exposure level will be above that used by EPA for undisturbed sites.

MassDEP notes that exposure to constituents on airborne particulates can occur through either direct inhalation or via inhalation followed by movement of the particles from the upper respiratory tract to the gastrointestinal tract. For direct inhalation, MassDEP indicates that only approximately half of the inhaled particulate matter will actually reach the lungs. However, for this evaluation, it is assumed that all the agent inhaled is of concern, as many inhaled constituents act at sites along the respiratory tract and do not need to reach the lungs to have adverse effects. For the inhalation-to-oral pathway, the ingested dose is estimated to be twice the measured PM10 dose of 60 ug/m3. However, the total soil intake via this pathway (2 x 60 ug/m3 x 20 m3/day x 1 mg/1000 ug = 2.4 mg soil) is so low as to not add significantly to the soil dose calculated for direct ingestion and is not considered further in this assessment.

Exposure can be calculated using the equation:

$$ADE/LADE = \frac{EPC \times IF \times PM10 \times RAF \times EF \times ED}{BW \times AT}$$

Where:

ADE = Average daily exposure to the constituent (mg/m3),
LADE= Lifetime average daily dose (mg/m3),
EPC = Constituent concentration in soil (mg/kg),
IF = Inhalation Fraction (20 m3 / 20 m3day; MassDEP 2002),
PM10 = Particulate air concentration (60 ug/m3; MassDEP 2002).

RAF = Relative absorption factor (1 used to be conservative),
EF = Frequency of contact (100 days/year),
ED = Exposure Duration (5 years), and
AT = Averaging Time (365 days x 5 or 70 years).

Table 5 in Appendix A provides the estimated exposure and risk values for inhalation exposure to an adult landscaper, assuming no dust suppression measures are implemented. Exposure to other site users, including teachers and parents, would be expected to be lower.

3.1.5 Human Health Imminent Hazard Evaluation Results

Using the EPCs, exposure factors, and toxicity values discussed above, and using conventional risk characterization models, imminent hazard calculations were performed. The calculations are contained in *LaGoy Risk Analysis, Inc. (LaGoy)* "Evaluation of Soil Data from the Charles C. Cashman Elementary School, 193 Lions Mouth Road, Amesbury, Massachusetts dated July 27, 2020" and attached as Appendix A.

For noncarcinogenic (systemic) effects, EPA and MassDEP assume that there is a level below which no effects will occur (a threshold no effect concentration). To evaluate possible risk from exposure to noncarcinogenic contaminants, the average daily dose (ADD) is divided by the health criterion value [the reference dose (RfD)]. If the ADD:RfD ratio, also termed the hazard index or HI, is less than ten for all constituents (i.e., if the daily intake is below the health criterion), then the contaminant is considered unlikely to pose an Imminent Hazard (i.e., a significant risk under conditions of short-term exposure) to individuals exposed under the given scenario. If the HI is less than ten, the site does not pose an Imminent Hazard. For cancer risk, the exposure, termed the lifetime average daily dose or LADD is multiplied by the cancer slope factor to estimate cancer risk, and this risk is compared with a target risk level of 1 in 100,000 or 10-5.

Imminent hazards associated with short term exposure to site constituents in soil are estimated in Table 3 for children and in Table 5 for landscapers (and other adults). Based on these calculations, exposure by children to soil concentrations of site constituents results in a hazard index of 0.5 (soil ingestion plus dermal absorption risks combined) and a cancer risk of 1 x 10-5. Exposure by adults to soil concentrations of site constituents results in a hazard index of 0.08 (soil ingestion, dermal absorption, and inhalation exposures combined) and a cancer risk of 3 x 10-6. These levels do not exceed the Imminent Hazard criterion of an HI of ten and a cancer risk level of 10^{-5}, indicating that continued use of this site does not pose an imminent hazard.

Hazards and risks associated with longer term exposure to site constituents in soil are estimated in Table 4 in Appendix A for children and in Table 6 in Appendix A for

landscapers (and other adults). Based on these calculations, exposure by children to soil concentrations of site constituents results in a hazard index of 0.3 and a cancer risk of 1 x 10-5. Exposure by adults to soil concentrations of site constituents results in a hazard index of 0.08 and a cancer risk of 1×10^{-5}. These levels do not exceed the long-term risk targets of a cancer risk of 10^{-5} and an HI of 1, indicating that continued long term exposure at these concentrations would not pose a significant risk.

Based on these results, an imminent hazard to human health does not exist at the site.

3.2 Environmental Imminent Hazard Evaluation

The site property is developed for educational use and is partially paved or built on and partially uncovered. The developed areas of the site possess little potential environmental habitat because of human use; however, undeveloped portions of the site may serve as habitat for native flora and fauna. According to 40 CMR 40.0955(3), the following conditions constitute an imminent hazard to the environment:

- evidence of stressed biota attributable to the release at the disposal site, including, without limitation, fish kills or abiotic conditions; or

- a release to the environment of oil or hazardous material which produces immediate or acute adverse impacts to freshwater or saltwater fish populations.

No such conditions are known to exist as a result of arsenic in site soil. Therefore, it is concluded that the site poses no imminent hazard to the environment.

3.3 Safety Imminent Hazard Evaluation

An imminent hazard to safety is evaluated by identifying conditions that could pose a threat of physical harm or bodily injury to existing receptors under current site conditions. Examples include the presence of an explosive environment or insecurely containerized waste.

No conditions representative of an imminent hazard to safety exist on the site. Based on these factors, it is concluded that no imminent hazard to safety exists at the site.

4.0 SUMMARY, CONCLUSION & RECOMMENDATIONS

An IHE was performed for the presence of arsenic in soil of the Cashman school property. The IHE examined potential imminent hazards to the health of students, non-student users of the playing fields, commercial (school) workers, and construction/utility workers not protected by conditions of an adequate Health and Safety Plan. The IHE also evaluated potential imminent hazards to the environment and safety. The IHE concludes the following:

- The site poses no imminent hazard to students, non-student users of the playing fields, school workers, and construction/utility workers.
- The site poses no imminent hazard to the environment.
- The site poses no imminent hazard to safety.

Soil was recently sampled by *ECMS* and analyzed with respect to the Cashman Elementary School property located at 193 Lions Mouth Road in Amesbury, Massachusetts. Arsenic and several other metals were detected at levels above a reportable concentration (arsenic) and above levels expected in background soil. However, no anthropogenic source of arsenic was present, the Amesbury area is known to have naturally-elevated arsenic levels in soil, and the source appears most likely to be natural. Further assessment will be required to determine if the source of arsenic detected on the Site is naturally occurring and presented with lines of evidence as part of the development of a Conceptual Site Model (CSM) for this "release". While the arsenic is assumed to be naturally occurring, calculations were performed to assess if a calculated risk was present for either short-term (IH) or longer-term exposure. Evaluation of the concentrations detected and of site-specific factors indicates that an Imminent Hazard condition does not exist at the site. Use of the site would also not pose a Significant Risks.

It should be noted that calculated risks did not exceed but were at the target risk levels. Therefore, although the area does not pose an Imminent Hazard or Significant Risk for current use, considering the use of the site as a school, it may be prudent to take measures to mitigate the potential for exposure. Such measures could include replacing natural soil in areas of exposed soil with imported soil containing lower levels of natural arsenic.

In order to ensure that public health is adequately protected, conservative assumptions (i.e., those unlikely to underestimate risk) were used in deriving both the exposure estimates and the toxicity values that are included in this letter report. Because of the use of these conservative assumptions, it is likely that the actual potential for non-cancer and cancer risks is lower than as is estimated in this report.

5.0 REFERENCES

Massachusetts Department of Environmental Protection (MADEP). 1994. Background Documentation for the Development of MCP Numerical Standards. April 1994.

Massachusetts Department of Environmental Protection (MADEP). 1995. Guidance for Disposal Site Risk Characterization in Support of the Massachusetts Contingency Plan.

Massachusetts Department of Environmental Protection (MADEP). 2002. Characterization of Risks due to Inhalation of Particulates by Construction Workers. Technical Update. Boston, MA, May 2002.

Massachusetts Department of Environmental Protection (MassDEP) 2006 MCP Numerical Standards Development Spreadsheets zip format - June 2006.

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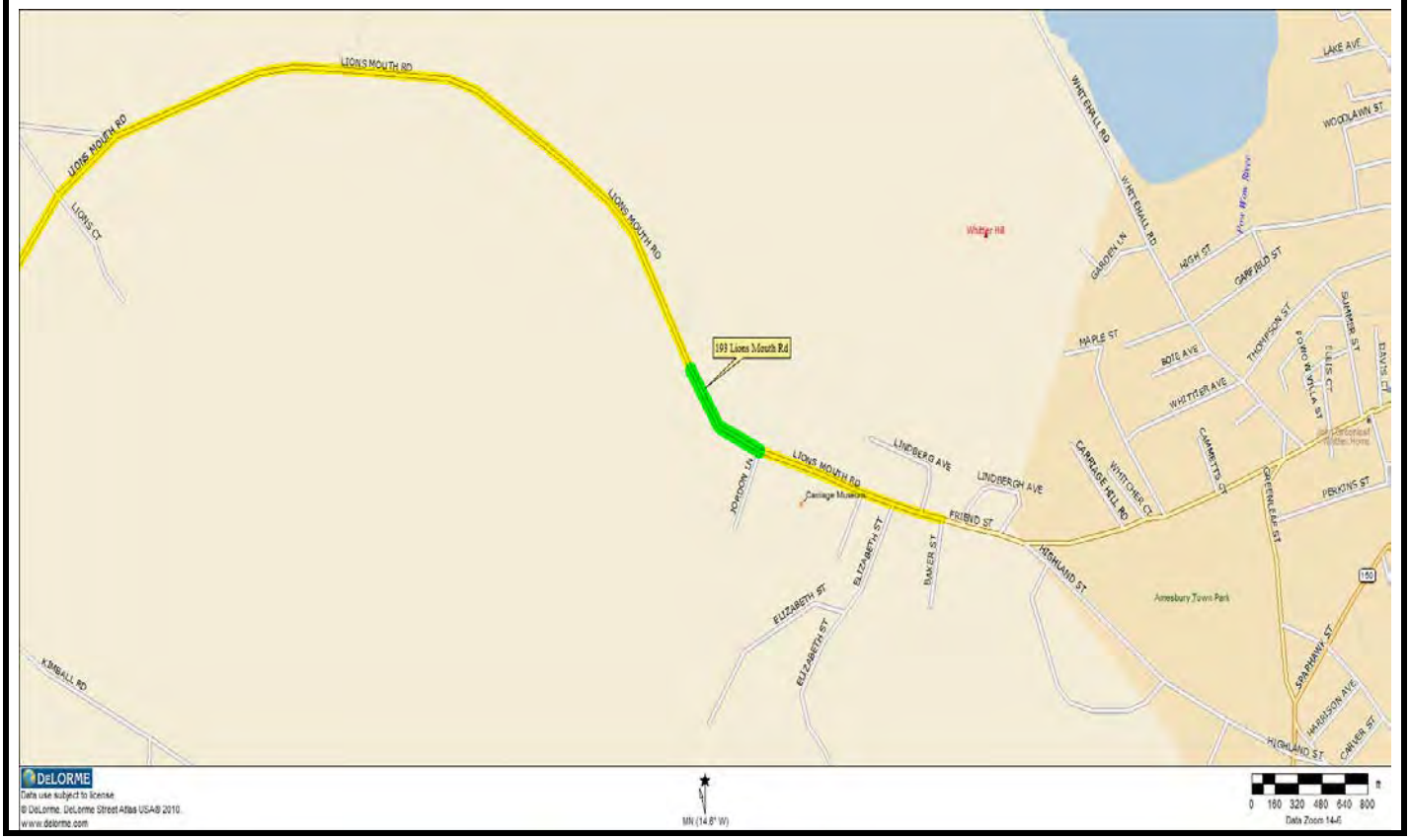
Massachusetts Department of Environmental Protection (MADEP). 2014. Best Management Practices ("BMPS") for Non-Commercial Gardening at Disposal Sites. Boston, MA, WSC # 14-910. December 2014.

McBride, M.B.Shayler, H.A., Russell-Anelli, J.M., Spliethoff,, H.M., and Marquez-Bravo, L.G., 2015. Arsenic and Lead Uptake by Vegetable Crops Grown on an Old Orchard Site Amended with Compost. Water Air Soil Pollut. 2015 Aug; 226(8): 265

FIGURES





Cashman Elementary School **193 Lions Mouth Road** **Amesbury, Massachusetts** **01913**	**Environmental & Construction Management Services, Inc.**	**Project No.** 1009.073	**Figure 1**
		Site Locus / Street Location Plan	
		Drawn By: KJK	**Date:** 8/24/18

N

CITY OF AMESBURY, MASS.

Assessor Maps

LEGEND

- Parcel Line
- Building Footprints
- Prior Parcel Line with Common Ownership
- 5 Condo Unit Number
- Right of Way
- Map Index
- Town Boundaries
- Easements
- Hydrographic Features
- Streams
- Wetlands

Exempt Lands

- Federal
- State
- Municipal
- Private

N

SCALE: 1" = 100'

100 0 100 200 300 400

NOTE:
THE AREAS, BOUNDARIES, AND DIMENSIONS SHOWN ON THIS TAX MAP ARE DERIVED FROM AERIAL PHOTOGRAPHS, GROUND SURVEYS, AND RECORDED PLANS, MAPS, DEEDS, AND WILLS, AND ARE INTENDED TO BE USED FOR PROPERTY ASSESSMENT PURPOSES ONLY AND NOT FOR CONVEYANCE.

MAP REVISION DATE		
As of January 1, 2018		

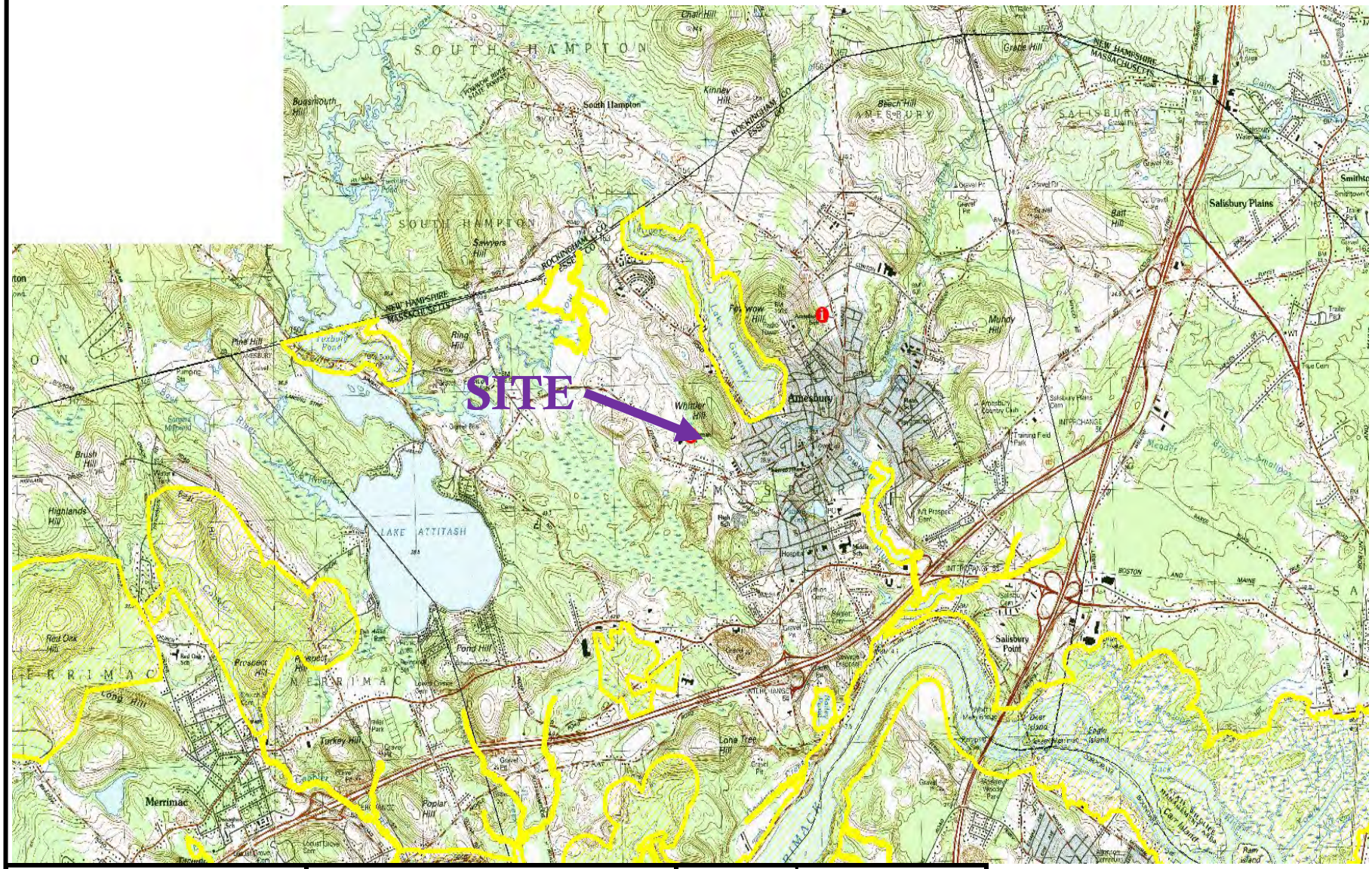
Data Sources: The data for this map was supplied by the Merrimack Valley Planning Commission, the Town of Amesbury and the Executive Office of Environmental Affairs/MassGIS.

Merrimack Valley Planning Commission
plan • develop • promote

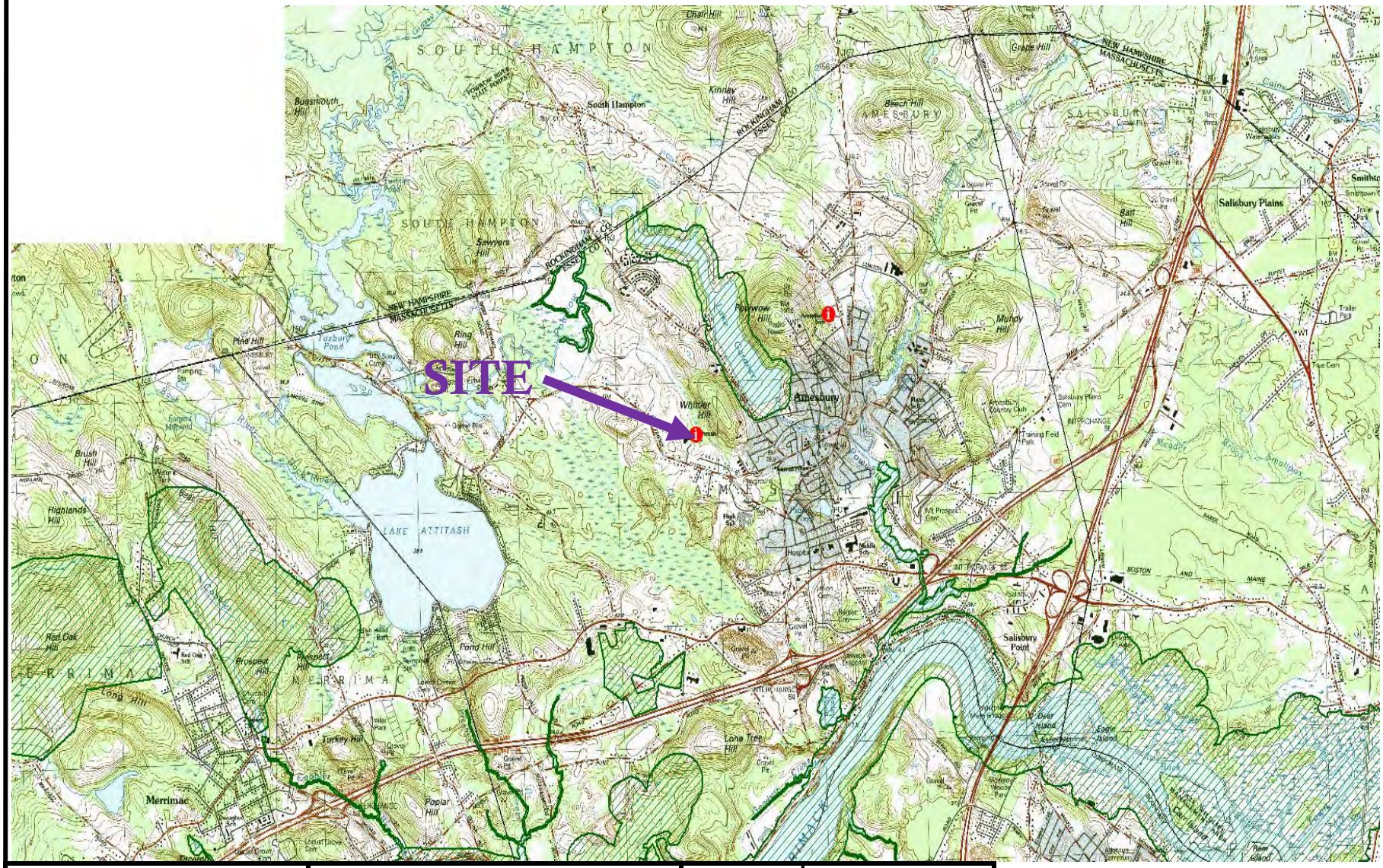
J:\ArcGIS\Amesbury\AmesburyAssessorMap_24x36.mxd

INDEX

| | | |



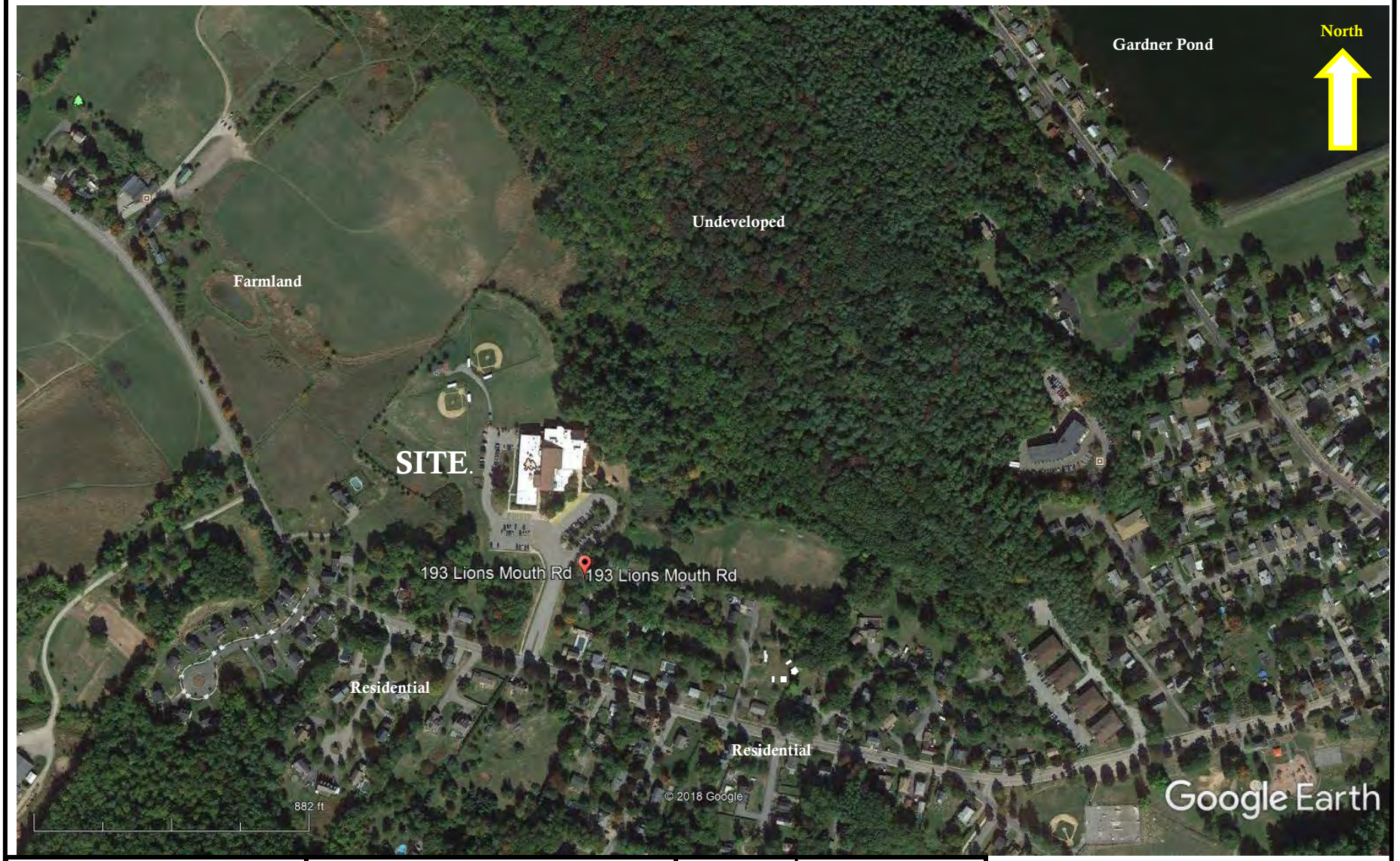
Cashman Elementary School **193 Lions Mouth Road** **Amesbury, Massachusetts** **01913**	**Environmental & Construction Management Services, Inc.**	**Project No.** 1009.073	**Figure 3**
		Priority Habitats of Rare Species Plan	
		Drawn By: KJK	**Date:** 8/23/18



Cashman Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts
01913

Environmental & Construction Management Services, Inc.

Project No. 1009.073	**Figure 4**
Map of Estimated Habitats of Rare Wildlife and Certified Vernal Pools	
Drawn By: KJK	**Date:** 8/23/18



Cashman Elementary School **193 Lions Mouth Road** **Amesbury, Massachusetts** **01913**	**Environmental & Construction Management Services, Inc.**	**Project No.** 1009.073	**Figure 5**
		Aerial Photograph Site Location Plan	
		Drawn By: KJK	**Date:** 8/24/2018

MassDEP - Bureau of Waste Site Cleanup

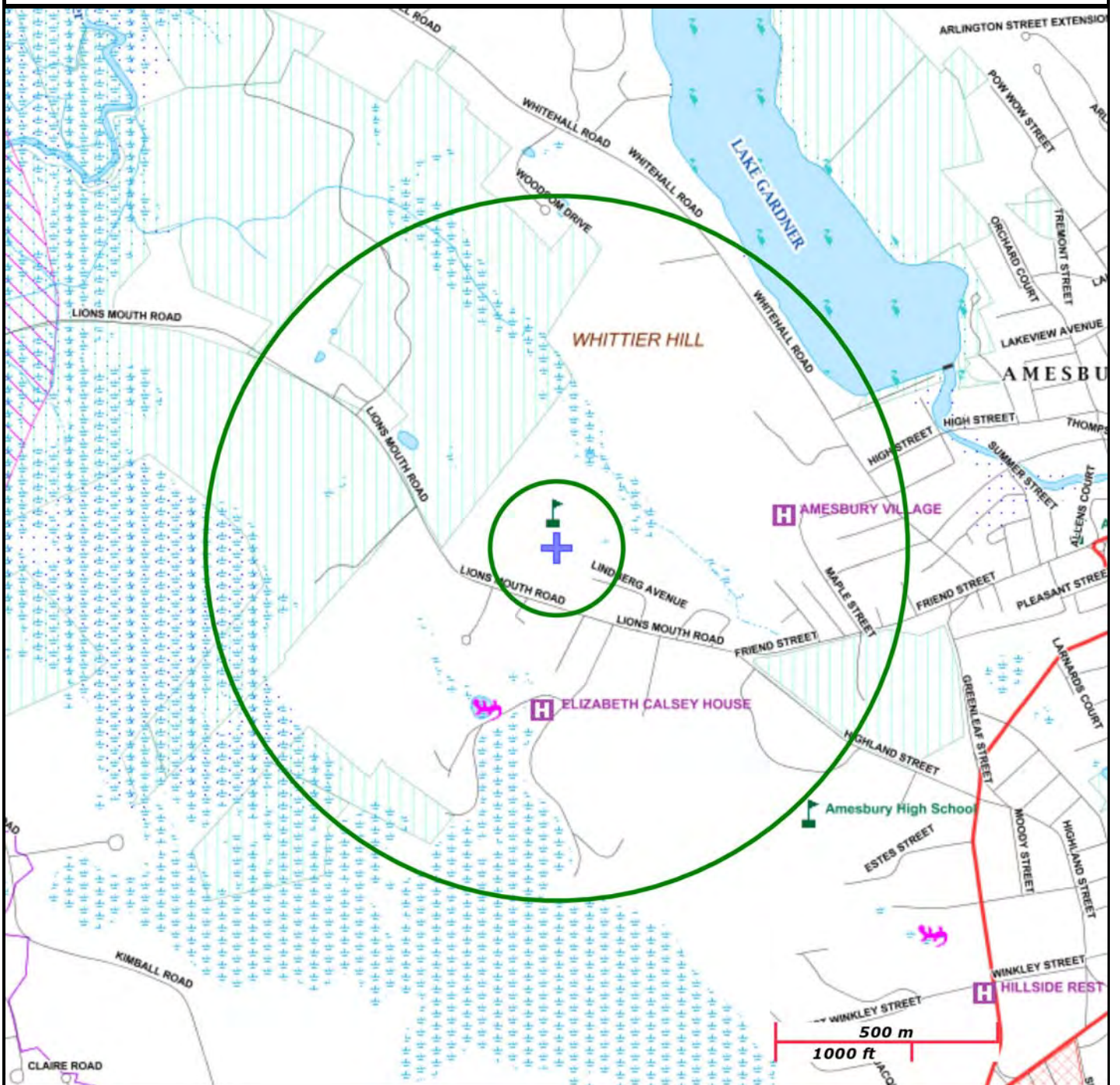
Phase 1 Site Assessment Map: 500 feet & 0.5 Mile Radii

Site Information:
CAHSMAN ELEMENTARY SCHOOL
193 LIONS MOUTH ROAD AMESBURY, MA

NAD83 UTM Meters:
4746679mN , 340744mE (Zone: 19)
September 13, 2018

The information shown is the best available at the date of printing. However, it may be incomplete. The responsible party and LSP are ultimately responsible for ascertaining the true conditions surrounding the site. Metadata for data layers shown on this map can be found at: http://www.mass.gov/mgis/.

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection



Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail

Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct

Basins: Major, PWS; Streams: Perennial, Intermittent, Man Made Shore, Dam

Aquifers: Medium Yield, High Yield, EPA Sole Source

Non Potential Drinking Water Source Area: Medium, High (Yield)

PWS Protection Areas: Zone II, IWPA, Zone A

Hydrography: Open Water, PWS Reservoir, Tidal Flat

Wetlands: Freshwater, Saltwater, Cranberry Bog

FEMA 100yr Floodplain; Protected Open Space; ACEC

Est. Rare Wetland Wildlife Hab; Vernal Pool: Cert., Potential

Solid Waste Landfill; PWS: Com.GW,SW, Emerg., Non-Com.

National Flood Hazard Layer FIRMette

FEMA

42°51'31.27"N

70°57'17.71"W



70°56'40.25"W

42°51'4.90"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Legend

FIGURE 7

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/13/2018 at 3:39:51 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



Cashman Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts
01913

Environmental & Construction Management Services, Inc.

Project No. 1009.073	**Figure 8**
Site Plan	
Drawn By: KJK	**Date:** 8/23/18

GENERAL NOTES

1. SEE SHEETS 1.3.01 AND 1.3.02 FOR ALL EROSION AND SEDIMENT CONTROL BARRIER INSTALLATIONS.
2. SEE SHEETS 1.3.01 AND 1.3.02 FOR ALL AREAS OF FUTURE STORMWATER MANAGEMENT. ALSO SEE NOTE 3 ON SHEET 1.3.01.
3. FOR TREES TO BE PROTECTED AND TO REMAIN, SEE LANDSCAPE PLANS.

Soil Sample Legend

- Surface Loam Sample
- Subsoil Sample
  - 24" Depth at Smaple 1
  - 22" Depth at Sample 2

STRIP EXISTING LOAM TOPSOIL AND STOCKPILE IN THE AREA DESIGNATED FOR STOCKPILING (AREA SHOWN CROSS HATCHED)

STRIP EXISTING LOAM TOPSOIL AND STOCKPILE IN THE AREA DESIGNATED FOR STOCKPILING (AREA SHOWN CROSS HATCHED)

STRIP EXISTING LOAM TOPSOIL AND STOCKPILE IN THE AREA DESIGNATED FOR STOCKPILING (AREA SHOWN CROSS HATCHED)

STRIP EXISTING LOAM TOPSOIL AND STOCKPILE IN THE AREA DESIGNATED FOR STOCKPILING (AREA SHOWN CROSS HATCHED)

WITHIN THE AREA OF THE EXISTING LOW SPOT, DO NOT REMOVE THE VEGETATIVE COVER OR TOPSOIL.

LOAM TOPSOIL STOCKPILE AREA WITHIN THE LIMIT SHOWN FOR LOAM TOPSOIL STOCKPILE. DO NOT REMOVE THE VEGETATIVE COVER OR TOPSOIL.

DO NOT REMOVE THE VEGETATIVE COVER OR TOPSOIL WITHIN THIS AREA.

LION'S MOUTH ROAD

LINDBERGH AVENUE (PUBLIC - 50' WIDE)

LINDBERGH AVENUE (DISCONTINUED)

MASSACHUSETTS STATE PLANE COORDINATES (NAD83 - GEOID 12A)

AMESBURY ELEMENTARY SCHOOL

EARLY SITE PREPARATION

AMESBURY, MA

DINISCO DESIGN
architects + planners

99 Chauncy Street, Suite 901
Boston, MA 02111
(617) 426-2858

DGT Associates
Surveying & Engineers
1071 Worcester Road
Framingham, MA 01701
(508) 879-0030

Brown Sardina, Inc.
Landscape Architects
24 Roland Street
Boston, MA 02129
(617) 482-4703

Thompson Engineering Company, Inc.
Electrical Engineers
89 Newbury Street, Suite 103
Danvers, MA 01923
(617) 866-9066

Hancock Associates
Surveyor
185 Centre Street
Danvers, MA 09123
(978) 777-3050

ECMS Figure 9
Soil Sample Location Plan

KEY PLAN

NORTH ARROW — STAMP

Date: 6 JULY 2020

Drawn By: KMR

Scale: 0 40 80

Revisions

Number	Date	Description

90% EARLY SITE PACKAGE

Proposed Topsoil Removal Limit Plan

1.3.06

G:\Condocs\ahdr\12526\Dwg\12526_Exp_Rtn.dwg

© 2020 DiNisco Design

TABLES

TABLE 1

SUMMARY OF TOPSOIL/LOAM/SUBSOIL SAMPLES FOR pH, REACTIVITY, IGNITABILITY, MASSDEP 14 METALS, POLCHLORINATED BIPHENYLS (PCBs) & TOTAL PETROLEUM HYDROCARBONS (TPH)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SS-1	SS-2	SSS-3	SSS-4	SSS-5	SSS-6	SSS-7	SSS-8	SSS-9	MassDEP	MassDEP
Laboratory ID		SC58794-01	SC58794-02	SC58794-10	SC58794-11	SC58794-12	SC58794-13	SC58794-14	SC58794-15	SC58794-16	Reportable Concentrations	Imminent Hazard
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020		
Sample Depth		24"	22"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1	
SM2540 G (11) Mod. (%)												
solids	% Solids	89.3	88.8	82.7	88.9	85.8	92.6	83.4	86.1	78.7	NA	
SW846 9045D (pH Units)												
pH		5.99	6.08	6.13	5.58	5.57	5.74	5.71	5.56	5.41	NA	
SW846 Ch. 7.3 (mg/kg dry)												
Reactivity		Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative		
Reactive Cyanide		<6	<7	<7	<6	<6	<6	<7	<6	<7	30	
Reactive Sulfide		< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20		
SW846 1030 (N/A)												
NA	Ignitability by Definition	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	NA	
MassDEP 14 Metals - SW846 6010C (mg/kg)												
7440-36-0	Antimony	<5.59	<5.58	<5.98	<5.41	<6.27	<5.63	<6.01	<6.24	<6.28	20	
7440-38-2	Arsenic	**39.9**	**55.9**	**36.6**	**20.5**	**53.4**	**29.6**	**48.6**	**48.7**	**82.3**	**20**	**40**
7440-41-7	Beryllium	<0.559	<0.558	<0.598	<0.541	<0.627	<0.563	<0.601	<0.624	<0.628	90	
7440-43-9	Cadmium	<0.559	<0.558	<0.598	<0.541	<0.627	<0.563	<0.601	<0.624	<0.628	70	
7440-47-3	Chromium	22.6	19.4	21.8	18.8	25.0	30.0	65.9	31.6	24.7	100	
7439-92-1	Lead	8.42	19.3	17.0	18.6	17.0	15.8	28.6	21.0	22.9	200	
7440-02-0	Nickel	39.7	71.4	33.2	20.3	46.2	25.6	44.8	47.7	76.0	600	
7782-49-2	Selenium	<1.68	<1.67	<1.80	<1.62	<1.88	<1.69	<1.80	<1.87	<1.88	400	
7440-22-4	Silver	<3.35	<3.35	<3.59	<3.25	<3.76	<3.38	<3.60	<3.75	<3.77	100	
7440-28-0	Thallium	<3.35	<3.35	<3.59	<3.25	<3.76	<3.38	<3.60	<3.75	<3.77	8	
7440-62-2	Vanadium	22.7	24.5	30.1	24.5	33.9	35.8	46.7	36.0	39.4	400	
7440-66-6	Zinc	36.3	58.5	107	36.0	52.1	43.2	56.2	52.3	64.7	1000	
7440-39-3	Barium	18.4	22.5	30.0	29.5	30.3	28.6	34.6	33.0	29.1	1000	
RCRA Metals - SW846 7471B (mg/kg)												
7439-97-6	Mercury	<0.115	<0.127	<0.110	<0.116	<0.103	<0.120	<0.128	<0.115	<0.120	20	
Polychlorinated biphenyls (PCBs) - SW846 8082A (µg/kg)												
12674-11-2	Aroclor-1016	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
11104-28-2	Aroclor-1221	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
11141-16-5	Aroclor-1232	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
53469-21-9	Aroclor-1242	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
12672-29-6	Aroclor-1248	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
11097-69-1	Aroclor-1254	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
11096-82-5	Aroclor-1260	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	1000	
37324-23-5	Aroclor-1262	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	-	
11100-14-4	Aroclor-1268	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	-	
Total Petroleum Hydrocarbons (TPH) 8100 by GC (mg/kg)												
PH(TOT)	Total Petroleum Hydrocarbons	24.9	38.7	113	118	106	134	170	111	129	1000	

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazrdous Materials List (MOHML) revised (effective) 2014

Environmental & Construction Management Services, Inc.

TABLE 1

SUMMARY OF TOPSOIL/LOAM/SUBSOIL SAMPLES FOR pH, REACTIVITY, IGNITABILITY, MASSDEP 14 METALS, POLCHLORINATED BIPHENYLS (PCBs) & TOTAL PETROLEUM HYDROCARBONS (TPH)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location Laboratory ID Sample Date Sample Depth		SSS-10 SC58794-03 7/9/2020 2-6"	SSS-11 SC58794-04 7/9/2020 2-6"	SSS-12 SC58794-05 7/9/2020 2-6"	SSS-13 SC58794-06 7/9/2020 2-6"	SSS-14 SC58794-07 7/9/2020 2-6"	SSS-15 SC58794-17 7/9/2020 2-6"	SSS-16 SC58794-08 7/9/2020 2-6"	SSS-17 SC58794-09 7/9/2020 2-6"	MassDEP Reportable Concentrations RCS-1	MassDEP Imminent Hazard
SM2540 G (11) Mod. (%)											
solids	% Solids	80.1	80.6	83.3	79.0	86.9	79.8	90.3	89.6	NA	
SW846 9045D (pH Units)											
pH		6.17	5.47	5.71	6.35	6.03	5.69	6.08	6.11		
SW846 Ch. 7.3 (mg/kg dry)											
Reactivity		Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative		
Reactive Cyanide		<7	<9	<6	<7	<6	<7	<6	<6	30	
Reactive Sulfide		< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20		
SW846 1030 (N/A)											
NA	Ignitability by Definition	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	NA	
MassDEP 14 Metals - SW846 6010C (mg/kg)											
7440-36-0	Antimony	<5.89	<6.24	<5.56	<6.11	<5.63	<6.33	<5.58	<5.33	20	
7440-38-2	Arsenic	**25.4**	**33.6**	**39.2**	**49.1**	**23.7**	**37.8**	**36.6**	**21.9**	**20**	**40**
7440-41-7	Beryllium	<0.589	<0.624	<0.556	<0.611	<0.563	<0.633	<0.558	<0.533	90	
7440-43-9	Cadmium	<0.589	<0.624	<0.556	<0.611	<0.563	<0.633	<0.558	<0.533	70	
7440-47-3	Chromium	22.9	23.2	17.4	23.3	36.0	31.5	21.7	19.4	100	
7439-92-1	Lead	13.7	18.9	19.6	22.7	13.7	25.9	17.5	12.1	200	
7440-02-0	Nickel	28.2	30.4	26.9	37.2	26.1	37.7	30.6	27.9	600	
7782-49-2	Selenium	<1.77	<1.87	<1.67	<1.83	<1.69	<1.90	<1.67	<1.60	400	
7440-22-4	Silver	<3.53	<3.74	<3.34	<3.67	<3.38	<3.80	<3.35	<3.20	100	
7440-28-0	Thallium	<3.53	<3.74	<3.34	<3.67	<3.38	<3.80	<3.35	<3.20	8	
7440-62-2	Vanadium	29.6	38.3	33.5	34.6	41.9	36.3	30.6	8.48	400	
7440-66-6	Zinc	60.8	43.2	37.9	49.2	44.6	60.7	44.3	61.8	1000	
7440-39-3	Barium	26.5	24.8	21.7	28.9	44.1	46.3	24.0	113	1000	
RCRA Metals - SW846 7471B (mg/kg)											
7439-97-6	Mercury	<0.117	<0.126	<0.129	<0.133	<0.118	<0.123	<0.119	<0.116	20	
Polychlorinated biphenyls (PCBs) - SW846 8082A (µg/kg)											
12674-11-2	Aroclor-1016	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
11104-28-2	Aroclor-1221	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
11141-16-5	Aroclor-1232	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
53469-21-9	Aroclor-1242	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
12672-29-6	Aroclor-1248	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
11097-69-1	Aroclor-1254	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
11096-82-5	Aroclor-1260	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	1000	
37324-23-5	Aroclor-1262	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	-	
11100-14-4	Aroclor-1268	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	-	
Total Petroleum Hydrocarbons (TPH) 8100 by GC (mg/kg)											
PH(TOT)	Total Petroleum Hydrocarbons	109	184	180	93.0	116	168	93.6	49.7	1000	

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazrdous Materials List (MOHML) revised (effective) 2014

Environmental & Construction Management Services, Inc.

TABLE 2

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR VOLATILE ORGANIC COMPOUNDS (VOCs)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SS-1	SS-2	SSS-3	SSS-4	SSS-5	SSS-6	SSS-7	SSS-8	SSS-9	MassDEP Reportable Concentrations
Laboratory ID		SC58794-01	SC58794-02	SC58794-10	SC58794-11	SC58794-12	SC58794-13	SC58794-14	SC58794-15	SC58794-16	
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	
Sample Depth		24"	22"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Volatile Organic Compounds (VOCs) - SW846 8260B (µg/kg)											
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
67-64-1	Acetone	<532	<573	<711	<643	<662	<521	<594	<605	<760	6000
107-13-1	Acrylonitrile	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
71-43-2	Benzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	2000
108-86-1	Bromobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
74-97-5	Bromochloromethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
75-27-4	Bromodichloromethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
75-25-2	Bromoform	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
74-83-9	Bromomethane	<106	<115	<142	<129	<132	<104	<119	<121	<152	500
78-93-3	2-Butanone (MEK)	<106	<115	<142	<129	<132	<104	<119	<121	<152	4000
104-51-8	n-Butylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
135-98-8	sec-Butylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
98-06-6	tert-Butylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
75-15-0	Carbon disulfide	<106	<115	<142	<129	<132	<104	<119	<121	<152	100000
56-23-5	Carbon tetrachloride	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	5000
108-90-7	Chlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000
75-00-3	Chloroethane	<106	<115	<142	<129	<132	<104	<119	<121	<152	100000
67-66-3	Chloroform	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	200
74-87-3	Chloromethane	<106	<115	<142	<129	<132	<104	<119	<121	<152	100000
95-49-8	2-Chlorotoluene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
106-43-4	4-Chlorotoluene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
96-12-8	1,2-Dibromo-3-chloropropane	<106	<115	<142	<129	<132	<104	<119	<121	<152	10000
124-48-1	Dibromochloromethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	5
106-93-4	1,2-Dibromoethane (EDB)	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
74-95-3	Dibromomethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	500000
95-50-1	1,2-Dichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	9000
541-73-1	1,3-Dichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	3000
106-46-7	1,4-Dichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	700
75-71-8	Dichlorodifluoromethane (Freon12)	<106	<115	<142	<129	<132	<104	<119	<121	<152	1000000
75-34-3	1,1-Dichloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	400
107-06-2	1,2-Dichloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
75-35-4	1,1-Dichloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	3000
156-59-2	cis-1,2-Dichloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	300
156-60-5	trans-1,2-Dichloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000
78-87-5	1,2-Dichloropropane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
142-28-9	1,3-Dichloropropane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	500000
594-20-7	2,2-Dichloropropane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
563-58-6	1,1-Dichloropropene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
10061-01-5	cis-1,3-Dichloropropene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	10
10061-02-6	trans-1,3-Dichloropropene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	10
100-41-4	Ethylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	40000
87-68-3	Hexachlorobutadiene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	30000
591-78-6	2-Hexanone (MBK)	<106	<115	<142	<129	<132	<104	<119	<121	<152	100000
98-82-8	Isopropylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000000
99-87-6	4-Isopropyltoluene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
1634-04-4	Methyl tert-butyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
108-10-1	4-Methyl-2-pentanone (MIBK)	<106	<115	<142	<129	<132	<104	<119	<121	<152	400
75-09-2	Methylene chloride	<106	<115	<142	<129	<132	<104	<119	<121	<152	100
91-20-3	Naphthalene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	4000
103-65-1	n-Propylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
100-42-5	Styrene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	3000
630-20-6	1,1,1,2-Tetrachloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
79-34-5	1,1,2,2-Tetrachloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	5
127-18-4	Tetrachloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000
108-88-3	Toluene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	30000
87-61-6	1,2,3-Trichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
120-82-1	1,2,4-Trichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	2000
108-70-3	1,3,5-Trichlorobenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	30000
71-55-6	1,1,1-Trichloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
79-00-5	1,1,2-Trichloroethane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100
79-01-6	Trichloroethene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	300
75-69-4	Trichlorofluoromethane (Freon 11)	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000000
96-18-4	1,2,3-Trichloropropane	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
95-63-6	1,2,4-Trimethylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	1000000
108-67-8	1,3,5-Trimethylbenzene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	10000
75-01-4	Vinyl chloride	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	700
179601-23-1	m,p-Xylene	<106	<115	<142	<129	<132	<104	<119	<121	<152	300000
95-47-6	o-Xylene	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	500000
109-99-9	Tetrahydrofuran	<106	<115	<142	<129	<132	<104	<119	<121	<152	500000
60-29-7	Ethyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
994-05-8	Tert-amyl methyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
637-92-3	Ethyl tert-butyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	
108-20-3	Di-isopropyl ether	<53.2	<57.3	<71.1	<64.3	<66.2	<52.1	<59.4	<60.5	<76.0	100000
75-65-0	Tert-Butanol / butyl alcohol	<1060	<1150	<1420	<1290	<1320	<1040	<1190	<1210	<1520	100000
123-91-1	1,4-Dioxane	<1060	<1150	<1420	<1290	<1320	<1040	<1190	<1210	<1520	10000
110-57-6	trans-1,4-Dichloro-2-butene	<266	<286	<356	<321	<331	<261	<297	<302	<380	200
64-17-5	Ethanol	<10600	<11500	<14200	<12900	<13200	<10400	<11900	<12100	<15200	100000

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazrdous Materials List (MOHML) revised (effective) February 14, 2008

Environmental & Construction Management Services, Inc.

TABLE 2

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR VOLATILE ORGANIC COMPOUNDS (VOCs)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SSS-10	SSS-11	SSS-12	SSS-13	SSS-14	SSS-15	SSS-16	SSS-17	MassDEP Reportable Concentrations
Laboratory ID		SC58794-03	SC58794-04	SC58794-05	SC58794-06	SC58794-07	SC58794-17	SC58794-08	SC58794-09	
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	
Sample Depth		2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Volatile Organic Compounds (VOCs) - SW846 8260B (µg/kg)										
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
67-64-1	Acetone	<686	<693	<637	<695	<585	<695	<540	<529	6000
107-13-1	Acrylonitrile	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
71-43-2	Benzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	2000
108-86-1	Bromobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
74-97-5	Bromochloromethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
75-27-4	Bromodichloromethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
75-25-2	Bromoform	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
74-83-9	Bromomethane	<137	<139	<127	<139	<117	<139	<108	<106	500
78-93-3	2-Butanone (MEK)	<137	<139	<127	<139	<117	<139	<108	<106	4000
104-51-8	n-Butylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
135-98-8	sec-Butylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
98-06-6	tert-Butylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
75-15-0	Carbon disulfide	<137	<139	<127	<139	<117	<139	<108	<106	100000
56-23-5	Carbon tetrachloride	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	5000
108-90-7	Chlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000
75-00-3	Chloroethane	<137	<139	<127	<139	<117	<139	<108	<106	100000
67-66-3	Chloroform	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	200
74-87-3	Chloromethane	<137	<139	<127	<139	<117	<139	<108	<106	100000
95-49-8	2-Chlorotoluene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
106-43-4	4-Chlorotoluene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
96-12-8	1,2-Dibromo-3-chloropropane	<137	<139	<127	<139	<117	<139	<108	<106	10000
124-48-1	Dibromochloromethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	5
106-93-4	1,2-Dibromoethane (EDB)	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
74-95-3	Dibromomethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	500000
95-50-1	1,2-Dichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	9000
541-73-1	1,3-Dichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	3000
106-46-7	1,4-Dichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	700
75-71-8	Dichlorodifluoromethane (Freon12)	<137	<139	<127	<139	<117	<139	<108	<106	1000000
75-34-3	1,1-Dichloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	400
107-06-2	1,2-Dichloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
75-35-4	1,1-Dichloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	3000
156-59-2	cis-1,2-Dichloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	300
156-60-5	trans-1,2-Dichloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000
78-87-5	1,2-Dichloropropane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
142-28-9	1,3-Dichloropropane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	500000
594-20-7	2,2-Dichloropropane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
563-58-6	1,1-Dichloropropene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
10061-01-5	cis-1,3-Dichloropropene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	10
10061-02-6	trans-1,3-Dichloropropene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	10
100-41-4	Ethylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	40000
87-68-3	Hexachlorobutadiene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	30000
591-78-6	2-Hexanone (MBK)	<137	<139	<127	<139	<117	<139	<108	<106	100000
98-82-8	Isopropylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000000
99-87-6	4-Isopropyltoluene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
1634-04-4	Methyl tert-butyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
108-10-1	4-Methyl-2-pentanone (MIBK)	<137	<139	<127	<139	<117	<139	<108	<106	400
75-09-2	Methylene chloride	<137	<139	<127	<139	<117	<139	<108	<106	100
91-20-3	Naphthalene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	4000
103-65-1	n-Propylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
100-42-5	Styrene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	3000
630-20-6	1,1,1,2-Tetrachloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
79-34-5	1,1,2,2-Tetrachloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	5
127-18-4	Tetrachloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000
108-88-3	Toluene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	30000
87-61-6	1,2,3-Trichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
120-82-1	1,2,4-Trichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	2000
108-70-3	1,3,5-Trichlorobenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	30000
71-55-6	1,1,1-Trichloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
79-00-5	1,1,2-Trichloroethane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100
79-01-6	Trichloroethene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	300
75-69-4	Trichlorofluoromethane (Freon 11)	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000000
96-18-4	1,2,3-Trichloropropane	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
95-63-6	1,2,4-Trimethylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	1000000
108-67-8	1,3,5-Trimethylbenzene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	10000
75-01-4	Vinyl chloride	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	700
179601-23-1	m,p-Xylene	<137	<139	<127	<139	<117	<139	<108	<106	300000
95-47-6	o-Xylene	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	500000
109-99-9	Tetrahydrofuran	<137	<139	<127	<139	<117	<139	<108	<106	500000
60-29-7	Ethyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
994-05-8	Tert-amyl methyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
637-92-3	Ethyl tert-butyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	
108-20-3	Di-isopropyl ether	<68.6	<69.3	<63.7	<69.5	<58.5	<69.5	<54.0	<52.9	100000
75-65-0	Tert-Butanol / butyl alcohol	<1370	<1390	<1270	<1390	<1170	<1390	<1080	<1060	100000
123-91-1	1,4-Dioxane	<1370	<1390	<1270	<1390	<1170	<1390	<1080	<1060	10000
110-57-6	trans-1,4-Dichloro-2-butene	<343	<347	<318	<348	<292	<347	<270	<264	200
64-17-5	Ethanol	<13700	<13900	<12700	<13900	<11700	<13900	<10800	<10600	100000

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bolfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazrdous Materials List (MOHML) revised (effective) February 14, 2008

Environmental & Construction Management Services, Inc.

TABLE 3

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SS-1	SS-2	SSS-3	SSS-4	SSS-5	SSS-6	SSS-7	SSS-8	SSS-9	MassDEP Reportable Concentrations
Laboratory ID		SC58794-01	SC58794-02	SC58794-10	SC58794-11	SC58794-12	SC58794-13	SC58794-14	SC58794-15	SC58794-16	
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	
Sample Depth		24"	22"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Semi-Volatile Organic Compounds (SVOCs) - SW846 8270D (µg/kg)											
83-32-9	Acenaphthene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	4000
208-96-8	Acenaphthylene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000
62-53-3	Aniline	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
120-12-7	Anthracene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
103-33-3	Azobenzene/Diphenyldiazene	<368	<369	<396	<367	<379	<352	<394	<379	<415	50000
92-87-5	Benzidine	<736	<738	<792	<735	<759	<704	<787	<757	<829	10000
56-55-3	Benzo (a) anthracene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	7000
50-32-8	Benzo (a) pyrene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	2000
205-99-2	Benzo (b) fluoranthene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	7000
191-24-2	Benzo (g,h,i) perylene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
207-08-9	Benzo (k) fluoranthene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
65-85-0	Benzoic acid	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
100-51-6	Benzyl alcohol	<368	<369	<396	<367	<379	<352	<394	<379	<415	-
111-91-1	Bis(2-chloroethoxy)methane	<368	<369	<396	<367	<379	<352	<394	<379	<415	500000
111-44-4	Bis(2-chloroethyl)ether	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
108-60-1	Bis(2-chloroisopropyl)ether	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
117-81-7	Bis(2-ethylhexyl)phthalate	<186	<187	<201	<186	<192	<178	<199	<192	<210	200000
101-55-3	4-Bromophenyl phenyl ether	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
85-68-7	Butyl benzyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
86-74-8	Carbazole	<186	<187	<201	<186	<192	<178	<199	<192	<210	-
59-50-7	4-Chloro-3-methylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
106-47-8	4-Chloroaniline	<186	<187	<201	<186	<192	<178	<199	<192	<210	1000
91-58-7	2-Chloronaphthalene	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
95-57-8	2-Chlorophenol	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
7005-72-3	4-Chlorophenyl phenyl ether	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
218-01-9	Chrysene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	70000
53-70-3	Dibenzo (a,h) anthracene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	700
132-64-9	Dibenzofuran	<186	<187	<201	<186	<192	<178	<199	<192	<210	100000
95-50-1	1,2-Dichlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	9000
541-73-1	1,3-Dichlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000
106-46-7	1,4-Dichlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	700
91-94-1	3,3´-Dichlorobenzidine	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000
120-83-2	2,4-Dichlorophenol	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
84-66-2	Diethyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	10000
131-11-3	Dimethyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	30000
105-67-9	2,4-Dimethylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	700
84-74-2	Di-n-butyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	50000
534-52-1	4,6-Dinitro-2-methylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	50000
51-28-5	2,4-Dinitrophenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	3000
121-14-2	2,4-Dinitrotoluene	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
606-20-2	2,6-Dinitrotoluene	<186	<187	<201	<186	<192	<178	<199	<192	<210	100000
117-84-0	Di-n-octyl phthalate	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000
206-44-0	Fluoranthene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
86-73-7	Fluorene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
118-74-1	Hexachlorobenzene	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
87-68-3	Hexachlorobutadiene	<186	<187	<201	<186	<192	<178	<199	<192	<210	6000
77-47-4	Hexachlorocyclopentadiene	<186	<187	<201	<186	<192	<178	<199	<192	<210	50000
67-72-1	Hexachloroethane	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
193-39-5	Indeno (1,2,3-cd) pyrene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	7000
78-59-1	Isophorone	<186	<187	<201	<186	<192	<178	<199	<192	<210	100000
91-57-6	2-Methylnaphthalene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	700
95-48-7	2-Methylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	500000
108-39-4, 106-44-5	3 & 4-Methylphenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	500000
91-20-3	Naphthalene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	4000
88-74-4	2-Nitroaniline	<368	<369	<396	<367	<379	<352	<394	<379	<415	-
99-09-2	3-Nitroaniline	<368	<369	<396	<367	<379	<352	<394	<379	<415	-
100-01-6	4-Nitroaniline	<186	<187	<201	<186	<192	<178	<199	<192	<210	1000000
98-95-3	Nitrobenzene	<186	<187	<201	<186	<192	<178	<199	<192	<210	500000
88-75-5	2-Nitrophenol	<186	<187	<201	<186	<192	<178	<199	<192	<210	100000
100-02-7	4-Nitrophenol	<1470	<1480	<1580	<1470	<1520	<1410	<1570	<1510	<1660	100000
62-75-9	N-Nitrosodimethylamine	<186	<187	<201	<186	<192	<178	<199	<192	<210	50000
621-64-7	N-Nitrosodi-n-propylamine	<186	<187	<201	<186	<192	<178	<199	<192	<210	50000
86-30-6	N-Nitrosodiphenylamine	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
87-86-5	Pentachlorophenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	3000
85-01-8	Phenanthrene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	10000
108-95-2	Phenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000
129-00-0	Pyrene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	1000000
110-86-1	Pyridine	<368	<369	<396	<367	<379	<352	<394	<379	<415	500000
120-82-1	1,2,4-Trichlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	2000
90-12-0	1-Methylnaphthalene	<74.4	<74.6	<80.1	<74.3	<76.7	<71.1	<79.6	<76.5	<83.8	-
95-95-4	2,4,5-Trichlorophenol	<368	<369	<396	<367	<379	<352	<394	<379	<415	3000
88-06-2	2,4,6-Trichlorophenol	<186	<187	<201	<186	<192	<178	<199	<192	<210	700
82-68-8	Pentachloronitrobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	100000
95-94-3	1,2,4,5-Tetrachlorobenzene	<368	<369	<396	<367	<379	<352	<394	<379	<415	1000000

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Boldfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

Environmental & Construction Management Services, Inc.

TABLE 3

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SSS-10	SSS-11	SSS-12	SSS-13	SSS-14	SSS-15	SSS-16	SSS-17	MassDEP Reportable Concentrations
Laboratory ID		SC58794-03	SC58794-04	SC58794-05	SC58794-06	SC58794-07	SC58794-17	SC58794-08	SC58794-09	
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	
Sample Depth		2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Semi-Volatile Organic Compounds (SVOCs) - SW846 8270D (µg/kg)										
83-32-9	Acenaphthene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	4000
208-96-8	Acenaphthylene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000
62-53-3	Aniline	<407	<405	<385	<414	<375	<407	<361	<356	100000
120-12-7	Anthracene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
103-33-3	Azobenzene/Diphenyldiazene	<407	<405	<385	<414	<375	<407	<361	<356	50000
92-87-5	Benzidine	<815	<809	<771	<828	<750	<814	<722	<713	10000
56-55-3	Benzo (a) anthracene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	7000
50-32-8	Benzo (a) pyrene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	2000
205-99-2	Benzo (b) fluoranthene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	7000
191-24-2	Benzo (g,h,i) perylene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
207-08-9	Benzo (k) fluoranthene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
65-85-0	Benzoic acid	<407	<405	<385	<414	<375	<407	<361	<356	1000000
100-51-6	Benzyl alcohol	<407	<405	<385	<414	<375	<407	<361	<356	-
111-91-1	Bis(2-chloroethoxy)methane	<407	<405	<385	<414	<375	<407	<361	<356	500000
111-44-4	Bis(2-chloroethyl)ether	<206	<205	<195	<210	<190	<206	<183	<180	700
108-60-1	Bis(2-chloroisopropyl)ether	<206	<205	<195	<210	<190	<206	<183	<180	700
117-81-7	Bis(2-ethylhexyl)phthalate	305	<205	<195	<210	<190	<206	<183	<180	200000
101-55-3	4-Bromophenyl phenyl ether	<407	<405	<385	<414	<375	<407	<361	<356	100000
85-68-7	Butyl benzyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	100000
86-74-8	Carbazole	<206	<205	<195	<210	<190	<206	<183	<180	-
59-50-7	4-Chloro-3-methylphenol	<407	<405	<385	<414	<375	<407	<361	<356	1000000
106-47-8	4-Chloroaniline	<206	<205	<195	<210	<190	<206	<183	<180	1000
91-58-7	2-Chloronaphthalene	<407	<405	<385	<414	<375	<407	<361	<356	1000000
95-57-8	2-Chlorophenol	<206	<205	<195	<210	<190	<206	<183	<180	700
7005-72-3	4-Chlorophenyl phenyl ether	<407	<405	<385	<414	<375	<407	<361	<356	1000000
218-01-9	Chrysene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	70000
53-70-3	Dibenzo (a,h) anthracene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	700
132-64-9	Dibenzofuran	<206	<205	<195	<210	<190	<206	<183	<180	100000
95-50-1	1,2-Dichlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	9000
541-73-1	1,3-Dichlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	1000
106-46-7	1,4-Dichlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	700
91-94-1	3,3´-Dichlorobenzidine	<407	<405	<385	<414	<375	<407	<361	<356	1000
120-83-2	2,4-Dichlorophenol	<206	<205	<195	<210	<190	<206	<183	<180	700
84-66-2	Diethyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	10000
131-11-3	Dimethyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	30000
105-67-9	2,4-Dimethylphenol	<407	<405	<385	<414	<375	<407	<361	<356	700
84-74-2	Di-n-butyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	50000
534-52-1	4,6-Dinitro-2-methylphenol	<407	<405	<385	<414	<375	<407	<361	<356	50000
51-28-5	2,4-Dinitrophenol	<407	<405	<385	<414	<375	<407	<361	<356	3000
121-14-2	2,4-Dinitrotoluene	<206	<205	<195	<210	<190	<206	<183	<180	700
606-20-2	2,6-Dinitrotoluene	<206	<205	<195	<210	<190	<206	<183	<180	100000
117-84-0	Di-n-octyl phthalate	<407	<405	<385	<414	<375	<407	<361	<356	1000000
206-44-0	Fluoranthene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
86-73-7	Fluorene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
118-74-1	Hexachlorobenzene	<206	<205	<195	<210	<190	<206	<183	<180	700
87-68-3	Hexachlorobutadiene	<206	<205	<195	<210	<190	<206	<183	<180	6000
77-47-4	Hexachlorocyclopentadiene	<206	<205	<195	<210	<190	<206	<183	<180	50000
67-72-1	Hexachloroethane	<206	<205	<195	<210	<190	<206	<183	<180	700
193-39-5	Indeno (1,2,3-cd) pyrene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	7000
78-59-1	Isophorone	<206	<205	<195	<210	<190	<206	<183	<180	100000
91-57-6	2-Methylnaphthalene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	700
95-48-7	2-Methylphenol	<407	<405	<385	<414	<375	<407	<361	<356	500000
108-39-4, 106-44-5	3 & 4-Methylphenol	<407	<405	<385	<414	<375	<407	<361	<356	500000
91-20-3	Naphthalene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	4000
88-74-4	2-Nitroaniline	<407	<405	<385	<414	<375	<407	<361	<356	-
99-09-2	3-Nitroaniline	<407	<405	<385	<414	<375	<407	<361	<356	-
100-01-6	4-Nitroaniline	<206	<205	<195	<210	<190	<206	<183	<180	1000000
98-95-3	Nitrobenzene	<206	<205	<195	<210	<190	<206	<183	<180	500000
88-75-5	2-Nitrophenol	<206	<205	<195	<210	<190	<206	<183	<180	100000
100-02-7	4-Nitrophenol	<1630	<1620	<1540	<1660	<1500	<1630	<1440	<1430	100000
62-75-9	N-Nitrosodimethylamine	<206	<205	<195	<210	<190	<206	<183	<180	50000
621-64-7	N-Nitrosodi-n-propylamine	<206	<205	<195	<210	<190	<206	<183	<180	50000
86-30-6	N-Nitrosodiphenylamine	<407	<405	<385	<414	<375	<407	<361	<356	100000
87-86-5	Pentachlorophenol	<407	<405	<385	<414	<375	<407	<361	<356	3000
85-01-8	Phenanthrene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	10000
108-95-2	Phenol	<407	<405	<385	<414	<375	<407	<361	<356	1000
129-00-0	Pyrene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	1000000
110-86-1	Pyridine	<407	<405	<385	<414	<375	<407	<361	<356	500000
120-82-1	1,2,4-Trichlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	2000
90-12-0	1-Methylnaphthalene	<82.3	<81.8	<77.9	<83.7	<75.8	<82.3	<73.0	<72.0	-
95-95-4	2,4,5-Trichlorophenol	<407	<405	<385	<414	<375	<407	<361	<356	3000
88-06-2	2,4,6-Trichlorophenol	<206	<205	<195	<210	<190	<206	<183	<180	700
82-68-8	Pentachloronitrobenzene	<407	<405	<385	<414	<375	<407	<361	<356	100000
95-94-3	1,2,4,5-Tetrachlorobenzene	<407	<405	<385	<414	<375	<407	<361	<356	1000000

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Boldfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

TABLE 4

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR PESTICIDES AND HERBICIDES

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location Laboratory ID Sample Date Sample Depth		SS-1 SC58794-01 7/9/2020 24"	SS-2 SC58794-02 7/9/2020 22"	SSS-3 SC58794-10 7/9/2020 2-6"	SSS-4 SC58794-11 7/9/2020 2-6"	SSS-5 SC58794-12 7/9/2020 2-6"	SSS-6 SC58794-13 7/9/2020 2-6"	SSS-7 SC58794-14 7/9/2020 2-6"	SSS-8 SC58794-15 7/9/2020 2-6"	SSS-9 SC58794-16 7/9/2020 2-6"	MCP Reportable Concentrations RCS-1
Pesticides - SW846 8081B (µg/kg)											
319-84-6	a-BHC	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	50000
319-85-7	b-BHC	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	10000
319-86-8	d-BHC	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	10000
58-89-9	g-BHC (Lindane)	<3.32	<3.34	<3.46	<3.23	<3.46	<3.22	<3.57	<3.45	<3.80	3000
76-44-8	Heptachlor	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	200
309-00-2	Aldrin	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	100000
1024-57-3	Heptachlor epoxide	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	90
959-98-8	Endosulfan I	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	500
60-57-1	Dieldrin	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	50
72-55-9	4,4' -DDE	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	3000
72-20-8	Endrin	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	8000
33213-65-9	Endosulfan II	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	500
72-54-8	4,4' -DDD	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	4000
1031-07-8	Endosulfan sulfate	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	-
50-29-3	4,4' -DDT	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	-
72-43-5	Methoxychlor	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	200000
53494-70-5	Endrin ketone	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	8000
7421-93-4	Endrin aldehyde	<8.85	<8.90	<9.24	<8.60	<9.21	<8.58	<9.51	<9.19	<10.1	10000
5103-71-9	alpha-Chlordane	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	-
5103-74-2	gamma-Chlordane	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	-
8001-35-2	Toxaphene	<111	<111	<115	<108	<115	<107	<119	<115	<127	10000
57-74-9	Chlordane	<22.1	<22.3	<23.1	<21.5	<23.0	<21.4	<23.8	<23.0	<25.3	700
15972-60-8	Alachlor	<5.53	<5.56	<5.77	<5.38	<5.76	<5.36	<5.94	<5.75	<6.34	100
Herbicides - SW846 8151A (µg/kg)											
93-76-5	2,4,5-T	<80	<80	<80	<80	<80	<80	<80	<80	<80	100000
93-72-1	2,4,5-TP (Silvex)	<80	<80	<80	<80	<80	<80	<80	<80	<80	100000
94-75-7	2,4-D	<80	<80	<80	<80	<80	<80	<80	<80	<80	100000
94-82-6	2,4-DB	<80	<80	<80	<80	<80	<80	<80	<80	<80	100000
75-99-0	Dalapon	<80	<80	<80	<80	<80	<80	<80	<80	<80	1000000
1918-00-9	Dicamba	<80	<80	<80	<80	<80	<80	<80	<80	<80	500000
120-36-5	Dichloroprop	<80	<80	<80	<80	<80	<80	<80	<80	<80	-
88-85-7	Dinoseb	<80	<80	<80	<80	<80	<80	<80	<80	<80	500000
94-74-6	MCPA	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	100000
7085-19-0	MCPP	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	-

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Boldfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

TABLE 4

SUMMARY OF TOPSOIL/LOAM & SUBSOIL SAMPLES FOR PESTICIDES AND HERBICIDES

Cashman School
Amesbury, Massachusetts
***ECMS* Project No. 1009.073**

Sample Location		SSS-10	SSS-11	SSS-12	SSS-13	SSS-14	SSS-15	SSS-16	SSS-17	MCP
Laboratory ID		SC58794-03	SC58794-04	SC58794-05	SC58794-06	SC58794-07	SC58794-17	SC58794-08	SC58794-09	Reportable
Sample Date		7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	7/9/2020	Concentrations
Sample Depth		2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	2-6"	RCS-1
Pesticides - SW846 8081B (µg/kg)										
319-84-6	a-BHC	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	4000
319-85-7	b-BHC	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	3000
319-86-8	d-BHC	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	3000
58-89-9	g-BHC (Lindane)	<3.64	<3.69	<3.51	<3.78	<3.38	<3.73	<3.26	<3.34	50000
76-44-8	Heptachlor	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	100
309-00-2	Aldrin	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	100000
1024-57-3	Heptachlor epoxide	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	10000
959-98-8	Endosulfan I	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	700
60-57-1	Dieldrin	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	10000
72-55-9	4,4' -DDE	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	50
72-20-8	Endrin	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	500
33213-65-9	Endosulfan II	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	500
72-54-8	4,4' -DDD	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	-
1031-07-8	Endosulfan sulfate	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	8000
50-29-3	4,4' -DDT	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	10000
72-43-5	Methoxychlor	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	8000
53494-70-5	Endrin ketone	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	3000
7421-93-4	Endrin aldehyde	<9.71	<9.84	<9.36	<10.1	<9.01	<9.95	<8.71	<8.92	200
5103-71-9	alpha-Chlordane	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	90
5103-74-2	gamma-Chlordane	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	700
8001-35-2	Toxaphene	<121	<123	<117	<126	<113	<124	<109	<111	200000
57-74-9	Chlordane	<24.3	<24.6	<23.4	<25.2	<22.5	<24.9	<21.8	<22.3	10000
15972-60-8	Alachlor	<6.07	<6.15	<5.85	<6.30	<5.63	<6.22	<5.44	<5.57	-
Herbicides - SW846 8151A (µg/kg)										
93-76-5	2,4,5-T	<80	<80	<80	<80	<80	<80	<80	<80	100000
93-72-1	2,4,5-TP (Silvex)	<80	<80	<80	<80	<80	<80	<80	<80	100000
94-75-7	2,4-D	<80	<80	<80	<80	<80	<80	<80	<80	100000
94-82-6	2,4-DB	<80	<80	<80	<80	<80	<80	<80	<80	100000
75-99-0	Dalapon	<80	<80	<80	<80	<80	<80	<80	<80	1000000
1918-00-9	Dicamba	<80	<80	<80	<80	<80	<80	<80	<80	500000
120-36-5	Dichloroprop	<80	<80	<80	<80	<80	<80	<80	<80	-
88-85-7	Dinoseb	<80	<80	<80	<80	<80	<80	<80	<80	500000
94-74-6	MCPA	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	100000
7085-19-0	MCPP	<3300	<3300	<3300	<3300	<3300	<3300	<3300	<3300	-

< indicates less than the respective method detection limit.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Boldfaced type indicates an exceedance.
Pursuant to MCP 310 CMR 40.0975(6)(a-c): MCP Method 1 Soil Standards, and Massachusetts Oil and Hazardous Materials List (MOHML) revised (effective) 2014

APPENDIX A

LAGOY RISK ANALYSIS "EVALUATION OF SOIL DATA FROM THE CHARLES C. CASHMAN ELEMENTARY SCHOOL, 193 LIONS MOUTH ROAD, AMESBURY, MASSACHUSETTS DATED JULY 27, 2020

LaGoy Risk Analysis, Inc.
P.O. Box 498
Hopkinton, MA 01748
(508) 208-9299
Peter_LaGoy@msn.com

July 27, 2020

Kevin Kavanaugh
ECMS, Inc.
288 Grove Street, #391
Braintree, MA 02184

RE: Evaluation of Soil Data from the Charles C. Cashman Elementary School, 193 Lions Mouth Road, Amesbury, Massachusetts

Dear Kevin:

I reviewed the soil data collected by Environmental & Construction Management Services, Inc. (ECMS) on July 9, 2020, from the Charles C. Cashman Elementary School property at 193 Lions Mouth Road in Amesbury, Massachusetts. I understand that samples were collected from loam and shallow (2 feet deep) subsoil near an existing baseball field on the property.

Based on my review and using standard calculations following the methodology required by the Massachusetts Department of Environmental Protection (MassDEP), the detected constituents do not pose an Imminent Hazard under the Massachusetts Contingency Plan (MCP), which is the relevant state regulatory program. Using the average concentration of arsenic and the maximum value of other metals that were detected above state-wide background levels for natural soil in Massachusetts as an exposure point concentration (EPC; the level of a constituent that an individual could regularly contact) and site-specific exposure assumptions provided on children and adults likely to use this field, the constituents that were detected do not pose an Imminent Hazard. I would also note that the use does not pose a calculated Significant Risk as that term is defined under the MCP, and that the arsenic appears to be present as a result of its presence in native soil. Although the site does not pose an Imminent Hazard under the MCP, steps to reduce or eliminate the potential for contact with these constituents and the associated soil at the site may still be prudent from both a risk management and MCP perspective.

Initial Evaluation

The Cashman school property in Amesbury, Massachusetts consists of a roughly 35-acre parcel that is currently used for pre-K through 4th grade students. The results of explorations performed at the property indicate that fill material identified at the site contains varying amounts of ash and cinders and may also contain remnants of the former residential building that had occupied the property prior to the garden.

The recent subject sampling event consisted of collecting 15 soil samples from beneath the grass (2-6 inches in depth), and two additional samples of slightly deeper soil (2 feet in depth). Soil was analyzed for the presence of metals, total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs, including the polycyclic aromatic hydrocarbons (PAHs), and pesticides and herbicides. The results of the sampling are presented in Table 1.

Only arsenic was present at a concentration above a reportable concentration. TPH was also detected in most samples (concentrations around 100 mg/kg) but could be present as a result of it use as a binder (waxes) in various lawn care products. Maximum metal concentrations were compared with expected concentrations in soil in Massachusetts (Table 2), and chromium, nickel, and vanadium were present at levels above expected background. The four metals, arsenic, chromium, nickel, and vanadium will be considered in the imminent hazard calculations.

The source of the arsenic is site soils does not appear to be associated with anthropogenic use but rather as a result of naturally-elevated arsenic concentrations. While arsenic was used widely for industrial purposes (e.g., for preservation of hides in tanning; as a pesticide as lead arsenates) the past use of the property is not consistent with these uses, and if the arsenic was present as a result of agricultural pesticide use, lead levels would be expected to be higher. Amesbury is in an area of Massachusetts known to have naturally elevated arsenic levels and consequently, its present is considered most likely to be attributable to natural sources. As such, its presence would not be regulated under the MCP but considering its location at a school, further assessment is prudent.

Imminent Hazard Calculations

An Imminent Hazard Evaluation (IHE) performed in accordance with the MCP evaluates whether constituents that are detected at a site could pose a risk of harm to human health, safety, public welfare, and the environment under current site conditions or for a short period of time (5 years, unless site conditions indicate a shorter time period is appropriate). For this site, the constituent of greatest concern, arsenic appears to be present as a result of natural background, and as such does not pose an imminent hazard. However, because of the use of the property as a school, further calculations are warranted to determine if some mitigation of the presence of even these natural soils may be warranted.

An Imminent Hazard does not exist if the cumulative cancer risk calculated for the short time period is below one in one hundred thousand (1×10^{-5} or 1E-05), the "hazard index" is below ten (10) for most constituents or below one (1) for constituents that have the potential to cause serious effects (specifically lead and cyanide, per a discussion with Nancy Bettinger of MassDEP BWSC ORS in January 2007, and trichloroethylene, per a discussion with Paul Locke of MassDEP in November 2012) following short-term exposures, and the site does not pose a risk to safety, public welfare, or the environment based on a consideration of site conditions and applicable standards. The results of the Imminent Hazard Risk Characterization are used as the basis for a decision as to whether or not an Immediate Response Action is necessary at the site.

This Imminent Hazard Evaluation has been conducted to specifically evaluate metals detected in soil at the Cashman Elementary School in Amesbury, Massachusetts. The purpose of this evaluation is to determine if a calculated Imminent Hazard to human health, as defined by the MCP, currently exists for the area for short-term exposure. Past exposure is likely to have been similar, so this IHE also provides information about possible past risks associated with use of the area.

This IHE focuses on human health. A consideration of site conditions indicates that the presence of the identified constituents does not pose an Imminent Hazard to public welfare, the environment, or safety.

Toxicity Assessment

The toxicity values for the metals are presented in Tables 3 and 5. Further description of the toxicity of arsenic, the metal of primary concern, is presented below.

Arsenic is a metalloid that has been shown to cause skin, bladder, and perhaps other cancers in individuals exposed through drinking water from wells with high arsenic levels. Arsenic has also been associated with an increased risk of lung cancer in exposed workers. Chronic exposure to arsenic at high levels causes adverse effects on the gastrointestinal tract. In addition, there is some evidence that exposure causes polyneuropathy. EPA has established an oral reference dose of 0.0003 mg/kg/day and an inhalation reference concentration of 2.5×10^{-5} mg/m^3. EPA has also established an oral cancer potency factor of 1.5 $(mg/kg/day)^{-1}$ and an inhalation unit risk of 0.003 $(ug/m^3)^{-1}$ and MassDEP uses these values.

Exposure Evaluation

As part of an IHE, concentrations of constituents detected in accessible surface soil can be used to evaluate the potential for actual exposure and risk with respect to current site uses and activities. The MCP defines accessible surface soil as soil that extends to a depth of 6 inches below the ground surface. As noted in MassDEP guidance, for an IHE, the focus is on short term risks, and maximum concentrations are typically used in the assessment as exposure point concentrations (EPCs; the concentration an individual could be exposed to on a regular basis). Maximum concentrations were used as EPCs for chromium, nickel, and vanadium. For this site, concentrations of arsenic in shallow soil

were detected in a narrow range (21.9 mg/kg – 82.3 mg/kg), and the 95% Upper Confidence Limit (UCL) calculated using the EPA's ProUCL model version 5.1 was used to calculate an EPC of 46.4 mg/kg for arsenic, based on a normal distribution of data and the Student t-test.

Quantitative Exposure Assessment

In general, individuals are exposed to materials released into the environment in varying quantities and proportions via a wide variety of possible exposure routes. The actual amount of material to which an individual is exposed depends on the individual's frequency, extent, and duration of exposure, which in turn depend on many factors, including location of residence, age, body weight, sex, and activity patterns. Patterns of exposure are highly variable among individuals. This large potential variation in exposure to environmental conditions implies that a certain amount of uncertainty is inherent in risk assessment. This exposure assessment uses standard approaches and assumptions that are designed to be health protective, i.e., they are designed to produce estimates of exposure that overestimate, rather than underestimate, actual exposure and risk.

The purpose of a quantitative exposure assessment is to estimate the Chronic Daily Intake (CDI) of each contaminant of concern by an individual for each exposure route. For carcinogens, the CDI is averaged over the full lifetime (by convention, assumed to be 70 years; MassDEP 2008) and is termed the Lifetime Average Daily Dose or LADD for oral and dermal exposures. For noncarcinogens, the dose is only averaged over the period of exposure and is noted as the Average Daily Dose or ADD for oral and dermal exposure.

Soil Exposure - Children

Children are at school 180 days per year, and can also use the school facilities during the summer (roughly 70 days; end of June to end of August) but will use the outdoor play fields for only a fraction of that time and for short periods. Very young children (less than 2 year of age) are considered unlikely to be present on a regular basis. For the purposes of this assessment, contact by children is assumed for 109 days per year, which is the outdoor time assumed by MassDEP (1994) in initially establishing the S-1 soil standards. Exposure for a third of a year to a single outdoor play area is unlikely but provides a conservative estimate of exposure potential. People who contact soil may be exposed to constituents present in the soil by direct contact and subsequent ingestion of contaminated soil or by dermal absorption of constituents in soils adhering to the skin. Younger children are of greatest concern for soil contact, and therefore, assessment of exposure to younger children can be used to conservatively evaluate the potential for risks to older students. For this IHE, children are estimated to weigh an average of 15 kg (33 lbs) based on the median weight for 5-year-old children (the youngest age likely to be regularly out on their own) determined in the NHANES II study for the US population in 1980 (MassDEP 1994). USEPA has reviewed more current data and has indicated average weights for humans have increased since that study.

Soil Ingestion: Children in regular contact with site soil are estimated to ingest 100 mg of soil per day (MassDEP 2002). All constituents in soil are assumed to be as available

from the soil as from the media used in the toxicity studies and, consequently, a relative absorption factor or RAF of one is used for these constituents. Using this assumption and the others noted above, the ADD and LADD for soil ingestion by children can be estimated using the formula:

$$\text{ADD/LADD} = \frac{\text{CS x IR x RAF x EF x ED}}{\text{BW x } 10^6 \text{ (mg/kg) x AT}}$$

Where:

ADD	=	Average daily intake of the constituent (mg/kg/day),
LADD	=	Lifetime average daily dose (mg/kg/day),
CS	=	Constituent concentration in soil (mg/kg),
IR	=	Soil ingestion rate (100 mg/day; MassDEP 1995),
RAF	=	Relative absorption factor (1),
EF	=	Frequency of ingestion (109 days/year; MassDEP 1995),
ED	=	Exposure Duration (5 years; MassDEP 1995),
BW	=	Body weight (15 kg; EPA 1989), and
AT	=	Averaging Time (365 days x 5 yrs (ADD) or 365 x 70 (LADD) days).

The calculated ADD for children exposed to lead detected in soil at the property based on this equation is provided in Table 3 for ingestion exposure to the soil at the school.

Dermal Contact: Dermal exposure to constituents in soil can occur through direct physical contact with soil. The same assumptions as for soil ingestion are used, with the exceptions that in place of an ingestion rate, a soil adherence factor of 0.2 mg soil/cm^2 of skin, an exposed skin surface area of 3000 cm^2 (roughly a third of the body surface area for this age child; MassDEP 1994) and constituent-specific relative absorption factors were used. Using these assumptions, the ADD and LADD can be estimated using the formula:

$$\text{ADD/LADD} = \frac{\text{CS x AD x SA x RAF x EF x ED}}{\text{BW x } 10^6 \text{ (mg/kg) x AT}}$$

Where:

ADD	=	Average daily intake of the constituent (mg/kg/day),
LADD	=	Lifetime average daily dose (mg/kg/day),
CS	=	Constituent concentration in soil (mg/kg),
AD	=	Soil adherence to skin (0.2 mg/cm^2; MassDEP 1995),
SA	=	Exposed skin surface area (3000 cm^2; MassDEP 1995),
RAF	=	Relative absorption factor (constituent-specific; MassDEP 2006),
EF	=	Frequency of contact (109 days/year),
ED	=	Exposure Duration (5 years),
BW	=	Body weight (15 kg; EPA 1989), and
AT	=	Averaging Time (365 days x 5 yrs (ADD) or 365 days x 70 days (LADD)).

The calculated ADD for children exposed to lead in soil at the site based on this equation is provided in Table 3 for exposure via dermal contact to the soil EPCs.

While the primary purpose of this assessment is to calculate whether an imminent hazard exists, the same approach can be modified slightly to assess overall site risks, given the continued use of the school and playground for current purposes. The assumption that children are unlikely to use the facility for more than 109 days per year, and for more than 5 years seems likely, given the grades (pre-K to 4th) that currently use the school. However, as a conservative measure, risks are also assessed assuming that children play at the school for 100 days per year over the course of a 10-year period and that they weigh 24 kg (average body weight for 2-12 years) over this period. This exposure and risk are calculated in Table 4.

Soil Exposure - Adults

Adults that may use the area would include school landscape workers, teachers, and parents attending games. Of these groups, landscapers would be expected to have the highest potential for regular contact. In order to determine if such soil contact is safe, exposure and risks to landscapers were evaluated quantitatively, using the previously-established EPCs.

Landscapers who work site soil may be exposed to constituents present in the soil by direct contact and subsequent ingestion of contaminated soil or by dermal absorption of constituents in soils adhering to the skin. Workers may also be exposed to constituents that become airborne as a component of windborne dust. Exposure for these people is assumed to occur for 100 days over the course of a year, assuming that during the roughly 8-month landscaping season, these workers are outdoors roughly 3 days per week over the 240-day period. Adults are estimated to weigh 70 kg. It should be noted that these calculations are particularly conservative in that exposure estimates are compared with toxicity values designed to be protective for chronic (long-term) exposures; toxicity values for short-term exposure are generally lower by a factor of 10.

Soil Ingestion: Workers in frequent contact with site soil are estimated to ingest 100 mg of soil per day (MassDEP 2002) and this value will be used for landscape workers. Using these assumptions and the others noted above, the ADD and LADD for soil ingestion by workers can be estimated using the formula for soil ingestion noted above. The calculated ADD for the constituents in soil at the property based on this equation is provided in Table 5 for soil ingestion exposure to the site-wide exposure point concentration.

Dermal Contact: Dermal exposure to constituents in soil can occur through direct physical contact with soil. The same assumptions as for soil ingestion are used, with the exceptions that in place of an ingestion rate, a soil adherence factor of 0.29 mg soil/cm^2 of skin, an exposed skin surface area of 3500 cm^2, and constituent-specific relative

absorption factors were used. Using these assumptions, the ADD and LADD can be estimated using the formula for dermal contact noted above. The calculated ADD for the constituents in soil at the property based on this equation is provided in Table 5 for exposure via dermal contact to the EPCs in soil.

Inhalation. Although unlikely considering the small area of uncovered soil, landscapers could be exposed via inhalation to constituents entrained in soil-derived dust (MassDEP 2002). To estimate exposure, the same assumptions provided above for body weight, lifetime exposure duration and frequency were used. It was assumed that the gardener inhaled 20 cubic meters (m^3) of air during the time on site (essentially equal to the daily inhalation rate of 20 m^3/day; EPA, 1989 and corresponding to a full workday at an average moderate to heavy level of exertion; MassDEP 1995a).

In order to evaluate the potential for inhalation exposure to constituents entrained in the dust, it is necessary to estimate the amount of dust that would be present in the air, and the amount of air inhaled during the period that dust is present in the air. MassDEP (2002) suggests a value of 60 ug/m^3 for excavations and this value will be used in this evaluation, which is a conservative approach since excavation work would be expected to generate more dust than gardening. The value of 60 ug/m^3 is based on the assumption that gardeners will only receive intermittent exposure to visible dust but that the average exposure level will be above that used by EPA for undisturbed sites.

MassDEP notes that exposure to constituents on airborne particulates can occur through either direct inhalation or via inhalation followed by movement of the particles from the upper respiratory tract to the gastrointestinal tract. For direct inhalation, MassDEP indicates that only approximately half of the inhaled particulate matter will actually reach the lungs. However, for this evaluation, it is assumed that all the agent inhaled is of concern, as many inhaled constituents act at sites along the respiratory tract and do not need to reach the lungs to have adverse effects. For the inhalation-to-oral pathway, the ingested dose is estimated to be twice the measured PM_{10} dose of 60 ug/m^3. However, the total soil intake via this pathway (2 x 60 ug/m^3 x 20 m^3/day x 1 mg/1000 ug = 2.4 mg soil) is so low as to not add significantly to the soil dose calculated for direct ingestion and is not considered further in this assessment.

Exposure can be calculated using the equation:

$$ADE/LADE = \frac{EPC \times IF \times PM10 \times RAF \times EF \times ED}{BW \times AT}$$

Where:

ADE = Average daily exposure to the constituent (mg/m^3),
LADE= Lifetime average daily dose (mg/m^3),
EPC = Constituent concentration in soil (mg/kg),
IF = Inhalation Fraction (20 m^3 / 20 m^3day; MassDEP 2002),
PM10 = Particulate air concentration (60 ug/m^3; MassDEP 2002).
RAF = Relative absorption factor (1 used to be conservative),

EF	=	Frequency of contact (100 days/year),
ED	=	Exposure Duration (5 years), and
AT	=	Averaging Time (365 days x 5 or 70 years).

Table 5 provides the estimated exposure and risk values for inhalation exposure to an adult landscaper, assuming no dust suppression measures are implemented. Exposure to other site users, including teachers and parents, would be expected to be lower.

Health Risks at the Site

In this section, information concerning the potential levels of exposure to contaminants is combined with information concerning the toxicity of the contaminants in order to determine the potential health risks at the property. For noncarcinogenic (systemic) effects, EPA and MassDEP assume that there is a level below which no effects will occur (a threshold no effect concentration). To evaluate possible risk from exposure to noncarcinogenic contaminants, the average daily dose (ADD) is divided by the health criterion value [the reference dose (RfD)]. If the ADD:RfD ratio, also termed the hazard index or HI, is less than ten for all constituents (i.e., if the daily intake is below the health criterion), then the contaminant is considered unlikely to pose an Imminent Hazard (i.e., a significant risk under conditions of short-term exposure) to individuals exposed under the given scenario. If the HI is less than ten, the site does not pose an Imminent Hazard. For cancer risk, the exposure, termed the lifetime average daily dose or LADD is multiplied by the cancer slope factor to estimate cancer risk, and this risk is compared with a target risk level of 1 in 100,000 or 10^{-5}.

Imminent hazards associated with short term exposure to site constituents in soil are estimated in Table 3 for children and in Table 5 for landscapers (and other adults). Based on these calculations, exposure by children to soil concentrations of site constituents results in a hazard index of 0.5 (soil ingestion plus dermal absorption risks combined) and a cancer risk of 1×10^{-5}. Exposure by adults to soil concentrations of site constituents results in a hazard index of 0.08 (soil ingestion, dermal absorption, and inhalation exposures combined) and a cancer risk of 3×10^{-6}. These levels do not exceed the Imminent Hazard criterion of an HI of ten and a cancer risk level of 10^{-5}, indicating that continued use of this site does not pose an imminent hazard.

Hazards and risks associated with longer term exposure to site constituents in soil are estimated in Table 4 for children and in Table 6 for landscapers (and other adults). Based on these calculations, exposure by children to soil concentrations of site constituents results in a hazard index of 0.3 and a cancer risk of 1×10^{-5}. Exposure by adults to soil concentrations of site constituents results in a hazard index of 0.08 and a cancer risk of 1×10^{-5}. These levels do not exceed the long-term risk targets of a cancer risk of 10^{-5} and an HI of 1, indicating that continued long term exposure at these concentrations would not pose a significant risk.

A number of assumptions were used in deriving the exposure estimates and toxicity criteria. While there is some uncertainty in the resulting hazard and risk estimates, conservative (health protective) assumptions were made so actual hazards and risks are likely to be lower than the calculated hazards and risks.

Conclusions and Recommendations

Soil was recently sampled by ECMS and analyzed with respect to the Cashman Elementary School property located at 193 Lions Mouth Road in Amesbury, Massachusetts. Arsenic and several other metals were detected at levels above a reportable concentration (arsenic) and above levels expected in background soil. However, no anthropogenic source of arsenic was present, the Amesbury area is known to have naturally-elevated arsenic levels in soil, and the source appears most likely to be natural. While the arsenic is assumed to be naturally occurring, calculations were performed to assess if a calculated risk was present for either short-term (IH) or longer-term exposure. Evaluation of the concentrations detected and of site-specific factors indicates that an Imminent Hazard condition does not exist at the site. Use of the site would also not pose a Significant Risks.

It should be noted that calculated risks did not exceed but were at the target risk levels. Therefore, although the area does not pose an Imminent Hazard or Significant Risk for current use, considering the use of the site as a school, it may be prudent to take measures to mitigate the potential for exposure. Such measures could include replacing natural soil in areas of exposed soil with imported soil containing lower levels of natural arsenic.

In order to ensure that public health is adequately protected, conservative assumptions (i.e., those unlikely to underestimate risk) were used in deriving both the exposure estimates and the toxicity values that are included in this letter report. Because of the use of these conservative assumptions, it is likely that the actual potential for non-cancer and cancer risks is lower than as is estimated in this report.

If you have any questions, please give me a call.

Sincerely,

Peter K. LaGoy
Principal

References

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Table 1
Exposure Point Concentrations for Soil
Cashman School
Amesbury, Massachusetts

	Number of Samples	Soil Average/a (mg/kg)	Soil Maximum (mg/kg)	EPC (mg/kg)	MCP RCS-1 Reportable Concentration (mg/kg)
Metals					
Antimony	17		ND	NC	20
Arsenic (0-1 ft)	15	46.4	82.3	46.4	20
Arsenic (2 ft)	2		55.9	NC	20
Barium	17		34.6	NC	1000
Beryllium	17		ND	NC	90
Cadmium	17		ND	NC	70
Chromium	17		65.9	66	100
Lead	17		28.6	NC	200
Mercury	17		ND	NC	20
Nickel	17		76	76	600
Selenium	17		ND	NC	400
Silver	17		ND	NC	100
Thallium	17		ND	NC	8
Vanadium	17		46.7	47	400
Zinc	17		107	NC	1000
TPH	17		184	NC	
VOCs	17		ND	NC	
SVOCs	17		ND	NC	
Pesticides/Herbicides	17		ND	NC	

Table 2
Comparison of Maximum Site Concentrations with Background Levels in Massachusetts Soil
Cashman School
Amesbury, Massachusetts

ANALYTE	Soil Maximum	Background Levels in MA/a Natural Soil	Fill Soil	Urban Maximum
Metals (mg/kg)/a				
Antimony	ND	1	7	160
Arsenic	**82.3**	20	20	99
Barium	34.6	50	50	680
Beryllium	ND	0.4	0.9	7.5
Cadmium	ND	2	3	25
Chromium	**65.9**	30	40	530
Lead	28.6	100	600	11000
Mercury	ND	0.3	1	23
Nickel	**76**	20	30	220
Selenium	ND	0.5	1	57
Silver	ND	0.6	5	82
Thallium	ND	0.6	5	50
Vanadium	**46.7**	30	30	47
Zinc	107	100	300	5000

a/ "Natural soil" represent soils from non-urban areas with no visible ash.
"Fill soils" represent soils that have visible coal or wood ash and are associated with fill.
Maximum values are the maximum detected in several studies
Background values derived from MADEP 2002 Technical update: Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil.
Values in bold exceed the "fill soil" background value.

Table 3
Exposure and Risk of Imminent Hazard for Children
Cashman School
Amesbury, Massachusetts

SOIL INGESTION	Soil EPC				Oral	Oral		
			ADD	LADD	RfD	CSF	Hazard	Risk
ANALYTE	mg/kg		mg/kg/day	mg/kg/day	mg/kg/day	1/(mg/kg/day)	ADD/RfD	LADD x CSF
Arsenic	46.4		9.24E-05	6.60E-06	0.0003	1.5	3.1E-01	9.9E-06
Chromium	66		1.31E-04		0.003		4.4E-02	
Nickel	76		1.51E-04		0.02		7.6E-03	
Vanadium	47		9.36E-05		0.009		1.0E-02	

DERMAL CONTACT	Soil EPC	Dermal RAF			Oral	Oral		
			ADD	LADD	RfD	CSF	Hazard	Risk
	mg/kg		mg/kg/day	mg/kg/day	mg/kg/day	1/(mg/kg/day)	ADD/RfD	LADD x CSF
Arsenic	46.4	0.03	1.66E-05	1.19E-06	0.0003	1.5	5.5E-02	1.8E-06
Chromium	66	0.1	7.88E-05		0.003		2.6E-02	
Nickel	76	0.2	1.82E-04		0.02		9.1E-03	
Vanadium	47	0.1	5.61E-05		0.009		6.2E-03	
						SUM	**0.5**	**1E-05**

Table 3
Exposure and Risk of Imminent Hazard for Children
Cashman School
Amesbury, Massachusetts

SOIL INGESTION	Soil EPC				Oral	Oral		
			ADD	LADD	RfD	CSF	Hazard	Risk
ANALYTE	mg/kg		mg/kg/day	mg/kg/day	mg/kg/day	1/(mg/kg/day)	ADD/RfD	LADD x CSF
Arsenic	46.4		5.30E-05	7.57E-06	0.0003	1.5	1.8E-01	1.1E-05
Chromium	66		7.53E-05		0.003		2.5E-02	
Nickel	76		8.68E-05		0.02		4.3E-03	
Vanadium	47		5.37E-05		0.009		6.0E-03	

DERMAL CONTACT	Soil EPC	Dermal RAF			Oral	Oral		
			ADD	LADD	RfD	CSF	Hazard	Risk
	mg/kg		mg/kg/day	mg/kg/day	mg/kg/day	1/(mg/kg/day)	ADD/RfD	LADD x CSF
Arsenic	46.4	0.03	9.53E-06	1.36E-06	0.0003	1.5	3.2E-02	2.0E-06
Chromium	66	0.1	4.52E-05		0.003		1.5E-02	
Nickel	76	0.2	1.04E-04		0.02		5.2E-03	
Vanadium	47	0.1	3.22E-05		0.009		3.6E-03	
						SUM	**0.3**	**1E-05**

Table 4
Exposure and Risk for Adult Gardeners
Cashman School
Amesbury, Massachusetts

ANALYTE	EPC		ADD	LADD	Oral RfD	Oral CSF	Hazard	Risk
SOIL INGESTION	**mg/kg**		**mg/kg/day**	**mg/kg/day**	**mg/kg/day**	**1/(mg/kg/day)**	**ADD/RfD**	**LADD x CSF**
Arsenic	46.4		1.91E-06	1.36E-06	0.0003	1.5	6.4E-03	2.0E-06
Chromium	66		2.71E-06		0.003		9.0E-04	
Nickel	76		3.12E-06		0.02		1.6E-04	
Vanadium	47		1.93E-06		0.009		2.1E-04	

	EPC	Dermal			Oral	Oral		
DERMAL CONTACT	**mg/kg**	**RAF**	**ADD**	**LADD**	**RfD**	**CSF**	**Hazard**	**Risk**
Arsenic	46.4	0.03	5.81E-06	4.15E-07	0.0003	1.5	1.9E-02	6.2E-07
Chromium	66	0.1	2.75E-05		0.003		9.2E-03	
Nickel	76	0.2	6.34E-05		0.02		3.2E-03	
Vanadium	47	0.1	1.96E-05		0.009		2.2E-03	

	EPC		ADE	LADE	Inhalation RfC	Inhalation URF	Hazard	Risk
DUST INHALATION	**mg/kg**		**mg/m3**	**ug/m3/a**	**mg/m3**	**1/(ug/m3)**	**ADE/RfC**	**LADE x URF**
Arsenic	46.4		8.01E-07	5.72E-08	0.000025	0.003	3.2E-02	1.7E-10
Chromium	66		1.14E-06	8.14E-08	0.0004	0.012	2.8E-03	9.8E-10
Nickel	76		1.31E-06	9.37E-08	0.001	0.00048	1.3E-03	4.5E-11
Vanadium	47		8.11E-07		0.001		8.1E-04	

						SUM	**0.08**	**2.7E-06**

Table 4
Exposure and Risk for Adult Gardeners
Cashman School
Amesbury, Massachusetts

ANALYTE					Oral	Oral		
	EPC		ADD	LADD	RfD	CSF	Hazard	Risk
SOIL INGESTION	**mg/kg**		**mg/kg/day**	**mg/kg/day**	**mg/kg/day**	**1/(mg/kg/day)**	**ADD/RfD**	**LADD x CSF**
Arsenic	46.4		1.91E-06	6.49E-06	0.0003	1.5	6.4E-03	9.7E-06
Chromium	66		2.71E-06		0.003		9.0E-04	
Nickel	76		3.12E-06		0.02		1.6E-04	
Vanadium	47		1.93E-06		0.009		2.1E-04	

	EPC	Dermal			Oral	Oral		
DERMAL CONTACT	**mg/kg**	**RAF**	**ADD**	**LADD**	**RfD**	**CSF**	**Hazard**	**Risk**
Arsenic	46.4	0.03	5.81E-06	1.97E-06	0.0003	1.5	1.9E-02	3.0E-06
Chromium	66	0.1	2.75E-05		0.003		9.2E-03	
Nickel	76	0.2	6.34E-05		0.02		3.2E-03	
Vanadium	47	0.1	1.96E-05		0.009		2.2E-03	

					Inhalation	Inhalation		
	EPC		ADE	LADE	RfC	URF	Hazard	Risk
DUST INHALATION	**mg/kg**		**mg/m3**	**ug/m3/a**	**mg/m3**	**1/(ug/m3)**	**ADE/RfC**	**LADE x URF**
Arsenic	46.4		8.01E-07	2.72E-07	0.000025	0.003	3.2E-02	8.2E-10
Chromium	66		1.14E-06	3.87E-07	0.0004	0.012	2.8E-03	4.6E-09
Nickel	76		1.31E-06	4.46E-07	0.001	0.00048	1.3E-03	2.1E-10
Vanadium	47		8.11E-07		0.001		8.1E-04	

						SUM	**0.08**	**1E-05**

APPENDIX B

QUALIFICATIONS/LIMITATIONS

QUALIFICATIONS/LIMITATIONS

Environmental & Construction Management Services, Inc. (ECMS) professional services have been performed, our findings obtained, and our recommendations prepared in accordance with customary principles and practices in the fields of environmental science and engineering. This warranty is in lieu of all other warranties either expressed or implied. *ECMS* is not responsible for the independent conclusions, opinions or recommendations made by others based on the records review, site inspection, field exploration, and laboratory test data presented in this report.

Factual information regarding on-site business operations, conditions, and historical data provided to *ECMS* is assumed to be correct and complete. *ECMS* assumes no responsibility for hidden or latent conditions or misrepresentation by the property owner, its representatives, public information officials or any authority consulted in connection with the compilation of this report.

The findings set forth in the attached Site assessment report are strictly limited in time and scope to the date of the evaluation(s). The conclusions presented in the Report are based solely on the services described therein, and not on scientific tasks or procedures beyond the scope of agreed upon services or the time and budgeting restraints imposed by the client.

The purpose of this report was to assess the physical characteristics of the subject Site with respect to the presence in the environment of hazardous material or oil. No specific attempt was made to check on the compliance of present or past owners or operators or of the Site with Federal, State or local laws and regulations, environmental, or otherwise.

Partial findings of this investigation are based on data provided by others. No warranty is expressed or implied with the usage of such data. Much of the information provided in this report is based upon personal interviews and research of all available documents, records and maps held by the appropriate government and private agencies. This is subject to the limitations of historical documentation, availability and accuracy of pertinent records, and the personal recollection of those persons contacted by *ECMS* personnel. *ECMS* is not a professional title insurance firm and makes no guarantee, explicit or implied that the listing, which was reviewed, represented a comprehensive delineation of past Site ownership or tenancy for legal purposes.

Observations were made of the Site and of structures on the Site as indicated within the Report. Where access to portions of the Site or to structures on the Site was unavailable or limited, *ECMS* is unable to render an opinion as to the presence of hazardous material or oil, or to the presence if indirect evidence relating to hazardous material or oil, in that portion of the Site or structure. In addition, *ECMS* renders no opinion as to the presence of hazardous material or oil, where direct observation of the interior walls, floor, or ceiling of a structure on a Site was obstructed by objects or coverings on or over these surfaces.

The initial site investigation took into account the natural and man-made features of the Site, including any unusual or suspect phenomenon. These factors combined with the Site's geology, hydrology, topography, and past and present land uses served as a basis for choosing a methodology and location for subsurface exploration as well as ground water and subsurface sampling, if done. The subsurface data, if provided, is meant as a representative overview of the Site.

The conclusions and recommendations contained in this report may be based in part upon various types of chemical data and are contingent upon their validity. As indicated within the Report, some

of these data are preliminary "screening" level data, and should be confirmed with quantitative analyses if more specific information is necessary. It should be noted that variations in the types and concentrations of contaminants and variations in their flow paths may occur due to seasonal water table fluctuations, past disposal practices, the passage of time, and other factors. Should additional data or variations of current data become available in the future, these data should be reviewed, and the conclusions and recommendations presented herein modified accordingly.

Chemical analyses may have been performed for specific parameters during the course of this Site assessment, as described in the text. However, it should be noted that additional chemical constituents not searched for during the current study might be present in soil and/or ground water at the Site.

APPENDIX H

COPY OF SOIL SAMPLE EUROFINS SPECTRUM LABORATORY REPORT

eurofins | Environment Testing New England

☑ Final Report
☐ Revised Report

Report Date:
17-Jul-20 14:44

Laboratory Report
SC58794

ECMS, Inc.
639 Granite Street, Suite 407
Braintree, MA 02184
Attn: Kevin Kavanaugh

Project: Cashman School - Amesbury, MA
Project #: 1009.073

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.
All applicable NELAC requirements have been met.

Massachusetts # RI907
New York # 11393
Rhode Island # LAI00368
USDA # P330-20-00109

Authorized by:

Agnes Huntley
Project Manager



Eurofins Environment Testing New England holds primary NELAC certification in the State of New York for the analytes as indicated with an X in the "Cert." column within this report. Please note that the State of New York does not offer certification for all analytes. Please refer to our website for specific certification holdings in each state.
Please note that this report contains 175 pages of analytical data plus Chain of Custody document(s). When the Laboratory Report is indicated as revised, this report supersedes any previously dated reports for the laboratory ID(s) referenced above. Where this report identifies subcontracted analyses, copies of the subcontractor's test report are available upon request. This report may not be reproduced, except in full, without written approval from Eurofins Environment Testing New England.

Eurofins Environment Testing New England is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Eurofins Environment Testing New England is currently accredited for the specific method or analyte indicated. Please refer to our "Quality" web page at www.eurofinsus.com/Spectrum for a full listing of our current certifications and fields of accreditation.

Please contact the Laboratory or Technical Director at 413-789-9018 with any questions regarding the data contained in this laboratory report.

Sample Summary

Work Order: SC58794

Project: Cashman School - Amesbury, MA

Project Number: 1009.073

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
SC58794-01	SS-1	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-02	SS-2	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-03	SSS-10	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-04	SSS-11	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-05	SSS-12	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-06	SSS-13	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-07	SSS-14	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-08	SSS-16	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-09	SSS-17	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-10	SSS-3	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-11	SSS-4	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-12	SSS-5	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-13	SSS-6	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-14	SSS-7	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-15	SSS-8	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-16	SSS-9	Soil	09-Jul-20 00:00	10-Jul-20 15:28
SC58794-17	SSS-15	Soil	09-Jul-20 00:00	10-Jul-20 15:28

MassDEP Analytical Protocol Certification Form

Laboratory Name: Eurofins Spectrum Analytical, Inc. **Project #:** 1009.073

Project Location: Cashman School - Amesbury, MA **RTN:**

This form provides certifications for the following data set: SC58794-01 through SC58794-17

Matrices: Soil

CAM Protocol

✓ 8260 VOC CAM II A	✓ 7470/7471 Hg CAM III B	MassDEP VPH CAM IV A	✓ 8081 Pesticides CAM V B	7196 Hex Cr CAM VI B	MassDEP APH CAM IX A
✓ 8270 SVOC CAM II B	7010 Metals CAM III C	MassDEP EPH CAM IV B	✓ 8151 Herbicides CAM V C	8330 Explosives CAM VIII A	TO-15 VOC CAM IX B
✓ 6010 Metals CAM III A	6020 Metals CAM III D	✓ 8082 PCB CAM V A	9012 Total Cyanide/PAC CAM VI A	9014 Total Cyanide/PAC CAM VI A	6860 Perchlorate CAM VIII B

Affirmative responses to questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain of Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	Yes ✓ No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	✓ Yes No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	✓ Yes No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	✓ Yes No
E	a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	Yes No Yes No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to questions A through E)?	✓ Yes No

Responses to questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	✓ Yes No

***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.**

H	Were all QC performance standards specified in the CAM protocol(s) achieved?	Yes ✓ No
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	✓ Yes No

All negative responses are addressed in a case narrative on the cover page of this report.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Dawn E. Wojcik

Dawn E. Wojcik
Laboratory Director
Date: 7/17/2020

CASE NARRATIVE:

Data has been reported to the RDL. This report excludes estimated concentrations detected below the RDL and above the MDL (J-Flag).

All non-detects and all results below the reporting limit are reported as "<" (less than) the reporting limit in this report.

The samples were received 2.3 degrees Celsius, please refer to the Chain of Custody for details specific to temperature upon receipt. An infrared thermometer with a tolerance of +/- 1.0 degrees Celsius was used immediately upon receipt of the samples.

If a Matrix Spike (MS), Matrix Spike Duplicate (MSD) or Duplicate (DUP) was not requested on the Chain of Custody, method criteria may have been fulfilled with a source sample not of this Sample Delivery Group. If method or program required MS/MSD/Dup were not performed, sufficient sample was not provided to the laboratory.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method. Regulatory limits may not be achieved if specific method and/or technique was not requested on the Chain of Custody.

According to WSC-CAM 5/2009 Rev.1, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although they may still be within the recommended recovery range, a range has been set based on historical control limits.

Some target analytes which are not listed as exceptions in the Summary of CAM Reporting Limits may exceed the recommended RL based on sample initial volume or weight provided, % moisture content, or responsiveness of a particular analyte to purge and trap instrumentation.

All VOC soils samples submitted and analyzed in methanol will have a minimum dilution factor of 50. This is the minimum amount of solvent allowed on the instrumentation without causing interference. Soils are run on a manual load instrument. 100ug of sample (MEOH) is spiked into 5ml DI water along with the surrogate and added directly onto the instrument. Additional dilution factors may be required to keep analyte concentration within instrument calibration range.

Method SW846 5035A is designed to use on samples containing low levels of VOCs, ranging from 0.5 to 200 ug/Kg. Target analytes that are less responsive to purge and trap may be present at concentrations over 200ug/Kg but may not be reportable in the methanol preserved vial (SW846 5030). This is the result of the inherent dilution factor required for the methanol preservation.

Analyses for Total Hardness, pH, and Total Residual Chlorine fall under the state of Pennsylvania code Chapter 252.6 accreditation by rule.

Reactivity (40 CFR 261.23) Case Narrative:

These samples do not exhibit the characteristics of reactivity as defined in 40 CFR 261.23, sections (1), (2) and (4); however, Eurofins Spectrum Analytical, Inc. does not test for detonation, explosive reaction or potential, or forbidden explosives as defined in 40 CFR 261.23, sections (3), (6), (7) and (8).

Reactive sulfide and cyanide are tested at a pH of 2 and not tested at all conditions between pH 2 and12.5 as stated in 40 CFR 261.23, section (5); thus reactive cyanide and sulfide results as reported in this document can not be used to support the nonreactive properties of these samples.

The responsibility falls on the generator to use knowledge of the waste to determine if the waste meets or does not meet the descriptive, prose definition of reactivity.

See below for any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

SW8151A

Laboratory Control Samples:

537320A BSD

SW8151A

Laboratory Control Samples:

537320A BSD

Dinoseb RPD 64.3% (20%) is outside individual acceptance criteria.

CG33195-LCS

This parameter is outside laboratory rpd specified recovery limits.

Dinoseb

CG33195-LCSD

This parameter is outside laboratory rpd specified recovery limits.

Dinoseb

SW846 6010C

Laboratory Control Samples:

2001078 SRM/SRMD

Lead percent recoveries (82/86) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

Spikes:

2001078-MS1 *Source: SC58794-02*

The spike recovery exceeded the QC control limits for the MS and/or MSD. The batch was accepted based upon acceptable PS and /or LCS recovery.

Antimony

2001078-MSD1 *Source: SC58794-02*

The spike recovery exceeded the QC control limits for the MS and/or MSD. The batch was accepted based upon acceptable PS and /or LCS recovery.

Antimony

Duplicates:

2001078-DUP1 *Source: SC58794-02*

The RPD exceeded the QC control limits; however precision is demonstrated with acceptable RPD values for MS/MSD.

Nickel

SW846 7471B

Spikes:

2001079-MS1 *Source: SC58794-01*

The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

Mercury

SW846 8081B

Laboratory Control Samples:

2001088 BS/BSD

Chlordane [2C] percent recoveries (0/0) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

Chlordane percent recoveries (0/0) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

SW846 8081B

Laboratory Control Samples:

2001088 BS/BSD

Toxaphene [2C] percent recoveries (0/0) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

Toxaphene percent recoveries (0/0) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

Samples:

SC58794-05 *SSS-12*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-06 *SSS-13*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-07 *SSS-14*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SW846 8081B

Samples:

SC58794-08 *SSS-16*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-09 *SSS-17*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-10 *SSS-3*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-11 *SSS-4*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-12 *SSS-5*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-13 *SSS-6*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-14 *SSS-7*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-15 *SSS-8*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-16 *SSS-9*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SC58794-17 *SSS-15*

The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.

SW846 8260C

Laboratory Control Samples:

2001076 BS/BSD

SW846 8260C

Laboratory Control Samples:

2001076 BS/BSD

1,1,2-Trichlorotrifluoroethane (Freon 113) percent recoveries (130/131) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

2-Butanone (MEK) percent recoveries (133/109) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

SW846 8260C

Laboratory Control Samples:

2001076 BS/BSD

2-Hexanone (MBK) percent recoveries (150/130) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

Acetone percent recoveries (121/143) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

SW846 8260C

Laboratory Control Samples:

2001076 BS/BSD

Chloroethane percent recoveries (147/137) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

Chloromethane percent recoveries (133/137) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

SW846 8260C

Laboratory Control Samples:

2001076 BS/BSD

Dichlorodifluoromethane (Freon12) percent recoveries (150/150) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

Trichlorofluoromethane (Freon 11) percent recoveries (140/138) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SS-1
SS-2
SSS-10
SSS-11
SSS-12
SSS-13
SSS-14
SSS-15
SSS-16
SSS-17
SSS-3
SSS-4
SSS-5
SSS-6
SSS-7
SSS-8
SSS-9

SW846 8270D

Laboratory Control Samples:

2001083 BSD

N-Nitrosodimethylamine RPD 32% (30%) is outside individual acceptance criteria.

Pyridine RPD 33% (30%) is outside individual acceptance criteria.

2001083-BSD1

Analyte is out of acceptance range in the QC spike but the total number of out of range analytes is within overall method criteria.

N-Nitrosodimethylamine
Pyridine

SW846 8270D

Spikes:

2001083-MS1 *Source: SC58794-01*

The spike recovery for this QC sample is outside the established control limits. The sample results for the QC batch were accepted based on LCS/LCSD or SRM recoveries within the control limits.

2,4-Dinitrophenol
Aniline
Benzidine
Benzoic acid

2001083-MSD1 *Source: SC58794-01*

The spike recovery for this QC sample is outside the established control limits. The sample results for the QC batch were accepted based on LCS/LCSD or SRM recoveries within the control limits.

Aniline
Benzidine

Sample Acceptance Check Form

Client:	ECMS, Inc.
Project:	Cashman School - Amesbury, MA / 1009.073
Work Order:	SC58794
Sample(s) received on:	7/10/2020

The following outlines the condition of samples for the attached Chain of Custody upon receipt.

	Yes	No	N/A
Were custody seals present?	☐	☑	☐
Were custody seals intact?	☐	☐	☑
Were samples received at a temperature of ≤ 6°C?	☑	☐	☐
Were samples cooled on ice upon transfer to laboratory representative?	☑	☐	☐
Were sample containers received intact?	☑	☐	☐
Were samples properly labeled (labels affixed to sample containers and include sample ID, site location, and/or project number and the collection date)?	☑	☐	☐
Were samples accompanied by a Chain of Custody document?	☑	☐	☐
Does Chain of Custody document include proper, full, and complete documentation, which shall include sample ID, site location, and/or project number, date and time of collection, collector's name, preservation type, sample matrix and any special remarks concerning the sample?	☐	☑	☐
Did sample container labels agree with Chain of Custody document?	☑	☐	☐
Were samples received within method-specific holding times?	☑	☐	☐

Summary of Hits

Lab ID: SC58794-01 **Client ID:** SS-1

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	39.9		1.68	mg/kg	SW846 6010C
Barium	18.4		1.12	mg/kg	SW846 6010C
Chromium	22.6		1.12	mg/kg	SW846 6010C
Lead	8.42		1.68	mg/kg	SW846 6010C
Nickel	39.7		1.12	mg/kg	SW846 6010C
Vanadium	22.7		1.68	mg/kg	SW846 6010C
Zinc	36.3		3.35	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	24.9		14.9	mg/kg	SW846 8100Mod.

Lab ID: SC58794-02 **Client ID:** SS-2

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	55.9		1.67	mg/kg	SW846 6010C
Barium	22.5		1.12	mg/kg	SW846 6010C
Chromium	19.4		1.12	mg/kg	SW846 6010C
Lead	19.3		1.67	mg/kg	SW846 6010C
Nickel	71.4		1.12	mg/kg	SW846 6010C
Vanadium	24.5		1.67	mg/kg	SW846 6010C
Zinc	58.5		3.35	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	38.7		14.6	mg/kg	SW846 8100Mod.

Lab ID: SC58794-03 **Client ID:** SSS-10

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	25.4		1.77	mg/kg	SW846 6010C
Barium	26.5		1.18	mg/kg	SW846 6010C
Chromium	22.9		1.18	mg/kg	SW846 6010C
Lead	13.7		1.77	mg/kg	SW846 6010C
Nickel	28.2		1.18	mg/kg	SW846 6010C
Vanadium	29.6		1.77	mg/kg	SW846 6010C
Zinc	60.8		3.53	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	109		16.2	mg/kg	SW846 8100Mod.
Bis(2-ethylhexyl)phthalate	305		206	µg/kg	SW846 8270D

Lab ID: SC58794-04 **Client ID:** SSS-11

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	33.6		1.87	mg/kg	SW846 6010C
Barium	24.8		1.25	mg/kg	SW846 6010C
Chromium	23.2		1.25	mg/kg	SW846 6010C
Lead	18.9		1.87	mg/kg	SW846 6010C
Nickel	30.4		1.25	mg/kg	SW846 6010C
Vanadium	38.3		1.87	mg/kg	SW846 6010C
Zinc	43.2		3.74	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	184		16.4	mg/kg	SW846 8100Mod.

Lab ID: SC58794-05 **Client ID:** SSS-12

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	39.2		1.67	mg/kg	SW846 6010C
Barium	21.7		1.11	mg/kg	SW846 6010C
Chromium	17.4		1.11	mg/kg	SW846 6010C
Lead	19.6		1.67	mg/kg	SW846 6010C
Nickel	26.9		1.11	mg/kg	SW846 6010C
Vanadium	33.5		1.67	mg/kg	SW846 6010C
Zinc	37.9		3.34	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	180		15.9	mg/kg	SW846 8100Mod.

Lab ID: SC58794-06 **Client ID:** SSS-13

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	49.1		1.83	mg/kg	SW846 6010C
Barium	28.9		1.22	mg/kg	SW846 6010C
Chromium	23.3		1.22	mg/kg	SW846 6010C
Lead	22.7		1.83	mg/kg	SW846 6010C
Nickel	37.2		1.22	mg/kg	SW846 6010C
Vanadium	34.6		1.83	mg/kg	SW846 6010C
Zinc	49.2		3.67	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	93.0		16.5	mg/kg	SW846 8100Mod.

Lab ID: SC58794-07 **Client ID:** SSS-14

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	23.7		1.69	mg/kg	SW846 6010C
Barium	44.1		1.13	mg/kg	SW846 6010C
Chromium	36.0		1.13	mg/kg	SW846 6010C
Lead	13.7		1.69	mg/kg	SW846 6010C
Nickel	26.1		1.13	mg/kg	SW846 6010C
Vanadium	41.9		1.69	mg/kg	SW846 6010C
Zinc	44.6		3.38	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	116		15.2	mg/kg	SW846 8100Mod.

Lab ID: SC58794-08 **Client ID:** SSS-16

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	36.6		1.67	mg/kg	SW846 6010C
Barium	24.0		1.12	mg/kg	SW846 6010C
Chromium	21.7		1.12	mg/kg	SW846 6010C
Lead	17.5		1.67	mg/kg	SW846 6010C
Nickel	30.6		1.12	mg/kg	SW846 6010C
Vanadium	30.6		1.67	mg/kg	SW846 6010C
Zinc	44.3		3.35	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	93.6		14.7	mg/kg	SW846 8100Mod.

Lab ID: SC58794-09 **Client ID:** SSS-17

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	21.9		1.60	mg/kg	SW846 6010C
Barium	113		1.07	mg/kg	SW846 6010C
Chromium	19.4		1.07	mg/kg	SW846 6010C
Lead	12.1		1.60	mg/kg	SW846 6010C
Nickel	27.9		1.07	mg/kg	SW846 6010C
Vanadium	8.48		1.60	mg/kg	SW846 6010C
Zinc	61.8		3.20	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	49.7		14.5	mg/kg	SW846 8100Mod.

Lab ID: SC58794-10 **Client ID:** SSS-3

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	36.6		1.80	mg/kg	SW846 6010C
Barium	30.0		1.20	mg/kg	SW846 6010C
Chromium	21.8		1.20	mg/kg	SW846 6010C
Lead	17.0		1.80	mg/kg	SW846 6010C
Nickel	33.2		1.20	mg/kg	SW846 6010C
Vanadium	30.1		1.80	mg/kg	SW846 6010C
Zinc	107		3.59	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	113		15.9	mg/kg	SW846 8100Mod.

Lab ID: SC58794-11 **Client ID:** SSS-4

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	20.5		1.62	mg/kg	SW846 6010C
Barium	29.5		1.08	mg/kg	SW846 6010C
Chromium	18.8		1.08	mg/kg	SW846 6010C
Lead	18.6		1.62	mg/kg	SW846 6010C
Nickel	20.3		1.08	mg/kg	SW846 6010C
Vanadium	24.5		1.62	mg/kg	SW846 6010C
Zinc	36.0		3.25	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	118		14.5	mg/kg	SW846 8100Mod.

Lab ID: SC58794-12 **Client ID:** SSS-5

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	53.4		1.88	mg/kg	SW846 6010C
Barium	30.3		1.25	mg/kg	SW846 6010C
Chromium	25.0		1.25	mg/kg	SW846 6010C
Lead	17.0		1.88	mg/kg	SW846 6010C
Nickel	46.2		1.25	mg/kg	SW846 6010C
Vanadium	33.9		1.88	mg/kg	SW846 6010C
Zinc	52.1		3.76	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	106		15.4	mg/kg	SW846 8100Mod.

Lab ID: SC58794-13 **Client ID:** SSS-6

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	29.6		1.69	mg/kg	SW846 6010C
Barium	28.6		1.13	mg/kg	SW846 6010C
Chromium	30.0		1.13	mg/kg	SW846 6010C
Lead	15.8		1.69	mg/kg	SW846 6010C
Nickel	25.6		1.13	mg/kg	SW846 6010C
Vanadium	35.8		1.69	mg/kg	SW846 6010C
Zinc	43.2		3.38	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	134		14.3	mg/kg	SW846 8100Mod.

Lab ID: SC58794-14 **Client ID:** SSS-7

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	48.6		1.80	mg/kg	SW846 6010C
Barium	34.6		1.20	mg/kg	SW846 6010C
Chromium	65.9		1.20	mg/kg	SW846 6010C
Lead	28.6		1.80	mg/kg	SW846 6010C
Nickel	44.8		1.20	mg/kg	SW846 6010C
Vanadium	46.7		1.80	mg/kg	SW846 6010C
Zinc	56.2		3.60	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	170		15.8	mg/kg	SW846 8100Mod.

Lab ID: SC58794-15 **Client ID:** SSS-8

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	48.7		1.87	mg/kg	SW846 6010C
Barium	33.0		1.25	mg/kg	SW846 6010C
Chromium	31.6		1.25	mg/kg	SW846 6010C
Lead	21.0		1.87	mg/kg	SW846 6010C
Nickel	47.7		1.25	mg/kg	SW846 6010C
Vanadium	36.0		1.87	mg/kg	SW846 6010C
Zinc	52.3		3.75	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	111		15.4	mg/kg	SW846 8100Mod.

Lab ID: SC58794-16 **Client ID:** SSS-9

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	82.3		1.88	mg/kg	SW846 6010C
Barium	29.1		1.26	mg/kg	SW846 6010C
Chromium	24.7		1.26	mg/kg	SW846 6010C
Lead	22.9		1.88	mg/kg	SW846 6010C
Nickel	76.0		1.26	mg/kg	SW846 6010C
Vanadium	39.4		1.88	mg/kg	SW846 6010C
Zinc	64.7		3.77	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	129		16.8	mg/kg	SW846 8100Mod.

Lab ID: SC58794-17 **Client ID:** SSS-15

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	37.8		1.90	mg/kg	SW846 6010C
Barium	46.3		1.27	mg/kg	SW846 6010C
Chromium	31.5		1.27	mg/kg	SW846 6010C
Lead	25.9		1.90	mg/kg	SW846 6010C
Nickel	37.7		1.27	mg/kg	SW846 6010C
Vanadium	36.3		1.90	mg/kg	SW846 6010C
Zinc	60.7		3.80	mg/kg	SW846 6010C
Total Petroleum Hydrocarbons	168		16.7	mg/kg	SW846 8100Mod.

Please note that because there are no reporting limits associated with hazardous waste characterizations or micro analyses, this summary does not include hits from these analyses if included in this work order.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-1	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-01				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 17.81 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 53.2		µg/kg dry	53.2	29.1	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 532		µg/kg dry	532	67.2	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 53.2		µg/kg dry	53.2	19.2	50	"	"	"	"	"	X
71-43-2	Benzene	< 53.2		µg/kg dry	53.2	8.51	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 53.2		µg/kg dry	53.2	12.0	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 53.2		µg/kg dry	53.2	7.60	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 53.2		µg/kg dry	53.2	13.7	50	"	"	"	"	"	X
75-25-2	Bromoform	< 53.2		µg/kg dry	53.2	11.4	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 106		µg/kg dry	106	26.3	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 106		µg/kg dry	106	24.3	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 53.2		µg/kg dry	53.2	21.3	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 53.2		µg/kg dry	53.2	16.3	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 53.2		µg/kg dry	53.2	21.7	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 106		µg/kg dry	106	19.7	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 53.2		µg/kg dry	53.2	15.9	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 53.2		µg/kg dry	53.2	6.43	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 106		µg/kg dry	106	23.7	50	"	"	"	"	"	X
67-66-3	Chloroform	< 53.2		µg/kg dry	53.2	6.27	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 106		µg/kg dry	106	63.2	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 53.2		µg/kg dry	53.2	13.2	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 53.2		µg/kg dry	53.2	9.62	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 106		µg/kg dry	106	21.0	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 53.2		µg/kg dry	53.2	8.40	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 53.2		µg/kg dry	53.2	14.5	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 53.2		µg/kg dry	53.2	10.0	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 53.2		µg/kg dry	53.2	9.57	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 53.2		µg/kg dry	53.2	13.2	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 53.2		µg/kg dry	53.2	9.52	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 106		µg/kg dry	106	69.5	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 53.2		µg/kg dry	53.2	12.3	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 53.2		µg/kg dry	53.2	13.9	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 53.2		µg/kg dry	53.2	13.6	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 53.2		µg/kg dry	53.2	17.7	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 53.2		µg/kg dry	53.2	12.1	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 53.2		µg/kg dry	53.2	18.4	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 53.2		µg/kg dry	53.2	16.8	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 53.2		µg/kg dry	53.2	14.0	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 53.2		µg/kg dry	53.2	16.3	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 53.2		µg/kg dry	53.2	12.5	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 53.2		µg/kg dry	53.2	21.6	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 53.2		µg/kg dry	53.2	11.1	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 53.2		µg/kg dry	53.2	17.0	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 106		µg/kg dry	106	35.4	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-1	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-01				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260							Initial weight: 17.81 g						
98-82-8	Isopropylbenzene	< 53.2		µg/kg dry	53.2	19.3	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 53.2		µg/kg dry	53.2	14.7	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 53.2		µg/kg dry	53.2	16.0	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 106		µg/kg dry	106	38.1	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 106		µg/kg dry	106	45.4	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 53.2		µg/kg dry	53.2	15.4	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 53.2		µg/kg dry	53.2	13.2	50	"	"	"	"	"	X
100-42-5	Styrene	< 53.2		µg/kg dry	53.2	7.02	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 53.2		µg/kg dry	53.2	12.8	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 53.2		µg/kg dry	53.2	16.9	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 53.2		µg/kg dry	53.2	16.7	50	"	"	"	"	"	X
108-88-3	Toluene	< 53.2		µg/kg dry	53.2	8.56	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 53.2		µg/kg dry	53.2	12.4	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 53.2		µg/kg dry	53.2	8.77	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 53.2		µg/kg dry	53.2	8.40	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 53.2		µg/kg dry	53.2	12.9	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 53.2		µg/kg dry	53.2	16.4	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 53.2		µg/kg dry	53.2	9.09	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 53.2		µg/kg dry	53.2	24.0	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 53.2		µg/kg dry	53.2	24.5	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 53.2		µg/kg dry	53.2	13.5	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 53.2		µg/kg dry	53.2	11.1	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 53.2		µg/kg dry	53.2	26.2	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 106		µg/kg dry	106	31.3	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 53.2		µg/kg dry	53.2	16.4	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 106		µg/kg dry	106	38.9	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 53.2		µg/kg dry	53.2	14.4	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 53.2		µg/kg dry	53.2	29.4	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 53.2		µg/kg dry	53.2	14.7	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 53.2		µg/kg dry	53.2	17.2	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1060		µg/kg dry	1060	755	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1060		µg/kg dry	1060	313	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 266		µg/kg dry	266	35.1	50	"	"	"	"	"	X
64-17-5	Ethanol	< 10600		µg/kg dry	10600	916	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*105*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*103*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*103*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*103*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 74.4		µg/kg dry	74.4	39.5	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-1	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-01				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 74.4		µg/kg dry	74.4	38.8	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 368		µg/kg dry	368	23.4	1	"	"	"	"	"	X
120-12-7	Anthracene	< 74.4		µg/kg dry	74.4	42.8	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 368		µg/kg dry	368	39.9	1	"	"	"	"	"	
92-87-5	Benzidine	< 736		µg/kg dry	736	23.4	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 74.4		µg/kg dry	74.4	41.8	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 74.4		µg/kg dry	74.4	50.8	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 74.4		µg/kg dry	74.4	56.0	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 74.4		µg/kg dry	74.4	52.5	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 74.4		µg/kg dry	74.4	63.6	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 368		µg/kg dry	368	22.1	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 368		µg/kg dry	368	85.2	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 368		µg/kg dry	368	37.1	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 186		µg/kg dry	186	34.5	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 186		µg/kg dry	186	29.9	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 186		µg/kg dry	186	47.4	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 368		µg/kg dry	368	41.6	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 368		µg/kg dry	368	36.9	1	"	"	"	"	"	X
86-74-8	Carbazole	< 186		µg/kg dry	186	42.8	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 368		µg/kg dry	368	43.3	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 186		µg/kg dry	186	23.0	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 368		µg/kg dry	368	50.4	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 186		µg/kg dry	186	35.7	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 368		µg/kg dry	368	36.0	1	"	"	"	"	"	X
218-01-9	Chrysene	< 74.4		µg/kg dry	74.4	42.0	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 74.4		µg/kg dry	74.4	55.0	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 186		µg/kg dry	186	50.1	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 368		µg/kg dry	368	43.9	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 368		µg/kg dry	368	39.7	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 368		µg/kg dry	368	41.8	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 368		µg/kg dry	368	40.7	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 186		µg/kg dry	186	45.2	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 368		µg/kg dry	368	38.6	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 368		µg/kg dry	368	41.4	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 368		µg/kg dry	368	29.1	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 368		µg/kg dry	368	39.4	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 368		µg/kg dry	368	52.7	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 368		µg/kg dry	368	38.1	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 186		µg/kg dry	186	44.6	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 186		µg/kg dry	186	38.0	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 368		µg/kg dry	368	54.8	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 74.4		µg/kg dry	74.4	43.6	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-1	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-01				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 74.4		µg/kg dry	74.4	48.1	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 186		µg/kg dry	186	46.8	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 186		µg/kg dry	186	46.8	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 186		µg/kg dry	186	46.9	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 186		µg/kg dry	186	42.0	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 74.4		µg/kg dry	74.4	50.8	1	"	"	"	"	"	X
78-59-1	Isophorone	< 186		µg/kg dry	186	28.7	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 74.4		µg/kg dry	74.4	52.1	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 368		µg/kg dry	368	29.6	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 368		µg/kg dry	368	28.9	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 74.4		µg/kg dry	74.4	42.9	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 368		µg/kg dry	368	33.3	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 368		µg/kg dry	368	34.0	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 186		µg/kg dry	186	49.1	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 186		µg/kg dry	186	43.0	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 186		µg/kg dry	186	32.6	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1470		µg/kg dry	1470	49.0	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 186		µg/kg dry	186	24.3	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 186		µg/kg dry	186	32.6	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 368		µg/kg dry	368	37.5	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 368		µg/kg dry	368	43.8	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 74.4		µg/kg dry	74.4	42.2	1	"	"	"	"	"	X
108-95-2	Phenol	< 368		µg/kg dry	368	37.2	1	"	"	"	"	"	X
129-00-0	Pyrene	< 74.4		µg/kg dry	74.4	41.0	1	"	"	"	"	"	X
110-86-1	Pyridine	< 368		µg/kg dry	368	87.1	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 368		µg/kg dry	368	45.3	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 74.4		µg/kg dry	74.4	41.0	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 368		µg/kg dry	368	38.0	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 186		µg/kg dry	186	45.5	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 368		µg/kg dry	368	39.1	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 368		µg/kg dry	368	43.8	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*91*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*87*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*81*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*105*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*92*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*85*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 22.1		µg/kg dry	22.1	15.9	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 22.1		µg/kg dry	22.1	6.54	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 22.1		µg/kg dry	22.1	6.13	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-1	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-01				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 22.1		µg/kg dry	22.1	2.10	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 22.1		µg/kg dry	22.1	6.92	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 22.1		µg/kg dry	22.1	17.2	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 22.1		µg/kg dry	22.1	4.76	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 22.1		µg/kg dry	22.1	5.16	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 22.1		µg/kg dry	22.1	4.71	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*93*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*86*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*81*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*71*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546													
319-84-6	alpha-BHC	< 5.53		µg/kg dry	5.53	0.255	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.53		µg/kg dry	5.53	0.354	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.53		µg/kg dry	5.53	0.288	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.32		µg/kg dry	3.32	0.587	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.53		µg/kg dry	5.53	0.642	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.53		µg/kg dry	5.53	0.188	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.53		µg/kg dry	5.53	0.221	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.53		µg/kg dry	5.53	0.255	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.53		µg/kg dry	5.53	0.266	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.53		µg/kg dry	5.53	0.288	1	"	"	"	"	"	X
72-20-8	Endrin	< 8.85		µg/kg dry	8.85	0.542	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 8.85		µg/kg dry	8.85	0.354	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 8.85		µg/kg dry	8.85	0.465	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 8.85		µg/kg dry	8.85	0.808	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 8.85		µg/kg dry	8.85	3.80	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 8.85		µg/kg dry	8.85	0.598	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 8.85		µg/kg dry	8.85	0.321	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 8.85		µg/kg dry	8.85	1.39	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.53		µg/kg dry	5.53	0.232	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.53		µg/kg dry	5.53	0.277	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 111		µg/kg dry	111	78.1	1	"	"	"	"	"	X
57-74-9	Chlordane	< 22.1		µg/kg dry	22.1	2.78	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.53		µg/kg dry	5.53	0.487	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*82*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*85*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*68*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*65*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-1 SC58794-01	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**24.9**		mg/kg dry	14.9	12.4	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*76*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*101*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.35		mg/kg dry	3.35	0.181	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**39.9**		mg/kg dry	1.68	0.212	1	"	"	"	"	"	X
7440-39-3	Barium	**18.4**		mg/kg dry	1.12	0.132	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.559		mg/kg dry	0.559	0.0281	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.559		mg/kg dry	0.559	0.0290	1	"	"	"	"	"	X
7440-47-3	Chromium	**22.6**		mg/kg dry	1.12	0.149	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.115		mg/kg dry	0.115	0.0096	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**39.7**		mg/kg dry	1.12	0.129	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**8.42**		mg/kg dry	1.68	0.237	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.59		mg/kg dry	5.59	0.420	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.68		mg/kg dry	1.68	0.320	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.35		mg/kg dry	3.35	1.23	1	"	"	"	"	"	X
7440-62-2	Vanadium	**22.7**		mg/kg dry	1.68	0.297	1	"	"	"	"	"	X
7440-66-6	Zinc	**36.3**		mg/kg dry	3.35	0.865	1	"	"	"	"	"	X
General Chemistry Parameters													
	% Solids	**89.3**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.99**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A									Methylation date: 13-Jul-20				
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 17:28	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*86*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-1 SC58794-01	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:30	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-2	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-02				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.55 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 57.3		µg/kg dry	57.3	31.4	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 573		µg/kg dry	573	72.4	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 57.3		µg/kg dry	57.3	20.7	50	"	"	"	"	"	X
71-43-2	Benzene	< 57.3		µg/kg dry	57.3	9.17	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 57.3		µg/kg dry	57.3	12.9	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 57.3		µg/kg dry	57.3	8.19	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 57.3		µg/kg dry	57.3	14.8	50	"	"	"	"	"	X
75-25-2	Bromoform	< 57.3		µg/kg dry	57.3	12.3	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 115		µg/kg dry	115	28.3	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 115		µg/kg dry	115	26.2	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 57.3		µg/kg dry	57.3	22.9	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 57.3		µg/kg dry	57.3	17.6	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 57.3		µg/kg dry	57.3	23.4	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 115		µg/kg dry	115	21.2	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 57.3		µg/kg dry	57.3	17.1	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 57.3		µg/kg dry	57.3	6.93	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 115		µg/kg dry	115	25.6	50	"	"	"	"	"	X
67-66-3	Chloroform	< 57.3		µg/kg dry	57.3	6.76	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 115		µg/kg dry	115	68.1	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 57.3		µg/kg dry	57.3	14.2	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 57.3		µg/kg dry	57.3	10.4	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 115		µg/kg dry	115	22.6	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 57.3		µg/kg dry	57.3	9.05	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 57.3		µg/kg dry	57.3	15.6	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 57.3		µg/kg dry	57.3	10.8	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 57.3		µg/kg dry	57.3	10.3	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 57.3		µg/kg dry	57.3	14.3	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 57.3		µg/kg dry	57.3	10.3	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 115		µg/kg dry	115	74.9	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 57.3		µg/kg dry	57.3	13.2	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 57.3		µg/kg dry	57.3	15.0	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 57.3		µg/kg dry	57.3	14.7	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 57.3		µg/kg dry	57.3	19.1	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 57.3		µg/kg dry	57.3	13.1	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 57.3		µg/kg dry	57.3	19.9	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 57.3		µg/kg dry	57.3	18.1	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 57.3		µg/kg dry	57.3	15.1	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 57.3		µg/kg dry	57.3	17.5	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 57.3		µg/kg dry	57.3	13.5	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 57.3		µg/kg dry	57.3	23.3	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 57.3		µg/kg dry	57.3	12.0	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 57.3		µg/kg dry	57.3	18.3	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 115		µg/kg dry	115	38.1	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-2	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-02				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 16.55 g						
98-82-8	Isopropylbenzene	< 57.3		µg/kg dry	57.3	20.8	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 57.3		µg/kg dry	57.3	15.9	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 57.3		µg/kg dry	57.3	17.2	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 115		µg/kg dry	115	41.0	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 115		µg/kg dry	115	48.9	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 57.3		µg/kg dry	57.3	16.6	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 57.3		µg/kg dry	57.3	14.3	50	"	"	"	"	"	X
100-42-5	Styrene	< 57.3		µg/kg dry	57.3	7.56	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 57.3		µg/kg dry	57.3	13.8	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 57.3		µg/kg dry	57.3	18.2	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 57.3		µg/kg dry	57.3	18.0	50	"	"	"	"	"	X
108-88-3	Toluene	< 57.3		µg/kg dry	57.3	9.22	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 57.3		µg/kg dry	57.3	13.3	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 57.3		µg/kg dry	57.3	9.45	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 57.3		µg/kg dry	57.3	9.05	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 57.3		µg/kg dry	57.3	13.9	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 57.3		µg/kg dry	57.3	17.7	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 57.3		µg/kg dry	57.3	9.80	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 57.3		µg/kg dry	57.3	25.9	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 57.3		µg/kg dry	57.3	26.4	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 57.3		µg/kg dry	57.3	14.5	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 57.3		µg/kg dry	57.3	12.0	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 57.3		µg/kg dry	57.3	28.2	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 115		µg/kg dry	115	33.7	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 57.3		µg/kg dry	57.3	17.6	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 115		µg/kg dry	115	41.9	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 57.3		µg/kg dry	57.3	15.5	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 57.3		µg/kg dry	57.3	31.7	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 57.3		µg/kg dry	57.3	15.9	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 57.3		µg/kg dry	57.3	18.5	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1150		µg/kg dry	1150	814	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1150		µg/kg dry	1150	337	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 286		µg/kg dry	286	37.8	50	"	"	"	"	"	X
64-17-5	Ethanol	< 11500		µg/kg dry	11500	987	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*105*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*104*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*104*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*106*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 74.6		µg/kg dry	74.6	39.6	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-2	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-02				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 74.6		µg/kg dry	74.6	38.9	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 369		µg/kg dry	369	23.5	1	"	"	"	"	"	X
120-12-7	Anthracene	< 74.6		µg/kg dry	74.6	42.9	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 369		µg/kg dry	369	40.0	1	"	"	"	"	"	
92-87-5	Benzidine	< 738		µg/kg dry	738	23.5	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 74.6		µg/kg dry	74.6	41.9	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 74.6		µg/kg dry	74.6	51.0	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 74.6		µg/kg dry	74.6	56.1	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 74.6		µg/kg dry	74.6	52.6	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 74.6		µg/kg dry	74.6	63.7	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 369		µg/kg dry	369	22.1	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 369		µg/kg dry	369	85.4	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 369		µg/kg dry	369	37.2	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 187		µg/kg dry	187	34.5	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 187		µg/kg dry	187	30.0	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 187		µg/kg dry	187	47.5	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 369		µg/kg dry	369	41.7	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 369		µg/kg dry	369	37.0	1	"	"	"	"	"	X
86-74-8	Carbazole	< 187		µg/kg dry	187	42.9	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 369		µg/kg dry	369	43.4	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 187		µg/kg dry	187	23.0	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 369		µg/kg dry	369	50.5	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 187		µg/kg dry	187	35.8	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 369		µg/kg dry	369	36.1	1	"	"	"	"	"	X
218-01-9	Chrysene	< 74.6		µg/kg dry	74.6	42.1	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 74.6		µg/kg dry	74.6	55.1	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 187		µg/kg dry	187	50.2	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 369		µg/kg dry	369	44.0	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 369		µg/kg dry	369	39.8	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 369		µg/kg dry	369	41.9	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 369		µg/kg dry	369	40.8	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 187		µg/kg dry	187	45.3	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 369		µg/kg dry	369	38.7	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 369		µg/kg dry	369	41.5	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 369		µg/kg dry	369	29.2	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 369		µg/kg dry	369	39.5	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 369		µg/kg dry	369	52.9	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 369		µg/kg dry	369	38.2	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 187		µg/kg dry	187	44.7	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 187		µg/kg dry	187	38.1	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 369		µg/kg dry	369	54.9	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 74.6		µg/kg dry	74.6	43.7	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-2	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-02				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 74.6		µg/kg dry	74.6	48.2	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 187		µg/kg dry	187	46.9	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 187		µg/kg dry	187	46.9	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 187		µg/kg dry	187	47.1	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 187		µg/kg dry	187	42.1	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 74.6		µg/kg dry	74.6	51.0	1	"	"	"	"	"	X
78-59-1	Isophorone	< 187		µg/kg dry	187	28.7	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 74.6		µg/kg dry	74.6	52.2	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 369		µg/kg dry	369	29.6	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 369		µg/kg dry	369	28.9	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 74.6		µg/kg dry	74.6	43.0	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 369		µg/kg dry	369	33.4	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 369		µg/kg dry	369	34.1	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 187		µg/kg dry	187	49.2	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 187		µg/kg dry	187	43.1	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 187		µg/kg dry	187	32.6	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1480		µg/kg dry	1480	49.1	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 187		µg/kg dry	187	24.4	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 187		µg/kg dry	187	32.6	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 369		µg/kg dry	369	37.6	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 369		µg/kg dry	369	43.9	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 74.6		µg/kg dry	74.6	42.3	1	"	"	"	"	"	X
108-95-2	Phenol	< 369		µg/kg dry	369	37.3	1	"	"	"	"	"	X
129-00-0	Pyrene	< 74.6		µg/kg dry	74.6	41.1	1	"	"	"	"	"	X
110-86-1	Pyridine	< 369		µg/kg dry	369	87.3	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 369		µg/kg dry	369	45.4	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 74.6		µg/kg dry	74.6	41.1	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 369		µg/kg dry	369	38.1	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 187		µg/kg dry	187	45.6	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 369		µg/kg dry	369	39.2	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 369		µg/kg dry	369	43.9	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*99*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*100*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*89*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*108*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*92*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*86*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 22.3		µg/kg dry	22.3	16.0	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 22.3		µg/kg dry	22.3	6.58	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 22.3		µg/kg dry	22.3	6.16	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-2	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-02				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 22.3		µg/kg dry	22.3	2.11	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 22.3		µg/kg dry	22.3	6.95	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 22.3		µg/kg dry	22.3	17.3	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 22.3		µg/kg dry	22.3	4.79	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 22.3		µg/kg dry	22.3	5.19	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 22.3		µg/kg dry	22.3	4.74	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*97*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*89*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*87*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*78*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546													
319-84-6	alpha-BHC	< 5.56		µg/kg dry	5.56	0.256	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.56		µg/kg dry	5.56	0.356	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.56		µg/kg dry	5.56	0.289	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.34		µg/kg dry	3.34	0.590	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.56		µg/kg dry	5.56	0.645	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.56		µg/kg dry	5.56	0.189	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.56		µg/kg dry	5.56	0.223	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.56		µg/kg dry	5.56	0.256	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.56		µg/kg dry	5.56	0.267	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.56		µg/kg dry	5.56	0.289	1	"	"	"	"	"	X
72-20-8	Endrin	< 8.90		µg/kg dry	8.90	0.545	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 8.90		µg/kg dry	8.90	0.356	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 8.90		µg/kg dry	8.90	0.467	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 8.90		µg/kg dry	8.90	0.812	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 8.90		µg/kg dry	8.90	3.82	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 8.90		µg/kg dry	8.90	0.601	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 8.90		µg/kg dry	8.90	0.323	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 8.90		µg/kg dry	8.90	1.40	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.56		µg/kg dry	5.56	0.234	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.56		µg/kg dry	5.56	0.278	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 111		µg/kg dry	111	78.5	1	"	"	"	"	"	X
57-74-9	Chlordane	< 22.3		µg/kg dry	22.3	2.80	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.56		µg/kg dry	5.56	0.490	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*87*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*93*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*81*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*77*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-2	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-02				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC													
Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**38.7**		mg/kg dry	14.6	12.2	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*76*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*101*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.35		mg/kg dry	3.35	0.181	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**55.9**		mg/kg dry	1.67	0.212	1	"	"	"	"	"	X
7440-39-3	Barium	**22.5**		mg/kg dry	1.12	0.132	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.558		mg/kg dry	0.558	0.0280	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.558		mg/kg dry	0.558	0.0289	1	"	"	"	"	"	X
7440-47-3	Chromium	**19.4**		mg/kg dry	1.12	0.148	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.127		mg/kg dry	0.127	0.0105	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**71.4**		mg/kg dry	1.12	0.128	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**19.3**		mg/kg dry	1.67	0.236	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.58		mg/kg dry	5.58	0.419	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.67		mg/kg dry	1.67	0.319	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.35		mg/kg dry	3.35	1.23	1	"	"	"	"	"	X
7440-62-2	Vanadium	**24.5**		mg/kg dry	1.67	0.297	1	"	"	"	"	"	X
7440-66-6	Zinc	**58.5**		mg/kg dry	3.35	0.863	1	"	"	"	"	"	X
General Chemistry Parameters													
	% Solids	**88.8**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**6.08**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses													
Prepared by method SW8151A									Methylation date: 13-Jul-20				
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 17:52	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*82*			*30-150 %*			"	"	"	"	"	

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Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SS-2 SC58794-02	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 7		mg/kg	7	7	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:31	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-10	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-03				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.67 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 68.6		µg/kg dry	68.6	37.6	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 686		µg/kg dry	686	86.8	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 68.6		µg/kg dry	68.6	24.8	50	"	"	"	"	"	X
71-43-2	Benzene	< 68.6		µg/kg dry	68.6	11.0	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 68.6		µg/kg dry	68.6	15.5	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 68.6		µg/kg dry	68.6	9.81	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 68.6		µg/kg dry	68.6	17.7	50	"	"	"	"	"	X
75-25-2	Bromoform	< 68.6		µg/kg dry	68.6	14.7	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 137		µg/kg dry	137	33.9	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 137		µg/kg dry	137	31.4	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 68.6		µg/kg dry	68.6	27.5	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 68.6		µg/kg dry	68.6	21.1	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 68.6		µg/kg dry	68.6	28.0	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 137		µg/kg dry	137	25.4	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 68.6		µg/kg dry	68.6	20.5	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 68.6		µg/kg dry	68.6	8.30	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 137		µg/kg dry	137	30.6	50	"	"	"	"	"	X
67-66-3	Chloroform	< 68.6		µg/kg dry	68.6	8.10	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 137		µg/kg dry	137	81.5	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 68.6		µg/kg dry	68.6	17.0	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 68.6		µg/kg dry	68.6	12.4	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 137		µg/kg dry	137	27.1	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 68.6		µg/kg dry	68.6	10.8	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 68.6		µg/kg dry	68.6	18.7	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 68.6		µg/kg dry	68.6	12.9	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 68.6		µg/kg dry	68.6	12.4	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 68.6		µg/kg dry	68.6	17.1	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 68.6		µg/kg dry	68.6	12.3	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 137		µg/kg dry	137	89.8	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 68.6		µg/kg dry	68.6	15.9	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 68.6		µg/kg dry	68.6	18.0	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 68.6		µg/kg dry	68.6	17.6	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 68.6		µg/kg dry	68.6	22.9	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 68.6		µg/kg dry	68.6	15.6	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 68.6		µg/kg dry	68.6	23.8	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 68.6		µg/kg dry	68.6	21.7	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 68.6		µg/kg dry	68.6	18.1	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 68.6		µg/kg dry	68.6	21.0	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 68.6		µg/kg dry	68.6	16.2	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 68.6		µg/kg dry	68.6	27.9	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 68.6		µg/kg dry	68.6	14.3	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 68.6		µg/kg dry	68.6	22.0	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 137		µg/kg dry	137	45.6	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-10	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-03				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
						Initial weight: 16.67 g							
98-82-8	Isopropylbenzene	< 68.6		µg/kg dry	68.6	24.9	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 68.6		µg/kg dry	68.6	19.0	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 68.6		µg/kg dry	68.6	20.7	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 137		µg/kg dry	137	49.1	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 137		µg/kg dry	137	58.6	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 68.6		µg/kg dry	68.6	19.9	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 68.6		µg/kg dry	68.6	17.1	50	"	"	"	"	"	X
100-42-5	Styrene	< 68.6		µg/kg dry	68.6	9.06	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 68.6		µg/kg dry	68.6	16.5	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 68.6		µg/kg dry	68.6	21.8	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 68.6		µg/kg dry	68.6	21.6	50	"	"	"	"	"	X
108-88-3	Toluene	< 68.6		µg/kg dry	68.6	11.1	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 68.6		µg/kg dry	68.6	16.0	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 68.6		µg/kg dry	68.6	11.3	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 68.6		µg/kg dry	68.6	10.8	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 68.6		µg/kg dry	68.6	16.6	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 68.6		µg/kg dry	68.6	21.2	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 68.6		µg/kg dry	68.6	11.7	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 68.6		µg/kg dry	68.6	31.0	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 68.6		µg/kg dry	68.6	31.6	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 68.6		µg/kg dry	68.6	17.4	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 68.6		µg/kg dry	68.6	14.3	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 68.6		µg/kg dry	68.6	33.8	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 137		µg/kg dry	137	40.4	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 68.6		µg/kg dry	68.6	21.1	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 137		µg/kg dry	137	50.2	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 68.6		µg/kg dry	68.6	18.6	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 68.6		µg/kg dry	68.6	38.0	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 68.6		µg/kg dry	68.6	19.0	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 68.6		µg/kg dry	68.6	22.2	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1370		µg/kg dry	1370	975	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1370		µg/kg dry	1370	404	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 343		µg/kg dry	343	45.3	50	"	"	"	"	"	X
64-17-5	Ethanol	< 13700		µg/kg dry	13700	1180	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*104*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*106*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*106*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 82.3		µg/kg dry	82.3	43.7	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-10	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-03				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 82.3		µg/kg dry	82.3	43.0	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 407		µg/kg dry	407	25.9	1	"	"	"	"	"	X
120-12-7	Anthracene	< 82.3		µg/kg dry	82.3	47.4	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 407		µg/kg dry	407	44.2	1	"	"	"	"	"	
92-87-5	Benzidine	< 815		µg/kg dry	815	25.9	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 82.3		µg/kg dry	82.3	46.3	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 82.3		µg/kg dry	82.3	56.3	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 82.3		µg/kg dry	82.3	62.0	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 82.3		µg/kg dry	82.3	58.1	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 82.3		µg/kg dry	82.3	70.4	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 407		µg/kg dry	407	24.4	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 407		µg/kg dry	407	94.3	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 407		µg/kg dry	407	41.1	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 206		µg/kg dry	206	38.1	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 206		µg/kg dry	206	33.1	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	**305**		µg/kg dry	206	52.5	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 407		µg/kg dry	407	46.0	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 407		µg/kg dry	407	40.9	1	"	"	"	"	"	X
86-74-8	Carbazole	< 206		µg/kg dry	206	47.4	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 407		µg/kg dry	407	47.9	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 206		µg/kg dry	206	25.4	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 407		µg/kg dry	407	55.8	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 206		µg/kg dry	206	39.5	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 407		µg/kg dry	407	39.9	1	"	"	"	"	"	X
218-01-9	Chrysene	< 82.3		µg/kg dry	82.3	46.5	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 82.3		µg/kg dry	82.3	60.9	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 206		µg/kg dry	206	55.4	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 407		µg/kg dry	407	48.6	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 407		µg/kg dry	407	43.9	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 407		µg/kg dry	407	46.3	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 407		µg/kg dry	407	45.1	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 206		µg/kg dry	206	50.0	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 407		µg/kg dry	407	42.7	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 407		µg/kg dry	407	45.8	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 407		µg/kg dry	407	32.2	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 407		µg/kg dry	407	43.6	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 407		µg/kg dry	407	58.4	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 407		µg/kg dry	407	42.2	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 206		µg/kg dry	206	49.4	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 206		µg/kg dry	206	42.1	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 407		µg/kg dry	407	60.6	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 82.3		µg/kg dry	82.3	48.3	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-10	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-03				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 82.3		µg/kg dry	82.3	53.2	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 206		µg/kg dry	206	51.8	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 206		µg/kg dry	206	51.8	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 206		µg/kg dry	206	52.0	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 206		µg/kg dry	206	46.5	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 82.3		µg/kg dry	82.3	56.3	1	"	"	"	"	"	X
78-59-1	Isophorone	< 206		µg/kg dry	206	31.7	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 82.3		µg/kg dry	82.3	57.6	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 407		µg/kg dry	407	32.7	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 407		µg/kg dry	407	32.0	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 82.3		µg/kg dry	82.3	47.5	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 407		µg/kg dry	407	36.9	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 407		µg/kg dry	407	37.6	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 206		µg/kg dry	206	54.3	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 206		µg/kg dry	206	47.6	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 206		µg/kg dry	206	36.0	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1630		µg/kg dry	1630	54.2	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 206		µg/kg dry	206	26.9	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 206		µg/kg dry	206	36.0	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 407		µg/kg dry	407	41.5	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 407		µg/kg dry	407	48.5	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 82.3		µg/kg dry	82.3	46.7	1	"	"	"	"	"	X
108-95-2	Phenol	< 407		µg/kg dry	407	41.2	1	"	"	"	"	"	X
129-00-0	Pyrene	< 82.3		µg/kg dry	82.3	45.4	1	"	"	"	"	"	X
110-86-1	Pyridine	< 407		µg/kg dry	407	96.4	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 407		µg/kg dry	407	50.1	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 82.3		µg/kg dry	82.3	45.4	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 407		µg/kg dry	407	42.1	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 206		µg/kg dry	206	50.4	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 407		µg/kg dry	407	43.3	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 407		µg/kg dry	407	48.5	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*94*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*105*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*88*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*106*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*86*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*73*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 24.3		µg/kg dry	24.3	17.5	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 24.3		µg/kg dry	24.3	7.18	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 24.3		µg/kg dry	24.3	6.73	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-10	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-03				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 24.3		µg/kg dry	24.3	2.31	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 24.3		µg/kg dry	24.3	7.59	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 24.3		µg/kg dry	24.3	18.9	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 24.3		µg/kg dry	24.3	5.22	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 24.3		µg/kg dry	24.3	5.66	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 24.3		µg/kg dry	24.3	5.17	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*80*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*75*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*79*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*72*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546													
319-84-6	alpha-BHC	< 6.07		µg/kg dry	6.07	0.279	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 6.07		µg/kg dry	6.07	0.389	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 6.07		µg/kg dry	6.07	0.316	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.64		µg/kg dry	3.64	0.643	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 6.07		µg/kg dry	6.07	0.704	1	"	"	"	"	"	X
309-00-2	Aldrin	< 6.07		µg/kg dry	6.07	0.206	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 6.07		µg/kg dry	6.07	0.243	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 6.07		µg/kg dry	6.07	0.279	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 6.07		µg/kg dry	6.07	0.291	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 6.07		µg/kg dry	6.07	0.316	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.71		µg/kg dry	9.71	0.595	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.71		µg/kg dry	9.71	0.389	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.71		µg/kg dry	9.71	0.510	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.71		µg/kg dry	9.71	0.886	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.71		µg/kg dry	9.71	4.16	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.71		µg/kg dry	9.71	0.656	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.71		µg/kg dry	9.71	0.352	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.71		µg/kg dry	9.71	1.53	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 6.07		µg/kg dry	6.07	0.255	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 6.07		µg/kg dry	6.07	0.304	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 121		µg/kg dry	121	85.7	1	"	"	"	"	"	X
57-74-9	Chlordane	< 24.3		µg/kg dry	24.3	3.05	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 6.07		µg/kg dry	6.07	0.534	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*87*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*83*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*71*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*70*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-10 SC58794-03	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**109**		mg/kg dry	16.2	13.5	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*76*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*100*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.53		mg/kg dry	3.53	0.191	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**25.4**		mg/kg dry	1.77	0.224	1	"	"	"	"	"	X
7440-39-3	Barium	**26.5**		mg/kg dry	1.18	0.139	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.589		mg/kg dry	0.589	0.0296	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.589		mg/kg dry	0.589	0.0305	1	"	"	"	"	"	X
7440-47-3	Chromium	**22.9**		mg/kg dry	1.18	0.157	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.117		mg/kg dry	0.117	0.0098	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**28.2**		mg/kg dry	1.18	0.135	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**13.7**		mg/kg dry	1.77	0.250	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.89		mg/kg dry	5.89	0.443	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.77		mg/kg dry	1.77	0.337	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.53		mg/kg dry	3.53	1.30	1	"	"	"	"	"	X
7440-62-2	Vanadium	**29.6**		mg/kg dry	1.77	0.313	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**60.8**		mg/kg dry	3.53	0.911	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**80.1**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**6.17**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 13-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 18:17	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*76*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-10 SC58794-03	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 7		mg/kg	7	7	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:32	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-11	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-04				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.23 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 69.3		µg/kg dry	69.3	38.0	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 693		µg/kg dry	693	87.6	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 69.3		µg/kg dry	69.3	25.0	50	"	"	"	"	"	X
71-43-2	Benzene	< 69.3		µg/kg dry	69.3	11.1	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 69.3		µg/kg dry	69.3	15.7	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 69.3		µg/kg dry	69.3	9.91	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 69.3		µg/kg dry	69.3	17.9	50	"	"	"	"	"	X
75-25-2	Bromoform	< 69.3		µg/kg dry	69.3	14.8	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 139		µg/kg dry	139	34.2	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 139		µg/kg dry	139	31.7	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 69.3		µg/kg dry	69.3	27.7	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 69.3		µg/kg dry	69.3	21.3	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 69.3		µg/kg dry	69.3	28.3	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 139		µg/kg dry	139	25.6	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 69.3		µg/kg dry	69.3	20.7	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 69.3		µg/kg dry	69.3	8.39	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 139		µg/kg dry	139	30.9	50	"	"	"	"	"	X
67-66-3	Chloroform	< 69.3		µg/kg dry	69.3	8.18	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 139		µg/kg dry	139	82.4	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 69.3		µg/kg dry	69.3	17.2	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 69.3		µg/kg dry	69.3	12.5	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 139		µg/kg dry	139	27.4	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 69.3		µg/kg dry	69.3	11.0	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 69.3		µg/kg dry	69.3	18.9	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 69.3		µg/kg dry	69.3	13.0	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 69.3		µg/kg dry	69.3	12.5	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 69.3		µg/kg dry	69.3	17.3	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 69.3		µg/kg dry	69.3	12.4	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 139		µg/kg dry	139	90.7	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 69.3		µg/kg dry	69.3	16.0	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 69.3		µg/kg dry	69.3	18.2	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 69.3		µg/kg dry	69.3	17.7	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 69.3		µg/kg dry	69.3	23.1	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 69.3		µg/kg dry	69.3	15.8	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 69.3		µg/kg dry	69.3	24.1	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 69.3		µg/kg dry	69.3	21.9	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 69.3		µg/kg dry	69.3	18.2	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 69.3		µg/kg dry	69.3	21.2	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 69.3		µg/kg dry	69.3	16.4	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 69.3		µg/kg dry	69.3	28.2	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 69.3		µg/kg dry	69.3	14.5	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 69.3		µg/kg dry	69.3	22.2	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 139		µg/kg dry	139	46.1	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-11	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-04				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 16.23 g						
98-82-8	Isopropylbenzene	< 69.3		µg/kg dry	69.3	25.2	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 69.3		µg/kg dry	69.3	19.2	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 69.3		µg/kg dry	69.3	20.9	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 139		µg/kg dry	139	49.6	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 139		µg/kg dry	139	59.2	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 69.3		µg/kg dry	69.3	20.1	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 69.3		µg/kg dry	69.3	17.3	50	"	"	"	"	"	X
100-42-5	Styrene	< 69.3		µg/kg dry	69.3	9.15	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 69.3		µg/kg dry	69.3	16.7	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 69.3		µg/kg dry	69.3	22.0	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 69.3		µg/kg dry	69.3	21.8	50	"	"	"	"	"	X
108-88-3	Toluene	< 69.3		µg/kg dry	69.3	11.2	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 69.3		µg/kg dry	69.3	16.2	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 69.3		µg/kg dry	69.3	11.4	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 69.3		µg/kg dry	69.3	11.0	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 69.3		µg/kg dry	69.3	16.8	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 69.3		µg/kg dry	69.3	21.4	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 69.3		µg/kg dry	69.3	11.9	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 69.3		µg/kg dry	69.3	31.3	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 69.3		µg/kg dry	69.3	32.0	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 69.3		µg/kg dry	69.3	17.5	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 69.3		µg/kg dry	69.3	14.5	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 69.3		µg/kg dry	69.3	34.1	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 139		µg/kg dry	139	40.8	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 69.3		µg/kg dry	69.3	21.4	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 139		µg/kg dry	139	50.7	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 69.3		µg/kg dry	69.3	18.8	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 69.3		µg/kg dry	69.3	38.3	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 69.3		µg/kg dry	69.3	19.2	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 69.3		µg/kg dry	69.3	22.4	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1390		µg/kg dry	1390	984	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1390		µg/kg dry	1390	408	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 347		µg/kg dry	347	45.8	50	"	"	"	"	"	X
64-17-5	Ethanol	< 13900		µg/kg dry	13900	1190	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*104*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*106*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*104*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*105*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 81.8		µg/kg dry	81.8	43.4	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-11	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-04				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 81.8		µg/kg dry	81.8	42.7	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 405		µg/kg dry	405	25.7	1	"	"	"	"	"	X
120-12-7	Anthracene	< 81.8		µg/kg dry	81.8	47.1	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 405		µg/kg dry	405	43.9	1	"	"	"	"	"	
92-87-5	Benzidine	< 809		µg/kg dry	809	25.7	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 81.8		µg/kg dry	81.8	46.0	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 81.8		µg/kg dry	81.8	55.9	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 81.8		µg/kg dry	81.8	61.6	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 81.8		µg/kg dry	81.8	57.7	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 81.8		µg/kg dry	81.8	69.9	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 405		µg/kg dry	405	24.3	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 405		µg/kg dry	405	93.7	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 405		µg/kg dry	405	40.8	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 205		µg/kg dry	205	37.9	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 205		µg/kg dry	205	32.9	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 205		µg/kg dry	205	52.1	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 405		µg/kg dry	405	45.7	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 405		µg/kg dry	405	40.6	1	"	"	"	"	"	X
86-74-8	Carbazole	< 205		µg/kg dry	205	47.1	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 405		µg/kg dry	405	47.6	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 205		µg/kg dry	205	25.3	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 405		µg/kg dry	405	55.4	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 205		µg/kg dry	205	39.2	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 405		µg/kg dry	405	39.6	1	"	"	"	"	"	X
218-01-9	Chrysene	< 81.8		µg/kg dry	81.8	46.2	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 81.8		µg/kg dry	81.8	60.4	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 205		µg/kg dry	205	55.1	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 405		µg/kg dry	405	48.3	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 405		µg/kg dry	405	43.6	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 405		µg/kg dry	405	46.0	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 405		µg/kg dry	405	44.8	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 205		µg/kg dry	205	49.7	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 405		µg/kg dry	405	42.4	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 405		µg/kg dry	405	45.5	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 405		µg/kg dry	405	32.0	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 405		µg/kg dry	405	43.3	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 405		µg/kg dry	405	58.0	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 405		µg/kg dry	405	41.9	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 205		µg/kg dry	205	49.0	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 205		µg/kg dry	205	41.8	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 405		µg/kg dry	405	60.2	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 81.8		µg/kg dry	81.8	47.9	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-11	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-04				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 81.8		µg/kg dry	81.8	52.8	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 205		µg/kg dry	205	51.5	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 205		µg/kg dry	205	51.5	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 205		µg/kg dry	205	51.6	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 205		µg/kg dry	205	46.2	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 81.8		µg/kg dry	81.8	55.9	1	"	"	"	"	"	X
78-59-1	Isophorone	< 205		µg/kg dry	205	31.5	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 81.8		µg/kg dry	81.8	57.3	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 405		µg/kg dry	405	32.5	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 405		µg/kg dry	405	31.8	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 81.8		µg/kg dry	81.8	47.2	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 405		µg/kg dry	405	36.7	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 405		µg/kg dry	405	37.4	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 205		µg/kg dry	205	53.9	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 205		µg/kg dry	205	47.3	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 205		µg/kg dry	205	35.8	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1620		µg/kg dry	1620	53.8	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 205		µg/kg dry	205	26.7	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 205		µg/kg dry	205	35.8	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 405		µg/kg dry	405	41.2	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 405		µg/kg dry	405	48.2	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 81.8		µg/kg dry	81.8	46.3	1	"	"	"	"	"	X
108-95-2	Phenol	< 405		µg/kg dry	405	41.0	1	"	"	"	"	"	X
129-00-0	Pyrene	< 81.8		µg/kg dry	81.8	45.1	1	"	"	"	"	"	X
110-86-1	Pyridine	< 405		µg/kg dry	405	95.8	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 405		µg/kg dry	405	49.8	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 81.8		µg/kg dry	81.8	45.1	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 405		µg/kg dry	405	41.8	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 205		µg/kg dry	205	50.0	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 405		µg/kg dry	405	43.0	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 405		µg/kg dry	405	48.2	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*73*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*86*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*89*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*99*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*84*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*92*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 24.6		µg/kg dry	24.6	17.7	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 24.6		µg/kg dry	24.6	7.27	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 24.6		µg/kg dry	24.6	6.81	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-11	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-04				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 24.6		µg/kg dry	24.6	2.34	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 24.6		µg/kg dry	24.6	7.69	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 24.6		µg/kg dry	24.6	19.1	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 24.6		µg/kg dry	24.6	5.29	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 24.6		µg/kg dry	24.6	5.73	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 24.6		µg/kg dry	24.6	5.24	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*74*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*68*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*78*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*71*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546													
319-84-6	alpha-BHC	< 6.15		µg/kg dry	6.15	0.283	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 6.15		µg/kg dry	6.15	0.394	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 6.15		µg/kg dry	6.15	0.320	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.69		µg/kg dry	3.69	0.652	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 6.15		µg/kg dry	6.15	0.713	1	"	"	"	"	"	X
309-00-2	Aldrin	< 6.15		µg/kg dry	6.15	0.209	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 6.15		µg/kg dry	6.15	0.246	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 6.15		µg/kg dry	6.15	0.283	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 6.15		µg/kg dry	6.15	0.295	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 6.15		µg/kg dry	6.15	0.320	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.84		µg/kg dry	9.84	0.603	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.84		µg/kg dry	9.84	0.394	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.84		µg/kg dry	9.84	0.517	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.84		µg/kg dry	9.84	0.898	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.84		µg/kg dry	9.84	4.22	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.84		µg/kg dry	9.84	0.664	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.84		µg/kg dry	9.84	0.357	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.84		µg/kg dry	9.84	1.55	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 6.15		µg/kg dry	6.15	0.258	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 6.15		µg/kg dry	6.15	0.308	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 123		µg/kg dry	123	86.8	1	"	"	"	"	"	X
57-74-9	Chlordane	< 24.6		µg/kg dry	24.6	3.09	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 6.15		µg/kg dry	6.15	0.541	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*88*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*84*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*61*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*58*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-11 SC58794-04	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**184**		mg/kg dry	16.4	13.8	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*79*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*103*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.74		mg/kg dry	3.74	0.202	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**33.6**		mg/kg dry	1.87	0.237	1	"	"	"	"	"	X
7440-39-3	Barium	**24.8**		mg/kg dry	1.25	0.147	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.624		mg/kg dry	0.624	0.0313	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.624		mg/kg dry	0.624	0.0323	1	"	"	"	"	"	X
7440-47-3	Chromium	**23.2**		mg/kg dry	1.25	0.166	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.126		mg/kg dry	0.126	0.0105	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**30.4**		mg/kg dry	1.25	0.144	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**18.9**		mg/kg dry	1.87	0.265	1	"	"	"	"	"	X
7440-36-0	Antimony	< 6.24		mg/kg dry	6.24	0.469	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.87		mg/kg dry	1.87	0.357	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.74		mg/kg dry	3.74	1.38	1	"	"	"	"	"	X
7440-62-2	Vanadium	**38.3**		mg/kg dry	1.87	0.332	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**43.2**		mg/kg dry	3.74	0.966	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**80.6**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.47**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 13-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 19:30	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*81*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-11 SC58794-04	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 9		mg/kg	9	9	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:33	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-12	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-05				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.77 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 63.7		µg/kg dry	63.7	34.9	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 637		µg/kg dry	637	80.5	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 63.7		µg/kg dry	63.7	23.0	50	"	"	"	"	"	X
71-43-2	Benzene	< 63.7		µg/kg dry	63.7	10.2	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 63.7		µg/kg dry	63.7	14.4	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 63.7		µg/kg dry	63.7	9.11	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 63.7		µg/kg dry	63.7	16.4	50	"	"	"	"	"	X
75-25-2	Bromoform	< 63.7		µg/kg dry	63.7	13.6	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 127		µg/kg dry	127	31.5	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 127		µg/kg dry	127	29.1	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 63.7		µg/kg dry	63.7	25.5	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 63.7		µg/kg dry	63.7	19.6	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 63.7		µg/kg dry	63.7	26.0	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 127		µg/kg dry	127	23.6	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 63.7		µg/kg dry	63.7	19.0	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 63.7		µg/kg dry	63.7	7.71	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 127		µg/kg dry	127	28.4	50	"	"	"	"	"	X
67-66-3	Chloroform	< 63.7		µg/kg dry	63.7	7.52	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 127		µg/kg dry	127	75.7	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 63.7		µg/kg dry	63.7	15.8	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 63.7		µg/kg dry	63.7	11.5	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 127		µg/kg dry	127	25.2	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 63.7		µg/kg dry	63.7	10.1	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 63.7		µg/kg dry	63.7	17.3	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 63.7		µg/kg dry	63.7	12.0	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 63.7		µg/kg dry	63.7	11.5	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 63.7		µg/kg dry	63.7	15.9	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 63.7		µg/kg dry	63.7	11.4	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 127		µg/kg dry	127	83.3	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 63.7		µg/kg dry	63.7	14.7	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 63.7		µg/kg dry	63.7	16.7	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 63.7		µg/kg dry	63.7	16.3	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 63.7		µg/kg dry	63.7	21.2	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 63.7		µg/kg dry	63.7	14.5	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 63.7		µg/kg dry	63.7	22.1	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 63.7		µg/kg dry	63.7	20.1	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 63.7		µg/kg dry	63.7	16.7	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 63.7		µg/kg dry	63.7	19.5	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 63.7		µg/kg dry	63.7	15.0	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 63.7		µg/kg dry	63.7	25.9	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 63.7		µg/kg dry	63.7	13.3	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 63.7		µg/kg dry	63.7	20.4	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 127		µg/kg dry	127	42.4	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-12	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-05				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
						Initial weight: 16.77 g							
98-82-8	Isopropylbenzene	< 63.7		µg/kg dry	63.7	23.1	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 63.7		µg/kg dry	63.7	17.6	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 63.7		µg/kg dry	63.7	19.2	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 127		µg/kg dry	127	45.6	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 127		µg/kg dry	127	54.4	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 63.7		µg/kg dry	63.7	18.5	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 63.7		µg/kg dry	63.7	15.9	50	"	"	"	"	"	X
100-42-5	Styrene	< 63.7		µg/kg dry	63.7	8.41	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 63.7		µg/kg dry	63.7	15.3	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 63.7		µg/kg dry	63.7	20.2	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 63.7		µg/kg dry	63.7	20.1	50	"	"	"	"	"	X
108-88-3	Toluene	< 63.7		µg/kg dry	63.7	10.3	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 63.7		µg/kg dry	63.7	14.8	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 63.7		µg/kg dry	63.7	10.5	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 63.7		µg/kg dry	63.7	10.1	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 63.7		µg/kg dry	63.7	15.4	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 63.7		µg/kg dry	63.7	19.7	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 63.7		µg/kg dry	63.7	10.9	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 63.7		µg/kg dry	63.7	28.8	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 63.7		µg/kg dry	63.7	29.4	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 63.7		µg/kg dry	63.7	16.1	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 63.7		µg/kg dry	63.7	13.3	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 63.7		µg/kg dry	63.7	31.3	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 127		µg/kg dry	127	37.4	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 63.7		µg/kg dry	63.7	19.6	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 127		µg/kg dry	127	46.6	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 63.7		µg/kg dry	63.7	17.3	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 63.7		µg/kg dry	63.7	35.2	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 63.7		µg/kg dry	63.7	17.6	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 63.7		µg/kg dry	63.7	20.6	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1270		µg/kg dry	1270	904	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1270		µg/kg dry	1270	375	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-butene	< 318		µg/kg dry	318	42.0	50	"	"	"	"	"	X
64-17-5	Ethanol	< 12700		µg/kg dry	12700	1100	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*106*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*103*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*102*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*104*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 77.9		µg/kg dry	77.9	41.4	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-12	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-05				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 77.9		µg/kg dry	77.9	40.7	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 385		µg/kg dry	385	24.5	1	"	"	"	"	"	X
120-12-7	Anthracene	< 77.9		µg/kg dry	77.9	44.9	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 385		µg/kg dry	385	41.8	1	"	"	"	"	"	
92-87-5	Benzidine	< 771		µg/kg dry	771	24.5	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 77.9		µg/kg dry	77.9	43.8	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 77.9		µg/kg dry	77.9	53.3	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 77.9		µg/kg dry	77.9	58.6	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 77.9		µg/kg dry	77.9	55.0	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 77.9		µg/kg dry	77.9	66.6	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 385		µg/kg dry	385	23.1	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 385		µg/kg dry	385	89.2	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 385		µg/kg dry	385	38.9	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 195		µg/kg dry	195	36.1	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 195		µg/kg dry	195	31.3	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 195		µg/kg dry	195	49.6	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 385		µg/kg dry	385	43.6	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 385		µg/kg dry	385	38.7	1	"	"	"	"	"	X
86-74-8	Carbazole	< 195		µg/kg dry	195	44.9	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 385		µg/kg dry	385	45.3	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 195		µg/kg dry	195	24.1	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 385		µg/kg dry	385	52.8	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 195		µg/kg dry	195	37.4	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 385		µg/kg dry	385	37.7	1	"	"	"	"	"	X
218-01-9	Chrysene	< 77.9		µg/kg dry	77.9	44.0	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 77.9		µg/kg dry	77.9	57.6	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 195		µg/kg dry	195	52.4	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 385		µg/kg dry	385	46.0	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 385		µg/kg dry	385	41.6	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 385		µg/kg dry	385	43.8	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 385		µg/kg dry	385	42.6	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 195		µg/kg dry	195	47.3	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 385		µg/kg dry	385	40.4	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 385		µg/kg dry	385	43.3	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 385		µg/kg dry	385	30.5	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 385		µg/kg dry	385	41.2	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 385		µg/kg dry	385	55.3	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 385		µg/kg dry	385	39.9	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 195		µg/kg dry	195	46.7	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 195		µg/kg dry	195	39.8	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 385		µg/kg dry	385	57.4	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 77.9		µg/kg dry	77.9	45.7	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-12	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-05				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 77.9		µg/kg dry	77.9	50.3	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 195		µg/kg dry	195	49.1	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 195		µg/kg dry	195	49.1	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 195		µg/kg dry	195	49.2	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 195		µg/kg dry	195	44.0	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 77.9		µg/kg dry	77.9	53.3	1	"	"	"	"	"	X
78-59-1	Isophorone	< 195		µg/kg dry	195	30.0	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 77.9		µg/kg dry	77.9	54.6	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 385		µg/kg dry	385	31.0	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 385		µg/kg dry	385	30.3	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 77.9		µg/kg dry	77.9	45.0	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 385		µg/kg dry	385	34.9	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 385		µg/kg dry	385	35.6	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 195		µg/kg dry	195	51.4	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 195		µg/kg dry	195	45.1	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 195		µg/kg dry	195	34.1	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1540		µg/kg dry	1540	51.3	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 195		µg/kg dry	195	25.5	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 195		µg/kg dry	195	34.1	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 385		µg/kg dry	385	39.2	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 385		µg/kg dry	385	45.9	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 77.9		µg/kg dry	77.9	44.2	1	"	"	"	"	"	X
108-95-2	Phenol	< 385		µg/kg dry	385	39.0	1	"	"	"	"	"	X
129-00-0	Pyrene	< 77.9		µg/kg dry	77.9	43.0	1	"	"	"	"	"	X
110-86-1	Pyridine	< 385		µg/kg dry	385	91.2	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 385		µg/kg dry	385	47.4	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 77.9		µg/kg dry	77.9	43.0	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 385		µg/kg dry	385	39.8	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 195		µg/kg dry	195	47.7	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 385		µg/kg dry	385	41.0	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 385		µg/kg dry	385	45.9	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*88*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*95*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*79*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*99*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*87*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*75*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 23.4		µg/kg dry	23.4	16.9	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 23.4		µg/kg dry	23.4	6.91	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 23.4		µg/kg dry	23.4	6.48	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-12	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-05				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 23.4		µg/kg dry	23.4	2.22	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 23.4		µg/kg dry	23.4	7.31	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 23.4		µg/kg dry	23.4	18.2	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 23.4		µg/kg dry	23.4	5.03	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 23.4		µg/kg dry	23.4	5.45	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 23.4		µg/kg dry	23.4	4.98	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*71*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*68*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*81*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*73*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.85		µg/kg dry	5.85	0.269	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.85		µg/kg dry	5.85	0.374	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.85		µg/kg dry	5.85	0.304	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.51		µg/kg dry	3.51	0.620	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.85		µg/kg dry	5.85	0.678	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.85		µg/kg dry	5.85	0.199	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.85		µg/kg dry	5.85	0.234	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.85		µg/kg dry	5.85	0.269	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.85		µg/kg dry	5.85	0.281	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.85		µg/kg dry	5.85	0.304	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.36		µg/kg dry	9.36	0.573	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.36		µg/kg dry	9.36	0.374	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.36		µg/kg dry	9.36	0.491	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.36		µg/kg dry	9.36	0.854	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.36		µg/kg dry	9.36	4.01	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.36		µg/kg dry	9.36	0.632	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.36		µg/kg dry	9.36	0.339	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.36		µg/kg dry	9.36	1.47	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.85		µg/kg dry	5.85	0.246	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.85		µg/kg dry	5.85	0.292	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 117		µg/kg dry	117	82.5	1	"	"	"	"	"	X
57-74-9	Chlordane	< 23.4		µg/kg dry	23.4	2.94	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.85		µg/kg dry	5.85	0.515	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*88*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*88*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*58*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*55*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-12 SC58794-05	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**180**		mg/kg dry	15.9	13.3	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*84*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*112*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.34		mg/kg dry	3.34	0.180	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**39.2**		mg/kg dry	1.67	0.211	1	"	"	"	"	"	X
7440-39-3	Barium	**21.7**		mg/kg dry	1.11	0.131	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.556		mg/kg dry	0.556	0.0279	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.556		mg/kg dry	0.556	0.0288	1	"	"	"	"	"	X
7440-47-3	Chromium	**17.4**		mg/kg dry	1.11	0.148	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.129		mg/kg dry	0.129	0.0107	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**26.9**		mg/kg dry	1.11	0.128	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**19.6**		mg/kg dry	1.67	0.236	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.56		mg/kg dry	5.56	0.418	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.67		mg/kg dry	1.67	0.318	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.34		mg/kg dry	3.34	1.23	1	"	"	"	"	"	X
7440-62-2	Vanadium	**33.5**		mg/kg dry	1.67	0.296	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**37.9**		mg/kg dry	3.34	0.861	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**83.3**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.71**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 13-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 19:54	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*82*			*30-150 %*			"	"	"	"	"	

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Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-12 SC58794-05	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:33	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-13	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-06				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.9 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 69.5		µg/kg dry	69.5	38.1	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 695		µg/kg dry	695	87.9	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 69.5		µg/kg dry	69.5	25.1	50	"	"	"	"	"	X
71-43-2	Benzene	< 69.5		µg/kg dry	69.5	11.1	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 69.5		µg/kg dry	69.5	15.7	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 69.5		µg/kg dry	69.5	9.94	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 69.5		µg/kg dry	69.5	17.9	50	"	"	"	"	"	X
75-25-2	Bromoform	< 69.5		µg/kg dry	69.5	14.9	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 139		µg/kg dry	139	34.3	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 139		µg/kg dry	139	31.8	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 69.5		µg/kg dry	69.5	27.8	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 69.5		µg/kg dry	69.5	21.3	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 69.5		µg/kg dry	69.5	28.4	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 139		µg/kg dry	139	25.7	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 69.5		µg/kg dry	69.5	20.8	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 69.5		µg/kg dry	69.5	8.41	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 139		µg/kg dry	139	31.0	50	"	"	"	"	"	X
67-66-3	Chloroform	< 69.5		µg/kg dry	69.5	8.20	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 139		µg/kg dry	139	82.6	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 69.5		µg/kg dry	69.5	17.2	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 69.5		µg/kg dry	69.5	12.6	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 139		µg/kg dry	139	27.5	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 69.5		µg/kg dry	69.5	11.0	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 69.5		µg/kg dry	69.5	18.9	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 69.5		µg/kg dry	69.5	13.1	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 69.5		µg/kg dry	69.5	12.5	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 69.5		µg/kg dry	69.5	17.3	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 69.5		µg/kg dry	69.5	12.4	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 139		µg/kg dry	139	90.9	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 69.5		µg/kg dry	69.5	16.1	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 69.5		µg/kg dry	69.5	18.2	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 69.5		µg/kg dry	69.5	17.8	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 69.5		µg/kg dry	69.5	23.1	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 69.5		µg/kg dry	69.5	15.8	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 69.5		µg/kg dry	69.5	24.1	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 69.5		µg/kg dry	69.5	22.0	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 69.5		µg/kg dry	69.5	18.3	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 69.5		µg/kg dry	69.5	21.3	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 69.5		µg/kg dry	69.5	16.4	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 69.5		µg/kg dry	69.5	28.3	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 69.5		µg/kg dry	69.5	14.5	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 69.5		µg/kg dry	69.5	22.2	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 139		µg/kg dry	139	46.2	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-13	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-06				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
						Initial weight: 16.9 g							
98-82-8	Isopropylbenzene	< 69.5		µg/kg dry	69.5	25.2	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 69.5		µg/kg dry	69.5	19.3	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 69.5		µg/kg dry	69.5	20.9	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 139		µg/kg dry	139	49.8	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 139		µg/kg dry	139	59.4	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 69.5		µg/kg dry	69.5	20.2	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 69.5		µg/kg dry	69.5	17.3	50	"	"	"	"	"	X
100-42-5	Styrene	< 69.5		µg/kg dry	69.5	9.17	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 69.5		µg/kg dry	69.5	16.7	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 69.5		µg/kg dry	69.5	22.0	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 69.5		µg/kg dry	69.5	21.9	50	"	"	"	"	"	X
108-88-3	Toluene	< 69.5		µg/kg dry	69.5	11.2	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 69.5		µg/kg dry	69.5	16.2	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 69.5		µg/kg dry	69.5	11.5	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 69.5		µg/kg dry	69.5	11.0	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 69.5		µg/kg dry	69.5	16.8	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 69.5		µg/kg dry	69.5	21.5	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 69.5		µg/kg dry	69.5	11.9	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 69.5		µg/kg dry	69.5	31.4	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 69.5		µg/kg dry	69.5	32.0	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 69.5		µg/kg dry	69.5	17.6	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 69.5		µg/kg dry	69.5	14.5	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 69.5		µg/kg dry	69.5	34.2	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 139		µg/kg dry	139	40.9	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 69.5		µg/kg dry	69.5	21.4	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 139		µg/kg dry	139	50.8	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 69.5		µg/kg dry	69.5	18.8	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 69.5		µg/kg dry	69.5	38.4	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 69.5		µg/kg dry	69.5	19.3	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 69.5		µg/kg dry	69.5	22.4	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1390		µg/kg dry	1390	987	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1390		µg/kg dry	1390	409	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 348		µg/kg dry	348	45.9	50	"	"	"	"	"	X
64-17-5	Ethanol	< 13900		µg/kg dry	13900	1200	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*102*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*103*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*105*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 83.7		µg/kg dry	83.7	44.4	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-13	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-06				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 83.7		µg/kg dry	83.7	43.7	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 414		µg/kg dry	414	26.4	1	"	"	"	"	"	X
120-12-7	Anthracene	< 83.7		µg/kg dry	83.7	48.2	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 414		µg/kg dry	414	44.9	1	"	"	"	"	"	
92-87-5	Benzidine	< 828		µg/kg dry	828	26.4	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 83.7		µg/kg dry	83.7	47.1	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 83.7		µg/kg dry	83.7	57.2	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 83.7		µg/kg dry	83.7	63.0	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 83.7		µg/kg dry	83.7	59.1	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 83.7		µg/kg dry	83.7	71.5	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 414		µg/kg dry	414	24.8	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 414		µg/kg dry	414	95.9	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 414		µg/kg dry	414	41.8	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 210		µg/kg dry	210	38.8	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 210		µg/kg dry	210	33.6	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 210		µg/kg dry	210	53.3	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 414		µg/kg dry	414	46.8	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 414		µg/kg dry	414	41.5	1	"	"	"	"	"	X
86-74-8	Carbazole	< 210		µg/kg dry	210	48.2	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 414		µg/kg dry	414	48.7	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 210		µg/kg dry	210	25.9	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 414		µg/kg dry	414	56.7	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 210		µg/kg dry	210	40.2	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 414		µg/kg dry	414	40.5	1	"	"	"	"	"	X
218-01-9	Chrysene	< 83.7		µg/kg dry	83.7	47.3	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 83.7		µg/kg dry	83.7	61.9	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 210		µg/kg dry	210	56.3	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 414		µg/kg dry	414	49.4	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 414		µg/kg dry	414	44.7	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 414		µg/kg dry	414	47.1	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 414		µg/kg dry	414	45.8	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 210		µg/kg dry	210	50.8	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 414		µg/kg dry	414	43.4	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 414		µg/kg dry	414	46.6	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 414		µg/kg dry	414	32.8	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 414		µg/kg dry	414	44.3	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 414		µg/kg dry	414	59.4	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 414		µg/kg dry	414	42.9	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 210		µg/kg dry	210	50.2	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 210		µg/kg dry	210	42.8	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 414		µg/kg dry	414	61.6	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 83.7		µg/kg dry	83.7	49.1	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-13	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-06				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 83.7		µg/kg dry	83.7	54.1	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 210		µg/kg dry	210	52.7	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 210		µg/kg dry	210	52.7	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 210		µg/kg dry	210	52.8	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 210		µg/kg dry	210	47.3	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 83.7		µg/kg dry	83.7	57.2	1	"	"	"	"	"	X
78-59-1	Isophorone	< 210		µg/kg dry	210	32.3	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 83.7		µg/kg dry	83.7	58.6	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 414		µg/kg dry	414	33.3	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 414		µg/kg dry	414	32.5	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 83.7		µg/kg dry	83.7	48.3	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 414		µg/kg dry	414	37.5	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 414		µg/kg dry	414	38.3	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 210		µg/kg dry	210	55.2	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 210		µg/kg dry	210	48.4	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 210		µg/kg dry	210	36.6	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1660		µg/kg dry	1660	55.1	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 210		µg/kg dry	210	27.4	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 210		µg/kg dry	210	36.6	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 414		µg/kg dry	414	42.2	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 414		µg/kg dry	414	49.3	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 83.7		µg/kg dry	83.7	47.4	1	"	"	"	"	"	X
108-95-2	Phenol	< 414		µg/kg dry	414	41.9	1	"	"	"	"	"	X
129-00-0	Pyrene	< 83.7		µg/kg dry	83.7	46.2	1	"	"	"	"	"	X
110-86-1	Pyridine	< 414		µg/kg dry	414	98.0	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 414		µg/kg dry	414	50.9	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 83.7		µg/kg dry	83.7	46.2	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 414		µg/kg dry	414	42.8	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 210		µg/kg dry	210	51.2	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 414		µg/kg dry	414	44.0	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 414		µg/kg dry	414	49.3	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*94*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*88*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*84*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*100*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*77*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*84*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 25.2		µg/kg dry	25.2	18.2	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 25.2		µg/kg dry	25.2	7.45	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 25.2		µg/kg dry	25.2	6.98	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-13	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-06				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 25.2		µg/kg dry	25.2	2.39	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 25.2		µg/kg dry	25.2	7.88	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 25.2		µg/kg dry	25.2	19.6	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 25.2		µg/kg dry	25.2	5.42	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 25.2		µg/kg dry	25.2	5.87	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 25.2		µg/kg dry	25.2	5.37	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*91*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*84*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*84*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*76*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 6.30		µg/kg dry	6.30	0.290	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 6.30		µg/kg dry	6.30	0.403	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 6.30		µg/kg dry	6.30	0.328	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.78		µg/kg dry	3.78	0.668	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 6.30		µg/kg dry	6.30	0.731	1	"	"	"	"	"	X
309-00-2	Aldrin	< 6.30		µg/kg dry	6.30	0.214	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 6.30		µg/kg dry	6.30	0.252	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 6.30		µg/kg dry	6.30	0.290	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 6.30		µg/kg dry	6.30	0.302	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 6.30		µg/kg dry	6.30	0.328	1	"	"	"	"	"	X
72-20-8	Endrin	< 10.1		µg/kg dry	10.1	0.618	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 10.1		µg/kg dry	10.1	0.403	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 10.1		µg/kg dry	10.1	0.529	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 10.1		µg/kg dry	10.1	0.920	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 10.1		µg/kg dry	10.1	4.32	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 10.1		µg/kg dry	10.1	0.681	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 10.1		µg/kg dry	10.1	0.365	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 10.1		µg/kg dry	10.1	1.59	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 6.30		µg/kg dry	6.30	0.265	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 6.30		µg/kg dry	6.30	0.315	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 126		µg/kg dry	126	88.9	1	"	"	"	"	"	X
57-74-9	Chlordane	< 25.2		µg/kg dry	25.2	3.17	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 6.30		µg/kg dry	6.30	0.555	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*72*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*62*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*52*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*53*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-13 SC58794-06	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**93.0**		mg/kg dry	16.5	13.8	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*78*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*105*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.67		mg/kg dry	3.67	0.198	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**49.1**		mg/kg dry	1.83	0.232	1	"	"	"	"	"	X
7440-39-3	Barium	**28.9**		mg/kg dry	1.22	0.144	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.611		mg/kg dry	0.611	0.0307	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.611		mg/kg dry	0.611	0.0316	1	"	"	"	"	"	X
7440-47-3	Chromium	**23.3**		mg/kg dry	1.22	0.163	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.133		mg/kg dry	0.133	0.0111	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**37.2**		mg/kg dry	1.22	0.141	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**22.7**		mg/kg dry	1.83	0.259	1	"	"	"	"	"	X
7440-36-0	Antimony	< 6.11		mg/kg dry	6.11	0.459	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.83		mg/kg dry	1.83	0.349	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.67		mg/kg dry	3.67	1.35	1	"	"	"	"	"	X
7440-62-2	Vanadium	**34.6**		mg/kg dry	1.83	0.325	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**49.2**		mg/kg dry	3.67	0.946	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**79.0**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**6.35**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 13-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 20:19	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*85*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-13 SC58794-06	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 7		mg/kg	7	7	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:34	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-14	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-07				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.96 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 58.5		µg/kg dry	58.5	32.0	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 585		µg/kg dry	585	73.9	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 58.5		µg/kg dry	58.5	21.1	50	"	"	"	"	"	X
71-43-2	Benzene	< 58.5		µg/kg dry	58.5	9.36	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 58.5		µg/kg dry	58.5	13.2	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 58.5		µg/kg dry	58.5	8.36	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 58.5		µg/kg dry	58.5	15.1	50	"	"	"	"	"	X
75-25-2	Bromoform	< 58.5		µg/kg dry	58.5	12.5	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 117		µg/kg dry	117	28.9	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 117		µg/kg dry	117	26.7	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 58.5		µg/kg dry	58.5	23.4	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 58.5		µg/kg dry	58.5	18.0	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 58.5		µg/kg dry	58.5	23.9	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 117		µg/kg dry	117	21.6	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 58.5		µg/kg dry	58.5	17.5	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 58.5		µg/kg dry	58.5	7.08	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 117		µg/kg dry	117	26.1	50	"	"	"	"	"	X
67-66-3	Chloroform	< 58.5		µg/kg dry	58.5	6.90	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 117		µg/kg dry	117	69.5	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 58.5		µg/kg dry	58.5	14.5	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 58.5		µg/kg dry	58.5	10.6	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 117		µg/kg dry	117	23.1	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 58.5		µg/kg dry	58.5	9.24	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 58.5		µg/kg dry	58.5	15.9	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 58.5		µg/kg dry	58.5	11.0	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 58.5		µg/kg dry	58.5	10.5	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 58.5		µg/kg dry	58.5	14.6	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 58.5		µg/kg dry	58.5	10.5	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 117		µg/kg dry	117	76.5	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 58.5		µg/kg dry	58.5	13.5	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 58.5		µg/kg dry	58.5	15.3	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 58.5		µg/kg dry	58.5	15.0	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 58.5		µg/kg dry	58.5	19.5	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 58.5		µg/kg dry	58.5	13.3	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 58.5		µg/kg dry	58.5	20.3	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 58.5		µg/kg dry	58.5	18.5	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 58.5		µg/kg dry	58.5	15.4	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 58.5		µg/kg dry	58.5	17.9	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 58.5		µg/kg dry	58.5	13.8	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 58.5		µg/kg dry	58.5	23.8	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 58.5		µg/kg dry	58.5	12.2	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 58.5		µg/kg dry	58.5	18.7	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 117		µg/kg dry	117	38.9	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-14	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-07				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 16.96 g						
98-82-8	Isopropylbenzene	< 58.5		µg/kg dry	58.5	21.2	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 58.5		µg/kg dry	58.5	16.2	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 58.5		µg/kg dry	58.5	17.6	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 117		µg/kg dry	117	41.9	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 117		µg/kg dry	117	49.9	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 58.5		µg/kg dry	58.5	17.0	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 58.5		µg/kg dry	58.5	14.6	50	"	"	"	"	"	X
100-42-5	Styrene	< 58.5		µg/kg dry	58.5	7.72	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 58.5		µg/kg dry	58.5	14.1	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 58.5		µg/kg dry	58.5	18.5	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 58.5		µg/kg dry	58.5	18.4	50	"	"	"	"	"	X
108-88-3	Toluene	< 58.5		µg/kg dry	58.5	9.41	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 58.5		µg/kg dry	58.5	13.6	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 58.5		µg/kg dry	58.5	9.65	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 58.5		µg/kg dry	58.5	9.24	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 58.5		µg/kg dry	58.5	14.2	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 58.5		µg/kg dry	58.5	18.1	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 58.5		µg/kg dry	58.5	10.0	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 58.5		µg/kg dry	58.5	26.4	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 58.5		µg/kg dry	58.5	27.0	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 58.5		µg/kg dry	58.5	14.8	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 58.5		µg/kg dry	58.5	12.2	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 58.5		µg/kg dry	58.5	28.8	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 117		µg/kg dry	117	34.4	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 58.5		µg/kg dry	58.5	18.0	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 117		µg/kg dry	117	42.7	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 58.5		µg/kg dry	58.5	15.8	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 58.5		µg/kg dry	58.5	32.3	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 58.5		µg/kg dry	58.5	16.2	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 58.5		µg/kg dry	58.5	18.9	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1170		µg/kg dry	1170	830	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1170		µg/kg dry	1170	344	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 292		µg/kg dry	292	38.6	50	"	"	"	"	"	X
64-17-5	Ethanol	< 11700		µg/kg dry	11700	1010	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*107*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*104*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*107*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 75.8		µg/kg dry	75.8	40.2	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-14	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-07				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 75.8		µg/kg dry	75.8	39.5	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 375		µg/kg dry	375	23.9	1	"	"	"	"	"	X
120-12-7	Anthracene	< 75.8		µg/kg dry	75.8	43.6	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 375		µg/kg dry	375	40.7	1	"	"	"	"	"	
92-87-5	Benzidine	< 750		µg/kg dry	750	23.9	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 75.8		µg/kg dry	75.8	42.6	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 75.8		µg/kg dry	75.8	51.8	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 75.8		µg/kg dry	75.8	57.0	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 75.8		µg/kg dry	75.8	53.5	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 75.8		µg/kg dry	75.8	64.7	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 375		µg/kg dry	375	22.5	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 375		µg/kg dry	375	86.8	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 375		µg/kg dry	375	37.8	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 190		µg/kg dry	190	35.1	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 190		µg/kg dry	190	30.4	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 190		µg/kg dry	190	48.3	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 375		µg/kg dry	375	42.4	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 375		µg/kg dry	375	37.6	1	"	"	"	"	"	X
86-74-8	Carbazole	< 190		µg/kg dry	190	43.6	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 375		µg/kg dry	375	44.1	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 190		µg/kg dry	190	23.4	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 375		µg/kg dry	375	51.3	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 190		µg/kg dry	190	36.3	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 375		µg/kg dry	375	36.7	1	"	"	"	"	"	X
218-01-9	Chrysene	< 75.8		µg/kg dry	75.8	42.8	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 75.8		µg/kg dry	75.8	56.0	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 190		µg/kg dry	190	51.0	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 375		µg/kg dry	375	44.8	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 375		µg/kg dry	375	40.4	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 375		µg/kg dry	375	42.6	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 375		µg/kg dry	375	41.5	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 190		µg/kg dry	190	46.0	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 375		µg/kg dry	375	39.3	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 375		µg/kg dry	375	42.1	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 375		µg/kg dry	375	29.6	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 375		µg/kg dry	375	40.1	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 375		µg/kg dry	375	53.7	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 375		µg/kg dry	375	38.8	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 190		µg/kg dry	190	45.4	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 190		µg/kg dry	190	38.7	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 375		µg/kg dry	375	55.8	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 75.8		µg/kg dry	75.8	44.4	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-14	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-07				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 75.8		µg/kg dry	75.8	49.0	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 190		µg/kg dry	190	47.7	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 190		µg/kg dry	190	47.7	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 190		µg/kg dry	190	47.8	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 190		µg/kg dry	190	42.8	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 75.8		µg/kg dry	75.8	51.8	1	"	"	"	"	"	X
78-59-1	Isophorone	< 190		µg/kg dry	190	29.2	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 75.8		µg/kg dry	75.8	53.0	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 375		µg/kg dry	375	30.1	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 375		µg/kg dry	375	29.4	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 75.8		µg/kg dry	75.8	43.7	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 375		µg/kg dry	375	34.0	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 375		µg/kg dry	375	34.6	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 190		µg/kg dry	190	50.0	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 190		µg/kg dry	190	43.8	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 190		µg/kg dry	190	33.2	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1500		µg/kg dry	1500	49.9	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 190		µg/kg dry	190	24.8	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 190		µg/kg dry	190	33.2	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 375		µg/kg dry	375	38.2	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 375		µg/kg dry	375	44.6	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 75.8		µg/kg dry	75.8	42.9	1	"	"	"	"	"	X
108-95-2	Phenol	< 375		µg/kg dry	375	37.9	1	"	"	"	"	"	X
129-00-0	Pyrene	< 75.8		µg/kg dry	75.8	41.8	1	"	"	"	"	"	X
110-86-1	Pyridine	< 375		µg/kg dry	375	88.7	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 375		µg/kg dry	375	46.1	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 75.8		µg/kg dry	75.8	41.8	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 375		µg/kg dry	375	38.7	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 190		µg/kg dry	190	46.3	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 375		µg/kg dry	375	39.9	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 375		µg/kg dry	375	44.6	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*94*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*96*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*83*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*106*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*89*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*71*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 22.5		µg/kg dry	22.5	16.2	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 22.5		µg/kg dry	22.5	6.65	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 22.5		µg/kg dry	22.5	6.24	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-14	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-07				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 22.5		µg/kg dry	22.5	2.14	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 22.5		µg/kg dry	22.5	7.04	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 22.5		µg/kg dry	22.5	17.5	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 22.5		µg/kg dry	22.5	4.84	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 22.5		µg/kg dry	22.5	5.25	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 22.5		µg/kg dry	22.5	4.80	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*94*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*85*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*84*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*75*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.63		µg/kg dry	5.63	0.259	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.63		µg/kg dry	5.63	0.360	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.63		µg/kg dry	5.63	0.293	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.38		µg/kg dry	3.38	0.597	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.63		µg/kg dry	5.63	0.653	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.63		µg/kg dry	5.63	0.191	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.63		µg/kg dry	5.63	0.225	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.63		µg/kg dry	5.63	0.259	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.63		µg/kg dry	5.63	0.270	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.63		µg/kg dry	5.63	0.293	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.01		µg/kg dry	9.01	0.552	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.01		µg/kg dry	9.01	0.360	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.01		µg/kg dry	9.01	0.473	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.01		µg/kg dry	9.01	0.822	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.01		µg/kg dry	9.01	3.86	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.01		µg/kg dry	9.01	0.608	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.01		µg/kg dry	9.01	0.326	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.01		µg/kg dry	9.01	1.42	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.63		µg/kg dry	5.63	0.236	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.63		µg/kg dry	5.63	0.281	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 113		µg/kg dry	113	79.4	1	"	"	"	"	"	X
57-74-9	Chlordane	< 22.5		µg/kg dry	22.5	2.83	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.63		µg/kg dry	5.63	0.495	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*80*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*80*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*57*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*67*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-14 SC58794-07	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**116**		mg/kg dry	15.2	12.7	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*75*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*101*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.38		mg/kg dry	3.38	0.183	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**23.7**		mg/kg dry	1.69	0.214	1	"	"	"	"	"	X
7440-39-3	Barium	**44.1**		mg/kg dry	1.13	0.133	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.563		mg/kg dry	0.563	0.0283	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.563		mg/kg dry	0.563	0.0292	1	"	"	"	"	"	X
7440-47-3	Chromium	**36.0**		mg/kg dry	1.13	0.150	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.118		mg/kg dry	0.118	0.0098	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**26.1**		mg/kg dry	1.13	0.130	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**13.7**		mg/kg dry	1.69	0.239	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.63		mg/kg dry	5.63	0.424	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.69		mg/kg dry	1.69	0.322	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.38		mg/kg dry	3.38	1.24	1	"	"	"	"	"	X
7440-62-2	Vanadium	**41.9**		mg/kg dry	1.69	0.300	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**44.6**		mg/kg dry	3.38	0.872	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**86.9**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**6.03**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 13-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 21:33	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*81*			*30-150 %*			"	"	"	"	"	

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Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-14 SC58794-07	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:37	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-16	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-08				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 17.1 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 54.0		µg/kg dry	54.0	29.6	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 540		µg/kg dry	540	68.3	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 54.0		µg/kg dry	54.0	19.5	50	"	"	"	"	"	X
71-43-2	Benzene	< 54.0		µg/kg dry	54.0	8.64	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 54.0		µg/kg dry	54.0	12.2	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 54.0		µg/kg dry	54.0	7.72	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 54.0		µg/kg dry	54.0	13.9	50	"	"	"	"	"	X
75-25-2	Bromoform	< 54.0		µg/kg dry	54.0	11.6	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 108		µg/kg dry	108	26.7	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 108		µg/kg dry	108	24.7	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 54.0		µg/kg dry	54.0	21.6	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 54.0		µg/kg dry	54.0	16.6	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 54.0		µg/kg dry	54.0	22.0	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 108		µg/kg dry	108	20.0	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 54.0		µg/kg dry	54.0	16.1	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 54.0		µg/kg dry	54.0	6.53	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 108		µg/kg dry	108	24.1	50	"	"	"	"	"	X
67-66-3	Chloroform	< 54.0		µg/kg dry	54.0	6.37	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 108		µg/kg dry	108	64.1	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 54.0		µg/kg dry	54.0	13.4	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 54.0		µg/kg dry	54.0	9.77	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 108		µg/kg dry	108	21.3	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 54.0		µg/kg dry	54.0	8.53	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 54.0		µg/kg dry	54.0	14.7	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 54.0		µg/kg dry	54.0	10.2	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 54.0		µg/kg dry	54.0	9.72	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 54.0		µg/kg dry	54.0	13.4	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 54.0		µg/kg dry	54.0	9.67	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 108		µg/kg dry	108	70.6	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 54.0		µg/kg dry	54.0	12.5	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 54.0		µg/kg dry	54.0	14.1	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 54.0		µg/kg dry	54.0	13.8	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 54.0		µg/kg dry	54.0	18.0	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 54.0		µg/kg dry	54.0	12.3	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 54.0		µg/kg dry	54.0	18.7	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 54.0		µg/kg dry	54.0	17.1	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 54.0		µg/kg dry	54.0	14.2	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 54.0		µg/kg dry	54.0	16.5	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 54.0		µg/kg dry	54.0	12.7	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 54.0		µg/kg dry	54.0	22.0	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 54.0		µg/kg dry	54.0	11.3	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 54.0		µg/kg dry	54.0	17.3	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 108		µg/kg dry	108	35.9	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-16	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-08				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260							Initial weight: 17.1 g						
98-82-8	Isopropylbenzene	< 54.0		µg/kg dry	54.0	19.6	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 54.0		µg/kg dry	54.0	15.0	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 54.0		µg/kg dry	54.0	16.3	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 108		µg/kg dry	108	38.7	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 108		µg/kg dry	108	46.1	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 54.0		µg/kg dry	54.0	15.7	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 54.0		µg/kg dry	54.0	13.4	50	"	"	"	"	"	X
100-42-5	Styrene	< 54.0		µg/kg dry	54.0	7.13	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 54.0		µg/kg dry	54.0	13.0	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 54.0		µg/kg dry	54.0	17.1	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 54.0		µg/kg dry	54.0	17.0	50	"	"	"	"	"	X
108-88-3	Toluene	< 54.0		µg/kg dry	54.0	8.69	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 54.0		µg/kg dry	54.0	12.6	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 54.0		µg/kg dry	54.0	8.91	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 54.0		µg/kg dry	54.0	8.53	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 54.0		µg/kg dry	54.0	13.1	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 54.0		µg/kg dry	54.0	16.7	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 54.0		µg/kg dry	54.0	9.23	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 54.0		µg/kg dry	54.0	24.4	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 54.0		µg/kg dry	54.0	24.9	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 54.0		µg/kg dry	54.0	13.7	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 54.0		µg/kg dry	54.0	11.3	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 54.0		µg/kg dry	54.0	26.6	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 108		µg/kg dry	108	31.7	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 54.0		µg/kg dry	54.0	16.6	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 108		µg/kg dry	108	39.5	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 54.0		µg/kg dry	54.0	14.6	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 54.0		µg/kg dry	54.0	29.9	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 54.0		µg/kg dry	54.0	15.0	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 54.0		µg/kg dry	54.0	17.4	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1080		µg/kg dry	1080	767	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1080		µg/kg dry	1080	318	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 270		µg/kg dry	270	35.6	50	"	"	"	"	"	X
64-17-5	Ethanol	< 10800		µg/kg dry	10800	930	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*104*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*105*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 73.0		µg/kg dry	73.0	38.7	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-16	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-08				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 73.0		µg/kg dry	73.0	38.1	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 361		µg/kg dry	361	23.0	1	"	"	"	"	"	X
120-12-7	Anthracene	< 73.0		µg/kg dry	73.0	42.0	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 361		µg/kg dry	361	39.2	1	"	"	"	"	"	
92-87-5	Benzidine	< 722		µg/kg dry	722	23.0	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 73.0		µg/kg dry	73.0	41.0	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 73.0		µg/kg dry	73.0	49.9	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 73.0		µg/kg dry	73.0	54.9	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 73.0		µg/kg dry	73.0	51.5	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 73.0		µg/kg dry	73.0	62.4	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 361		µg/kg dry	361	21.7	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 361		µg/kg dry	361	83.6	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 361		µg/kg dry	361	36.4	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 183		µg/kg dry	183	33.8	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 183		µg/kg dry	183	29.3	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 183		µg/kg dry	183	46.5	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 361		µg/kg dry	361	40.8	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 361		µg/kg dry	361	36.2	1	"	"	"	"	"	X
86-74-8	Carbazole	< 183		µg/kg dry	183	42.0	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 361		µg/kg dry	361	42.5	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 183		µg/kg dry	183	22.5	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 361		µg/kg dry	361	49.5	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 183		µg/kg dry	183	35.0	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 361		µg/kg dry	361	35.3	1	"	"	"	"	"	X
218-01-9	Chrysene	< 73.0		µg/kg dry	73.0	41.3	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 73.0		µg/kg dry	73.0	53.9	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 183		µg/kg dry	183	49.1	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 361		µg/kg dry	361	43.1	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 361		µg/kg dry	361	39.0	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 361		µg/kg dry	361	41.0	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 361		µg/kg dry	361	39.9	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 183		µg/kg dry	183	44.3	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 361		µg/kg dry	361	37.9	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 361		µg/kg dry	361	40.6	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 361		µg/kg dry	361	28.6	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 361		µg/kg dry	361	38.6	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 361		µg/kg dry	361	51.8	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 361		µg/kg dry	361	37.4	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 183		µg/kg dry	183	43.8	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 183		µg/kg dry	183	37.3	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 361		µg/kg dry	361	53.7	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 73.0		µg/kg dry	73.0	42.8	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-16	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-08				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 73.0		µg/kg dry	73.0	47.2	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 183		µg/kg dry	183	46.0	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 183		µg/kg dry	183	46.0	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 183		µg/kg dry	183	46.1	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 183		µg/kg dry	183	41.3	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 73.0		µg/kg dry	73.0	49.9	1	"	"	"	"	"	X
78-59-1	Isophorone	< 183		µg/kg dry	183	28.1	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 73.0		µg/kg dry	73.0	51.1	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 361		µg/kg dry	361	29.0	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 361		µg/kg dry	361	28.3	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 73.0		µg/kg dry	73.0	42.1	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 361		µg/kg dry	361	32.7	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 361		µg/kg dry	361	33.4	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 183		µg/kg dry	183	48.1	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 183		µg/kg dry	183	42.2	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 183		µg/kg dry	183	32.0	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1440		µg/kg dry	1440	48.0	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 183		µg/kg dry	183	23.9	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 183		µg/kg dry	183	32.0	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 361		µg/kg dry	361	36.8	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 361		µg/kg dry	361	43.0	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 73.0		µg/kg dry	73.0	41.4	1	"	"	"	"	"	X
108-95-2	Phenol	< 361		µg/kg dry	361	36.5	1	"	"	"	"	"	X
129-00-0	Pyrene	< 73.0		µg/kg dry	73.0	40.3	1	"	"	"	"	"	X
110-86-1	Pyridine	< 361		µg/kg dry	361	85.5	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 361		µg/kg dry	361	44.4	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 73.0		µg/kg dry	73.0	40.3	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 361		µg/kg dry	361	37.3	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 183		µg/kg dry	183	44.6	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 361		µg/kg dry	361	38.4	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 361		µg/kg dry	361	43.0	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*64*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*85*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*78*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*90*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*84*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*74*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 21.8		µg/kg dry	21.8	15.7	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 21.8		µg/kg dry	21.8	6.43	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 21.8		µg/kg dry	21.8	6.03	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-16	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-08				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 21.8		µg/kg dry	21.8	2.07	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 21.8		µg/kg dry	21.8	6.80	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 21.8		µg/kg dry	21.8	16.9	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 21.8		µg/kg dry	21.8	4.68	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 21.8		µg/kg dry	21.8	5.07	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 21.8		µg/kg dry	21.8	4.64	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*73*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*67*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*81*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*74*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.44		µg/kg dry	5.44	0.250	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.44		µg/kg dry	5.44	0.348	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.44		µg/kg dry	5.44	0.283	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.26		µg/kg dry	3.26	0.577	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.44		µg/kg dry	5.44	0.631	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.44		µg/kg dry	5.44	0.185	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.44		µg/kg dry	5.44	0.218	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.44		µg/kg dry	5.44	0.250	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.44		µg/kg dry	5.44	0.261	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.44		µg/kg dry	5.44	0.283	1	"	"	"	"	"	X
72-20-8	Endrin	< 8.71		µg/kg dry	8.71	0.533	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 8.71		µg/kg dry	8.71	0.348	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 8.71		µg/kg dry	8.71	0.457	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 8.71		µg/kg dry	8.71	0.794	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 8.71		µg/kg dry	8.71	3.73	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 8.71		µg/kg dry	8.71	0.588	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 8.71		µg/kg dry	8.71	0.316	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 8.71		µg/kg dry	8.71	1.37	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.44		µg/kg dry	5.44	0.229	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.44		µg/kg dry	5.44	0.272	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 109		µg/kg dry	109	76.8	1	"	"	"	"	"	X
57-74-9	Chlordane	< 21.8		µg/kg dry	21.8	2.74	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.44		µg/kg dry	5.44	0.479	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*68*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*61*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*53*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*55*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-16	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-08				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC													
Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**93.6**		mg/kg dry	14.7	12.3	1	SW846 8100Mod.	14-Jul-20	16-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*73*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*97*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.35		mg/kg dry	3.35	0.181	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**36.6**		mg/kg dry	1.67	0.212	1	"	"	"	"	"	X
7440-39-3	Barium	**24.0**		mg/kg dry	1.12	0.132	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.558		mg/kg dry	0.558	0.0280	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.558		mg/kg dry	0.558	0.0289	1	"	"	"	"	"	X
7440-47-3	Chromium	**21.7**		mg/kg dry	1.12	0.148	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.119		mg/kg dry	0.119	0.0099	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**30.6**		mg/kg dry	1.12	0.128	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**17.5**		mg/kg dry	1.67	0.237	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.58		mg/kg dry	5.58	0.420	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.67		mg/kg dry	1.67	0.319	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.35		mg/kg dry	3.35	1.23	1	"	"	"	"	"	X
7440-62-2	Vanadium	**30.6**		mg/kg dry	1.67	0.297	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**44.3**		mg/kg dry	3.35	0.864	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**90.3**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**6.08**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses													
Prepared by method SW8151A										Methylation date: 13-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 21:57	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*84*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-16 SC58794-08	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:38	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-17	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-09				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 17.77 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 52.9		µg/kg dry	52.9	29.0	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 529		µg/kg dry	529	66.8	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 52.9		µg/kg dry	52.9	19.1	50	"	"	"	"	"	X
71-43-2	Benzene	< 52.9		µg/kg dry	52.9	8.46	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 52.9		µg/kg dry	52.9	12.0	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 52.9		µg/kg dry	52.9	7.56	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 52.9		µg/kg dry	52.9	13.6	50	"	"	"	"	"	X
75-25-2	Bromoform	< 52.9		µg/kg dry	52.9	11.3	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 106		µg/kg dry	106	26.1	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 106		µg/kg dry	106	24.2	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 52.9		µg/kg dry	52.9	21.2	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 52.9		µg/kg dry	52.9	16.2	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 52.9		µg/kg dry	52.9	21.6	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 106		µg/kg dry	106	19.6	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 52.9		µg/kg dry	52.9	15.8	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 52.9		µg/kg dry	52.9	6.40	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 106		µg/kg dry	106	23.6	50	"	"	"	"	"	X
67-66-3	Chloroform	< 52.9		µg/kg dry	52.9	6.24	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 106		µg/kg dry	106	62.8	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 52.9		µg/kg dry	52.9	13.1	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 52.9		µg/kg dry	52.9	9.57	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 106		µg/kg dry	106	20.9	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 52.9		µg/kg dry	52.9	8.35	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 52.9		µg/kg dry	52.9	14.4	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 52.9		µg/kg dry	52.9	9.94	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 52.9		µg/kg dry	52.9	9.52	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 52.9		µg/kg dry	52.9	13.2	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 52.9		µg/kg dry	52.9	9.47	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 106		µg/kg dry	106	69.2	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 52.9		µg/kg dry	52.9	12.2	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 52.9		µg/kg dry	52.9	13.9	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 52.9		µg/kg dry	52.9	13.5	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 52.9		µg/kg dry	52.9	17.6	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 52.9		µg/kg dry	52.9	12.1	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 52.9		µg/kg dry	52.9	18.3	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 52.9		µg/kg dry	52.9	16.7	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 52.9		µg/kg dry	52.9	13.9	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 52.9		µg/kg dry	52.9	16.2	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 52.9		µg/kg dry	52.9	12.5	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 52.9		µg/kg dry	52.9	21.5	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 52.9		µg/kg dry	52.9	11.1	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 52.9		µg/kg dry	52.9	16.9	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 106		µg/kg dry	106	35.2	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-17	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-09				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 17.77 g						
98-82-8	Isopropylbenzene	< 52.9		µg/kg dry	52.9	19.2	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 52.9		µg/kg dry	52.9	14.6	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 52.9		µg/kg dry	52.9	15.9	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 106		µg/kg dry	106	37.9	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 106		µg/kg dry	106	45.2	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 52.9		µg/kg dry	52.9	15.3	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 52.9		µg/kg dry	52.9	13.2	50	"	"	"	"	"	X
100-42-5	Styrene	< 52.9		µg/kg dry	52.9	6.98	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 52.9		µg/kg dry	52.9	12.7	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 52.9		µg/kg dry	52.9	16.8	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 52.9		µg/kg dry	52.9	16.7	50	"	"	"	"	"	X
108-88-3	Toluene	< 52.9		µg/kg dry	52.9	8.51	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 52.9		µg/kg dry	52.9	12.3	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 52.9		µg/kg dry	52.9	8.72	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 52.9		µg/kg dry	52.9	8.35	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 52.9		µg/kg dry	52.9	12.8	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 52.9		µg/kg dry	52.9	16.3	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 52.9		µg/kg dry	52.9	9.04	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 52.9		µg/kg dry	52.9	23.9	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 52.9		µg/kg dry	52.9	24.4	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 52.9		µg/kg dry	52.9	13.4	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 52.9		µg/kg dry	52.9	11.1	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 52.9		µg/kg dry	52.9	26.0	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 106		µg/kg dry	106	31.1	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 52.9		µg/kg dry	52.9	16.3	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 106		µg/kg dry	106	38.7	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 52.9		µg/kg dry	52.9	14.3	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 52.9		µg/kg dry	52.9	29.2	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 52.9		µg/kg dry	52.9	14.6	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 52.9		µg/kg dry	52.9	17.1	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1060		µg/kg dry	1060	751	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1060		µg/kg dry	1060	311	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 264		µg/kg dry	264	34.9	50	"	"	"	"	"	X
64-17-5	Ethanol	< 10600		µg/kg dry	10600	911	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*102*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*106*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*106*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 72.0		µg/kg dry	72.0	38.2	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-17	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-09				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 72.0		µg/kg dry	72.0	37.6	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 356		µg/kg dry	356	22.7	1	"	"	"	"	"	X
120-12-7	Anthracene	< 72.0		µg/kg dry	72.0	41.5	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 356		µg/kg dry	356	38.7	1	"	"	"	"	"	
92-87-5	Benzidine	< 713		µg/kg dry	713	22.7	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 72.0		µg/kg dry	72.0	40.5	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 72.0		µg/kg dry	72.0	49.2	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 72.0		µg/kg dry	72.0	54.2	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 72.0		µg/kg dry	72.0	50.9	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 72.0		µg/kg dry	72.0	61.5	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 356		µg/kg dry	356	21.4	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 356		µg/kg dry	356	82.5	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 356		µg/kg dry	356	36.0	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 180		µg/kg dry	180	33.4	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 180		µg/kg dry	180	28.9	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 180		µg/kg dry	180	45.9	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 356		µg/kg dry	356	40.3	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 356		µg/kg dry	356	35.7	1	"	"	"	"	"	X
86-74-8	Carbazole	< 180		µg/kg dry	180	41.5	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 356		µg/kg dry	356	41.9	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 180		µg/kg dry	180	22.2	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 356		µg/kg dry	356	48.8	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 180		µg/kg dry	180	34.6	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 356		µg/kg dry	356	34.9	1	"	"	"	"	"	X
218-01-9	Chrysene	< 72.0		µg/kg dry	72.0	40.7	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 72.0		µg/kg dry	72.0	53.2	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 180		µg/kg dry	180	48.5	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 356		µg/kg dry	356	42.5	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 356		µg/kg dry	356	38.4	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 356		µg/kg dry	356	40.5	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 356		µg/kg dry	356	39.4	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 180		µg/kg dry	180	43.7	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 356		µg/kg dry	356	37.4	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 356		µg/kg dry	356	40.1	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 356		µg/kg dry	356	28.2	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 356		µg/kg dry	356	38.1	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 356		µg/kg dry	356	51.1	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 356		µg/kg dry	356	36.9	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 180		µg/kg dry	180	43.2	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 180		µg/kg dry	180	36.8	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 356		µg/kg dry	356	53.0	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 72.0		µg/kg dry	72.0	42.2	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-17	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-09				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 72.0		µg/kg dry	72.0	46.5	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 180		µg/kg dry	180	45.4	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 180		µg/kg dry	180	45.4	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 180		µg/kg dry	180	45.5	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 180		µg/kg dry	180	40.7	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 72.0		µg/kg dry	72.0	49.2	1	"	"	"	"	"	X
78-59-1	Isophorone	< 180		µg/kg dry	180	27.8	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 72.0		µg/kg dry	72.0	50.4	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 356		µg/kg dry	356	28.6	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 356		µg/kg dry	356	28.0	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 72.0		µg/kg dry	72.0	41.6	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 356		µg/kg dry	356	32.3	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 356		µg/kg dry	356	32.9	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 180		µg/kg dry	180	47.5	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 180		µg/kg dry	180	41.7	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 180		µg/kg dry	180	31.5	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1430		µg/kg dry	1430	47.4	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 180		µg/kg dry	180	23.5	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 180		µg/kg dry	180	31.5	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 356		µg/kg dry	356	36.3	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 356		µg/kg dry	356	42.4	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 72.0		µg/kg dry	72.0	40.8	1	"	"	"	"	"	X
108-95-2	Phenol	< 356		µg/kg dry	356	36.1	1	"	"	"	"	"	X
129-00-0	Pyrene	< 72.0		µg/kg dry	72.0	39.7	1	"	"	"	"	"	X
110-86-1	Pyridine	< 356		µg/kg dry	356	84.3	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 356		µg/kg dry	356	43.8	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 72.0		µg/kg dry	72.0	39.7	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 356		µg/kg dry	356	36.8	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 180		µg/kg dry	180	44.1	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 356		µg/kg dry	356	37.9	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 356		µg/kg dry	356	42.4	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*81*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*92*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*87*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*97*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*97*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*84*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 22.3		µg/kg dry	22.3	16.1	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 22.3		µg/kg dry	22.3	6.59	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 22.3		µg/kg dry	22.3	6.17	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-17	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-09				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 22.3		µg/kg dry	22.3	2.12	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 22.3		µg/kg dry	22.3	6.96	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 22.3		µg/kg dry	22.3	17.3	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 22.3		µg/kg dry	22.3	4.79	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 22.3		µg/kg dry	22.3	5.19	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 22.3		µg/kg dry	22.3	4.75	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*95*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*87*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*86*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*79*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.57		µg/kg dry	5.57	0.256	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.57		µg/kg dry	5.57	0.357	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.57		µg/kg dry	5.57	0.290	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.34		µg/kg dry	3.34	0.591	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.57		µg/kg dry	5.57	0.646	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.57		µg/kg dry	5.57	0.189	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.57		µg/kg dry	5.57	0.223	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.57		µg/kg dry	5.57	0.256	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.57		µg/kg dry	5.57	0.267	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.57		µg/kg dry	5.57	0.290	1	"	"	"	"	"	X
72-20-8	Endrin	< 8.92		µg/kg dry	8.92	0.546	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 8.92		µg/kg dry	8.92	0.357	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 8.92		µg/kg dry	8.92	0.468	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 8.92		µg/kg dry	8.92	0.814	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 8.92		µg/kg dry	8.92	3.82	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 8.92		µg/kg dry	8.92	0.602	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 8.92		µg/kg dry	8.92	0.323	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 8.92		µg/kg dry	8.92	1.40	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.57		µg/kg dry	5.57	0.234	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.57		µg/kg dry	5.57	0.279	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 111		µg/kg dry	111	78.6	1	"	"	"	"	"	X
57-74-9	Chlordane	< 22.3		µg/kg dry	22.3	2.80	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.57		µg/kg dry	5.57	0.490	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*72*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*66*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*53*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*54*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-17 SC58794-09	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**49.7**		mg/kg dry	14.5	12.1	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*83*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*111*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.20		mg/kg dry	3.20	0.173	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**21.9**		mg/kg dry	1.60	0.203	1	"	"	"	"	"	X
7440-39-3	Barium	**113**		mg/kg dry	1.07	0.126	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.533		mg/kg dry	0.533	0.0268	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.533		mg/kg dry	0.533	0.0276	1	"	"	"	"	"	X
7440-47-3	Chromium	**19.4**		mg/kg dry	1.07	0.142	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.116		mg/kg dry	0.116	0.0096	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**27.9**		mg/kg dry	1.07	0.123	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**12.1**		mg/kg dry	1.60	0.226	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.33		mg/kg dry	5.33	0.401	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.60		mg/kg dry	1.60	0.305	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.20		mg/kg dry	3.20	1.18	1	"	"	"	"	"	X
7440-62-2	Vanadium	**8.48**		mg/kg dry	1.60	0.284	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**61.8**		mg/kg dry	3.20	0.826	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**89.6**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**6.11**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 13-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 22:22	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*83*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-17 SC58794-09	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:39	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-3	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-10				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 14.95 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 71.1		µg/kg dry	71.1	39.0	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 711		µg/kg dry	711	89.9	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 71.1		µg/kg dry	71.1	25.7	50	"	"	"	"	"	X
71-43-2	Benzene	< 71.1		µg/kg dry	71.1	11.4	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 71.1		µg/kg dry	71.1	16.1	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 71.1		µg/kg dry	71.1	10.2	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 71.1		µg/kg dry	71.1	18.3	50	"	"	"	"	"	X
75-25-2	Bromoform	< 71.1		µg/kg dry	71.1	15.2	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 142		µg/kg dry	142	35.1	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 142		µg/kg dry	142	32.5	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 71.1		µg/kg dry	71.1	28.4	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 71.1		µg/kg dry	71.1	21.8	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 71.1		µg/kg dry	71.1	29.0	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 142		µg/kg dry	142	26.3	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 71.1		µg/kg dry	71.1	21.3	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 71.1		µg/kg dry	71.1	8.60	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 142		µg/kg dry	142	31.7	50	"	"	"	"	"	X
67-66-3	Chloroform	< 71.1		µg/kg dry	71.1	8.39	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 142		µg/kg dry	142	84.5	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 71.1		µg/kg dry	71.1	17.6	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 71.1		µg/kg dry	71.1	12.9	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 142		µg/kg dry	142	28.1	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 71.1		µg/kg dry	71.1	11.2	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 71.1		µg/kg dry	71.1	19.3	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 71.1		µg/kg dry	71.1	13.4	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 71.1		µg/kg dry	71.1	12.8	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 71.1		µg/kg dry	71.1	17.7	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 71.1		µg/kg dry	71.1	12.7	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 142		µg/kg dry	142	93.0	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 71.1		µg/kg dry	71.1	16.4	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 71.1		µg/kg dry	71.1	18.6	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 71.1		µg/kg dry	71.1	18.2	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 71.1		µg/kg dry	71.1	23.7	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 71.1		µg/kg dry	71.1	16.2	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 71.1		µg/kg dry	71.1	24.7	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 71.1		µg/kg dry	71.1	22.5	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 71.1		µg/kg dry	71.1	18.7	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 71.1		µg/kg dry	71.1	21.8	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 71.1		µg/kg dry	71.1	16.8	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 71.1		µg/kg dry	71.1	28.9	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 71.1		µg/kg dry	71.1	14.9	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 71.1		µg/kg dry	71.1	22.8	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 142		µg/kg dry	142	47.3	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-3	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-10				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 14.95 g						
98-82-8	Isopropylbenzene	< 71.1		µg/kg dry	71.1	25.8	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 71.1		µg/kg dry	71.1	19.7	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 71.1		µg/kg dry	71.1	21.4	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 142		µg/kg dry	142	50.9	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 142		µg/kg dry	142	60.7	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 71.1		µg/kg dry	71.1	20.6	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 71.1		µg/kg dry	71.1	17.7	50	"	"	"	"	"	X
100-42-5	Styrene	< 71.1		µg/kg dry	71.1	9.39	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 71.1		µg/kg dry	71.1	17.1	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 71.1		µg/kg dry	71.1	22.5	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 71.1		µg/kg dry	71.1	22.4	50	"	"	"	"	"	X
108-88-3	Toluene	< 71.1		µg/kg dry	71.1	11.4	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 71.1		µg/kg dry	71.1	16.6	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 71.1		µg/kg dry	71.1	11.7	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 71.1		µg/kg dry	71.1	11.2	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 71.1		µg/kg dry	71.1	17.2	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 71.1		µg/kg dry	71.1	22.0	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 71.1		µg/kg dry	71.1	12.2	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 71.1		µg/kg dry	71.1	32.1	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 71.1		µg/kg dry	71.1	32.8	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 71.1		µg/kg dry	71.1	18.0	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 71.1		µg/kg dry	71.1	14.9	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 71.1		µg/kg dry	71.1	35.0	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 142		µg/kg dry	142	41.8	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 71.1		µg/kg dry	71.1	21.9	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 142		µg/kg dry	142	52.0	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 71.1		µg/kg dry	71.1	19.3	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 71.1		µg/kg dry	71.1	39.3	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 71.1		µg/kg dry	71.1	19.7	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 71.1		µg/kg dry	71.1	23.0	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1420		µg/kg dry	1420	1010	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1420		µg/kg dry	1420	419	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 356		µg/kg dry	356	46.9	50	"	"	"	"	"	X
64-17-5	Ethanol	< 14200		µg/kg dry	14200	1230	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*104*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*109*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*108*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 80.1		µg/kg dry	80.1	42.5	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-3	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-10				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 80.1		µg/kg dry	80.1	41.8	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 396		µg/kg dry	396	25.2	1	"	"	"	"	"	X
120-12-7	Anthracene	< 80.1		µg/kg dry	80.1	46.1	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 396		µg/kg dry	396	43.0	1	"	"	"	"	"	
92-87-5	Benzidine	< 792		µg/kg dry	792	25.2	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 80.1		µg/kg dry	80.1	45.0	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 80.1		µg/kg dry	80.1	54.7	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 80.1		µg/kg dry	80.1	60.3	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 80.1		µg/kg dry	80.1	56.6	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 80.1		µg/kg dry	80.1	68.4	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 396		µg/kg dry	396	23.8	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 396		µg/kg dry	396	91.7	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 396		µg/kg dry	396	40.0	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 201		µg/kg dry	201	37.1	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 201		µg/kg dry	201	32.2	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 201		µg/kg dry	201	51.0	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 396		µg/kg dry	396	44.8	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 396		µg/kg dry	396	39.7	1	"	"	"	"	"	X
86-74-8	Carbazole	< 201		µg/kg dry	201	46.1	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 396		µg/kg dry	396	46.6	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 201		µg/kg dry	201	24.7	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 396		µg/kg dry	396	54.3	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 201		µg/kg dry	201	38.4	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 396		µg/kg dry	396	38.8	1	"	"	"	"	"	X
218-01-9	Chrysene	< 80.1		µg/kg dry	80.1	45.3	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 80.1		µg/kg dry	80.1	59.2	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 201		µg/kg dry	201	53.9	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 396		µg/kg dry	396	47.3	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 396		µg/kg dry	396	42.7	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 396		µg/kg dry	396	45.0	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 396		µg/kg dry	396	43.8	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 201		µg/kg dry	201	48.6	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 396		µg/kg dry	396	41.5	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 396		µg/kg dry	396	44.5	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 396		µg/kg dry	396	31.3	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 396		µg/kg dry	396	42.4	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 396		µg/kg dry	396	56.8	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 396		µg/kg dry	396	41.1	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 201		µg/kg dry	201	48.0	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 201		µg/kg dry	201	40.9	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 396		µg/kg dry	396	59.0	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 80.1		µg/kg dry	80.1	46.9	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-3	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-10				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 80.1		µg/kg dry	80.1	51.7	1	SW846 8270D	13-Jul-20	13-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 201		µg/kg dry	201	50.4	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 201		µg/kg dry	201	50.4	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 201		µg/kg dry	201	50.5	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 201		µg/kg dry	201	45.3	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 80.1		µg/kg dry	80.1	54.7	1	"	"	"	"	"	X
78-59-1	Isophorone	< 201		µg/kg dry	201	30.9	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 80.1		µg/kg dry	80.1	56.1	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 396		µg/kg dry	396	31.8	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 396		µg/kg dry	396	31.1	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 80.1		µg/kg dry	80.1	46.2	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 396		µg/kg dry	396	35.9	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 396		µg/kg dry	396	36.6	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 201		µg/kg dry	201	52.8	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 201		µg/kg dry	201	46.3	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 201		µg/kg dry	201	35.1	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1580		µg/kg dry	1580	52.7	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 201		µg/kg dry	201	26.2	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 201		µg/kg dry	201	35.1	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 396		µg/kg dry	396	40.3	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 396		µg/kg dry	396	47.2	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 80.1		µg/kg dry	80.1	45.4	1	"	"	"	"	"	X
108-95-2	Phenol	< 396		µg/kg dry	396	40.1	1	"	"	"	"	"	X
129-00-0	Pyrene	< 80.1		µg/kg dry	80.1	44.2	1	"	"	"	"	"	X
110-86-1	Pyridine	< 396		µg/kg dry	396	93.8	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 396		µg/kg dry	396	48.7	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 80.1		µg/kg dry	80.1	44.2	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 396		µg/kg dry	396	40.9	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 201		µg/kg dry	201	49.0	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 396		µg/kg dry	396	42.1	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 396		µg/kg dry	396	47.2	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*91*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*88*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*81*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*101*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*93*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*72*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 23.1		µg/kg dry	23.1	16.6	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 23.1		µg/kg dry	23.1	6.83	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 23.1		µg/kg dry	23.1	6.40	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-3	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
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CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 23.1		µg/kg dry	23.1	2.19	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 23.1		µg/kg dry	23.1	7.22	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 23.1		µg/kg dry	23.1	18.0	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 23.1		µg/kg dry	23.1	4.97	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 23.1		µg/kg dry	23.1	5.38	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 23.1		µg/kg dry	23.1	4.92	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*90*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*82*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*82*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*72*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.77		µg/kg dry	5.77	0.266	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.77		µg/kg dry	5.77	0.370	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.77		µg/kg dry	5.77	0.300	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.46		µg/kg dry	3.46	0.612	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.77		µg/kg dry	5.77	0.670	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.77		µg/kg dry	5.77	0.196	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.77		µg/kg dry	5.77	0.231	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.77		µg/kg dry	5.77	0.266	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.77		µg/kg dry	5.77	0.277	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.77		µg/kg dry	5.77	0.300	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.24		µg/kg dry	9.24	0.566	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.24		µg/kg dry	9.24	0.370	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.24		µg/kg dry	9.24	0.485	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.24		µg/kg dry	9.24	0.843	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.24		µg/kg dry	9.24	3.96	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.24		µg/kg dry	9.24	0.624	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.24		µg/kg dry	9.24	0.335	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.24		µg/kg dry	9.24	1.46	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.77		µg/kg dry	5.77	0.243	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.77		µg/kg dry	5.77	0.289	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 115		µg/kg dry	115	81.5	1	"	"	"	"	"	X
57-74-9	Chlordane	< 23.1		µg/kg dry	23.1	2.91	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.77		µg/kg dry	5.77	0.508	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*74*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*69*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*55*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*55*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-3	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-10				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC													
Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**113**		mg/kg dry	15.9	13.3	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*84*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*113*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.59		mg/kg dry	3.59	0.194	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**36.6**		mg/kg dry	1.80	0.227	1	"	"	"	"	"	X
7440-39-3	Barium	**30.0**		mg/kg dry	1.20	0.141	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.598		mg/kg dry	0.598	0.0300	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.598		mg/kg dry	0.598	0.0310	1	"	"	"	"	"	X
7440-47-3	Chromium	**21.8**		mg/kg dry	1.20	0.159	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.110		mg/kg dry	0.110	0.0092	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**33.2**		mg/kg dry	1.20	0.138	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**17.0**		mg/kg dry	1.80	0.254	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.98		mg/kg dry	5.98	0.450	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.80		mg/kg dry	1.80	0.342	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.59		mg/kg dry	3.59	1.32	1	"	"	"	"	"	X
7440-62-2	Vanadium	**30.1**		mg/kg dry	1.80	0.318	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**107**		mg/kg dry	3.59	0.926	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**82.7**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**6.13**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses													
Prepared by method SW8151A									Methylation date: 13-Jul-20				
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	13-Jul-20	14-Jul-20 22:46	M-CT007	537166A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*80*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-3 SC58794-10	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 7		mg/kg	7	7	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:40	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-4	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-11				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 14.54 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 64.3		µg/kg dry	64.3	35.2	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 643		µg/kg dry	643	81.3	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 64.3		µg/kg dry	64.3	23.2	50	"	"	"	"	"	X
71-43-2	Benzene	< 64.3		µg/kg dry	64.3	10.3	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 64.3		µg/kg dry	64.3	14.5	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 64.3		µg/kg dry	64.3	9.19	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 64.3		µg/kg dry	64.3	16.6	50	"	"	"	"	"	X
75-25-2	Bromoform	< 64.3		µg/kg dry	64.3	13.8	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 129		µg/kg dry	129	31.8	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 129		µg/kg dry	129	29.4	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 64.3		µg/kg dry	64.3	25.7	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 64.3		µg/kg dry	64.3	19.7	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 64.3		µg/kg dry	64.3	26.2	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 129		µg/kg dry	129	23.8	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 64.3		µg/kg dry	64.3	19.2	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 64.3		µg/kg dry	64.3	7.78	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 129		µg/kg dry	129	28.7	50	"	"	"	"	"	X
67-66-3	Chloroform	< 64.3		µg/kg dry	64.3	7.59	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 129		µg/kg dry	129	76.4	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 64.3		µg/kg dry	64.3	15.9	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 64.3		µg/kg dry	64.3	11.6	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 129		µg/kg dry	129	25.4	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 64.3		µg/kg dry	64.3	10.2	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 64.3		µg/kg dry	64.3	17.5	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 64.3		µg/kg dry	64.3	12.1	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 64.3		µg/kg dry	64.3	11.6	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 64.3		µg/kg dry	64.3	16.0	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 64.3		µg/kg dry	64.3	11.5	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 129		µg/kg dry	129	84.1	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 64.3		µg/kg dry	64.3	14.9	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 64.3		µg/kg dry	64.3	16.8	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 64.3		µg/kg dry	64.3	16.5	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 64.3		µg/kg dry	64.3	21.4	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 64.3		µg/kg dry	64.3	14.7	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 64.3		µg/kg dry	64.3	22.3	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 64.3		µg/kg dry	64.3	20.3	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 64.3		µg/kg dry	64.3	16.9	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 64.3		µg/kg dry	64.3	19.7	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 64.3		µg/kg dry	64.3	15.2	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 64.3		µg/kg dry	64.3	26.2	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 64.3		µg/kg dry	64.3	13.4	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 64.3		µg/kg dry	64.3	20.6	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 129		µg/kg dry	129	42.8	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-4	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-11				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 14.54 g						
98-82-8	Isopropylbenzene	< 64.3		µg/kg dry	64.3	23.3	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 64.3		µg/kg dry	64.3	17.8	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 64.3		µg/kg dry	64.3	19.4	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 129		µg/kg dry	129	46.0	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 129		µg/kg dry	129	54.9	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 64.3		µg/kg dry	64.3	18.6	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 64.3		µg/kg dry	64.3	16.0	50	"	"	"	"	"	X
100-42-5	Styrene	< 64.3		µg/kg dry	64.3	8.49	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 64.3		µg/kg dry	64.3	15.5	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 64.3		µg/kg dry	64.3	20.4	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 64.3		µg/kg dry	64.3	20.3	50	"	"	"	"	"	X
108-88-3	Toluene	< 64.3		µg/kg dry	64.3	10.4	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 64.3		µg/kg dry	64.3	15.0	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 64.3		µg/kg dry	64.3	10.6	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 64.3		µg/kg dry	64.3	10.2	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 64.3		µg/kg dry	64.3	15.6	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 64.3		µg/kg dry	64.3	19.9	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 64.3		µg/kg dry	64.3	11.0	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 64.3		µg/kg dry	64.3	29.1	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 64.3		µg/kg dry	64.3	29.6	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 64.3		µg/kg dry	64.3	16.3	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 64.3		µg/kg dry	64.3	13.4	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 64.3		µg/kg dry	64.3	31.6	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 129		µg/kg dry	129	37.8	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 64.3		µg/kg dry	64.3	19.8	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 129		µg/kg dry	129	47.0	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 64.3		µg/kg dry	64.3	17.4	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 64.3		µg/kg dry	64.3	35.6	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 64.3		µg/kg dry	64.3	17.8	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 64.3		µg/kg dry	64.3	20.8	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1290		µg/kg dry	1290	913	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1290		µg/kg dry	1290	379	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 321		µg/kg dry	321	42.4	50	"	"	"	"	"	X
64-17-5	Ethanol	< 12900		µg/kg dry	12900	1110	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*102*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*103*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*105*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 74.3		µg/kg dry	74.3	39.4	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-4	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-11				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 74.3		µg/kg dry	74.3	38.7	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 367		µg/kg dry	367	23.4	1	"	"	"	"	"	X
120-12-7	Anthracene	< 74.3		µg/kg dry	74.3	42.8	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 367		µg/kg dry	367	39.9	1	"	"	"	"	"	
92-87-5	Benzidine	< 735		µg/kg dry	735	23.4	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 74.3		µg/kg dry	74.3	41.8	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 74.3		µg/kg dry	74.3	50.8	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 74.3		µg/kg dry	74.3	55.9	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 74.3		µg/kg dry	74.3	52.4	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 74.3		µg/kg dry	74.3	63.5	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 367		µg/kg dry	367	22.0	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 367		µg/kg dry	367	85.1	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 367		µg/kg dry	367	37.1	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 186		µg/kg dry	186	34.4	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 186		µg/kg dry	186	29.8	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 186		µg/kg dry	186	47.3	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 367		µg/kg dry	367	41.5	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 367		µg/kg dry	367	36.9	1	"	"	"	"	"	X
86-74-8	Carbazole	< 186		µg/kg dry	186	42.8	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 367		µg/kg dry	367	43.2	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 186		µg/kg dry	186	22.9	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 367		µg/kg dry	367	50.3	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 186		µg/kg dry	186	35.6	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 367		µg/kg dry	367	36.0	1	"	"	"	"	"	X
218-01-9	Chrysene	< 74.3		µg/kg dry	74.3	42.0	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 74.3		µg/kg dry	74.3	54.9	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 186		µg/kg dry	186	50.0	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 367		µg/kg dry	367	43.9	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 367		µg/kg dry	367	39.6	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 367		µg/kg dry	367	41.8	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 367		µg/kg dry	367	40.6	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 186		µg/kg dry	186	45.1	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 367		µg/kg dry	367	38.5	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 367		µg/kg dry	367	41.3	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 367		µg/kg dry	367	29.1	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 367		µg/kg dry	367	39.3	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 367		µg/kg dry	367	52.7	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 367		µg/kg dry	367	38.1	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 186		µg/kg dry	186	44.5	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 186		µg/kg dry	186	38.0	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 367		µg/kg dry	367	54.7	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 74.3		µg/kg dry	74.3	43.5	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-4	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-11				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 74.3		µg/kg dry	74.3	48.0	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 186		µg/kg dry	186	46.8	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 186		µg/kg dry	186	46.8	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 186		µg/kg dry	186	46.9	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 186		µg/kg dry	186	42.0	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 74.3		µg/kg dry	74.3	50.8	1	"	"	"	"	"	X
78-59-1	Isophorone	< 186		µg/kg dry	186	28.6	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 74.3		µg/kg dry	74.3	52.0	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 367		µg/kg dry	367	29.5	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 367		µg/kg dry	367	28.8	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 74.3		µg/kg dry	74.3	42.9	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 367		µg/kg dry	367	33.3	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 367		µg/kg dry	367	34.0	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 186		µg/kg dry	186	49.0	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 186		µg/kg dry	186	43.0	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 186		µg/kg dry	186	32.5	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1470		µg/kg dry	1470	48.9	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 186		µg/kg dry	186	24.3	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 186		µg/kg dry	186	32.5	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 367		µg/kg dry	367	37.4	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 367		µg/kg dry	367	43.8	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 74.3		µg/kg dry	74.3	42.1	1	"	"	"	"	"	X
108-95-2	Phenol	< 367		µg/kg dry	367	37.2	1	"	"	"	"	"	X
129-00-0	Pyrene	< 74.3		µg/kg dry	74.3	41.0	1	"	"	"	"	"	X
110-86-1	Pyridine	< 367		µg/kg dry	367	87.0	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 367		µg/kg dry	367	45.2	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 74.3		µg/kg dry	74.3	41.0	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 367		µg/kg dry	367	38.0	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 186		µg/kg dry	186	45.4	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 367		µg/kg dry	367	39.1	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 367		µg/kg dry	367	43.8	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*63*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*78*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*74*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*86*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*82*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*74*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 21.5		µg/kg dry	21.5	15.5	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 21.5		µg/kg dry	21.5	6.36	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 21.5		µg/kg dry	21.5	5.96	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-4	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-11				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 21.5		µg/kg dry	21.5	2.04	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 21.5		µg/kg dry	21.5	6.72	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 21.5		µg/kg dry	21.5	16.7	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 21.5		µg/kg dry	21.5	4.62	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 21.5		µg/kg dry	21.5	5.01	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 21.5		µg/kg dry	21.5	4.58	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*95*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*85*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*88*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*80*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.38		µg/kg dry	5.38	0.247	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.38		µg/kg dry	5.38	0.344	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.38		µg/kg dry	5.38	0.280	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.23		µg/kg dry	3.23	0.570	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.38		µg/kg dry	5.38	0.624	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.38		µg/kg dry	5.38	0.183	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.38		µg/kg dry	5.38	0.215	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.38		µg/kg dry	5.38	0.247	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.38		µg/kg dry	5.38	0.258	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.38		µg/kg dry	5.38	0.280	1	"	"	"	"	"	X
72-20-8	Endrin	< 8.60		µg/kg dry	8.60	0.527	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 8.60		µg/kg dry	8.60	0.344	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 8.60		µg/kg dry	8.60	0.452	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 8.60		µg/kg dry	8.60	0.785	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 8.60		µg/kg dry	8.60	3.69	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 8.60		µg/kg dry	8.60	0.581	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 8.60		µg/kg dry	8.60	0.312	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 8.60		µg/kg dry	8.60	1.36	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.38		µg/kg dry	5.38	0.226	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.38		µg/kg dry	5.38	0.269	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 108		µg/kg dry	108	75.9	1	"	"	"	"	"	X
57-74-9	Chlordane	< 21.5		µg/kg dry	21.5	2.71	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.38		µg/kg dry	5.38	0.473	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*67*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*73*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*55*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*51*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-4 SC58794-11	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**118**		mg/kg dry	14.5	12.1	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*76*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*102*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.25		mg/kg dry	3.25	0.175	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**20.5**		mg/kg dry	1.62	0.206	1	"	"	"	"	"	X
7440-39-3	Barium	**29.5**		mg/kg dry	1.08	0.128	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.541		mg/kg dry	0.541	0.0272	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.541		mg/kg dry	0.541	0.0280	1	"	"	"	"	"	X
7440-47-3	Chromium	**18.8**		mg/kg dry	1.08	0.144	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.116		mg/kg dry	0.116	0.0097	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**20.3**		mg/kg dry	1.08	0.125	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**18.6**		mg/kg dry	1.62	0.230	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.41		mg/kg dry	5.41	0.407	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.62		mg/kg dry	1.62	0.310	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.25		mg/kg dry	3.25	1.19	1	"	"	"	"	"	X
7440-62-2	Vanadium	**24.5**		mg/kg dry	1.62	0.288	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**36.0**		mg/kg dry	3.25	0.838	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**88.9**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.58**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 14-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	14-Jul-20	15-Jul-20 17:03	M-CT007	537320A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*92*			*30-150 %*			"	"	"	"	"	

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Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-4 SC58794-11	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:41	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-5	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-12				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 15.08 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 66.2		µg/kg dry	66.2	36.3	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 662		µg/kg dry	662	83.7	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 66.2		µg/kg dry	66.2	23.9	50	"	"	"	"	"	X
71-43-2	Benzene	< 66.2		µg/kg dry	66.2	10.6	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 66.2		µg/kg dry	66.2	15.0	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 66.2		µg/kg dry	66.2	9.47	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 66.2		µg/kg dry	66.2	17.1	50	"	"	"	"	"	X
75-25-2	Bromoform	< 66.2		µg/kg dry	66.2	14.2	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 132		µg/kg dry	132	32.7	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 132		µg/kg dry	132	30.3	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 66.2		µg/kg dry	66.2	26.5	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 66.2		µg/kg dry	66.2	20.3	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 66.2		µg/kg dry	66.2	27.0	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 132		µg/kg dry	132	24.5	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 66.2		µg/kg dry	66.2	19.8	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 66.2		µg/kg dry	66.2	8.02	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 132		µg/kg dry	132	29.5	50	"	"	"	"	"	X
67-66-3	Chloroform	< 66.2		µg/kg dry	66.2	7.82	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 132		µg/kg dry	132	78.7	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 66.2		µg/kg dry	66.2	16.4	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 66.2		µg/kg dry	66.2	12.0	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 132		µg/kg dry	132	26.2	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 66.2		µg/kg dry	66.2	10.5	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 66.2		µg/kg dry	66.2	18.0	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 66.2		µg/kg dry	66.2	12.5	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 66.2		µg/kg dry	66.2	11.9	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 66.2		µg/kg dry	66.2	16.5	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 66.2		µg/kg dry	66.2	11.9	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 132		µg/kg dry	132	86.6	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 66.2		µg/kg dry	66.2	15.3	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 66.2		µg/kg dry	66.2	17.4	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 66.2		µg/kg dry	66.2	17.0	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 66.2		µg/kg dry	66.2	22.1	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 66.2		µg/kg dry	66.2	15.1	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 66.2		µg/kg dry	66.2	23.0	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 66.2		µg/kg dry	66.2	20.9	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 66.2		µg/kg dry	66.2	17.4	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 66.2		µg/kg dry	66.2	20.3	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 66.2		µg/kg dry	66.2	15.6	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 66.2		µg/kg dry	66.2	27.0	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 66.2		µg/kg dry	66.2	13.8	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 66.2		µg/kg dry	66.2	21.2	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 132		µg/kg dry	132	44.1	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-5	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-12				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 15.08 g						
98-82-8	Isopropylbenzene	< 66.2		µg/kg dry	66.2	24.0	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 66.2		µg/kg dry	66.2	18.3	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 66.2		µg/kg dry	66.2	19.9	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 132		µg/kg dry	132	47.4	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 132		µg/kg dry	132	56.6	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 66.2		µg/kg dry	66.2	19.2	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 66.2		µg/kg dry	66.2	16.5	50	"	"	"	"	"	X
100-42-5	Styrene	< 66.2		µg/kg dry	66.2	8.74	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 66.2		µg/kg dry	66.2	16.0	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 66.2		µg/kg dry	66.2	21.0	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 66.2		µg/kg dry	66.2	20.9	50	"	"	"	"	"	X
108-88-3	Toluene	< 66.2		µg/kg dry	66.2	10.7	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 66.2		µg/kg dry	66.2	15.4	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 66.2		µg/kg dry	66.2	10.9	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 66.2		µg/kg dry	66.2	10.5	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 66.2		µg/kg dry	66.2	16.0	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 66.2		µg/kg dry	66.2	20.5	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 66.2		µg/kg dry	66.2	11.3	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 66.2		µg/kg dry	66.2	29.9	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 66.2		µg/kg dry	66.2	30.5	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 66.2		µg/kg dry	66.2	16.8	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 66.2		µg/kg dry	66.2	13.8	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 66.2		µg/kg dry	66.2	32.6	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 132		µg/kg dry	132	39.0	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 66.2		µg/kg dry	66.2	20.4	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 132		µg/kg dry	132	48.4	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 66.2		µg/kg dry	66.2	18.0	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 66.2		µg/kg dry	66.2	36.6	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 66.2		µg/kg dry	66.2	18.3	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 66.2		µg/kg dry	66.2	21.4	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1320		µg/kg dry	1320	941	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1320		µg/kg dry	1320	390	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 331		µg/kg dry	331	43.7	50	"	"	"	"	"	X
64-17-5	Ethanol	< 13200		µg/kg dry	13200	1140	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*104*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*102*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*105*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*104*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 76.7		µg/kg dry	76.7	40.7	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-5	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-12				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 76.7		µg/kg dry	76.7	40.0	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 379		µg/kg dry	379	24.1	1	"	"	"	"	"	X
120-12-7	Anthracene	< 76.7		µg/kg dry	76.7	44.2	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 379		µg/kg dry	379	41.2	1	"	"	"	"	"	
92-87-5	Benzidine	< 759		µg/kg dry	759	24.1	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 76.7		µg/kg dry	76.7	43.1	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 76.7		µg/kg dry	76.7	52.4	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 76.7		µg/kg dry	76.7	57.7	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 76.7		µg/kg dry	76.7	54.2	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 76.7		µg/kg dry	76.7	65.5	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 379		µg/kg dry	379	22.8	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 379		µg/kg dry	379	87.9	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 379		µg/kg dry	379	38.3	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 192		µg/kg dry	192	35.5	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 192		µg/kg dry	192	30.8	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 192		µg/kg dry	192	48.9	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 379		µg/kg dry	379	42.9	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 379		µg/kg dry	379	38.1	1	"	"	"	"	"	X
86-74-8	Carbazole	< 192		µg/kg dry	192	44.2	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 379		µg/kg dry	379	44.6	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 192		µg/kg dry	192	23.7	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 379		µg/kg dry	379	52.0	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 192		µg/kg dry	192	36.8	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 379		µg/kg dry	379	37.1	1	"	"	"	"	"	X
218-01-9	Chrysene	< 76.7		µg/kg dry	76.7	43.4	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 76.7		µg/kg dry	76.7	56.7	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 192		µg/kg dry	192	51.6	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 379		µg/kg dry	379	45.3	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 379		µg/kg dry	379	40.9	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 379		µg/kg dry	379	43.1	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 379		µg/kg dry	379	42.0	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 192		µg/kg dry	192	46.6	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 379		µg/kg dry	379	39.8	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 379		µg/kg dry	379	42.7	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 379		µg/kg dry	379	30.0	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 379		µg/kg dry	379	40.6	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 379		µg/kg dry	379	54.4	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 379		µg/kg dry	379	39.3	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 192		µg/kg dry	192	46.0	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 192		µg/kg dry	192	39.2	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 379		µg/kg dry	379	56.5	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 76.7		µg/kg dry	76.7	45.0	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-5	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-12				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 76.7		µg/kg dry	76.7	49.6	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 192		µg/kg dry	192	48.3	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 192		µg/kg dry	192	48.3	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 192		µg/kg dry	192	48.4	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 192		µg/kg dry	192	43.4	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 76.7		µg/kg dry	76.7	52.4	1	"	"	"	"	"	X
78-59-1	Isophorone	< 192		µg/kg dry	192	29.6	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 76.7		µg/kg dry	76.7	53.7	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 379		µg/kg dry	379	30.5	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 379		µg/kg dry	379	29.8	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 76.7		µg/kg dry	76.7	44.3	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 379		µg/kg dry	379	34.4	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 379		µg/kg dry	379	35.1	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 192		µg/kg dry	192	50.6	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 192		µg/kg dry	192	44.4	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 192		µg/kg dry	192	33.6	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1520		µg/kg dry	1520	50.5	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 192		µg/kg dry	192	25.1	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 192		µg/kg dry	192	33.6	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 379		µg/kg dry	379	38.6	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 379		µg/kg dry	379	45.2	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 76.7		µg/kg dry	76.7	43.5	1	"	"	"	"	"	X
108-95-2	Phenol	< 379		µg/kg dry	379	38.4	1	"	"	"	"	"	X
129-00-0	Pyrene	< 76.7		µg/kg dry	76.7	42.3	1	"	"	"	"	"	X
110-86-1	Pyridine	< 379		µg/kg dry	379	89.8	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 379		µg/kg dry	379	46.7	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 76.7		µg/kg dry	76.7	42.3	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 379		µg/kg dry	379	39.2	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 192		µg/kg dry	192	46.9	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 379		µg/kg dry	379	40.4	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 379		µg/kg dry	379	45.2	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*79*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*91*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*75*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*95*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*90*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*81*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 23.0		µg/kg dry	23.0	16.6	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 23.0		µg/kg dry	23.0	6.81	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 23.0		µg/kg dry	23.0	6.38	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-5	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-12				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 23.0		µg/kg dry	23.0	2.19	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 23.0		µg/kg dry	23.0	7.20	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 23.0		µg/kg dry	23.0	17.9	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 23.0		µg/kg dry	23.0	4.95	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 23.0		µg/kg dry	23.0	5.37	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 23.0		µg/kg dry	23.0	4.91	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*94*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*84*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*84*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*77*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.76		µg/kg dry	5.76	0.265	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.76		µg/kg dry	5.76	0.369	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.76		µg/kg dry	5.76	0.299	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.46		µg/kg dry	3.46	0.610	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.76		µg/kg dry	5.76	0.668	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.76		µg/kg dry	5.76	0.196	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.76		µg/kg dry	5.76	0.230	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.76		µg/kg dry	5.76	0.265	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.76		µg/kg dry	5.76	0.276	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.76		µg/kg dry	5.76	0.299	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.21		µg/kg dry	9.21	0.564	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.21		µg/kg dry	9.21	0.369	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.21		µg/kg dry	9.21	0.484	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.21		µg/kg dry	9.21	0.841	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.21		µg/kg dry	9.21	3.95	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.21		µg/kg dry	9.21	0.622	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.21		µg/kg dry	9.21	0.334	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.21		µg/kg dry	9.21	1.45	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.76		µg/kg dry	5.76	0.242	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.76		µg/kg dry	5.76	0.288	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 115		µg/kg dry	115	81.3	1	"	"	"	"	"	X
57-74-9	Chlordane	< 23.0		µg/kg dry	23.0	2.90	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.76		µg/kg dry	5.76	0.507	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*75*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*75*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*61*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*58*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-5 SC58794-12	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**106**		mg/kg dry	15.4	12.9	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*64*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*86*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.76		mg/kg dry	3.76	0.203	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**53.4**		mg/kg dry	1.88	0.238	1	"	"	"	"	"	X
7440-39-3	Barium	**30.3**		mg/kg dry	1.25	0.148	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.627		mg/kg dry	0.627	0.0315	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.627		mg/kg dry	0.627	0.0325	1	"	"	"	"	"	X
7440-47-3	Chromium	**25.0**		mg/kg dry	1.25	0.167	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.103		mg/kg dry	0.103	0.0086	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**46.2**		mg/kg dry	1.25	0.144	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**17.0**		mg/kg dry	1.88	0.266	1	"	"	"	"	"	X
7440-36-0	Antimony	< 6.27		mg/kg dry	6.27	0.471	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.88		mg/kg dry	1.88	0.359	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.76		mg/kg dry	3.76	1.38	1	"	"	"	"	"	X
7440-62-2	Vanadium	**33.9**		mg/kg dry	1.88	0.333	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**52.1**		mg/kg dry	3.76	0.970	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**85.8**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.57**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 14-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	14-Jul-20	15-Jul-20 17:27	M-CT007	537320A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*80*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-5 SC58794-12	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:42	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-6	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-13				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.85 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 52.1		µg/kg dry	52.1	28.6	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 521		µg/kg dry	521	65.9	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 52.1		µg/kg dry	52.1	18.8	50	"	"	"	"	"	X
71-43-2	Benzene	< 52.1		µg/kg dry	52.1	8.34	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 52.1		µg/kg dry	52.1	11.8	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 52.1		µg/kg dry	52.1	7.45	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 52.1		µg/kg dry	52.1	13.4	50	"	"	"	"	"	X
75-25-2	Bromoform	< 52.1		µg/kg dry	52.1	11.2	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 104		µg/kg dry	104	25.7	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 104		µg/kg dry	104	23.8	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 52.1		µg/kg dry	52.1	20.8	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 52.1		µg/kg dry	52.1	16.0	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 52.1		µg/kg dry	52.1	21.3	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 104		µg/kg dry	104	19.3	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 52.1		µg/kg dry	52.1	15.6	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 52.1		µg/kg dry	52.1	6.30	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 104		µg/kg dry	104	23.2	50	"	"	"	"	"	X
67-66-3	Chloroform	< 52.1		µg/kg dry	52.1	6.15	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 104		µg/kg dry	104	61.9	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 52.1		µg/kg dry	52.1	12.9	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 52.1		µg/kg dry	52.1	9.43	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 104		µg/kg dry	104	20.6	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 52.1		µg/kg dry	52.1	8.23	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 52.1		µg/kg dry	52.1	14.2	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 52.1		µg/kg dry	52.1	9.80	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 52.1		µg/kg dry	52.1	9.38	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 52.1		µg/kg dry	52.1	13.0	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 52.1		µg/kg dry	52.1	9.33	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 104		µg/kg dry	104	68.2	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 52.1		µg/kg dry	52.1	12.0	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 52.1		µg/kg dry	52.1	13.7	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 52.1		µg/kg dry	52.1	13.3	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 52.1		µg/kg dry	52.1	17.4	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 52.1		µg/kg dry	52.1	11.9	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 52.1		µg/kg dry	52.1	18.1	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 52.1		µg/kg dry	52.1	16.5	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 52.1		µg/kg dry	52.1	13.7	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 52.1		µg/kg dry	52.1	15.9	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 52.1		µg/kg dry	52.1	12.3	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 52.1		µg/kg dry	52.1	21.2	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 52.1		µg/kg dry	52.1	10.9	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 52.1		µg/kg dry	52.1	16.7	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 104		µg/kg dry	104	34.6	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-6	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-13				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 16.85 g						
98-82-8	Isopropylbenzene	< 52.1		µg/kg dry	52.1	18.9	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 52.1		µg/kg dry	52.1	14.4	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 52.1		µg/kg dry	52.1	15.7	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 104		µg/kg dry	104	37.3	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 104		µg/kg dry	104	44.5	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 52.1		µg/kg dry	52.1	15.1	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 52.1		µg/kg dry	52.1	13.0	50	"	"	"	"	"	X
100-42-5	Styrene	< 52.1		µg/kg dry	52.1	6.88	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 52.1		µg/kg dry	52.1	12.6	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 52.1		µg/kg dry	52.1	16.5	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 52.1		µg/kg dry	52.1	16.4	50	"	"	"	"	"	X
108-88-3	Toluene	< 52.1		µg/kg dry	52.1	8.39	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 52.1		µg/kg dry	52.1	12.1	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 52.1		µg/kg dry	52.1	8.60	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 52.1		µg/kg dry	52.1	8.23	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 52.1		µg/kg dry	52.1	12.6	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 52.1		µg/kg dry	52.1	16.1	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 52.1		µg/kg dry	52.1	8.91	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 52.1		µg/kg dry	52.1	23.6	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 52.1		µg/kg dry	52.1	24.0	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 52.1		µg/kg dry	52.1	13.2	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 52.1		µg/kg dry	52.1	10.9	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 52.1		µg/kg dry	52.1	25.6	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 104		µg/kg dry	104	30.6	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 52.1		µg/kg dry	52.1	16.0	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 104		µg/kg dry	104	38.1	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 52.1		µg/kg dry	52.1	14.1	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 52.1		µg/kg dry	52.1	28.8	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 52.1		µg/kg dry	52.1	14.4	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 52.1		µg/kg dry	52.1	16.8	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1040		µg/kg dry	1040	740	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1040		µg/kg dry	1040	307	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 261		µg/kg dry	261	34.4	50	"	"	"	"	"	X
64-17-5	Ethanol	< 10400		µg/kg dry	10400	898	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*105*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*105*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*105*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*105*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 71.1		µg/kg dry	71.1	37.7	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-6	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-13				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 71.1		µg/kg dry	71.1	37.1	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 352		µg/kg dry	352	22.4	1	"	"	"	"	"	X
120-12-7	Anthracene	< 71.1		µg/kg dry	71.1	40.9	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 352		µg/kg dry	352	38.2	1	"	"	"	"	"	
92-87-5	Benzidine	< 704		µg/kg dry	704	22.4	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 71.1		µg/kg dry	71.1	40.0	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 71.1		µg/kg dry	71.1	48.6	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 71.1		µg/kg dry	71.1	53.5	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 71.1		µg/kg dry	71.1	50.2	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 71.1		µg/kg dry	71.1	60.8	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 352		µg/kg dry	352	21.1	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 352		µg/kg dry	352	81.5	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 352		µg/kg dry	352	35.5	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 178		µg/kg dry	178	33.0	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 178		µg/kg dry	178	28.6	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 178		µg/kg dry	178	45.3	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 352		µg/kg dry	352	39.8	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 352		µg/kg dry	352	35.3	1	"	"	"	"	"	X
86-74-8	Carbazole	< 178		µg/kg dry	178	40.9	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 352		µg/kg dry	352	41.4	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 178		µg/kg dry	178	22.0	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 352		µg/kg dry	352	48.2	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 178		µg/kg dry	178	34.1	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 352		µg/kg dry	352	34.4	1	"	"	"	"	"	X
218-01-9	Chrysene	< 71.1		µg/kg dry	71.1	40.2	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 71.1		µg/kg dry	71.1	52.6	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 178		µg/kg dry	178	47.9	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 352		µg/kg dry	352	42.0	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 352		µg/kg dry	352	38.0	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 352		µg/kg dry	352	40.0	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 352		µg/kg dry	352	38.9	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 178		µg/kg dry	178	43.2	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 352		µg/kg dry	352	36.9	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 352		µg/kg dry	352	39.6	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 352		µg/kg dry	352	27.8	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 352		µg/kg dry	352	37.6	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 352		µg/kg dry	352	50.4	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 352		µg/kg dry	352	36.5	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 178		µg/kg dry	178	42.7	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 178		µg/kg dry	178	36.4	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 352		µg/kg dry	352	52.4	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 71.1		µg/kg dry	71.1	41.7	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-6	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-13				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 71.1		µg/kg dry	71.1	46.0	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 178		µg/kg dry	178	44.8	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 178		µg/kg dry	178	44.8	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 178		µg/kg dry	178	44.9	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 178		µg/kg dry	178	40.2	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 71.1		µg/kg dry	71.1	48.6	1	"	"	"	"	"	X
78-59-1	Isophorone	< 178		µg/kg dry	178	27.4	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 71.1		µg/kg dry	71.1	49.8	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 352		µg/kg dry	352	28.3	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 352		µg/kg dry	352	27.6	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 71.1		µg/kg dry	71.1	41.1	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 352		µg/kg dry	352	31.9	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 352		µg/kg dry	352	32.5	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 178		µg/kg dry	178	46.9	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 178		µg/kg dry	178	41.2	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 178		µg/kg dry	178	31.1	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1410		µg/kg dry	1410	46.8	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 178		µg/kg dry	178	23.2	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 178		µg/kg dry	178	31.1	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 352		µg/kg dry	352	35.8	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 352		µg/kg dry	352	41.9	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 71.1		µg/kg dry	71.1	40.3	1	"	"	"	"	"	X
108-95-2	Phenol	< 352		µg/kg dry	352	35.6	1	"	"	"	"	"	X
129-00-0	Pyrene	< 71.1		µg/kg dry	71.1	39.2	1	"	"	"	"	"	X
110-86-1	Pyridine	< 352		µg/kg dry	352	83.3	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 352		µg/kg dry	352	43.3	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 71.1		µg/kg dry	71.1	39.2	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 352		µg/kg dry	352	36.4	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 178		µg/kg dry	178	43.5	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 352		µg/kg dry	352	37.4	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 352		µg/kg dry	352	41.9	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*100*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*93*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*78*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*98*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*87*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*77*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 21.4		µg/kg dry	21.4	15.5	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 21.4		µg/kg dry	21.4	6.34	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 21.4		µg/kg dry	21.4	5.94	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-6	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-13				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 21.4		µg/kg dry	21.4	2.04	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 21.4		µg/kg dry	21.4	6.70	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 21.4		µg/kg dry	21.4	16.7	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 21.4		µg/kg dry	21.4	4.61	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 21.4		µg/kg dry	21.4	5.00	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 21.4		µg/kg dry	21.4	4.57	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*93*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*82*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*78*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*70*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.36		µg/kg dry	5.36	0.247	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.36		µg/kg dry	5.36	0.343	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.36		µg/kg dry	5.36	0.279	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.22		µg/kg dry	3.22	0.568	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.36		µg/kg dry	5.36	0.622	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.36		µg/kg dry	5.36	0.182	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.36		µg/kg dry	5.36	0.214	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.36		µg/kg dry	5.36	0.247	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.36		µg/kg dry	5.36	0.257	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.36		µg/kg dry	5.36	0.279	1	"	"	"	"	"	X
72-20-8	Endrin	< 8.58		µg/kg dry	8.58	0.525	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 8.58		µg/kg dry	8.58	0.343	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 8.58		µg/kg dry	8.58	0.450	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 8.58		µg/kg dry	8.58	0.783	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 8.58		µg/kg dry	8.58	3.68	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 8.58		µg/kg dry	8.58	0.579	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 8.58		µg/kg dry	8.58	0.311	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 8.58		µg/kg dry	8.58	1.35	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.36		µg/kg dry	5.36	0.225	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.36		µg/kg dry	5.36	0.268	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 107		µg/kg dry	107	75.7	1	"	"	"	"	"	X
57-74-9	Chlordane	< 21.4		µg/kg dry	21.4	2.70	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.36		µg/kg dry	5.36	0.472	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*64*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*57*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*49*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*46*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-6 SC58794-13	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**134**		mg/kg dry	14.3	12.0	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*80*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*108*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.38		mg/kg dry	3.38	0.182	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**29.6**		mg/kg dry	1.69	0.214	1	"	"	"	"	"	X
7440-39-3	Barium	**28.6**		mg/kg dry	1.13	0.133	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.563		mg/kg dry	0.563	0.0282	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.563		mg/kg dry	0.563	0.0291	1	"	"	"	"	"	X
7440-47-3	Chromium	**30.0**		mg/kg dry	1.13	0.150	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.120		mg/kg dry	0.120	0.0100	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**25.6**		mg/kg dry	1.13	0.129	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**15.8**		mg/kg dry	1.69	0.239	1	"	"	"	"	"	X
7440-36-0	Antimony	< 5.63		mg/kg dry	5.63	0.423	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.69		mg/kg dry	1.69	0.322	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.38		mg/kg dry	3.38	1.24	1	"	"	"	"	"	X
7440-62-2	Vanadium	**35.8**		mg/kg dry	1.69	0.299	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**43.2**		mg/kg dry	3.38	0.871	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**92.6**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.74**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 14-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	14-Jul-20	15-Jul-20 17:52	M-CT007	537320A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*83*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-6 SC58794-13	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:42	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-7	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-14				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 18.18 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 59.4		µg/kg dry	59.4	32.6	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 594		µg/kg dry	594	75.1	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 59.4		µg/kg dry	59.4	21.5	50	"	"	"	"	"	X
71-43-2	Benzene	< 59.4		µg/kg dry	59.4	9.51	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 59.4		µg/kg dry	59.4	13.4	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 59.4		µg/kg dry	59.4	8.50	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 59.4		µg/kg dry	59.4	15.3	50	"	"	"	"	"	X
75-25-2	Bromoform	< 59.4		µg/kg dry	59.4	12.7	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 119		µg/kg dry	119	29.4	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 119		µg/kg dry	119	27.2	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 59.4		µg/kg dry	59.4	23.8	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 59.4		µg/kg dry	59.4	18.3	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 59.4		µg/kg dry	59.4	24.3	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 119		µg/kg dry	119	22.0	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 59.4		µg/kg dry	59.4	17.8	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 59.4		µg/kg dry	59.4	7.19	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 119		µg/kg dry	119	26.5	50	"	"	"	"	"	X
67-66-3	Chloroform	< 59.4		µg/kg dry	59.4	7.01	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 119		µg/kg dry	119	70.6	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 59.4		µg/kg dry	59.4	14.7	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 59.4		µg/kg dry	59.4	10.8	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 119		µg/kg dry	119	23.5	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 59.4		µg/kg dry	59.4	9.39	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 59.4		µg/kg dry	59.4	16.2	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 59.4		µg/kg dry	59.4	11.2	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 59.4		µg/kg dry	59.4	10.7	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 59.4		µg/kg dry	59.4	14.8	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 59.4		µg/kg dry	59.4	10.6	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 119		µg/kg dry	119	77.8	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 59.4		µg/kg dry	59.4	13.7	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 59.4		µg/kg dry	59.4	15.6	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 59.4		µg/kg dry	59.4	15.2	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 59.4		µg/kg dry	59.4	19.8	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 59.4		µg/kg dry	59.4	13.6	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 59.4		µg/kg dry	59.4	20.6	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 59.4		µg/kg dry	59.4	18.8	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 59.4		µg/kg dry	59.4	15.6	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 59.4		µg/kg dry	59.4	18.2	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 59.4		µg/kg dry	59.4	14.0	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 59.4		µg/kg dry	59.4	24.2	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 59.4		µg/kg dry	59.4	12.4	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 59.4		µg/kg dry	59.4	19.0	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 119		µg/kg dry	119	39.5	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-7	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-14				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 18.18 g						
98-82-8	Isopropylbenzene	< 59.4		µg/kg dry	59.4	21.6	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 59.4		µg/kg dry	59.4	16.5	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 59.4		µg/kg dry	59.4	17.9	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 119		µg/kg dry	119	42.6	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 119		µg/kg dry	119	50.8	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 59.4		µg/kg dry	59.4	17.2	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 59.4		µg/kg dry	59.4	14.8	50	"	"	"	"	"	X
100-42-5	Styrene	< 59.4		µg/kg dry	59.4	7.85	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 59.4		µg/kg dry	59.4	14.3	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 59.4		µg/kg dry	59.4	18.8	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 59.4		µg/kg dry	59.4	18.7	50	"	"	"	"	"	X
108-88-3	Toluene	< 59.4		µg/kg dry	59.4	9.57	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 59.4		µg/kg dry	59.4	13.9	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 59.4		µg/kg dry	59.4	9.81	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 59.4		µg/kg dry	59.4	9.39	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 59.4		µg/kg dry	59.4	14.4	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 59.4		µg/kg dry	59.4	18.4	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 59.4		µg/kg dry	59.4	10.2	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 59.4		µg/kg dry	59.4	26.9	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 59.4		µg/kg dry	59.4	27.4	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 59.4		µg/kg dry	59.4	15.0	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 59.4		µg/kg dry	59.4	12.4	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 59.4		µg/kg dry	59.4	29.2	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 119		µg/kg dry	119	35.0	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 59.4		µg/kg dry	59.4	18.3	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 119		µg/kg dry	119	43.5	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 59.4		µg/kg dry	59.4	16.1	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 59.4		µg/kg dry	59.4	32.9	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 59.4		µg/kg dry	59.4	16.5	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 59.4		µg/kg dry	59.4	19.2	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1190		µg/kg dry	1190	844	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1190		µg/kg dry	1190	350	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 297		µg/kg dry	297	39.2	50	"	"	"	"	"	X
64-17-5	Ethanol	< 11900		µg/kg dry	11900	1020	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*107*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*104*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*104*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 79.6		µg/kg dry	79.6	42.2	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-7	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-14				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 79.6		µg/kg dry	79.6	41.5	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 394		µg/kg dry	394	25.0	1	"	"	"	"	"	X
120-12-7	Anthracene	< 79.6		µg/kg dry	79.6	45.8	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 394		µg/kg dry	394	42.7	1	"	"	"	"	"	
92-87-5	Benzidine	< 787		µg/kg dry	787	25.0	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 79.6		µg/kg dry	79.6	44.7	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 79.6		µg/kg dry	79.6	54.4	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 79.6		µg/kg dry	79.6	59.9	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 79.6		µg/kg dry	79.6	56.2	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 79.6		µg/kg dry	79.6	68.0	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 394		µg/kg dry	394	23.6	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 394		µg/kg dry	394	91.1	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 394		µg/kg dry	394	39.7	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 199		µg/kg dry	199	36.9	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 199		µg/kg dry	199	32.0	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 199		µg/kg dry	199	50.7	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 394		µg/kg dry	394	44.5	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 394		µg/kg dry	394	39.5	1	"	"	"	"	"	X
86-74-8	Carbazole	< 199		µg/kg dry	199	45.8	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 394		µg/kg dry	394	46.3	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 199		µg/kg dry	199	24.6	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 394		µg/kg dry	394	53.9	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 199		µg/kg dry	199	38.2	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 394		µg/kg dry	394	38.5	1	"	"	"	"	"	X
218-01-9	Chrysene	< 79.6		µg/kg dry	79.6	45.0	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 79.6		µg/kg dry	79.6	58.8	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 199		µg/kg dry	199	53.6	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 394		µg/kg dry	394	47.0	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 394		µg/kg dry	394	42.5	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 394		µg/kg dry	394	44.7	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 394		µg/kg dry	394	43.5	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 199		µg/kg dry	199	48.3	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 394		µg/kg dry	394	41.3	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 394		µg/kg dry	394	44.3	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 394		µg/kg dry	394	31.1	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 394		µg/kg dry	394	42.1	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 394		µg/kg dry	394	56.4	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 394		µg/kg dry	394	40.8	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 199		µg/kg dry	199	47.7	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 199		µg/kg dry	199	40.7	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 394		µg/kg dry	394	58.6	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 79.6		µg/kg dry	79.6	46.6	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-7	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-14				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 79.6		µg/kg dry	79.6	51.4	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 199		µg/kg dry	199	50.1	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 199		µg/kg dry	199	50.1	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 199		µg/kg dry	199	50.2	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 199		µg/kg dry	199	45.0	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 79.6		µg/kg dry	79.6	54.4	1	"	"	"	"	"	X
78-59-1	Isophorone	< 199		µg/kg dry	199	30.7	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 79.6		µg/kg dry	79.6	55.7	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 394		µg/kg dry	394	31.6	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 394		µg/kg dry	394	30.9	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 79.6		µg/kg dry	79.6	45.9	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 394		µg/kg dry	394	35.7	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 394		µg/kg dry	394	36.4	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 199		µg/kg dry	199	52.5	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 199		µg/kg dry	199	46.0	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 199		µg/kg dry	199	34.8	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1570		µg/kg dry	1570	52.4	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 199		µg/kg dry	199	26.0	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 199		µg/kg dry	199	34.8	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 394		µg/kg dry	394	40.1	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 394		µg/kg dry	394	46.9	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 79.6		µg/kg dry	79.6	45.1	1	"	"	"	"	"	X
108-95-2	Phenol	< 394		µg/kg dry	394	39.8	1	"	"	"	"	"	X
129-00-0	Pyrene	< 79.6		µg/kg dry	79.6	43.9	1	"	"	"	"	"	X
110-86-1	Pyridine	< 394		µg/kg dry	394	93.2	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 394		µg/kg dry	394	48.4	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 79.6		µg/kg dry	79.6	43.9	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 394		µg/kg dry	394	40.7	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 199		µg/kg dry	199	48.7	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 394		µg/kg dry	394	41.9	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 394		µg/kg dry	394	46.9	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*105*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*90*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*88*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*101*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*83*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*63*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 23.8		µg/kg dry	23.8	17.1	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 23.8		µg/kg dry	23.8	7.02	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 23.8		µg/kg dry	23.8	6.58	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-7	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-14				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 23.8		µg/kg dry	23.8	2.26	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 23.8		µg/kg dry	23.8	7.43	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 23.8		µg/kg dry	23.8	18.5	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 23.8		µg/kg dry	23.8	5.11	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 23.8		µg/kg dry	23.8	5.54	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 23.8		µg/kg dry	23.8	5.06	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*74*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*68*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*86*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*76*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.94		µg/kg dry	5.94	0.273	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.94		µg/kg dry	5.94	0.380	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.94		µg/kg dry	5.94	0.309	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.57		µg/kg dry	3.57	0.630	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.94		µg/kg dry	5.94	0.689	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.94		µg/kg dry	5.94	0.202	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.94		µg/kg dry	5.94	0.238	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.94		µg/kg dry	5.94	0.273	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.94		µg/kg dry	5.94	0.285	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.94		µg/kg dry	5.94	0.309	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.51		µg/kg dry	9.51	0.582	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.51		µg/kg dry	9.51	0.380	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.51		µg/kg dry	9.51	0.499	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.51		µg/kg dry	9.51	0.867	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.51		µg/kg dry	9.51	4.08	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.51		µg/kg dry	9.51	0.642	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.51		µg/kg dry	9.51	0.345	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.51		µg/kg dry	9.51	1.50	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.94		µg/kg dry	5.94	0.250	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.94		µg/kg dry	5.94	0.297	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 119		µg/kg dry	119	83.8	1	"	"	"	"	"	X
57-74-9	Chlordane	< 23.8		µg/kg dry	23.8	2.99	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.94		µg/kg dry	5.94	0.523	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*79*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*64*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*51*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*50*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-7 SC58794-14	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**170**		mg/kg dry	15.8	13.2	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*84*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*113*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.60		mg/kg dry	3.60	0.195	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**48.6**		mg/kg dry	1.80	0.228	1	"	"	"	"	"	X
7440-39-3	Barium	**34.6**		mg/kg dry	1.20	0.142	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.601		mg/kg dry	0.601	0.0301	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.601		mg/kg dry	0.601	0.0311	1	"	"	"	"	"	X
7440-47-3	Chromium	**65.9**		mg/kg dry	1.20	0.160	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.128		mg/kg dry	0.128	0.0106	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**44.8**		mg/kg dry	1.20	0.138	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**28.6**		mg/kg dry	1.80	0.255	1	"	"	"	"	"	X
7440-36-0	Antimony	< 6.01		mg/kg dry	6.01	0.452	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.80		mg/kg dry	1.80	0.344	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.60		mg/kg dry	3.60	1.32	1	"	"	"	"	"	X
7440-62-2	Vanadium	**46.7**		mg/kg dry	1.80	0.320	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**56.2**		mg/kg dry	3.60	0.930	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**83.4**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.71**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 14-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	14-Jul-20	15-Jul-20 19:05	M-CT007	537320A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*85*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-7 SC58794-14	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 7		mg/kg	7	7	1	SW846 7.3.3.1/90	14-Jul-20	14-Jul-20 14:43	M-CT007	537292A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	14-Jul-20 15:17	M-CT007	537292B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	14-Jul-20 15:18	14-Jul-20 15:18	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-8	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-15				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.62 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 60.5		µg/kg dry	60.5	33.1	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 605		µg/kg dry	605	76.4	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 60.5		µg/kg dry	60.5	21.8	50	"	"	"	"	"	X
71-43-2	Benzene	< 60.5		µg/kg dry	60.5	9.67	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 60.5		µg/kg dry	60.5	13.7	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 60.5		µg/kg dry	60.5	8.64	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 60.5		µg/kg dry	60.5	15.6	50	"	"	"	"	"	X
75-25-2	Bromoform	< 60.5		µg/kg dry	60.5	12.9	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 121		µg/kg dry	121	29.9	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 121		µg/kg dry	121	27.6	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 60.5		µg/kg dry	60.5	24.2	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 60.5		µg/kg dry	60.5	18.6	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 60.5		µg/kg dry	60.5	24.7	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 121		µg/kg dry	121	22.4	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 60.5		µg/kg dry	60.5	18.1	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 60.5		µg/kg dry	60.5	7.31	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 121		µg/kg dry	121	27.0	50	"	"	"	"	"	X
67-66-3	Chloroform	< 60.5		µg/kg dry	60.5	7.13	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 121		µg/kg dry	121	71.8	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 60.5		µg/kg dry	60.5	15.0	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 60.5		µg/kg dry	60.5	10.9	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 121		µg/kg dry	121	23.9	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 60.5		µg/kg dry	60.5	9.55	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 60.5		µg/kg dry	60.5	16.4	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 60.5		µg/kg dry	60.5	11.4	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 60.5		µg/kg dry	60.5	10.9	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 60.5		µg/kg dry	60.5	15.1	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 60.5		µg/kg dry	60.5	10.8	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 121		µg/kg dry	121	79.1	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 60.5		µg/kg dry	60.5	14.0	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 60.5		µg/kg dry	60.5	15.8	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 60.5		µg/kg dry	60.5	15.5	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 60.5		µg/kg dry	60.5	20.1	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 60.5		µg/kg dry	60.5	13.8	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 60.5		µg/kg dry	60.5	21.0	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 60.5		µg/kg dry	60.5	19.1	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 60.5		µg/kg dry	60.5	15.9	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 60.5		µg/kg dry	60.5	18.5	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 60.5		µg/kg dry	60.5	14.3	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 60.5		µg/kg dry	60.5	24.6	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 60.5		µg/kg dry	60.5	12.6	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 60.5		µg/kg dry	60.5	19.3	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 121		µg/kg dry	121	40.2	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-8	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-15				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260							Initial weight: 16.62 g						
98-82-8	Isopropylbenzene	< 60.5		µg/kg dry	60.5	21.9	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 60.5		µg/kg dry	60.5	16.7	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 60.5		µg/kg dry	60.5	18.2	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 121		µg/kg dry	121	43.3	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 121		µg/kg dry	121	51.6	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 60.5		µg/kg dry	60.5	17.5	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 60.5		µg/kg dry	60.5	15.1	50	"	"	"	"	"	X
100-42-5	Styrene	< 60.5		µg/kg dry	60.5	7.98	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 60.5		µg/kg dry	60.5	14.6	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 60.5		µg/kg dry	60.5	19.2	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 60.5		µg/kg dry	60.5	19.0	50	"	"	"	"	"	X
108-88-3	Toluene	< 60.5		µg/kg dry	60.5	9.73	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 60.5		µg/kg dry	60.5	14.1	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 60.5		µg/kg dry	60.5	9.97	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 60.5		µg/kg dry	60.5	9.55	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 60.5		µg/kg dry	60.5	14.6	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 60.5		µg/kg dry	60.5	18.7	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 60.5		µg/kg dry	60.5	10.3	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 60.5		µg/kg dry	60.5	27.3	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 60.5		µg/kg dry	60.5	27.9	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 60.5		µg/kg dry	60.5	15.3	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 60.5		µg/kg dry	60.5	12.6	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 60.5		µg/kg dry	60.5	29.7	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 121		µg/kg dry	121	35.5	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 60.5		µg/kg dry	60.5	18.6	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 121		µg/kg dry	121	44.2	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 60.5		µg/kg dry	60.5	16.4	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 60.5		µg/kg dry	60.5	33.4	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 60.5		µg/kg dry	60.5	16.7	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 60.5		µg/kg dry	60.5	19.5	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1210		µg/kg dry	1210	858	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1210		µg/kg dry	1210	356	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 302		µg/kg dry	302	39.9	50	"	"	"	"	"	X
64-17-5	Ethanol	< 12100		µg/kg dry	12100	1040	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*106*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*108*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*107*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 76.5		µg/kg dry	76.5	40.6	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-8	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-15				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 76.5		µg/kg dry	76.5	39.9	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 379		µg/kg dry	379	24.1	1	"	"	"	"	"	X
120-12-7	Anthracene	< 76.5		µg/kg dry	76.5	44.0	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 379		µg/kg dry	379	41.1	1	"	"	"	"	"	
92-87-5	Benzidine	< 757		µg/kg dry	757	24.1	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 76.5		µg/kg dry	76.5	43.0	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 76.5		µg/kg dry	76.5	52.3	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 76.5		µg/kg dry	76.5	57.6	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 76.5		µg/kg dry	76.5	54.0	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 76.5		µg/kg dry	76.5	65.4	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 379		µg/kg dry	379	22.7	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 379		µg/kg dry	379	87.6	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 379		µg/kg dry	379	38.2	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 192		µg/kg dry	192	35.4	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 192		µg/kg dry	192	30.7	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 192		µg/kg dry	192	48.7	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 379		µg/kg dry	379	42.8	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 379		µg/kg dry	379	38.0	1	"	"	"	"	"	X
86-74-8	Carbazole	< 192		µg/kg dry	192	44.0	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 379		µg/kg dry	379	44.5	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 192		µg/kg dry	192	23.6	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 379		µg/kg dry	379	51.8	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 192		µg/kg dry	192	36.7	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 379		µg/kg dry	379	37.0	1	"	"	"	"	"	X
218-01-9	Chrysene	< 76.5		µg/kg dry	76.5	43.2	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 76.5		µg/kg dry	76.5	56.5	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 192		µg/kg dry	192	51.5	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 379		µg/kg dry	379	45.2	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 379		µg/kg dry	379	40.8	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 379		µg/kg dry	379	43.0	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 379		µg/kg dry	379	41.9	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 192		µg/kg dry	192	46.5	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 379		µg/kg dry	379	39.7	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 379		µg/kg dry	379	42.6	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 379		µg/kg dry	379	29.9	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 379		µg/kg dry	379	40.5	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 379		µg/kg dry	379	54.3	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 379		µg/kg dry	379	39.2	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 192		µg/kg dry	192	45.9	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 192		µg/kg dry	192	39.1	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 379		µg/kg dry	379	56.3	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 76.5		µg/kg dry	76.5	44.8	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-8	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-15				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 76.5		µg/kg dry	76.5	49.4	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 192		µg/kg dry	192	48.2	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 192		µg/kg dry	192	48.2	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 192		µg/kg dry	192	48.3	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 192		µg/kg dry	192	43.2	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 76.5		µg/kg dry	76.5	52.3	1	"	"	"	"	"	X
78-59-1	Isophorone	< 192		µg/kg dry	192	29.5	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 76.5		µg/kg dry	76.5	53.6	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 379		µg/kg dry	379	30.4	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 379		µg/kg dry	379	29.7	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 76.5		µg/kg dry	76.5	44.2	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 379		µg/kg dry	379	34.3	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 379		µg/kg dry	379	35.0	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 192		µg/kg dry	192	50.5	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 192		µg/kg dry	192	44.3	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 192		µg/kg dry	192	33.5	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1510		µg/kg dry	1510	50.4	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 192		µg/kg dry	192	25.0	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 192		µg/kg dry	192	33.5	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 379		µg/kg dry	379	38.5	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 379		µg/kg dry	379	45.1	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 76.5		µg/kg dry	76.5	43.4	1	"	"	"	"	"	X
108-95-2	Phenol	< 379		µg/kg dry	379	38.3	1	"	"	"	"	"	X
129-00-0	Pyrene	< 76.5		µg/kg dry	76.5	42.2	1	"	"	"	"	"	X
110-86-1	Pyridine	< 379		µg/kg dry	379	89.6	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 379		µg/kg dry	379	46.6	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 76.5		µg/kg dry	76.5	42.2	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 379		µg/kg dry	379	39.1	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 192		µg/kg dry	192	46.8	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 379		µg/kg dry	379	40.3	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 379		µg/kg dry	379	45.1	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*80*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*88*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*84*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*97*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*85*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*79*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 23.0		µg/kg dry	23.0	16.6	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 23.0		µg/kg dry	23.0	6.79	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 23.0		µg/kg dry	23.0	6.37	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-8	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-15				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 23.0		µg/kg dry	23.0	2.18	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 23.0		µg/kg dry	23.0	7.18	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 23.0		µg/kg dry	23.0	17.9	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 23.0		µg/kg dry	23.0	4.94	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 23.0		µg/kg dry	23.0	5.35	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 23.0		µg/kg dry	23.0	4.90	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*90*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*81*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*85*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*75*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 5.75		µg/kg dry	5.75	0.264	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 5.75		µg/kg dry	5.75	0.368	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 5.75		µg/kg dry	5.75	0.299	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.45		µg/kg dry	3.45	0.609	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 5.75		µg/kg dry	5.75	0.666	1	"	"	"	"	"	X
309-00-2	Aldrin	< 5.75		µg/kg dry	5.75	0.195	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 5.75		µg/kg dry	5.75	0.230	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 5.75		µg/kg dry	5.75	0.264	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 5.75		µg/kg dry	5.75	0.276	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 5.75		µg/kg dry	5.75	0.299	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.19		µg/kg dry	9.19	0.563	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.19		µg/kg dry	9.19	0.368	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.19		µg/kg dry	9.19	0.483	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.19		µg/kg dry	9.19	0.839	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.19		µg/kg dry	9.19	3.94	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.19		µg/kg dry	9.19	0.620	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.19		µg/kg dry	9.19	0.333	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.19		µg/kg dry	9.19	1.45	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 5.75		µg/kg dry	5.75	0.241	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 5.75		µg/kg dry	5.75	0.287	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 115		µg/kg dry	115	81.1	1	"	"	"	"	"	X
57-74-9	Chlordane	< 23.0		µg/kg dry	23.0	2.89	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 5.75		µg/kg dry	5.75	0.506	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*68*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*69*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*54*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*52*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-8 SC58794-15	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**111**		mg/kg dry	15.4	12.9	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*77*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*103*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.75		mg/kg dry	3.75	0.202	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**48.7**		mg/kg dry	1.87	0.237	1	"	"	"	"	"	X
7440-39-3	Barium	**33.0**		mg/kg dry	1.25	0.147	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.624		mg/kg dry	0.624	0.0313	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.624		mg/kg dry	0.624	0.0323	1	"	"	"	"	"	X
7440-47-3	Chromium	**31.6**		mg/kg dry	1.25	0.166	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.115		mg/kg dry	0.115	0.0095	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**47.7**		mg/kg dry	1.25	0.144	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**21.0**		mg/kg dry	1.87	0.265	1	"	"	"	"	"	X
7440-36-0	Antimony	< 6.24		mg/kg dry	6.24	0.469	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.87		mg/kg dry	1.87	0.357	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.75		mg/kg dry	3.75	1.38	1	"	"	"	"	"	X
7440-62-2	Vanadium	**36.0**		mg/kg dry	1.87	0.332	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**52.3**		mg/kg dry	3.75	0.966	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**86.1**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.56**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A									Methylation date: 14-Jul-20				
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	14-Jul-20	15-Jul-20 19:29	M-CT007	537320A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*84*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-8 SC58794-15	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 6		mg/kg	6	6	1	SW846 7.3.3.1/90	15-Jul-20	15-Jul-20 13:52	M-CT007	537434A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	15-Jul-20 14:40	M-CT007	537434B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	15-Jul-20 14:43	15-Jul-20 14:43	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-9	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-16				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 15.23 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 76.0		µg/kg dry	76.0	41.7	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 760		µg/kg dry	760	96.1	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 76.0		µg/kg dry	76.0	27.5	50	"	"	"	"	"	X
71-43-2	Benzene	< 76.0		µg/kg dry	76.0	12.2	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 76.0		µg/kg dry	76.0	17.2	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 76.0		µg/kg dry	76.0	10.9	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 76.0		µg/kg dry	76.0	19.6	50	"	"	"	"	"	X
75-25-2	Bromoform	< 76.0		µg/kg dry	76.0	16.3	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 152		µg/kg dry	152	37.6	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 152		µg/kg dry	152	34.8	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 76.0		µg/kg dry	76.0	30.4	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 76.0		µg/kg dry	76.0	23.3	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 76.0		µg/kg dry	76.0	31.0	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 152		µg/kg dry	152	28.1	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 76.0		µg/kg dry	76.0	22.7	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 76.0		µg/kg dry	76.0	9.20	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 152		µg/kg dry	152	33.9	50	"	"	"	"	"	X
67-66-3	Chloroform	< 76.0		µg/kg dry	76.0	8.97	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 152		µg/kg dry	152	90.3	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 76.0		µg/kg dry	76.0	18.9	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 76.0		µg/kg dry	76.0	13.8	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 152		µg/kg dry	152	30.0	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 76.0		µg/kg dry	76.0	12.0	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 76.0		µg/kg dry	76.0	20.7	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 76.0		µg/kg dry	76.0	14.3	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 76.0		µg/kg dry	76.0	13.7	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 76.0		µg/kg dry	76.0	18.9	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 76.0		µg/kg dry	76.0	13.6	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 152		µg/kg dry	152	99.5	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 76.0		µg/kg dry	76.0	17.6	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 76.0		µg/kg dry	76.0	19.9	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 76.0		µg/kg dry	76.0	19.5	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 76.0		µg/kg dry	76.0	25.3	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 76.0		µg/kg dry	76.0	17.3	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 76.0		µg/kg dry	76.0	26.4	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 76.0		µg/kg dry	76.0	24.0	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 76.0		µg/kg dry	76.0	20.0	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 76.0		µg/kg dry	76.0	23.3	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 76.0		µg/kg dry	76.0	17.9	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 76.0		µg/kg dry	76.0	31.0	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 76.0		µg/kg dry	76.0	15.9	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 76.0		µg/kg dry	76.0	24.3	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 152		µg/kg dry	152	50.6	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-9	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-16				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
							Initial weight: 15.23 g						
98-82-8	Isopropylbenzene	< 76.0		µg/kg dry	76.0	27.6	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 76.0		µg/kg dry	76.0	21.1	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 76.0		µg/kg dry	76.0	22.9	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 152		µg/kg dry	152	54.5	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 152		µg/kg dry	152	64.9	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 76.0		µg/kg dry	76.0	22.1	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 76.0		µg/kg dry	76.0	18.9	50	"	"	"	"	"	X
100-42-5	Styrene	< 76.0		µg/kg dry	76.0	10.0	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 76.0		µg/kg dry	76.0	18.3	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 76.0		µg/kg dry	76.0	24.1	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 76.0		µg/kg dry	76.0	24.0	50	"	"	"	"	"	X
108-88-3	Toluene	< 76.0		µg/kg dry	76.0	12.2	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 76.0		µg/kg dry	76.0	17.7	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 76.0		µg/kg dry	76.0	12.5	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 76.0		µg/kg dry	76.0	12.0	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 76.0		µg/kg dry	76.0	18.4	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 76.0		µg/kg dry	76.0	23.5	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 76.0		µg/kg dry	76.0	13.0	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 76.0		µg/kg dry	76.0	34.4	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 76.0		µg/kg dry	76.0	35.1	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 76.0		µg/kg dry	76.0	19.2	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 76.0		µg/kg dry	76.0	15.9	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 76.0		µg/kg dry	76.0	37.4	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 152		µg/kg dry	152	44.7	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 76.0		µg/kg dry	76.0	23.4	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 152		µg/kg dry	152	55.6	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 76.0		µg/kg dry	76.0	20.6	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 76.0		µg/kg dry	76.0	42.1	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 76.0		µg/kg dry	76.0	21.1	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 76.0		µg/kg dry	76.0	24.6	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1520		µg/kg dry	1520	1080	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1520		µg/kg dry	1520	448	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 380		µg/kg dry	380	50.2	50	"	"	"	"	"	X
64-17-5	Ethanol	< 15200		µg/kg dry	15200	1310	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*103*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*102*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*102*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 83.8		µg/kg dry	83.8	44.5	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-9	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-16				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 83.8		µg/kg dry	83.8	43.7	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 415		µg/kg dry	415	26.4	1	"	"	"	"	"	X
120-12-7	Anthracene	< 83.8		µg/kg dry	83.8	48.2	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 415		µg/kg dry	415	45.0	1	"	"	"	"	"	
92-87-5	Benzidine	< 829		µg/kg dry	829	26.4	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 83.8		µg/kg dry	83.8	47.1	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 83.8		µg/kg dry	83.8	57.3	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 83.8		µg/kg dry	83.8	63.1	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 83.8		µg/kg dry	83.8	59.2	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 83.8		µg/kg dry	83.8	71.6	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 415		µg/kg dry	415	24.9	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 415		µg/kg dry	415	96.0	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 415		µg/kg dry	415	41.8	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 210		µg/kg dry	210	38.8	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 210		µg/kg dry	210	33.7	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 210		µg/kg dry	210	53.4	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 415		µg/kg dry	415	46.9	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 415		µg/kg dry	415	41.6	1	"	"	"	"	"	X
86-74-8	Carbazole	< 210		µg/kg dry	210	48.2	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 415		µg/kg dry	415	48.7	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 210		µg/kg dry	210	25.9	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 415		µg/kg dry	415	56.8	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 210		µg/kg dry	210	40.2	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 415		µg/kg dry	415	40.6	1	"	"	"	"	"	X
218-01-9	Chrysene	< 83.8		µg/kg dry	83.8	47.4	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 83.8		µg/kg dry	83.8	61.9	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 210		µg/kg dry	210	56.4	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 415		µg/kg dry	415	49.5	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 415		µg/kg dry	415	44.7	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 415		µg/kg dry	415	47.1	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 415		µg/kg dry	415	45.9	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 210		µg/kg dry	210	50.9	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 415		µg/kg dry	415	43.5	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 415		µg/kg dry	415	46.6	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 415		µg/kg dry	415	32.8	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 415		µg/kg dry	415	44.3	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 415		µg/kg dry	415	59.4	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 415		µg/kg dry	415	43.0	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 210		µg/kg dry	210	50.2	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 210		µg/kg dry	210	42.8	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 415		µg/kg dry	415	61.7	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 83.8		µg/kg dry	83.8	49.1	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-9	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
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CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 83.8		µg/kg dry	83.8	54.1	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 210		µg/kg dry	210	52.8	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 210		µg/kg dry	210	52.8	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 210		µg/kg dry	210	52.9	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 210		µg/kg dry	210	47.4	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 83.8		µg/kg dry	83.8	57.3	1	"	"	"	"	"	X
78-59-1	Isophorone	< 210		µg/kg dry	210	32.3	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 83.8		µg/kg dry	83.8	58.7	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 415		µg/kg dry	415	33.3	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 415		µg/kg dry	415	32.5	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 83.8		µg/kg dry	83.8	48.4	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 415		µg/kg dry	415	37.6	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 415		µg/kg dry	415	38.3	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 210		µg/kg dry	210	55.3	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 210		µg/kg dry	210	48.5	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 210		µg/kg dry	210	36.7	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1660		µg/kg dry	1660	55.1	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 210		µg/kg dry	210	27.4	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 210		µg/kg dry	210	36.7	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 415		µg/kg dry	415	42.2	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 415		µg/kg dry	415	49.4	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 83.8		µg/kg dry	83.8	47.5	1	"	"	"	"	"	X
108-95-2	Phenol	< 415		µg/kg dry	415	42.0	1	"	"	"	"	"	X
129-00-0	Pyrene	< 83.8		µg/kg dry	83.8	46.2	1	"	"	"	"	"	X
110-86-1	Pyridine	< 415		µg/kg dry	415	98.1	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 415		µg/kg dry	415	51.0	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 83.8		µg/kg dry	83.8	46.2	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 415		µg/kg dry	415	42.8	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 210		µg/kg dry	210	51.3	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 415		µg/kg dry	415	44.1	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 415		µg/kg dry	415	49.4	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*70*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*94*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*79*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*98*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*92*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*81*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 25.3		µg/kg dry	25.3	18.3	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 25.3		µg/kg dry	25.3	7.49	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 25.3		µg/kg dry	25.3	7.02	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-9	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-16				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 25.3		µg/kg dry	25.3	2.41	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 25.3		µg/kg dry	25.3	7.92	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 25.3		µg/kg dry	25.3	19.7	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 25.3		µg/kg dry	25.3	5.45	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 25.3		µg/kg dry	25.3	5.90	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 25.3		µg/kg dry	25.3	5.40	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*84*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*74*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*82*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*74*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 6.34		µg/kg dry	6.34	0.291	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 6.34		µg/kg dry	6.34	0.405	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 6.34		µg/kg dry	6.34	0.329	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.80		µg/kg dry	3.80	0.672	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 6.34		µg/kg dry	6.34	0.735	1	"	"	"	"	"	X
309-00-2	Aldrin	< 6.34		µg/kg dry	6.34	0.215	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 6.34		µg/kg dry	6.34	0.253	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 6.34		µg/kg dry	6.34	0.291	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 6.34		µg/kg dry	6.34	0.304	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 6.34		µg/kg dry	6.34	0.329	1	"	"	"	"	"	X
72-20-8	Endrin	< 10.1		µg/kg dry	10.1	0.621	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 10.1		µg/kg dry	10.1	0.405	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 10.1		µg/kg dry	10.1	0.532	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 10.1		µg/kg dry	10.1	0.925	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 10.1		µg/kg dry	10.1	4.35	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 10.1		µg/kg dry	10.1	0.684	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 10.1		µg/kg dry	10.1	0.367	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 10.1		µg/kg dry	10.1	1.60	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 6.34		µg/kg dry	6.34	0.266	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 6.34		µg/kg dry	6.34	0.317	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 127		µg/kg dry	127	89.4	1	"	"	"	"	"	X
57-74-9	Chlordane	< 25.3		µg/kg dry	25.3	3.19	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 6.34		µg/kg dry	6.34	0.558	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*57*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*53*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*52*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-9 SC58794-16	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**129**		mg/kg dry	16.8	14.0	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*82*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*108*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.77		mg/kg dry	3.77	0.203	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**82.3**		mg/kg dry	1.88	0.238	1	"	"	"	"	"	X
7440-39-3	Barium	**29.1**		mg/kg dry	1.26	0.148	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.628		mg/kg dry	0.628	0.0315	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.628		mg/kg dry	0.628	0.0325	1	"	"	"	"	"	X
7440-47-3	Chromium	**24.7**		mg/kg dry	1.26	0.167	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.120		mg/kg dry	0.120	0.0100	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**76.0**		mg/kg dry	1.26	0.144	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**22.9**		mg/kg dry	1.88	0.266	1	"	"	"	"	"	X
7440-36-0	Antimony	< 6.28		mg/kg dry	6.28	0.472	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.88		mg/kg dry	1.88	0.359	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.77		mg/kg dry	3.77	1.38	1	"	"	"	"	"	X
7440-62-2	Vanadium	**39.4**		mg/kg dry	1.88	0.334	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**64.7**		mg/kg dry	3.77	0.972	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**78.7**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.41**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A										Methylation date: 14-Jul-20			
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	14-Jul-20	15-Jul-20 19:54	M-CT007	537320A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*73*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-9 SC58794-16	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 7		mg/kg	7	7	1	SW846 7.3.3.1/90	15-Jul-20	15-Jul-20 13:53	M-CT007	537434A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	15-Jul-20 14:40	M-CT007	537434B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	15-Jul-20 14:43	15-Jul-20 14:43	M-CT007	'[none]'	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-15	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-17				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
Prepared by method SW846 5035A Soil (high level)							Initial weight: 16.55 g						
76-13-1	1,1,2-Trichlorotrifluoroethane (Freon 113)	< 69.5		µg/kg dry	69.5	38.1	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
67-64-1	Acetone	< 695		µg/kg dry	695	87.8	50	"	"	"	"	"	X
107-13-1	Acrylonitrile	< 69.5		µg/kg dry	69.5	25.1	50	"	"	"	"	"	X
71-43-2	Benzene	< 69.5		µg/kg dry	69.5	11.1	50	"	"	"	"	"	X
108-86-1	Bromobenzene	< 69.5		µg/kg dry	69.5	15.7	50	"	"	"	"	"	X
74-97-5	Bromochloromethane	< 69.5		µg/kg dry	69.5	9.93	50	"	"	"	"	"	X
75-27-4	Bromodichloromethane	< 69.5		µg/kg dry	69.5	17.9	50	"	"	"	"	"	X
75-25-2	Bromoform	< 69.5		µg/kg dry	69.5	14.9	50	"	"	"	"	"	X
74-83-9	Bromomethane	< 139		µg/kg dry	139	34.3	50	"	"	"	"	"	X
78-93-3	2-Butanone (MEK)	< 139		µg/kg dry	139	31.7	50	"	"	"	"	"	X
104-51-8	n-Butylbenzene	< 69.5		µg/kg dry	69.5	27.8	50	"	"	"	"	"	X
135-98-8	sec-Butylbenzene	< 69.5		µg/kg dry	69.5	21.3	50	"	"	"	"	"	X
98-06-6	tert-Butylbenzene	< 69.5		µg/kg dry	69.5	28.3	50	"	"	"	"	"	X
75-15-0	Carbon disulfide	< 139		µg/kg dry	139	25.7	50	"	"	"	"	"	X
56-23-5	Carbon tetrachloride	< 69.5		µg/kg dry	69.5	20.8	50	"	"	"	"	"	X
108-90-7	Chlorobenzene	< 69.5		µg/kg dry	69.5	8.41	50	"	"	"	"	"	X
75-00-3	Chloroethane	< 139		µg/kg dry	139	31.0	50	"	"	"	"	"	X
67-66-3	Chloroform	< 69.5		µg/kg dry	69.5	8.20	50	"	"	"	"	"	X
74-87-3	Chloromethane	< 139		µg/kg dry	139	82.5	50	"	"	"	"	"	X
95-49-8	2-Chlorotoluene	< 69.5		µg/kg dry	69.5	17.2	50	"	"	"	"	"	X
106-43-4	4-Chlorotoluene	< 69.5		µg/kg dry	69.5	12.6	50	"	"	"	"	"	X
96-12-8	1,2-Dibromo-3-chloropropane	< 139		µg/kg dry	139	27.4	50	"	"	"	"	"	X
124-48-1	Dibromochloromethane	< 69.5		µg/kg dry	69.5	11.0	50	"	"	"	"	"	X
106-93-4	1,2-Dibromoethane (EDB)	< 69.5		µg/kg dry	69.5	18.9	50	"	"	"	"	"	X
74-95-3	Dibromomethane	< 69.5		µg/kg dry	69.5	13.1	50	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 69.5		µg/kg dry	69.5	12.5	50	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 69.5		µg/kg dry	69.5	17.3	50	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 69.5		µg/kg dry	69.5	12.4	50	"	"	"	"	"	X
75-71-8	Dichlorodifluoromethane (Freon12)	< 139		µg/kg dry	139	90.9	50	"	"	"	"	"	X
75-34-3	1,1-Dichloroethane	< 69.5		µg/kg dry	69.5	16.0	50	"	"	"	"	"	X
107-06-2	1,2-Dichloroethane	< 69.5		µg/kg dry	69.5	18.2	50	"	"	"	"	"	X
75-35-4	1,1-Dichloroethene	< 69.5		µg/kg dry	69.5	17.8	50	"	"	"	"	"	X
156-59-2	cis-1,2-Dichloroethene	< 69.5		µg/kg dry	69.5	23.1	50	"	"	"	"	"	X
156-60-5	trans-1,2-Dichloroethene	< 69.5		µg/kg dry	69.5	15.8	50	"	"	"	"	"	X
78-87-5	1,2-Dichloropropane	< 69.5		µg/kg dry	69.5	24.1	50	"	"	"	"	"	X
142-28-9	1,3-Dichloropropane	< 69.5		µg/kg dry	69.5	22.0	50	"	"	"	"	"	X
594-20-7	2,2-Dichloropropane	< 69.5		µg/kg dry	69.5	18.3	50	"	"	"	"	"	X
563-58-6	1,1-Dichloropropene	< 69.5		µg/kg dry	69.5	21.3	50	"	"	"	"	"	X
10061-01-5	cis-1,3-Dichloropropene	< 69.5		µg/kg dry	69.5	16.4	50	"	"	"	"	"	X
10061-02-6	trans-1,3-Dichloropropene	< 69.5		µg/kg dry	69.5	28.3	50	"	"	"	"	"	X
100-41-4	Ethylbenzene	< 69.5		µg/kg dry	69.5	14.5	50	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 69.5		µg/kg dry	69.5	22.2	50	"	"	"	"	"	X
591-78-6	2-Hexanone (MBK)	< 139		µg/kg dry	139	46.2	50	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-15	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-17				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260													
						Initial weight: 16.55 g							
98-82-8	Isopropylbenzene	< 69.5		µg/kg dry	69.5	25.2	50	SW846 8260C	13-Jul-20	13-Jul-20	DDP	2001076	X
99-87-6	4-Isopropyltoluene	< 69.5		µg/kg dry	69.5	19.2	50	"	"	"	"	"	X
1634-04-4	Methyl tert-butyl ether	< 69.5		µg/kg dry	69.5	20.9	50	"	"	"	"	"	X
108-10-1	4-Methyl-2-pentanone (MIBK)	< 139		µg/kg dry	139	49.7	50	"	"	"	"	"	X
75-09-2	Methylene chloride	< 139		µg/kg dry	139	59.3	50	"	"	"	"	"	X
91-20-3	Naphthalene	< 69.5		µg/kg dry	69.5	20.1	50	"	"	"	"	"	X
103-65-1	n-Propylbenzene	< 69.5		µg/kg dry	69.5	17.3	50	"	"	"	"	"	X
100-42-5	Styrene	< 69.5		µg/kg dry	69.5	9.17	50	"	"	"	"	"	X
630-20-6	1,1,1,2-Tetrachloroethane	< 69.5		µg/kg dry	69.5	16.7	50	"	"	"	"	"	X
79-34-5	1,1,2,2-Tetrachloroethane	< 69.5		µg/kg dry	69.5	22.0	50	"	"	"	"	"	X
127-18-4	Tetrachloroethene	< 69.5		µg/kg dry	69.5	21.9	50	"	"	"	"	"	X
108-88-3	Toluene	< 69.5		µg/kg dry	69.5	11.2	50	"	"	"	"	"	X
87-61-6	1,2,3-Trichlorobenzene	< 69.5		µg/kg dry	69.5	16.2	50	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 69.5		µg/kg dry	69.5	11.5	50	"	"	"	"	"	X
108-70-3	1,3,5-Trichlorobenzene	< 69.5		µg/kg dry	69.5	11.0	50	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	< 69.5		µg/kg dry	69.5	16.8	50	"	"	"	"	"	X
79-00-5	1,1,2-Trichloroethane	< 69.5		µg/kg dry	69.5	21.5	50	"	"	"	"	"	X
79-01-6	Trichloroethene	< 69.5		µg/kg dry	69.5	11.9	50	"	"	"	"	"	X
75-69-4	Trichlorofluoromethane (Freon 11)	< 69.5		µg/kg dry	69.5	31.4	50	"	"	"	"	"	X
96-18-4	1,2,3-Trichloropropane	< 69.5		µg/kg dry	69.5	32.0	50	"	"	"	"	"	X
95-63-6	1,2,4-Trimethylbenzene	< 69.5		µg/kg dry	69.5	17.6	50	"	"	"	"	"	X
108-67-8	1,3,5-Trimethylbenzene	< 69.5		µg/kg dry	69.5	14.5	50	"	"	"	"	"	X
75-01-4	Vinyl chloride	< 69.5		µg/kg dry	69.5	34.2	50	"	"	"	"	"	X
179601-23-1	m,p-Xylene	< 139		µg/kg dry	139	40.8	50	"	"	"	"	"	X
95-47-6	o-Xylene	< 69.5		µg/kg dry	69.5	21.4	50	"	"	"	"	"	X
109-99-9	Tetrahydrofuran	< 139		µg/kg dry	139	50.8	50	"	"	"	"	"	
60-29-7	Ethyl ether	< 69.5		µg/kg dry	69.5	18.8	50	"	"	"	"	"	X
994-05-8	Tert-amyl methyl ether	< 69.5		µg/kg dry	69.5	38.4	50	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	< 69.5		µg/kg dry	69.5	19.2	50	"	"	"	"	"	
108-20-3	Di-isopropyl ether	< 69.5		µg/kg dry	69.5	22.4	50	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 1390		µg/kg dry	1390	986	50	"	"	"	"	"	X
123-91-1	1,4-Dioxane	< 1390		µg/kg dry	1390	409	50	"	"	"	"	"	X
110-57-6	trans-1,4-Dichloro-2-buten e	< 347		µg/kg dry	347	45.8	50	"	"	"	"	"	X
64-17-5	Ethanol	< 13900		µg/kg dry	13900	1200	50	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*104*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*104*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*106*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*105*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds Prepared by method SW846 3546													
83-32-9	Acenaphthene	< 82.3		µg/kg dry	82.3	43.7	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-15	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-17				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
208-96-8	Acenaphthylene	< 82.3		µg/kg dry	82.3	42.9	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
62-53-3	Aniline	< 407		µg/kg dry	407	25.9	1	"	"	"	"	"	X
120-12-7	Anthracene	< 82.3		µg/kg dry	82.3	47.4	1	"	"	"	"	"	X
103-33-3	Azobenzene/Diphenyldiazene	< 407		µg/kg dry	407	44.2	1	"	"	"	"	"	
92-87-5	Benzidine	< 814		µg/kg dry	814	25.9	1	"	"	"	"	"	X
56-55-3	Benzo (a) anthracene	< 82.3		µg/kg dry	82.3	46.3	1	"	"	"	"	"	X
50-32-8	Benzo (a) pyrene	< 82.3		µg/kg dry	82.3	56.3	1	"	"	"	"	"	X
205-99-2	Benzo (b) fluoranthene	< 82.3		µg/kg dry	82.3	61.9	1	"	"	"	"	"	X
191-24-2	Benzo (g,h,i) perylene	< 82.3		µg/kg dry	82.3	58.1	1	"	"	"	"	"	X
207-08-9	Benzo (k) fluoranthene	< 82.3		µg/kg dry	82.3	70.3	1	"	"	"	"	"	X
65-85-0	Benzoic acid	< 407		µg/kg dry	407	24.4	1	"	"	"	"	"	X
100-51-6	Benzyl alcohol	< 407		µg/kg dry	407	94.3	1	"	"	"	"	"	X
111-91-1	Bis(2-chloroethoxy)methane	< 407		µg/kg dry	407	41.1	1	"	"	"	"	"	X
111-44-4	Bis(2-chloroethyl)ether	< 206		µg/kg dry	206	38.1	1	"	"	"	"	"	X
108-60-1	Bis(2-chloroisopropyl)ether	< 206		µg/kg dry	206	33.1	1	"	"	"	"	"	X
117-81-7	Bis(2-ethylhexyl)phthalate	< 206		µg/kg dry	206	52.4	1	"	"	"	"	"	X
101-55-3	4-Bromophenyl phenyl ether	< 407		µg/kg dry	407	46.0	1	"	"	"	"	"	X
85-68-7	Butyl benzyl phthalate	< 407		µg/kg dry	407	40.8	1	"	"	"	"	"	X
86-74-8	Carbazole	< 206		µg/kg dry	206	47.4	1	"	"	"	"	"	X
59-50-7	4-Chloro-3-methylphenol	< 407		µg/kg dry	407	47.9	1	"	"	"	"	"	X
106-47-8	4-Chloroaniline	< 206		µg/kg dry	206	25.4	1	"	"	"	"	"	X
91-58-7	2-Chloronaphthalene	< 407		µg/kg dry	407	55.8	1	"	"	"	"	"	X
95-57-8	2-Chlorophenol	< 206		µg/kg dry	206	39.5	1	"	"	"	"	"	X
7005-72-3	4-Chlorophenyl phenyl ether	< 407		µg/kg dry	407	39.9	1	"	"	"	"	"	X
218-01-9	Chrysene	< 82.3		µg/kg dry	82.3	46.5	1	"	"	"	"	"	X
53-70-3	Dibenzo (a,h) anthracene	< 82.3		µg/kg dry	82.3	60.8	1	"	"	"	"	"	X
132-64-9	Dibenzofuran	< 206		µg/kg dry	206	55.4	1	"	"	"	"	"	X
95-50-1	1,2-Dichlorobenzene	< 407		µg/kg dry	407	48.6	1	"	"	"	"	"	X
541-73-1	1,3-Dichlorobenzene	< 407		µg/kg dry	407	43.9	1	"	"	"	"	"	X
106-46-7	1,4-Dichlorobenzene	< 407		µg/kg dry	407	46.3	1	"	"	"	"	"	X
91-94-1	3,3´-Dichlorobenzidine	< 407		µg/kg dry	407	45.0	1	"	"	"	"	"	X
120-83-2	2,4-Dichlorophenol	< 206		µg/kg dry	206	50.0	1	"	"	"	"	"	X
84-66-2	Diethyl phthalate	< 407		µg/kg dry	407	42.7	1	"	"	"	"	"	X
131-11-3	Dimethyl phthalate	< 407		µg/kg dry	407	45.8	1	"	"	"	"	"	X
105-67-9	2,4-Dimethylphenol	< 407		µg/kg dry	407	32.2	1	"	"	"	"	"	X
84-74-2	Di-n-butyl phthalate	< 407		µg/kg dry	407	43.6	1	"	"	"	"	"	X
534-52-1	4,6-Dinitro-2-methylphenol	< 407		µg/kg dry	407	58.4	1	"	"	"	"	"	X
51-28-5	2,4-Dinitrophenol	< 407		µg/kg dry	407	42.2	1	"	"	"	"	"	X
121-14-2	2,4-Dinitrotoluene	< 206		µg/kg dry	206	49.4	1	"	"	"	"	"	X
606-20-2	2,6-Dinitrotoluene	< 206		µg/kg dry	206	42.1	1	"	"	"	"	"	X
117-84-0	Di-n-octyl phthalate	< 407		µg/kg dry	407	60.6	1	"	"	"	"	"	X
206-44-0	Fluoranthene	< 82.3		µg/kg dry	82.3	48.2	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-15	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-17				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GCMS													
Semivolatile Organic Compounds													
86-73-7	Fluorene	< 82.3		µg/kg dry	82.3	53.2	1	SW846 8270D	13-Jul-20	14-Jul-20	BJJ	2001083	X
118-74-1	Hexachlorobenzene	< 206		µg/kg dry	206	51.8	1	"	"	"	"	"	X
87-68-3	Hexachlorobutadiene	< 206		µg/kg dry	206	51.8	1	"	"	"	"	"	X
77-47-4	Hexachlorocyclopentadiene	< 206		µg/kg dry	206	51.9	1	"	"	"	"	"	X
67-72-1	Hexachloroethane	< 206		µg/kg dry	206	46.5	1	"	"	"	"	"	X
193-39-5	Indeno (1,2,3-cd) pyrene	< 82.3		µg/kg dry	82.3	56.3	1	"	"	"	"	"	X
78-59-1	Isophorone	< 206		µg/kg dry	206	31.7	1	"	"	"	"	"	X
91-57-6	2-Methylnaphthalene	< 82.3		µg/kg dry	82.3	57.6	1	"	"	"	"	"	X
95-48-7	2-Methylphenol	< 407		µg/kg dry	407	32.7	1	"	"	"	"	"	X
108-39-4, 106-44-5	3 & 4-Methylphenol	< 407		µg/kg dry	407	32.0	1	"	"	"	"	"	X
91-20-3	Naphthalene	< 82.3		µg/kg dry	82.3	47.5	1	"	"	"	"	"	X
88-74-4	2-Nitroaniline	< 407		µg/kg dry	407	36.9	1	"	"	"	"	"	X
99-09-2	3-Nitroaniline	< 407		µg/kg dry	407	37.6	1	"	"	"	"	"	X
100-01-6	4-Nitroaniline	< 206		µg/kg dry	206	54.3	1	"	"	"	"	"	X
98-95-3	Nitrobenzene	< 206		µg/kg dry	206	47.6	1	"	"	"	"	"	X
88-75-5	2-Nitrophenol	< 206		µg/kg dry	206	36.0	1	"	"	"	"	"	X
100-02-7	4-Nitrophenol	< 1630		µg/kg dry	1630	54.2	1	"	"	"	"	"	X
62-75-9	N-Nitrosodimethylamine	< 206		µg/kg dry	206	26.9	1	"	"	"	"	"	X
621-64-7	N-Nitrosodi-n-propylamine	< 206		µg/kg dry	206	36.0	1	"	"	"	"	"	X
86-30-6	N-Nitrosodiphenylamine	< 407		µg/kg dry	407	41.5	1	"	"	"	"	"	X
87-86-5	Pentachlorophenol	< 407		µg/kg dry	407	48.5	1	"	"	"	"	"	X
85-01-8	Phenanthrene	< 82.3		µg/kg dry	82.3	46.6	1	"	"	"	"	"	X
108-95-2	Phenol	< 407		µg/kg dry	407	41.2	1	"	"	"	"	"	X
129-00-0	Pyrene	< 82.3		µg/kg dry	82.3	45.4	1	"	"	"	"	"	X
110-86-1	Pyridine	< 407		µg/kg dry	407	96.4	1	"	"	"	"	"	X
120-82-1	1,2,4-Trichlorobenzene	< 407		µg/kg dry	407	50.1	1	"	"	"	"	"	X
90-12-0	1-Methylnaphthalene	< 82.3		µg/kg dry	82.3	45.4	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 407		µg/kg dry	407	42.1	1	"	"	"	"	"	X
88-06-2	2,4,6-Trichlorophenol	< 206		µg/kg dry	206	50.3	1	"	"	"	"	"	X
82-68-8	Pentachloronitrobenzene	< 407		µg/kg dry	407	43.3	1	"	"	"	"	"	X
95-94-3	1,2,4,5-Tetrachlorobenzene	< 407		µg/kg dry	407	48.5	1	"	"	"	"	"	X
Surrogate recoveries:													
321-60-8	*2-Fluorobiphenyl*	*81*			*30-130 %*			"	"	"	"	"	
367-12-4	*2-Fluorophenol*	*86*			*30-130 %*			"	"	"	"	"	
4165-60-0	*Nitrobenzene-d5*	*77*			*30-130 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*96*			*30-130 %*			"	"	"	"	"	
1718-51-0	*Terphenyl-dl4*	*86*			*30-130 %*			"	"	"	"	"	
118-79-6	*2,4,6-Tribromophenol*	*42*			*30-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls Prepared by method SW846 3546													
12674-11-2	Aroclor-1016	< 24.9		µg/kg dry	24.9	17.9	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
11104-28-2	Aroclor-1221	< 24.9		µg/kg dry	24.9	7.35	1	"	"	"	"	"	X
11141-16-5	Aroclor-1232	< 24.9		µg/kg dry	24.9	6.89	1	"	"	"	"	"	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-15	1009.073	Soil	09-Jul-20 00:00	10-Jul-20
SC58794-17				

CAS No.	*Analyte(s)*	*Result*	*Flag*	*Units*	**RDL*	*MDL*	*Dilution*	*Method Ref.*	*Prepared*	*Analyzed*	*Analyst*	*Batch*	*Cert.*
Semivolatile Organic Compounds by GC													
Polychlorinated Biphenyls													
53469-21-9	Aroclor-1242	< 24.9		µg/kg dry	24.9	2.36	1	SW846 8082A	13-Jul-20	15-Jul-20	BJJ	2001087	X
12672-29-6	Aroclor-1248	< 24.9		µg/kg dry	24.9	7.77	1	"	"	"	"	"	X
11097-69-1	Aroclor-1254	< 24.9		µg/kg dry	24.9	19.3	1	"	"	"	"	"	X
11096-82-5	Aroclor-1260	< 24.9		µg/kg dry	24.9	5.35	1	"	"	"	"	"	X
37324-23-5	Aroclor-1262	< 24.9		µg/kg dry	24.9	5.79	1	"	"	"	"	"	X
11100-14-4	Aroclor-1268	< 24.9		µg/kg dry	24.9	5.30	1	"	"	"	"	"	X
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*78*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*70*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*71*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*65*			*30-150 %*			"	"	"	"	"	
Pesticides													
Organochlorine Pesticides Prepared by method SW846 3546			Z-2										
319-84-6	alpha-BHC	< 6.22		µg/kg dry	6.22	0.286	1	SW846 8081B	13-Jul-20	16-Jul-20	BJJ	2001088	X
319-85-7	beta-BHC	< 6.22		µg/kg dry	6.22	0.398	1	"	"	"	"	"	X
319-86-8	delta-BHC	< 6.22		µg/kg dry	6.22	0.323	1	"	"	"	"	"	X
58-89-9	gamma-BHC (Lindane)	< 3.73		µg/kg dry	3.73	0.659	1	"	"	"	"	"	X
76-44-8	Heptachlor	< 6.22		µg/kg dry	6.22	0.721	1	"	"	"	"	"	X
309-00-2	Aldrin	< 6.22		µg/kg dry	6.22	0.211	1	"	"	"	"	"	X
1024-57-3	Heptachlor epoxide	< 6.22		µg/kg dry	6.22	0.249	1	"	"	"	"	"	X
959-98-8	Endosulfan I	< 6.22		µg/kg dry	6.22	0.286	1	"	"	"	"	"	X
60-57-1	Dieldrin	< 6.22		µg/kg dry	6.22	0.298	1	"	"	"	"	"	X
72-55-9	4,4'-DDE (p,p')	< 6.22		µg/kg dry	6.22	0.323	1	"	"	"	"	"	X
72-20-8	Endrin	< 9.95		µg/kg dry	9.95	0.609	1	"	"	"	"	"	X
33213-65-9	Endosulfan II	< 9.95		µg/kg dry	9.95	0.398	1	"	"	"	"	"	X
72-54-8	4,4'-DDD (p,p')	< 9.95		µg/kg dry	9.95	0.522	1	"	"	"	"	"	X
1031-07-8	Endosulfan sulfate	< 9.95		µg/kg dry	9.95	0.908	1	"	"	"	"	"	X
50-29-3	4,4'-DDT (p,p')	< 9.95		µg/kg dry	9.95	4.27	1	"	"	"	"	"	X
72-43-5	Methoxychlor	< 9.95		µg/kg dry	9.95	0.671	1	"	"	"	"	"	X
53494-70-5	Endrin ketone	< 9.95		µg/kg dry	9.95	0.361	1	"	"	"	"	"	X
7421-93-4	Endrin aldehyde	< 9.95		µg/kg dry	9.95	1.57	1	"	"	"	"	"	X
5103-71-9	alpha-Chlordane	< 6.22		µg/kg dry	6.22	0.261	1	"	"	"	"	"	X
5103-74-2	gamma-Chlordane	< 6.22		µg/kg dry	6.22	0.311	1	"	"	"	"	"	X
8001-35-2	Toxaphene	< 124		µg/kg dry	124	87.7	1	"	"	"	"	"	X
57-74-9	Chlordane	< 24.9		µg/kg dry	24.9	3.13	1	"	"	"	"	"	X
15972-60-8	Alachlor	< 6.22		µg/kg dry	6.22	0.547	1	"	"	"	"	"	
Surrogate recoveries:													
2051-24-3	*Decachlorobiphenyl (Sr)*	*66*			*30-150 %*			"	"	"	"	"	
2051-24-3	*Decachlorobiphenyl (Sr) [2C]*	*56*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS)*	*41*			*30-150 %*			"	"	"	"	"	
877-09-8	*2,4,5,6-TC-M-Xylene (IS) [2C]*	*45*			*30-150 %*			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-15 SC58794-17	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Extractable Petroleum Hydrocarbons													
Fingerprinting by GC Prepared by method SW846 3546													
	Total Petroleum Hydrocarbons	**168**		mg/kg dry	16.7	13.9	1	SW846 8100Mod.	14-Jul-20	15-Jul-20	BJJ	2001092	
Surrogate recoveries:													
84-15-1	*o-Terphenyl*	*78*			*40-140 %*			"	"	"	"	"	
3386-33-2	*1-Chlorooctadecane*	*104*			*40-140 %*			"	"	"	"	"	
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.80		mg/kg dry	3.80	0.205	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7440-38-2	Arsenic	**37.8**		mg/kg dry	1.90	0.241	1	"	"	"	"	"	X
7440-39-3	Barium	**46.3**		mg/kg dry	1.27	0.149	1	"	"	"	"	"	X
7440-41-7	Beryllium	< 0.633		mg/kg dry	0.633	0.0318	1	"	"	"	"	"	X
7440-43-9	Cadmium	< 0.633		mg/kg dry	0.633	0.0328	1	"	"	"	"	"	X
7440-47-3	Chromium	**31.5**		mg/kg dry	1.27	0.168	1	"	"	"	"	"	X
7439-97-6	Mercury	< 0.123		mg/kg dry	0.123	0.0102	1	SW846 7471B	13-Jul-20	13-Jul-20	edt	2001079	X
Prepared by method SW846 3050B													
7440-02-0	Nickel	**37.7**		mg/kg dry	1.27	0.146	1	SW846 6010C	15-Jul-20	15-Jul-20	EDT	2001078	X
7439-92-1	Lead	**25.9**		mg/kg dry	1.90	0.269	1	"	"	"	"	"	X
7440-36-0	Antimony	< 6.33		mg/kg dry	6.33	0.476	1	"	"	"	"	"	X
7782-49-2	Selenium	< 1.90		mg/kg dry	1.90	0.362	1	"	"	"	"	"	X
7440-28-0	Thallium	< 3.80		mg/kg dry	3.80	1.40	1	"	"	"	"	"	X
7440-62-2	Vanadium	**36.3**		mg/kg dry	1.90	0.337	1	"	"	17-Jul-20	"	"	X
7440-66-6	Zinc	**60.7**		mg/kg dry	3.80	0.980	1	"	"	15-Jul-20	"	"	X
General Chemistry Parameters													
	% Solids	**79.8**		%			1	SM2540 G (11) Mod.	10-Jul-20	14-Jul-20	PN	2001075	
Toxicity Characteristics													
	Ignitability by Definition	**Negative**		N/A			1	SW846 1030	10-Jul-20 17:23	10-Jul-20 21:00	PN	2001074	X
	pH	**5.69**	pH	pH Units			1	SW846 9045D	14-Jul-20 15:31	14-Jul-20 18:55	PN	2001081	X
Subcontracted Analyses													
Subcontracted Analyses Prepared by method SW8151A									Methylation date: 14-Jul-20				
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
93-76-5	2,4,5-T	< 80		ug/kg	80	80	10	SW8151A	14-Jul-20	15-Jul-20 21:08	M-CT007	537320A	
93-72-1	2,4,5-TP (Silvex)	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-75-7	2,4-D	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-82-6	2,4-DB	< 80		ug/kg	80	80	10	"	"	"	"	"	
75-99-0	Dalapon	< 80		ug/kg	80	80	10	"	"	"	"	"	
1918-00-9	Dicamba	< 80		ug/kg	80	80	10	"	"	"	"	"	
120-36-5	Dichloroprop	< 80		ug/kg	80	80	10	"	"	"	"	"	
88-85-7	Dinoseb	< 80		ug/kg	80	80	10	"	"	"	"	"	
94-74-6	MCPA	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
7085-19-0	MCPP	< 3300		ug/kg	3300	3300	10	"	"	"	"	"	
Surrogate recoveries:													
19719-28-9	*% DCAA*	*81*			*30-150 %*			"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
SSS-15 SC58794-17	1009.073	Soil	09-Jul-20 00:00	10-Jul-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Subcontracted Analyses													
Prepared by method SW846 7.3.3.1/90													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Cyanide	< 7		mg/kg	7	7	1	SW846 7.3.3.1/90	15-Jul-20	15-Jul-20 13:56	M-CT007	537434A	
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity Sulfide	< 20		mg/kg	20	20	1	SW846 CH7	"	15-Jul-20 14:40	M-CT007	537434B	
Prepared by method SW846-React													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Reactivity	**Negative**		Pos/Neg			1	SW846-React	15-Jul-20 14:43	15-Jul-20 14:43	M-CT007	'[none]'	

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 2001076 - SW846 5035A Soil (high level)										
Blank (2001076-BLK1)					Prepared & Analyzed: 13-Jul-20					
1,1,2-Trichlorotrifluoroethane (Freon 113)	< 50.0		µg/kg wet	50.0						
Acetone	< 500		µg/kg wet	500						
Acrylonitrile	< 50.0		µg/kg wet	50.0						
Benzene	< 50.0		µg/kg wet	50.0						
Bromobenzene	< 50.0		µg/kg wet	50.0						
Bromochloromethane	< 50.0		µg/kg wet	50.0						
Bromodichloromethane	< 50.0		µg/kg wet	50.0						
Bromoform	< 50.0		µg/kg wet	50.0						
Bromomethane	< 100		µg/kg wet	100						
2-Butanone (MEK)	< 100		µg/kg wet	100						
n-Butylbenzene	< 50.0		µg/kg wet	50.0						
sec-Butylbenzene	< 50.0		µg/kg wet	50.0						
tert-Butylbenzene	< 50.0		µg/kg wet	50.0						
Carbon disulfide	< 100		µg/kg wet	100						
Carbon tetrachloride	< 50.0		µg/kg wet	50.0						
Chlorobenzene	< 50.0		µg/kg wet	50.0						
Chloroethane	< 100		µg/kg wet	100						
Chloroform	< 50.0		µg/kg wet	50.0						
Chloromethane	< 100		µg/kg wet	100						
2-Chlorotoluene	< 50.0		µg/kg wet	50.0						
4-Chlorotoluene	< 50.0		µg/kg wet	50.0						
1,2-Dibromo-3-chloropropane	< 100		µg/kg wet	100						
Dibromochloromethane	< 50.0		µg/kg wet	50.0						
1,2-Dibromoethane (EDB)	< 50.0		µg/kg wet	50.0						
Dibromomethane	< 50.0		µg/kg wet	50.0						
1,2-Dichlorobenzene	< 50.0		µg/kg wet	50.0						
1,3-Dichlorobenzene	< 50.0		µg/kg wet	50.0						
1,4-Dichlorobenzene	< 50.0		µg/kg wet	50.0						
Dichlorodifluoromethane (Freon12)	< 100		µg/kg wet	100						
1,1-Dichloroethane	< 50.0		µg/kg wet	50.0						
1,2-Dichloroethane	< 50.0		µg/kg wet	50.0						
1,1-Dichloroethene	< 50.0		µg/kg wet	50.0						
cis-1,2-Dichloroethene	< 50.0		µg/kg wet	50.0						
trans-1,2-Dichloroethene	< 50.0		µg/kg wet	50.0						
1,2-Dichloropropane	< 50.0		µg/kg wet	50.0						
1,3-Dichloropropane	< 50.0		µg/kg wet	50.0						
2,2-Dichloropropane	< 50.0		µg/kg wet	50.0						
1,1-Dichloropropene	< 50.0		µg/kg wet	50.0						
cis-1,3-Dichloropropene	< 50.0		µg/kg wet	50.0						
trans-1,3-Dichloropropene	< 50.0		µg/kg wet	50.0						
Ethylbenzene	< 50.0		µg/kg wet	50.0						
Hexachlorobutadiene	< 50.0		µg/kg wet	50.0						
2-Hexanone (MBK)	< 100		µg/kg wet	100						
Isopropylbenzene	< 50.0		µg/kg wet	50.0						
4-Isopropyltoluene	< 50.0		µg/kg wet	50.0						
Methyl tert-butyl ether	< 50.0		µg/kg wet	50.0						
4-Methyl-2-pentanone (MIBK)	< 100		µg/kg wet	100						
Methylene chloride	< 100		µg/kg wet	100						
Naphthalene	< 50.0		µg/kg wet	50.0						
n-Propylbenzene	< 50.0		µg/kg wet	50.0						

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 2001076 - SW846 5035A Soil (high level)										
Blank (2001076-BLK1)					Prepared & Analyzed: 13-Jul-20					
Styrene	< 50.0		µg/kg wet	50.0						
1,1,1,2-Tetrachloroethane	< 50.0		µg/kg wet	50.0						
1,1,2,2-Tetrachloroethane	< 50.0		µg/kg wet	50.0						
Tetrachloroethene	< 50.0		µg/kg wet	50.0						
Toluene	< 50.0		µg/kg wet	50.0						
1,2,3-Trichlorobenzene	< 50.0		µg/kg wet	50.0						
1,2,4-Trichlorobenzene	< 50.0		µg/kg wet	50.0						
1,3,5-Trichlorobenzene	< 50.0		µg/kg wet	50.0						
1,1,1-Trichloroethane	< 50.0		µg/kg wet	50.0						
1,1,2-Trichloroethane	< 50.0		µg/kg wet	50.0						
Trichloroethene	< 50.0		µg/kg wet	50.0						
Trichlorofluoromethane (Freon 11)	< 50.0		µg/kg wet	50.0						
1,2,3-Trichloropropane	< 50.0		µg/kg wet	50.0						
1,2,4-Trimethylbenzene	< 50.0		µg/kg wet	50.0						
1,3,5-Trimethylbenzene	< 50.0		µg/kg wet	50.0						
Vinyl chloride	< 50.0		µg/kg wet	50.0						
m,p-Xylene	< 100		µg/kg wet	100						
o-Xylene	< 50.0		µg/kg wet	50.0						
Tetrahydrofuran	< 100		µg/kg wet	100						
Ethyl ether	< 50.0		µg/kg wet	50.0						
Tert-amyl methyl ether	< 50.0		µg/kg wet	50.0						
Ethyl tert-butyl ether	< 50.0		µg/kg wet	50.0						
Di-isopropyl ether	< 50.0		µg/kg wet	50.0						
Tert-Butanol / butyl alcohol	< 1000		µg/kg wet	1000						
1,4-Dioxane	< 1000		µg/kg wet	1000						
trans-1,4-Dichloro-2-butene	< 250		µg/kg wet	250						
Ethanol	< 10000		µg/kg wet	10000						
Surrogate: 4-Bromofluorobenzene	*49.8*		µg/kg		*50.0*		*100*	*70-130*		
Surrogate: Toluene-d8	*52.5*		µg/kg		*50.0*		*105*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*53.0*		µg/kg		*50.0*		*106*	*70-130*		
Surrogate: Dibromofluoromethane	*53.1*		µg/kg		*50.0*		*106*	*70-130*		
LCS (2001076-BS1)					Prepared & Analyzed: 13-Jul-20					
1,1,2-Trichlorotrifluoroethane (Freon 113)	**26.0**		µg/kg		20.0		130	70-130		
Acetone	**24.3**		µg/kg		20.0		121	70-130		
Acrylonitrile	**23.5**		µg/kg		20.0		117	70-130		
Benzene	**22.7**		µg/kg		20.0		114	70-130		
Bromobenzene	**20.7**		µg/kg		20.0		104	70-130		
Bromochloromethane	**23.7**		µg/kg		20.0		118	70-130		
Bromodichloromethane	**24.1**		µg/kg		20.0		120	70-130		
Bromoform	**22.2**		µg/kg		20.0		111	70-130		
Bromomethane	**19.7**		µg/kg		20.0		98	70-130		
2-Butanone (MEK)	**26.5**	QC2	µg/kg		20.0		133	70-130		
n-Butylbenzene	**17.3**		µg/kg		20.0		86	70-130		
sec-Butylbenzene	**15.9**		µg/kg		20.0		80	70-130		
tert-Butylbenzene	**18.0**		µg/kg		20.0		90	70-130		
Carbon disulfide	**25.3**		µg/kg		20.0		126	70-130		
Carbon tetrachloride	**25.9**		µg/kg		20.0		130	70-130		
Chlorobenzene	**20.9**		µg/kg		20.0		104	70-130		
Chloroethane	**29.3**	QC2	µg/kg		20.0		147	70-130		
Chloroform	**23.8**		µg/kg		20.0		119	70-130		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 2001076 - SW846 5035A Soil (high level)										
LCS (2001076-BS1)						Prepared & Analyzed: 13-Jul-20				
Chloromethane	**26.6**	QC2	µg/kg		20.0		133	70-130		
2-Chlorotoluene	**20.8**		µg/kg		20.0		104	70-130		
4-Chlorotoluene	**21.1**		µg/kg		20.0		106	70-130		
1,2-Dibromo-3-chloropropane	**20.7**		µg/kg		20.0		104	70-130		
Dibromochloromethane	**23.6**		µg/kg		20.0		118	70-130		
1,2-Dibromoethane (EDB)	**24.1**		µg/kg		20.0		120	70-130		
Dibromomethane	**24.6**		µg/kg		20.0		123	70-130		
1,2-Dichlorobenzene	**20.4**		µg/kg		20.0		102	70-130		
1,3-Dichlorobenzene	**21.0**		µg/kg		20.0		105	70-130		
1,4-Dichlorobenzene	**19.8**		µg/kg		20.0		99	70-130		
Dichlorodifluoromethane (Freon12)	**29.9**	QC2	µg/kg		20.0		150	70-130		
1,1-Dichloroethane	**25.0**		µg/kg		20.0		125	70-130		
1,2-Dichloroethane	**24.0**		µg/kg		20.0		120	70-130		
1,1-Dichloroethene	**24.4**		µg/kg		20.0		122	70-130		
cis-1,2-Dichloroethene	**22.6**		µg/kg		20.0		113	70-130		
trans-1,2-Dichloroethene	**23.8**		µg/kg		20.0		119	70-130		
1,2-Dichloropropane	**22.1**		µg/kg		20.0		110	70-130		
1,3-Dichloropropane	**22.6**		µg/kg		20.0		113	70-130		
2,2-Dichloropropane	**24.4**		µg/kg		20.0		122	70-130		
1,1-Dichloropropene	**23.2**		µg/kg		20.0		116	70-130		
cis-1,3-Dichloropropene	**22.7**		µg/kg		20.0		114	70-130		
trans-1,3-Dichloropropene	**25.6**		µg/kg		20.0		128	70-130		
Ethylbenzene	**20.2**		µg/kg		20.0		101	70-130		
Hexachlorobutadiene	**15.8**		µg/kg		20.0		79	70-130		
2-Hexanone (MBK)	**29.9**	QC2	µg/kg		20.0		150	70-130		
Isopropylbenzene	**17.6**		µg/kg		20.0		88	70-130		
4-Isopropyltoluene	**16.2**		µg/kg		20.0		81	70-130		
Methyl tert-butyl ether	**22.3**		µg/kg		20.0		111	70-130		
4-Methyl-2-pentanone (MIBK)	**24.1**		µg/kg		20.0		121	70-130		
Methylene chloride	**23.4**		µg/kg		20.0		117	70-130		
Naphthalene	**16.0**		µg/kg		20.0		80	70-130		
n-Propylbenzene	**20.8**		µg/kg		20.0		104	70-130		
Styrene	**18.4**		µg/kg		20.0		92	70-130		
1,1,1,2-Tetrachloroethane	**21.8**		µg/kg		20.0		109	70-130		
1,1,2,2-Tetrachloroethane	**21.2**		µg/kg		20.0		106	70-130		
Tetrachloroethene	**23.7**		µg/kg		20.0		118	70-130		
Toluene	**21.8**		µg/kg		20.0		109	70-130		
1,2,3-Trichlorobenzene	**18.4**		µg/kg		20.0		92	70-130		
1,2,4-Trichlorobenzene	**18.5**		µg/kg		20.0		93	70-130		
1,3,5-Trichlorobenzene	**18.9**		µg/kg		20.0		94	70-130		
1,1,1-Trichloroethane	**24.0**		µg/kg		20.0		120	70-130		
1,1,2-Trichloroethane	**23.9**		µg/kg		20.0		120	70-130		
Trichloroethene	**21.8**		µg/kg		20.0		109	70-130		
Trichlorofluoromethane (Freon 11)	**28.0**	QC2	µg/kg		20.0		140	70-130		
1,2,3-Trichloropropane	**22.8**		µg/kg		20.0		114	70-130		
1,2,4-Trimethylbenzene	**18.0**		µg/kg		20.0		90	70-130		
1,3,5-Trimethylbenzene	**18.2**		µg/kg		20.0		91	70-130		
Vinyl chloride	**24.6**		µg/kg		20.0		123	70-130		
m,p-Xylene	**43.8**		µg/kg		40.0		110	70-130		
o-Xylene	**17.8**		µg/kg		20.0		89	70-130		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 2001076 - SW846 5035A Soil (high level)										
LCS (2001076-BS1)					Prepared & Analyzed: 13-Jul-20					
Tetrahydrofuran	**21.2**		µg/kg		20.0		106	70-130		
Ethyl ether	**23.0**		µg/kg		20.0		115	70-130		
Tert-amyl methyl ether	**23.6**		µg/kg		20.0		118	70-130		
Ethyl tert-butyl ether	**23.3**		µg/kg		20.0		116	70-130		
Di-isopropyl ether	**23.6**		µg/kg		20.0		118	70-130		
Tert-Butanol / butyl alcohol	**254**		µg/kg		200		127	70-130		
1,4-Dioxane	**234**		µg/kg		200		117	70-130		
trans-1,4-Dichloro-2-butene	**21.2**		µg/kg		20.0		106	70-130		
Ethanol	**476**		µg/kg		400		119	70-130		
Surrogate: 4-Bromofluorobenzene	*51.6*		µg/kg		*50.0*		*103*	*70-130*		
Surrogate: Toluene-d8	*52.4*		µg/kg		*50.0*		*105*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*53.0*		µg/kg		*50.0*		*106*	*70-130*		
Surrogate: Dibromofluoromethane	*54.7*		µg/kg		*50.0*		*109*	*70-130*		
LCS Dup (2001076-BSD1)					Prepared & Analyzed: 13-Jul-20					
1,1,2-Trichlorotrifluoroethane (Freon 113)	**26.3**	QC2	µg/kg		20.0		131	70-130	1	30
Acetone	**28.6**	QC2	µg/kg		20.0		143	70-130	16	30
Acrylonitrile	**24.0**		µg/kg		20.0		120	70-130	2	30
Benzene	**23.0**		µg/kg		20.0		115	70-130	1	30
Bromobenzene	**20.8**		µg/kg		20.0		104	70-130	0.3	30
Bromochloromethane	**24.4**		µg/kg		20.0		122	70-130	3	30
Bromodichloromethane	**23.2**		µg/kg		20.0		116	70-130	4	30
Bromoform	**22.5**		µg/kg		20.0		112	70-130	1	30
Bromomethane	**20.1**		µg/kg		20.0		101	70-130	2	30
2-Butanone (MEK)	**21.8**		µg/kg		20.0		109	70-130	19	30
n-Butylbenzene	**17.8**		µg/kg		20.0		89	70-130	3	30
sec-Butylbenzene	**16.6**		µg/kg		20.0		83	70-130	4	30
tert-Butylbenzene	**18.3**		µg/kg		20.0		92	70-130	2	30
Carbon disulfide	**25.7**		µg/kg		20.0		128	70-130	2	30
Carbon tetrachloride	**25.0**		µg/kg		20.0		125	70-130	4	30
Chlorobenzene	**21.4**		µg/kg		20.0		107	70-130	2	30
Chloroethane	**27.3**	QC2	µg/kg		20.0		137	70-130	7	30
Chloroform	**23.5**		µg/kg		20.0		118	70-130	0.9	30
Chloromethane	**27.5**	QC2	µg/kg		20.0		137	70-130	3	30
2-Chlorotoluene	**21.2**		µg/kg		20.0		106	70-130	2	30
4-Chlorotoluene	**22.1**		µg/kg		20.0		110	70-130	4	30
1,2-Dibromo-3-chloropropane	**22.2**		µg/kg		20.0		111	70-130	7	30
Dibromochloromethane	**24.3**		µg/kg		20.0		122	70-130	3	30
1,2-Dibromoethane (EDB)	**24.4**		µg/kg		20.0		122	70-130	1	30
Dibromomethane	**24.6**		µg/kg		20.0		123	70-130	0.1	30
1,2-Dichlorobenzene	**21.2**		µg/kg		20.0		106	70-130	4	30
1,3-Dichlorobenzene	**21.7**		µg/kg		20.0		108	70-130	3	30
1,4-Dichlorobenzene	**20.3**		µg/kg		20.0		101	70-130	3	30
Dichlorodifluoromethane (Freon12)	**29.9**	QC2	µg/kg		20.0		150	70-130	0.03	30
1,1-Dichloroethane	**25.0**		µg/kg		20.0		125	70-130	0.04	30
1,2-Dichloroethane	**23.7**		µg/kg		20.0		118	70-130	1	30
1,1-Dichloroethene	**24.1**		µg/kg		20.0		121	70-130	0.9	30
cis-1,2-Dichloroethene	**22.5**		µg/kg		20.0		113	70-130	0.2	30
trans-1,2-Dichloroethene	**24.3**		µg/kg		20.0		121	70-130	2	30
1,2-Dichloropropane	**22.4**		µg/kg		20.0		112	70-130	1	30
1,3-Dichloropropane	**22.5**		µg/kg		20.0		112	70-130	0.5	30

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 2001076 - SW846 5035A Soil (high level)										
LCS Dup (2001076-BSD1)					Prepared & Analyzed: 13-Jul-20					
2,2-Dichloropropane	**24.8**		µg/kg		20.0		124	70-130	2	30
1,1-Dichloropropene	**22.5**		µg/kg		20.0		113	70-130	3	30
cis-1,3-Dichloropropene	**22.9**		µg/kg		20.0		114	70-130	0.8	30
trans-1,3-Dichloropropene	**25.6**		µg/kg		20.0		128	70-130	0.04	30
Ethylbenzene	**20.8**		µg/kg		20.0		104	70-130	3	30
Hexachlorobutadiene	**16.6**		µg/kg		20.0		83	70-130	5	30
2-Hexanone (MBK)	**25.9**		µg/kg		20.0		130	70-130	14	30
Isopropylbenzene	**18.3**		µg/kg		20.0		92	70-130	4	30
4-Isopropyltoluene	**16.6**		µg/kg		20.0		83	70-130	3	30
Methyl tert-butyl ether	**23.0**		µg/kg		20.0		115	70-130	3	30
4-Methyl-2-pentanone (MIBK)	**24.5**		µg/kg		20.0		122	70-130	1	30
Methylene chloride	**22.9**		µg/kg		20.0		114	70-130	2	30
Naphthalene	**18.5**		µg/kg		20.0		92	70-130	14	30
n-Propylbenzene	**21.4**		µg/kg		20.0		107	70-130	3	30
Styrene	**18.7**		µg/kg		20.0		93	70-130	2	30
1,1,1,2-Tetrachloroethane	**22.4**		µg/kg		20.0		112	70-130	2	30
1,1,2,2-Tetrachloroethane	**21.8**		µg/kg		20.0		109	70-130	3	30
Tetrachloroethene	**23.2**		µg/kg		20.0		116	70-130	2	30
Toluene	**22.1**		µg/kg		20.0		111	70-130	2	30
1,2,3-Trichlorobenzene	**19.2**		µg/kg		20.0		96	70-130	4	30
1,2,4-Trichlorobenzene	**19.3**		µg/kg		20.0		96	70-130	4	30
1,3,5-Trichlorobenzene	**19.3**		µg/kg		20.0		97	70-130	3	30
1,1,1-Trichloroethane	**24.1**		µg/kg		20.0		121	70-130	0.7	30
1,1,2-Trichloroethane	**23.8**		µg/kg		20.0		119	70-130	0.6	30
Trichloroethene	**21.8**		µg/kg		20.0		109	70-130	0.1	30
Trichlorofluoromethane (Freon 11)	**27.6**	QC2	µg/kg		20.0		138	70-130	1	30
1,2,3-Trichloropropane	**22.6**		µg/kg		20.0		113	70-130	0.7	30
1,2,4-Trimethylbenzene	**18.8**		µg/kg		20.0		94	70-130	5	30
1,3,5-Trimethylbenzene	**18.5**		µg/kg		20.0		93	70-130	2	30
Vinyl chloride	**25.6**		µg/kg		20.0		128	70-130	4	30
m,p-Xylene	**45.2**		µg/kg		40.0		113	70-130	3	30
o-Xylene	**18.7**		µg/kg		20.0		93	70-130	5	30
Tetrahydrofuran	**23.4**		µg/kg		20.0		117	70-130	10	30
Ethyl ether	**22.7**		µg/kg		20.0		113	70-130	1	30
Tert-amyl methyl ether	**23.8**		µg/kg		20.0		119	70-130	0.8	30
Ethyl tert-butyl ether	**23.6**		µg/kg		20.0		118	70-130	1	30
Di-isopropyl ether	**24.2**		µg/kg		20.0		121	70-130	3	30
Tert-Butanol / butyl alcohol	**252**		µg/kg		200		126	70-130	1	30
1,4-Dioxane	**238**		µg/kg		200		119	70-130	2	30
trans-1,4-Dichloro-2-butene	**21.6**		µg/kg		20.0		108	70-130	2	30
Ethanol	**474**		µg/kg		400		119	70-130	0.4	30
Surrogate: 4-Bromofluorobenzene	*52.6*		µg/kg		*50.0*		*105*	*70-130*		
Surrogate: Toluene-d8	*51.9*		µg/kg		*50.0*		*104*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*51.8*		µg/kg		*50.0*		*104*	*70-130*		
Surrogate: Dibromofluoromethane	*54.1*		µg/kg		*50.0*		*108*	*70-130*		
Duplicate (2001076-DUP1)			**Source: SC58794-17**		Prepared & Analyzed: 13-Jul-20					
1,1,2-Trichlorotrifluoroethane (Freon 113)	< 69.5		µg/kg dry	69.5		BRL				30
Acetone	< 695		µg/kg dry	695		BRL				30
Acrylonitrile	< 69.5		µg/kg dry	69.5		BRL				30
Benzene	< 69.5		µg/kg dry	69.5		BRL				30

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 2001076 - SW846 5035A Soil (high level)										
Duplicate (2001076-DUP1)			**Source: SC58794-17**		Prepared & Analyzed: 13-Jul-20					
Bromobenzene	< 69.5		µg/kg dry	69.5		BRL				30
Bromochloromethane	< 69.5		µg/kg dry	69.5		BRL				30
Bromodichloromethane	< 69.5		µg/kg dry	69.5		BRL				30
Bromoform	< 69.5		µg/kg dry	69.5		BRL				30
Bromomethane	< 139		µg/kg dry	139		BRL				30
2-Butanone (MEK)	< 139		µg/kg dry	139		BRL				30
n-Butylbenzene	< 69.5		µg/kg dry	69.5		BRL				30
sec-Butylbenzene	< 69.5		µg/kg dry	69.5		BRL				30
tert-Butylbenzene	< 69.5		µg/kg dry	69.5		BRL				30
Carbon disulfide	< 139		µg/kg dry	139		BRL				30
Carbon tetrachloride	< 69.5		µg/kg dry	69.5		BRL				30
Chlorobenzene	< 69.5		µg/kg dry	69.5		BRL				30
Chloroethane	< 139		µg/kg dry	139		BRL				30
Chloroform	< 69.5		µg/kg dry	69.5		BRL				30
Chloromethane	< 139		µg/kg dry	139		BRL				30
2-Chlorotoluene	< 69.5		µg/kg dry	69.5		BRL				30
4-Chlorotoluene	< 69.5		µg/kg dry	69.5		BRL				30
1,2-Dibromo-3-chloropropane	< 139		µg/kg dry	139		BRL				30
Dibromochloromethane	< 69.5		µg/kg dry	69.5		BRL				30
1,2-Dibromoethane (EDB)	< 69.5		µg/kg dry	69.5		BRL				30
Dibromomethane	< 69.5		µg/kg dry	69.5		BRL				30
1,2-Dichlorobenzene	< 69.5		µg/kg dry	69.5		BRL				30
1,3-Dichlorobenzene	< 69.5		µg/kg dry	69.5		BRL				30
1,4-Dichlorobenzene	< 69.5		µg/kg dry	69.5		BRL				30
Dichlorodifluoromethane (Freon12)	< 139		µg/kg dry	139		BRL				30
1,1-Dichloroethane	< 69.5		µg/kg dry	69.5		BRL				30
1,2-Dichloroethane	< 69.5		µg/kg dry	69.5		BRL				30
1,1-Dichloroethene	< 69.5		µg/kg dry	69.5		BRL				30
cis-1,2-Dichloroethene	< 69.5		µg/kg dry	69.5		BRL				30
trans-1,2-Dichloroethene	< 69.5		µg/kg dry	69.5		BRL				30
1,2-Dichloropropane	< 69.5		µg/kg dry	69.5		BRL				30
1,3-Dichloropropane	< 69.5		µg/kg dry	69.5		BRL				30
2,2-Dichloropropane	< 69.5		µg/kg dry	69.5		BRL				30
1,1-Dichloropropene	< 69.5		µg/kg dry	69.5		BRL				30
cis-1,3-Dichloropropene	< 69.5		µg/kg dry	69.5		BRL				30
trans-1,3-Dichloropropene	< 69.5		µg/kg dry	69.5		BRL				30
Ethylbenzene	< 69.5		µg/kg dry	69.5		BRL				30
Hexachlorobutadiene	< 69.5		µg/kg dry	69.5		BRL				30
2-Hexanone (MBK)	< 139		µg/kg dry	139		BRL				30
Isopropylbenzene	< 69.5		µg/kg dry	69.5		BRL				30
4-Isopropyltoluene	< 69.5		µg/kg dry	69.5		BRL				30
Methyl tert-butyl ether	< 69.5		µg/kg dry	69.5		BRL				30
4-Methyl-2-pentanone (MIBK)	< 139		µg/kg dry	139		BRL				30
Methylene chloride	< 139		µg/kg dry	139		BRL				30
Naphthalene	< 69.5		µg/kg dry	69.5		BRL				30
n-Propylbenzene	< 69.5		µg/kg dry	69.5		BRL				30
Styrene	< 69.5		µg/kg dry	69.5		BRL				30
1,1,1,2-Tetrachloroethane	< 69.5		µg/kg dry	69.5		BRL				30
1,1,2,2-Tetrachloroethane	< 69.5		µg/kg dry	69.5		BRL				30
Tetrachloroethene	< 69.5		µg/kg dry	69.5		BRL				30

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 2001076 - SW846 5035A Soil (high level)										
Duplicate (2001076-DUP1)			**Source: SC58794-17**			Prepared & Analyzed: 13-Jul-20				
Toluene	< 69.5		µg/kg dry	69.5		BRL				30
1,2,3-Trichlorobenzene	< 69.5		µg/kg dry	69.5		BRL				30
1,2,4-Trichlorobenzene	< 69.5		µg/kg dry	69.5		BRL				30
1,3,5-Trichlorobenzene	< 69.5		µg/kg dry	69.5		BRL				30
1,1,1-Trichloroethane	< 69.5		µg/kg dry	69.5		BRL				30
1,1,2-Trichloroethane	< 69.5		µg/kg dry	69.5		BRL				30
Trichloroethene	< 69.5		µg/kg dry	69.5		BRL				30
Trichlorofluoromethane (Freon 11)	< 69.5		µg/kg dry	69.5		BRL				30
1,2,3-Trichloropropane	< 69.5		µg/kg dry	69.5		BRL				30
1,2,4-Trimethylbenzene	< 69.5		µg/kg dry	69.5		BRL				30
1,3,5-Trimethylbenzene	< 69.5		µg/kg dry	69.5		BRL				30
Vinyl chloride	< 69.5		µg/kg dry	69.5		BRL				30
m,p-Xylene	< 139		µg/kg dry	139		BRL				30
o-Xylene	< 69.5		µg/kg dry	69.5		BRL				30
Tetrahydrofuran	< 139		µg/kg dry	139		BRL				30
Ethyl ether	< 69.5		µg/kg dry	69.5		BRL				30
Tert-amyl methyl ether	< 69.5		µg/kg dry	69.5		BRL				30
Ethyl tert-butyl ether	< 69.5		µg/kg dry	69.5		BRL				30
Di-isopropyl ether	< 69.5		µg/kg dry	69.5		BRL				30
Tert-Butanol / butyl alcohol	< 1390		µg/kg dry	1390		BRL				30
1,4-Dioxane	< 1390		µg/kg dry	1390		BRL				30
trans-1,4-Dichloro-2-butene	< 347		µg/kg dry	347		BRL				30
Ethanol	< 13900		µg/kg dry	13900		BRL				30
Surrogate: 4-Bromofluorobenzene	*52.1*		µg/kg		*50.0*		*104*	*70-130*		
Surrogate: Toluene-d8	*53.8*		µg/kg		*50.0*		*108*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*53.9*		µg/kg		*50.0*		*108*	*70-130*		
Surrogate: Dibromofluoromethane	*52.9*		µg/kg		*50.0*		*106*	*70-130*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
Blank (2001083-BLK1)					Prepared & Analyzed: 13-Jul-20					
Acenaphthene	< 66.7		µg/kg wet	66.7						
Acenaphthylene	< 66.7		µg/kg wet	66.7						
Aniline	< 330		µg/kg wet	330						
Anthracene	< 66.7		µg/kg wet	66.7						
Azobenzene/Diphenyldiazene	< 330		µg/kg wet	330						
Benzidine	< 660		µg/kg wet	660						
Benzo (a) anthracene	< 66.7		µg/kg wet	66.7						
Benzo (a) pyrene	< 66.7		µg/kg wet	66.7						
Benzo (b) fluoranthene	< 66.7		µg/kg wet	66.7						
Benzo (g,h,i) perylene	< 66.7		µg/kg wet	66.7						
Benzo (k) fluoranthene	< 66.7		µg/kg wet	66.7						
Benzoic acid	< 330		µg/kg wet	330						
Benzyl alcohol	< 330		µg/kg wet	330						
Bis(2-chloroethoxy)methane	< 330		µg/kg wet	330						
Bis(2-chloroethyl)ether	< 167		µg/kg wet	167						
Bis(2-chloroisopropyl)ether	< 167		µg/kg wet	167						
Bis(2-ethylhexyl)phthalate	< 167		µg/kg wet	167						
4-Bromophenyl phenyl ether	< 330		µg/kg wet	330						
Butyl benzyl phthalate	< 330		µg/kg wet	330						
Carbazole	< 167		µg/kg wet	167						
4-Chloro-3-methylphenol	< 330		µg/kg wet	330						
4-Chloroaniline	< 167		µg/kg wet	167						
2-Chloronaphthalene	< 330		µg/kg wet	330						
2-Chlorophenol	< 167		µg/kg wet	167						
4-Chlorophenyl phenyl ether	< 330		µg/kg wet	330						
Chrysene	< 66.7		µg/kg wet	66.7						
Dibenzo (a,h) anthracene	< 66.7		µg/kg wet	66.7						
Dibenzofuran	< 167		µg/kg wet	167						
1,2-Dichlorobenzene	< 330		µg/kg wet	330						
1,3-Dichlorobenzene	< 330		µg/kg wet	330						
1,4-Dichlorobenzene	< 330		µg/kg wet	330						
3,3´-Dichlorobenzidine	< 330		µg/kg wet	330						
2,4-Dichlorophenol	< 167		µg/kg wet	167						
Diethyl phthalate	< 330		µg/kg wet	330						
Dimethyl phthalate	< 330		µg/kg wet	330						
2,4-Dimethylphenol	< 330		µg/kg wet	330						
Di-n-butyl phthalate	< 330		µg/kg wet	330						
4,6-Dinitro-2-methylphenol	< 330		µg/kg wet	330						
2,4-Dinitrophenol	< 330		µg/kg wet	330						
2,4-Dinitrotoluene	< 167		µg/kg wet	167						
2,6-Dinitrotoluene	< 167		µg/kg wet	167						
Di-n-octyl phthalate	< 330		µg/kg wet	330						
Fluoranthene	< 66.7		µg/kg wet	66.7						
Fluorene	< 66.7		µg/kg wet	66.7						
Hexachlorobenzene	< 167		µg/kg wet	167						
Hexachlorobutadiene	< 167		µg/kg wet	167						
Hexachlorocyclopentadiene	< 167		µg/kg wet	167						
Hexachloroethane	< 167		µg/kg wet	167						
Indeno (1,2,3-cd) pyrene	< 66.7		µg/kg wet	66.7						
Isophorone	< 167		µg/kg wet	167						

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
Blank (2001083-BLK1)					Prepared & Analyzed: 13-Jul-20					
2-Methylnaphthalene	< 66.7		µg/kg wet	66.7						
2-Methylphenol	< 330		µg/kg wet	330						
3 & 4-Methylphenol	< 330		µg/kg wet	330						
Naphthalene	< 66.7		µg/kg wet	66.7						
2-Nitroaniline	< 330		µg/kg wet	330						
3-Nitroaniline	< 330		µg/kg wet	330						
4-Nitroaniline	< 167		µg/kg wet	167						
Nitrobenzene	< 167		µg/kg wet	167						
2-Nitrophenol	< 167		µg/kg wet	167						
4-Nitrophenol	< 1320		µg/kg wet	1320						
N-Nitrosodimethylamine	< 167		µg/kg wet	167						
N-Nitrosodi-n-propylamine	< 167		µg/kg wet	167						
N-Nitrosodiphenylamine	< 330		µg/kg wet	330						
Pentachlorophenol	< 330		µg/kg wet	330						
Phenanthrene	< 66.7		µg/kg wet	66.7						
Phenol	< 330		µg/kg wet	330						
Pyrene	< 66.7		µg/kg wet	66.7						
Pyridine	< 330		µg/kg wet	330						
1,2,4-Trichlorobenzene	< 330		µg/kg wet	330						
1-Methylnaphthalene	< 66.7		µg/kg wet	66.7						
2,4,5-Trichlorophenol	< 330		µg/kg wet	330						
2,4,6-Trichlorophenol	< 167		µg/kg wet	167						
Pentachloronitrobenzene	< 330		µg/kg wet	330						
1,2,4,5-Tetrachlorobenzene	< 330		µg/kg wet	330						
Surrogate: 2-Fluorobiphenyl	*1570*		µg/kg wet		*1670*		*94*	*30-130*		
Surrogate: 2-Fluorophenol	*1520*		µg/kg wet		*1670*		*91*	*30-130*		
Surrogate: Nitrobenzene-d5	*1510*		µg/kg wet		*1670*		*90*	*30-130*		
Surrogate: Phenol-d5	*1760*		µg/kg wet		*1670*		*106*	*30-130*		
Surrogate: Terphenyl-dl4	*1580*		µg/kg wet		*1670*		*95*	*30-130*		
Surrogate: 2,4,6-Tribromophenol	*1450*		µg/kg wet		*1670*		*87*	*30-130*		
LCS (2001083-BS1)					Prepared & Analyzed: 13-Jul-20					
Acenaphthene	**1430**		µg/kg wet	66.7	1670		86	40-140		
Acenaphthylene	**1420**		µg/kg wet	66.7	1670		85	40-140		
Aniline	**775**		µg/kg wet	330	1670		47	40-140		
Anthracene	**1510**		µg/kg wet	66.7	1670		90	40-140		
Azobenzene/Diphenyldiazene	**1470**		µg/kg wet	330	1670		88	40-140		
Benzidine	**663**		µg/kg wet	660	1670		40	40-140		
Benzo (a) anthracene	**1660**		µg/kg wet	66.7	1670		99	40-140		
Benzo (a) pyrene	**1820**		µg/kg wet	66.7	1670		109	40-140		
Benzo (b) fluoranthene	**1710**		µg/kg wet	66.7	1670		103	40-140		
Benzo (g,h,i) perylene	**1710**		µg/kg wet	66.7	1670		102	40-140		
Benzo (k) fluoranthene	**1680**		µg/kg wet	66.7	1670		101	40-140		
Benzoic acid	**1650**		µg/kg wet	330	1670		99	30-130		
Benzyl alcohol	**1350**		µg/kg wet	330	1670		81	40-140		
Bis(2-chloroethoxy)methane	**1360**		µg/kg wet	330	1670		82	40-140		
Bis(2-chloroethyl)ether	**1060**		µg/kg wet	167	1670		63	40-140		
Bis(2-chloroisopropyl)ether	**904**		µg/kg wet	167	1670		54	40-140		
Bis(2-ethylhexyl)phthalate	**1650**		µg/kg wet	167	1670		99	40-140		
4-Bromophenyl phenyl ether	**1440**		µg/kg wet	330	1670		86	40-140		
Butyl benzyl phthalate	**1660**		µg/kg wet	330	1670		100	40-140		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
LCS (2001083-BS1)					Prepared & Analyzed: 13-Jul-20					
Carbazole	**1480**		µg/kg wet	167	1670		89	40-140		
4-Chloro-3-methylphenol	**1600**		µg/kg wet	330	1670		96	30-130		
4-Chloroaniline	**1020**		µg/kg wet	167	1670		61	40-140		
2-Chloronaphthalene	**1560**		µg/kg wet	330	1670		94	40-140		
2-Chlorophenol	**1240**		µg/kg wet	167	1670		75	30-130		
4-Chlorophenyl phenyl ether	**1250**		µg/kg wet	330	1670		75	40-140		
Chrysene	**1580**		µg/kg wet	66.7	1670		95	40-140		
Dibenzo (a,h) anthracene	**1760**		µg/kg wet	66.7	1670		106	40-140		
Dibenzofuran	**1840**		µg/kg wet	167	1670		111	40-140		
1,2-Dichlorobenzene	**1430**		µg/kg wet	330	1670		86	40-140		
1,3-Dichlorobenzene	**1310**		µg/kg wet	330	1670		78	40-140		
1,4-Dichlorobenzene	**1220**		µg/kg wet	330	1670		73	40-140		
3,3´-Dichlorobenzidine	**1720**		µg/kg wet	330	1670		103	40-140		
2,4-Dichlorophenol	**1310**		µg/kg wet	167	1670		79	30-130		
Diethyl phthalate	**1510**		µg/kg wet	330	1670		90	40-140		
Dimethyl phthalate	**1440**		µg/kg wet	330	1670		86	40-140		
2,4-Dimethylphenol	**1480**		µg/kg wet	330	1670		89	30-130		
Di-n-butyl phthalate	**1490**		µg/kg wet	330	1670		89	40-140		
4,6-Dinitro-2-methylphenol	**2110**		µg/kg wet	330	1670		126	30-130		
2,4-Dinitrophenol	**1990**		µg/kg wet	330	1670		120	30-130		
2,4-Dinitrotoluene	**1840**		µg/kg wet	167	1670		110	40-140		
2,6-Dinitrotoluene	**1260**		µg/kg wet	167	1670		76	40-140		
Di-n-octyl phthalate	**1710**		µg/kg wet	330	1670		103	40-140		
Fluoranthene	**1430**		µg/kg wet	66.7	1670		86	40-140		
Fluorene	**1130**		µg/kg wet	66.7	1670		68	40-140		
Hexachlorobenzene	**1590**		µg/kg wet	167	1670		96	40-140		
Hexachlorobutadiene	**1490**		µg/kg wet	167	1670		89	40-140		
Hexachlorocyclopentadiene	**1840**		µg/kg wet	167	1670		110	40-140		
Hexachloroethane	**1410**		µg/kg wet	167	1670		85	40-140		
Indeno (1,2,3-cd) pyrene	**1900**		µg/kg wet	66.7	1670		114	40-140		
Isophorone	**1240**		µg/kg wet	167	1670		75	40-140		
2-Methylnaphthalene	**1630**		µg/kg wet	66.7	1670		98	40-140		
2-Methylphenol	**1770**		µg/kg wet	330	1670		106	30-130		
3 & 4-Methylphenol	**1260**		µg/kg wet	330	1670		76	30-130		
Naphthalene	**1480**		µg/kg wet	66.7	1670		89	40-140		
2-Nitroaniline	**1290**		µg/kg wet	330	1670		77	40-140		
3-Nitroaniline	**1180**		µg/kg wet	330	1670		71	40-140		
4-Nitroaniline	**1390**		µg/kg wet	167	1670		84	40-140		
Nitrobenzene	**1430**		µg/kg wet	167	1670		86	40-140		
2-Nitrophenol	**1560**		µg/kg wet	167	1670		93	30-130		
4-Nitrophenol	**1730**		µg/kg wet	1320	1670		104	30-130		
N-Nitrosodimethylamine	**1020**		µg/kg wet	167	1670		61	40-140		
N-Nitrosodi-n-propylamine	**1120**		µg/kg wet	167	1670		67	40-140		
N-Nitrosodiphenylamine	**1400**		µg/kg wet	330	1670		84	40-140		
Pentachlorophenol	**1370**		µg/kg wet	330	1670		82	30-130		
Phenanthrene	**1450**		µg/kg wet	66.7	1670		87	40-140		
Phenol	**1360**		µg/kg wet	330	1670		81	30-130		
Pyrene	**1790**		µg/kg wet	66.7	1670		108	40-140		
Pyridine	**722**		µg/kg wet	330	1670		43	40-140		
1,2,4-Trichlorobenzene	**1600**		µg/kg wet	330	1670		96	40-140		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
LCS (2001083-BS1)					Prepared & Analyzed: 13-Jul-20					
1-Methylnaphthalene	**1610**		µg/kg wet	66.7	1670		96	40-140		
2,4,5-Trichlorophenol	**1340**		µg/kg wet	330	1670		80	30-130		
2,4,6-Trichlorophenol	**1450**		µg/kg wet	167	1670		87	30-130		
Pentachloronitrobenzene	**1460**		µg/kg wet	330	1670		88	40-140		
1,2,4,5-Tetrachlorobenzene	**1360**		µg/kg wet	330	1670		81	40-140		
Surrogate: 2-Fluorobiphenyl	*1570*		µg/kg wet		*1670*		*94*	*30-130*		
Surrogate: 2-Fluorophenol	*1240*		µg/kg wet		*1670*		*74*	*30-130*		
Surrogate: Nitrobenzene-d5	*1470*		µg/kg wet		*1670*		*88*	*30-130*		
Surrogate: Phenol-d5	*1360*		µg/kg wet		*1670*		*82*	*30-130*		
Surrogate: Terphenyl-dl4	*1750*		µg/kg wet		*1670*		*105*	*30-130*		
Surrogate: 2,4,6-Tribromophenol	*1820*		µg/kg wet		*1670*		*109*	*30-130*		
LCS Dup (2001083-BSD1)					Prepared & Analyzed: 13-Jul-20					
Acenaphthene	**1490**		µg/kg wet	66.7	1670		89	40-140	4	30
Acenaphthylene	**1460**		µg/kg wet	66.7	1670		87	40-140	2	30
Aniline	**785**		µg/kg wet	330	1670		47	40-140	1	30
Anthracene	**1510**		µg/kg wet	66.7	1670		91	40-140	0.5	30
Azobenzene/Diphenyldiazene	**1530**		µg/kg wet	330	1670		92	40-140	4	30
Benzidine	**829**		µg/kg wet	660	1670		50	40-140	22	30
Benzo (a) anthracene	**1710**		µg/kg wet	66.7	1670		102	40-140	3	30
Benzo (a) pyrene	**1830**		µg/kg wet	66.7	1670		110	40-140	0.5	30
Benzo (b) fluoranthene	**1700**		µg/kg wet	66.7	1670		102	40-140	0.5	30
Benzo (g,h,i) perylene	**1710**		µg/kg wet	66.7	1670		102	40-140	0.06	30
Benzo (k) fluoranthene	**1750**		µg/kg wet	66.7	1670		105	40-140	4	30
Benzoic acid	**1650**		µg/kg wet	330	1670		99	30-130	0.3	30
Benzyl alcohol	**1370**		µg/kg wet	330	1670		82	40-140	1	30
Bis(2-chloroethoxy)methane	**1430**		µg/kg wet	330	1670		86	40-140	5	30
Bis(2-chloroethyl)ether	**1090**		µg/kg wet	167	1670		66	40-140	3	30
Bis(2-chloroisopropyl)ether	**923**		µg/kg wet	167	1670		55	40-140	2	30
Bis(2-ethylhexyl)phthalate	**1830**		µg/kg wet	167	1670		110	40-140	10	30
4-Bromophenyl phenyl ether	**1450**		µg/kg wet	330	1670		87	40-140	0.9	30
Butyl benzyl phthalate	**1680**		µg/kg wet	330	1670		101	40-140	1	30
Carbazole	**1490**		µg/kg wet	167	1670		90	40-140	0.5	30
4-Chloro-3-methylphenol	**1600**		µg/kg wet	330	1670		96	30-130	0.02	30
4-Chloroaniline	**1040**		µg/kg wet	167	1670		62	40-140	1	30
2-Chloronaphthalene	**1610**		µg/kg wet	330	1670		97	40-140	3	30
2-Chlorophenol	**1270**		µg/kg wet	167	1670		76	30-130	2	30
4-Chlorophenyl phenyl ether	**1260**		µg/kg wet	330	1670		76	40-140	0.9	30
Chrysene	**1620**		µg/kg wet	66.7	1670		97	40-140	3	30
Dibenzo (a,h) anthracene	**1770**		µg/kg wet	66.7	1670		106	40-140	0.7	30
Dibenzofuran	**1890**		µg/kg wet	167	1670		113	40-140	2	30
1,2-Dichlorobenzene	**1510**		µg/kg wet	330	1670		91	40-140	5	30
1,3-Dichlorobenzene	**1320**		µg/kg wet	330	1670		79	40-140	1	30
1,4-Dichlorobenzene	**1230**		µg/kg wet	330	1670		74	40-140	0.9	30
3,3´-Dichlorobenzidine	**1790**		µg/kg wet	330	1670		107	40-140	4	30
2,4-Dichlorophenol	**1360**		µg/kg wet	167	1670		82	30-130	4	30
Diethyl phthalate	**1500**		µg/kg wet	330	1670		90	40-140	0.7	30
Dimethyl phthalate	**1400**		µg/kg wet	330	1670		84	40-140	3	30
2,4-Dimethylphenol	**1510**		µg/kg wet	330	1670		91	30-130	2	30
Di-n-butyl phthalate	**1500**		µg/kg wet	330	1670		90	40-140	0.8	30
4,6-Dinitro-2-methylphenol	**2100**		µg/kg wet	330	1670		126	30-130	0.08	30

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
LCS Dup (2001083-BSD1)					Prepared & Analyzed: 13-Jul-20					
2,4-Dinitrophenol	**2140**		µg/kg wet	330	1670		129	30-130	7	30
2,4-Dinitrotoluene	**1770**		µg/kg wet	167	1670		106	40-140	4	30
2,6-Dinitrotoluene	**1350**		µg/kg wet	167	1670		81	40-140	7	30
Di-n-octyl phthalate	**1730**		µg/kg wet	330	1670		104	40-140	0.9	30
Fluoranthene	**1460**		µg/kg wet	66.7	1670		88	40-140	2	30
Fluorene	**1170**		µg/kg wet	66.7	1670		70	40-140	3	30
Hexachlorobenzene	**1640**		µg/kg wet	167	1670		98	40-140	3	30
Hexachlorobutadiene	**1540**		µg/kg wet	167	1670		92	40-140	3	30
Hexachlorocyclopentadiene	**2270**		µg/kg wet	167	1670		136	40-140	21	30
Hexachloroethane	**1420**		µg/kg wet	167	1670		85	40-140	0.7	30
Indeno (1,2,3-cd) pyrene	**1910**		µg/kg wet	66.7	1670		114	40-140	0.4	30
Isophorone	**1260**		µg/kg wet	167	1670		76	40-140	1	30
2-Methylnaphthalene	**1680**		µg/kg wet	66.7	1670		101	40-140	3	30
2-Methylphenol	**1800**		µg/kg wet	330	1670		108	30-130	2	30
3 & 4-Methylphenol	**1230**		µg/kg wet	330	1670		74	30-130	2	30
Naphthalene	**1460**		µg/kg wet	66.7	1670		88	40-140	1	30
2-Nitroaniline	**1430**		µg/kg wet	330	1670		86	40-140	10	30
3-Nitroaniline	**1160**		µg/kg wet	330	1670		70	40-140	1	30
4-Nitroaniline	**1390**		µg/kg wet	167	1670		83	40-140	0.1	30
Nitrobenzene	**1520**		µg/kg wet	167	1670		91	40-140	6	30
2-Nitrophenol	**1640**		µg/kg wet	167	1670		98	30-130	5	30
4-Nitrophenol	**1810**		µg/kg wet	1320	1670		109	30-130	5	30
N-Nitrosodimethylamine	**739**	QC6	µg/kg wet	167	1670		44	40-140	32	30
N-Nitrosodi-n-propylamine	**1190**		µg/kg wet	167	1670		71	40-140	6	30
N-Nitrosodiphenylamine	**1370**		µg/kg wet	330	1670		82	40-140	3	30
Pentachlorophenol	**1320**		µg/kg wet	330	1670		79	30-130	4	30
Phenanthrene	**1490**		µg/kg wet	66.7	1670		90	40-140	3	30
Phenol	**1400**		µg/kg wet	330	1670		84	30-130	3	30
Pyrene	**1810**		µg/kg wet	66.7	1670		109	40-140	1	30
Pyridine	**1000**	QC6	µg/kg wet	330	1670		60	40-140	33	30
1,2,4-Trichlorobenzene	**1640**		µg/kg wet	330	1670		98	40-140	2	30
1-Methylnaphthalene	**1650**		µg/kg wet	66.7	1670		99	40-140	3	30
2,4,5-Trichlorophenol	**1290**		µg/kg wet	330	1670		78	30-130	4	30
2,4,6-Trichlorophenol	**1480**		µg/kg wet	167	1670		89	30-130	2	30
Pentachloronitrobenzene	**1350**		µg/kg wet	330	1670		81	40-140	8	30
1,2,4,5-Tetrachlorobenzene	**1410**		µg/kg wet	330	1670		85	40-140	4	30
Surrogate: 2-Fluorobiphenyl	*1590*		µg/kg wet		*1670*		*95*	*30-130*		
Surrogate: 2-Fluorophenol	*1220*		µg/kg wet		*1670*		*73*	*30-130*		
Surrogate: Nitrobenzene-d5	*1490*		µg/kg wet		*1670*		*89*	*30-130*		
Surrogate: Phenol-d5	*1400*		µg/kg wet		*1670*		*84*	*30-130*		
Surrogate: Terphenyl-dl4	*1750*		µg/kg wet		*1670*		*105*	*30-130*		
Surrogate: 2,4,6-Tribromophenol	*1840*		µg/kg wet		*1670*		*110*	*30-130*		
Duplicate (2001083-DUP1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Acenaphthene	< 74.4		µg/kg dry	74.4		BRL				30
Acenaphthylene	< 74.4		µg/kg dry	74.4		BRL				30
Aniline	< 368		µg/kg dry	368		BRL				30
Anthracene	< 74.4		µg/kg dry	74.4		BRL				30
Azobenzene/Diphenyldiazene	< 368		µg/kg dry	368		BRL				30
Benzidine	< 736		µg/kg dry	736		BRL				30
Benzo (a) anthracene	< 74.4		µg/kg dry	74.4		BRL				30

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
Duplicate (2001083-DUP1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Benzo (a) pyrene	< 74.4		µg/kg dry	74.4		BRL				30
Benzo (b) fluoranthene	< 74.4		µg/kg dry	74.4		BRL				30
Benzo (g,h,i) perylene	< 74.4		µg/kg dry	74.4		BRL				30
Benzo (k) fluoranthene	< 74.4		µg/kg dry	74.4		BRL				30
Benzoic acid	< 368		µg/kg dry	368		BRL				30
Benzyl alcohol	< 368		µg/kg dry	368		BRL				30
Bis(2-chloroethoxy)methane	< 368		µg/kg dry	368		BRL				30
Bis(2-chloroethyl)ether	< 186		µg/kg dry	186		BRL				30
Bis(2-chloroisopropyl)ether	< 186		µg/kg dry	186		BRL				30
Bis(2-ethylhexyl)phthalate	< 186		µg/kg dry	186		BRL				30
4-Bromophenyl phenyl ether	< 368		µg/kg dry	368		BRL				30
Butyl benzyl phthalate	< 368		µg/kg dry	368		BRL				30
Carbazole	< 186		µg/kg dry	186		BRL				30
4-Chloro-3-methylphenol	< 368		µg/kg dry	368		BRL				30
4-Chloroaniline	< 186		µg/kg dry	186		BRL				30
2-Chloronaphthalene	< 368		µg/kg dry	368		BRL				30
2-Chlorophenol	< 186		µg/kg dry	186		BRL				30
4-Chlorophenyl phenyl ether	< 368		µg/kg dry	368		BRL				30
Chrysene	< 74.4		µg/kg dry	74.4		BRL				30
Dibenzo (a,h) anthracene	< 74.4		µg/kg dry	74.4		BRL				30
Dibenzofuran	< 186		µg/kg dry	186		BRL				30
1,2-Dichlorobenzene	< 368		µg/kg dry	368		BRL				30
1,3-Dichlorobenzene	< 368		µg/kg dry	368		BRL				30
1,4-Dichlorobenzene	< 368		µg/kg dry	368		BRL				30
3,3´-Dichlorobenzidine	< 368		µg/kg dry	368		BRL				30
2,4-Dichlorophenol	< 186		µg/kg dry	186		BRL				30
Diethyl phthalate	< 368		µg/kg dry	368		BRL				30
Dimethyl phthalate	< 368		µg/kg dry	368		BRL				30
2,4-Dimethylphenol	< 368		µg/kg dry	368		BRL				30
Di-n-butyl phthalate	< 368		µg/kg dry	368		BRL				30
4,6-Dinitro-2-methylphenol	< 368		µg/kg dry	368		BRL				30
2,4-Dinitrophenol	< 368		µg/kg dry	368		BRL				30
2,4-Dinitrotoluene	< 186		µg/kg dry	186		BRL				30
2,6-Dinitrotoluene	< 186		µg/kg dry	186		BRL				30
Di-n-octyl phthalate	< 368		µg/kg dry	368		BRL				30
Fluoranthene	< 74.4		µg/kg dry	74.4		BRL				30
Fluorene	< 74.4		µg/kg dry	74.4		BRL				30
Hexachlorobenzene	< 186		µg/kg dry	186		BRL				30
Hexachlorobutadiene	< 186		µg/kg dry	186		BRL				30
Hexachlorocyclopentadiene	< 186		µg/kg dry	186		BRL				30
Hexachloroethane	< 186		µg/kg dry	186		BRL				30
Indeno (1,2,3-cd) pyrene	< 74.4		µg/kg dry	74.4		BRL				30
Isophorone	< 186		µg/kg dry	186		BRL				30
2-Methylnaphthalene	< 74.4		µg/kg dry	74.4		BRL				30
2-Methylphenol	< 368		µg/kg dry	368		BRL				30
3 & 4-Methylphenol	< 368		µg/kg dry	368		BRL				30
Naphthalene	< 74.4		µg/kg dry	74.4		BRL				30
2-Nitroaniline	< 368		µg/kg dry	368		BRL				30
3-Nitroaniline	< 368		µg/kg dry	368		BRL				30
4-Nitroaniline	< 186		µg/kg dry	186		BRL				30

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
Duplicate (2001083-DUP1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Nitrobenzene	< 186		µg/kg dry	186		BRL				30
2-Nitrophenol	< 186		µg/kg dry	186		BRL				30
4-Nitrophenol	< 1470		µg/kg dry	1470		BRL				30
N-Nitrosodimethylamine	< 186		µg/kg dry	186		BRL				30
N-Nitrosodi-n-propylamine	< 186		µg/kg dry	186		BRL				30
N-Nitrosodiphenylamine	< 368		µg/kg dry	368		BRL				30
Pentachlorophenol	< 368		µg/kg dry	368		BRL				30
Phenanthrene	< 74.4		µg/kg dry	74.4		BRL				30
Phenol	< 368		µg/kg dry	368		BRL				30
Pyrene	< 74.4		µg/kg dry	74.4		BRL				30
Pyridine	< 368		µg/kg dry	368		BRL				30
1,2,4-Trichlorobenzene	< 368		µg/kg dry	368		BRL				30
1-Methylnaphthalene	< 74.4		µg/kg dry	74.4		BRL				30
2,4,5-Trichlorophenol	< 368		µg/kg dry	368		BRL				30
2,4,6-Trichlorophenol	< 186		µg/kg dry	186		BRL				30
Pentachloronitrobenzene	< 368		µg/kg dry	368		BRL				30
1,2,4,5-Tetrachlorobenzene	< 368		µg/kg dry	368		BRL				30
Surrogate: 2-Fluorobiphenyl	*1710*		µg/kg dry		*1860*		*92*	*30-130*		
Surrogate: 2-Fluorophenol	*1620*		µg/kg dry		*1860*		*87*	*30-130*		
Surrogate: Nitrobenzene-d5	*1440*		µg/kg dry		*1860*		*78*	*30-130*		
Surrogate: Phenol-d5	*1830*		µg/kg dry		*1860*		*99*	*30-130*		
Surrogate: Terphenyl-dl4	*1660*		µg/kg dry		*1860*		*89*	*30-130*		
Surrogate: 2,4,6-Tribromophenol	*1610*		µg/kg dry		*1860*		*87*	*30-130*		
Matrix Spike (2001083-MS1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Acenaphthene	**1370**		µg/kg dry	74.5	1860	BRL	73	40-140		
Acenaphthylene	**1370**		µg/kg dry	74.5	1860	BRL	74	40-140		
Aniline	**690**	QM9	µg/kg dry	368	1860	BRL	37	40-140		
Anthracene	**1530**		µg/kg dry	74.5	1860	BRL	82	40-140		
Azobenzene/Diphenyldiazene	**1470**		µg/kg dry	368	1860	BRL	79	40-140		
Benzidine	**54.7**	QM9	µg/kg dry	737	1860	BRL	3	40-140		
Benzo (a) anthracene	**1690**		µg/kg dry	74.5	1860	BRL	91	40-140		
Benzo (a) pyrene	**1800**		µg/kg dry	74.5	1860	BRL	97	40-140		
Benzo (b) fluoranthene	**1890**		µg/kg dry	74.5	1860	BRL	102	40-140		
Benzo (g,h,i) perylene	**1710**		µg/kg dry	74.5	1860	BRL	92	40-140		
Benzo (k) fluoranthene	**1720**		µg/kg dry	74.5	1860	BRL	92	40-140		
Benzoic acid	**2730**	QM9	µg/kg dry	368	1860	BRL	147	30-130		
Benzyl alcohol	**1430**		µg/kg dry	368	1860	BRL	77	40-140		
Bis(2-chloroethoxy)methane	**1520**		µg/kg dry	368	1860	BRL	82	40-140		
Bis(2-chloroethyl)ether	**1200**		µg/kg dry	186	1860	BRL	64	40-140		
Bis(2-chloroisopropyl)ether	**975**		µg/kg dry	186	1860	BRL	52	40-140		
Bis(2-ethylhexyl)phthalate	**1660**		µg/kg dry	186	1860	BRL	89	40-140		
4-Bromophenyl phenyl ether	**1480**		µg/kg dry	368	1860	BRL	80	40-140		
Butyl benzyl phthalate	**1660**		µg/kg dry	368	1860	BRL	89	40-140		
Carbazole	**1500**		µg/kg dry	186	1860	BRL	81	40-140		
4-Chloro-3-methylphenol	**1720**		µg/kg dry	368	1860	BRL	92	30-130		
4-Chloroaniline	**929**		µg/kg dry	186	1860	BRL	50	40-140		
2-Chloronaphthalene	**1700**		µg/kg dry	368	1860	BRL	91	40-140		
2-Chlorophenol	**1370**		µg/kg dry	186	1860	BRL	74	30-130		
4-Chlorophenyl phenyl ether	**1250**		µg/kg dry	368	1860	BRL	67	40-140		
Chrysene	**1610**		µg/kg dry	74.5	1860	BRL	86	40-140		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
Matrix Spike (2001083-MS1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Dibenzo (a,h) anthracene	**1780**		µg/kg dry	74.5	1860	BRL	96	40-140		
Dibenzofuran	**1790**		µg/kg dry	186	1860	BRL	96	40-140		
1,2-Dichlorobenzene	**1640**		µg/kg dry	368	1860	BRL	88	40-140		
1,3-Dichlorobenzene	**1430**		µg/kg dry	368	1860	BRL	77	40-140		
1,4-Dichlorobenzene	**1310**		µg/kg dry	368	1860	BRL	71	40-140		
3,3´-Dichlorobenzidine	**918**		µg/kg dry	368	1860	BRL	49	40-140		
2,4-Dichlorophenol	**1430**		µg/kg dry	186	1860	BRL	77	30-130		
Diethyl phthalate	**1400**		µg/kg dry	368	1860	BRL	75	40-140		
Dimethyl phthalate	**1580**		µg/kg dry	368	1860	BRL	85	40-140		
2,4-Dimethylphenol	**1360**		µg/kg dry	368	1860	BRL	73	30-130		
Di-n-butyl phthalate	**1520**		µg/kg dry	368	1860	BRL	82	40-140		
4,6-Dinitro-2-methylphenol	**2410**		µg/kg dry	368	1860	BRL	130	30-130		
2,4-Dinitrophenol	**2510**	QM9	µg/kg dry	368	1860	BRL	135	30-130		
2,4-Dinitrotoluene	**1650**		µg/kg dry	186	1860	BRL	89	40-140		
2,6-Dinitrotoluene	**1420**		µg/kg dry	186	1860	BRL	77	40-140		
Di-n-octyl phthalate	**1750**		µg/kg dry	368	1860	BRL	94	40-140		
Fluoranthene	**1480**		µg/kg dry	74.5	1860	BRL	80	40-140		
Fluorene	**1180**		µg/kg dry	74.5	1860	BRL	64	40-140		
Hexachlorobenzene	**1650**		µg/kg dry	186	1860	BRL	89	40-140		
Hexachlorobutadiene	**1610**		µg/kg dry	186	1860	BRL	86	40-140		
Hexachlorocyclopentadiene	**1810**		µg/kg dry	186	1860	BRL	98	40-140		
Hexachloroethane	**1490**		µg/kg dry	186	1860	BRL	80	40-140		
Indeno (1,2,3-cd) pyrene	**1830**		µg/kg dry	74.5	1860	BRL	98	40-140		
Isophorone	**1400**		µg/kg dry	186	1860	BRL	75	30-130		
2-Methylnaphthalene	**1750**		µg/kg dry	74.5	1860	BRL	94	40-140		
2-Methylphenol	**1890**		µg/kg dry	368	1860	BRL	102	30-130		
3 & 4-Methylphenol	**1350**		µg/kg dry	368	1860	BRL	72	30-130		
Naphthalene	**1570**		µg/kg dry	74.5	1860	BRL	84	40-140		
2-Nitroaniline	**1430**		µg/kg dry	368	1860	BRL	77	40-140		
3-Nitroaniline	**1020**		µg/kg dry	368	1860	BRL	55	40-140		
4-Nitroaniline	**1410**		µg/kg dry	186	1860	BRL	76	40-140		
Nitrobenzene	**1620**		µg/kg dry	186	1860	BRL	87	40-140		
2-Nitrophenol	**1620**		µg/kg dry	186	1860	BRL	87	30-130		
4-Nitrophenol	**1850**		µg/kg dry	1470	1860	BRL	100	30-130		
N-Nitrosodimethylamine	**894**		µg/kg dry	186	1860	BRL	48	40-140		
N-Nitrosodi-n-propylamine	**1250**		µg/kg dry	186	1860	BRL	67	40-140		
N-Nitrosodiphenylamine	**1570**		µg/kg dry	368	1860	BRL	85	40-140		
Pentachlorophenol	**1600**		µg/kg dry	368	1860	BRL	86	30-130		
Phenanthrene	**1510**		µg/kg dry	74.5	1860	BRL	81	40-140		
Phenol	**1460**		µg/kg dry	368	1860	BRL	79	30-130		
Pyrene	**1820**		µg/kg dry	74.5	1860	BRL	98	40-140		
Pyridine	**1180**		µg/kg dry	368	1860	BRL	64	40-140		
1,2,4-Trichlorobenzene	**1710**		µg/kg dry	368	1860	BRL	92	40-140		
1-Methylnaphthalene	**1720**		µg/kg dry	74.5	1860	BRL	93	40-140		
2,4,5-Trichlorophenol	**1440**		µg/kg dry	368	1860	BRL	77	30-130		
2,4,6-Trichlorophenol	**1540**		µg/kg dry	186	1860	BRL	83	30-130		
Pentachloronitrobenzene	**1490**		µg/kg dry	368	1860	BRL	80	40-140		
1,2,4,5-Tetrachlorobenzene	**1450**		µg/kg dry	368	1860	BRL	78	40-140		
Surrogate: 2-Fluorobiphenyl	*1650*		µg/kg dry		*1860*		*89*	*30-130*		
Surrogate: 2-Fluorophenol	*1300*		µg/kg dry		*1860*		*70*	*30-130*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
Matrix Spike (2001083-MS1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Surrogate: Nitrobenzene-d5	*1550*		µg/kg dry		*1860*		*83*	*30-130*		
Surrogate: Phenol-d5	*1470*		µg/kg dry		*1860*		*79*	*30-130*		
Surrogate: Terphenyl-dl4	*1730*		µg/kg dry		*1860*		*93*	*30-130*		
Surrogate: 2,4,6-Tribromophenol	*1600*		µg/kg dry		*1860*		*86*	*30-130*		
Matrix Spike Dup (2001083-MSD1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Acenaphthene	**1380**		µg/kg dry	74.2	1850	BRL	75	40-140	1	30
Acenaphthylene	**1400**		µg/kg dry	74.2	1850	BRL	75	40-140	2	30
Aniline	**600**	QM9	µg/kg dry	367	1850	BRL	32	40-140	14	30
Anthracene	**1480**		µg/kg dry	74.2	1850	BRL	80	40-140	3	30
Azobenzene/Diphenyldiazene	**1460**		µg/kg dry	367	1850	BRL	79	40-140	0.8	30
Benzidine	**54.9**	QM9	µg/kg dry	734	1850	BRL	3	40-140	0.3	30
Benzo (a) anthracene	**1630**		µg/kg dry	74.2	1850	BRL	88	40-140	3	30
Benzo (a) pyrene	**1790**		µg/kg dry	74.2	1850	BRL	97	40-140	0.3	30
Benzo (b) fluoranthene	**1810**		µg/kg dry	74.2	1850	BRL	98	40-140	4	30
Benzo (g,h,i) perylene	**1690**		µg/kg dry	74.2	1850	BRL	91	40-140	1	30
Benzo (k) fluoranthene	**1760**		µg/kg dry	74.2	1850	BRL	95	40-140	2	30
Benzoic acid	**2650**		µg/kg dry	367	1850	BRL	143	30-130	3	30
Benzyl alcohol	**1360**		µg/kg dry	367	1850	BRL	73	40-140	5	30
Bis(2-chloroethoxy)methane	**1420**		µg/kg dry	367	1850	BRL	77	40-140	7	30
Bis(2-chloroethyl)ether	**1100**		µg/kg dry	186	1850	BRL	59	40-140	8	30
Bis(2-chloroisopropyl)ether	**957**		µg/kg dry	186	1850	BRL	52	40-140	2	30
Bis(2-ethylhexyl)phthalate	**1750**		µg/kg dry	186	1850	BRL	94	40-140	5	30
4-Bromophenyl phenyl ether	**1410**		µg/kg dry	367	1850	BRL	76	40-140	5	30
Butyl benzyl phthalate	**1610**		µg/kg dry	367	1850	BRL	87	40-140	3	30
Carbazole	**1460**		µg/kg dry	186	1850	BRL	79	40-140	3	30
4-Chloro-3-methylphenol	**1620**		µg/kg dry	367	1850	BRL	87	30-130	6	30
4-Chloroaniline	**1010**		µg/kg dry	186	1850	BRL	55	40-140	9	30
2-Chloronaphthalene	**1630**		µg/kg dry	367	1850	BRL	88	40-140	4	30
2-Chlorophenol	**1330**		µg/kg dry	186	1850	BRL	72	30-130	3	30
4-Chlorophenyl phenyl ether	**1240**		µg/kg dry	367	1850	BRL	67	40-140	1	30
Chrysene	**1540**		µg/kg dry	74.2	1850	BRL	83	40-140	4	30
Dibenzo (a,h) anthracene	**1750**		µg/kg dry	74.2	1850	BRL	95	40-140	1	30
Dibenzofuran	**1710**		µg/kg dry	186	1850	BRL	92	40-140	5	30
1,2-Dichlorobenzene	**1470**		µg/kg dry	367	1850	BRL	79	40-140	11	30
1,3-Dichlorobenzene	**1390**		µg/kg dry	367	1850	BRL	75	40-140	3	30
1,4-Dichlorobenzene	**1280**		µg/kg dry	367	1850	BRL	69	40-140	3	30
3,3´-Dichlorobenzidine	**826**		µg/kg dry	367	1850	BRL	45	40-140	11	30
2,4-Dichlorophenol	**1350**		µg/kg dry	186	1850	BRL	73	30-130	6	30
Diethyl phthalate	**1320**		µg/kg dry	367	1850	BRL	71	40-140	6	30
Dimethyl phthalate	**1500**		µg/kg dry	367	1850	BRL	81	40-140	6	30
2,4-Dimethylphenol	**1200**		µg/kg dry	367	1850	BRL	65	30-130	13	30
Di-n-butyl phthalate	**1450**		µg/kg dry	367	1850	BRL	78	40-140	5	30
4,6-Dinitro-2-methylphenol	**2190**		µg/kg dry	367	1850	BRL	118	30-130	9	30
2,4-Dinitrophenol	**2290**		µg/kg dry	367	1850	BRL	123	30-130	9	30
2,4-Dinitrotoluene	**1550**		µg/kg dry	186	1850	BRL	83	40-140	6	30
2,6-Dinitrotoluene	**1380**		µg/kg dry	186	1850	BRL	74	40-140	3	30
Di-n-octyl phthalate	**1730**		µg/kg dry	367	1850	BRL	93	40-140	1	30
Fluoranthene	**1420**		µg/kg dry	74.2	1850	BRL	77	40-140	4	30
Fluorene	**1140**		µg/kg dry	74.2	1850	BRL	61	40-140	4	30
Hexachlorobenzene	**1560**		µg/kg dry	186	1850	BRL	84	40-140	5	30

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 2001083 - SW846 3546										
Matrix Spike Dup (2001083-MSD1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Hexachlorobutadiene	**1540**		µg/kg dry	186	1850	BRL	83	40-140	4	30
Hexachlorocyclopentadiene	**1620**		µg/kg dry	186	1850	BRL	88	40-140	11	30
Hexachloroethane	**1430**		µg/kg dry	186	1850	BRL	77	40-140	4	30
Indeno (1,2,3-cd) pyrene	**1810**		µg/kg dry	74.2	1850	BRL	98	40-140	0.7	30
Isophorone	**1320**		µg/kg dry	186	1850	BRL	71	30-130	6	30
2-Methylnaphthalene	**1690**		µg/kg dry	74.2	1850	BRL	91	40-140	3	30
2-Methylphenol	**1790**		µg/kg dry	367	1850	BRL	97	30-130	5	30
3 & 4-Methylphenol	**1260**		µg/kg dry	367	1850	BRL	68	30-130	7	30
Naphthalene	**1520**		µg/kg dry	74.2	1850	BRL	82	40-140	3	30
2-Nitroaniline	**1450**		µg/kg dry	367	1850	BRL	78	40-140	1	30
3-Nitroaniline	**1190**		µg/kg dry	367	1850	BRL	64	40-140	15	30
4-Nitroaniline	**1380**		µg/kg dry	186	1850	BRL	74	40-140	2	30
Nitrobenzene	**1520**		µg/kg dry	186	1850	BRL	82	40-140	6	30
2-Nitrophenol	**1600**		µg/kg dry	186	1850	BRL	86	30-130	1	30
4-Nitrophenol	**1840**		µg/kg dry	1470	1850	BRL	99	30-130	0.5	30
N-Nitrosodimethylamine	**825**		µg/kg dry	186	1850	BRL	44	40-140	8	30
N-Nitrosodi-n-propylamine	**1200**		µg/kg dry	186	1850	BRL	65	40-140	4	30
N-Nitrosodiphenylamine	**1420**		µg/kg dry	367	1850	BRL	77	40-140	10	30
Pentachlorophenol	**1490**		µg/kg dry	367	1850	BRL	81	30-130	7	30
Phenanthrene	**1420**		µg/kg dry	74.2	1850	BRL	77	40-140	6	30
Phenol	**1400**		µg/kg dry	367	1850	BRL	75	30-130	5	30
Pyrene	**1720**		µg/kg dry	74.2	1850	BRL	93	40-140	5	30
Pyridine	**910**		µg/kg dry	367	1850	BRL	49	40-140	26	30
1,2,4-Trichlorobenzene	**1650**		µg/kg dry	367	1850	BRL	89	40-140	4	30
1-Methylnaphthalene	**1700**		µg/kg dry	74.2	1850	BRL	91	40-140	2	30
2,4,5-Trichlorophenol	**1450**		µg/kg dry	367	1850	BRL	78	30-130	0.8	30
2,4,6-Trichlorophenol	**1470**		µg/kg dry	186	1850	BRL	79	30-130	5	30
Pentachloronitrobenzene	**1430**		µg/kg dry	367	1850	BRL	77	40-140	4	30
1,2,4,5-Tetrachlorobenzene	**1370**		µg/kg dry	367	1850	BRL	74	40-140	5	30
Surrogate: 2-Fluorobiphenyl	*1620*		µg/kg dry		*1850*		*87*	*30-130*		
Surrogate: 2-Fluorophenol	*1270*		µg/kg dry		*1850*		*69*	*30-130*		
Surrogate: Nitrobenzene-d5	*1540*		µg/kg dry		*1850*		*83*	*30-130*		
Surrogate: Phenol-d5	*1440*		µg/kg dry		*1850*		*78*	*30-130*		
Surrogate: Terphenyl-dl4	*1710*		µg/kg dry		*1850*		*92*	*30-130*		
Surrogate: 2,4,6-Tribromophenol	*1610*		µg/kg dry		*1850*		*87*	*30-130*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8082A										
Batch 2001087 - SW846 3546										
Blank (2001087-BLK1)					Prepared: 13-Jul-20 Analyzed: 15-Jul-20					
Aroclor-1016	< 20.0		µg/kg wet	20.0						
Aroclor-1016 [2C]	< 20.0		µg/kg wet	20.0						
Aroclor-1221	< 20.0		µg/kg wet	20.0						
Aroclor-1221 [2C]	< 20.0		µg/kg wet	20.0						
Aroclor-1232	< 20.0		µg/kg wet	20.0						
Aroclor-1232 [2C]	< 20.0		µg/kg wet	20.0						
Aroclor-1242	< 20.0		µg/kg wet	20.0						
Aroclor-1242 [2C]	< 20.0		µg/kg wet	20.0						
Aroclor-1248	< 20.0		µg/kg wet	20.0						
Aroclor-1248 [2C]	< 20.0		µg/kg wet	20.0						
Aroclor-1254	< 20.0		µg/kg wet	20.0						
Aroclor-1254 [2C]	< 20.0		µg/kg wet	20.0						
Aroclor-1260	< 20.0		µg/kg wet	20.0						
Aroclor-1260 [2C]	< 20.0		µg/kg wet	20.0						
Aroclor-1262	< 20.0		µg/kg wet	20.0						
Aroclor-1262 [2C]	< 20.0		µg/kg wet	20.0						
Aroclor-1268	< 20.0		µg/kg wet	20.0						
Aroclor-1268 [2C]	< 20.0		µg/kg wet	20.0						
Surrogate: Decachlorobiphenyl (Sr)	*14.0*		µg/kg wet		*13.3*		*105*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*12.4*		µg/kg wet		*13.3*		*93*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*12.6*		µg/kg wet		*13.3*		*94*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*11.0*		µg/kg wet		*13.3*		*82*	*30-150*		
LCS (2001087-BS1)					Prepared: 13-Jul-20 Analyzed: 15-Jul-20					
Aroclor-1016	**146**		µg/kg wet	20.0	167		88	40-140		
Aroclor-1016 [2C]	**143**		µg/kg wet	20.0	167		86	40-140		
Aroclor-1260	**151**		µg/kg wet	20.0	167		91	40-140		
Aroclor-1260 [2C]	**139**		µg/kg wet	20.0	167		83	40-140		
Surrogate: Decachlorobiphenyl (Sr)	*13.2*		µg/kg wet		*13.3*		*99*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*12.3*		µg/kg wet		*13.3*		*92*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*12.3*		µg/kg wet		*13.3*		*92*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*11.4*		µg/kg wet		*13.3*		*85*	*30-150*		
LCS Dup (2001087-BSD1)					Prepared: 13-Jul-20 Analyzed: 15-Jul-20					
Aroclor-1016	**156**		µg/kg wet	20.0	167		94	40-140	6	30
Aroclor-1016 [2C]	**153**		µg/kg wet	20.0	167		92	40-140	7	30
Aroclor-1260	**157**		µg/kg wet	20.0	167		94	40-140	3	30
Aroclor-1260 [2C]	**150**		µg/kg wet	20.0	167		90	40-140	8	30
Surrogate: Decachlorobiphenyl (Sr)	*12.8*		µg/kg wet		*13.3*		*96*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*12.1*		µg/kg wet		*13.3*		*91*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*12.2*		µg/kg wet		*13.3*		*91*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*11.1*		µg/kg wet		*13.3*		*83*	*30-150*		
Duplicate (2001087-DUP1)			**Source: SC58794-02**		Prepared: 13-Jul-20 Analyzed: 15-Jul-20					
Aroclor-1016	< 22.2		µg/kg dry	22.2		BRL				30
Aroclor-1016 [2C]	< 22.2		µg/kg dry	22.2		BRL				30
Aroclor-1260	< 22.2		µg/kg dry	22.2		BRL				30
Aroclor-1260 [2C]	< 22.2		µg/kg dry	22.2		BRL				30
Surrogate: Decachlorobiphenyl (Sr)	*11.4*		µg/kg dry		*14.8*		*77*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*10.4*		µg/kg dry		*14.8*		*70*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*12.6*		µg/kg dry		*14.8*		*85*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*11.0*		µg/kg dry		*14.8*		*74*	*30-150*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8082A										
Batch 2001087 - SW846 3546										
Matrix Spike (2001087-MS1)			**Source: SC58794-02**		Prepared: 13-Jul-20 Analyzed: 15-Jul-20					
Aroclor-1016	**156**		µg/kg dry	22.4	187	BRL	84	40-140		
Aroclor-1016 [2C]	**160**		µg/kg dry	22.4	187	BRL	86	40-140		
Aroclor-1260	**164**		µg/kg dry	22.4	187	BRL	88	40-140		
Aroclor-1260 [2C]	**155**		µg/kg dry	22.4	187	BRL	83	40-140		
Surrogate: Decachlorobiphenyl (Sr)	*13.3*		µg/kg dry		*14.9*		*89*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*13.0*		µg/kg dry		*14.9*		*87*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*12.0*		µg/kg dry		*14.9*		*81*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*11.6*		µg/kg dry		*14.9*		*78*	*30-150*		
Matrix Spike Dup (2001087-MSD1)			**Source: SC58794-02**		Prepared: 13-Jul-20 Analyzed: 15-Jul-20					
Aroclor-1016	**148**		µg/kg dry	21.3	178	BRL	83	40-140	6	30
Aroclor-1016 [2C]	**146**		µg/kg dry	21.3	178	BRL	82	40-140	9	30
Aroclor-1260	**157**		µg/kg dry	21.3	178	BRL	89	40-140	4	30
Aroclor-1260 [2C]	**148**		µg/kg dry	21.3	178	BRL	83	40-140	4	30
Surrogate: Decachlorobiphenyl (Sr)	*12.6*		µg/kg dry		*14.2*		*89*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*12.3*		µg/kg dry		*14.2*		*87*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*12.2*		µg/kg dry		*14.2*		*86*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*11.6*		µg/kg dry		*14.2*		*81*	*30-150*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8081B										
Batch 2001088 - SW846 3546										
Blank (2001088-BLK1)					Prepared: 13-Jul-20 Analyzed: 16-Jul-20					
alpha-BHC	< 5.00		µg/kg wet	5.00						
alpha-BHC [2C]	< 5.00		µg/kg wet	5.00						
beta-BHC	< 5.00		µg/kg wet	5.00						
beta-BHC [2C]	< 5.00		µg/kg wet	5.00						
delta-BHC	< 5.00		µg/kg wet	5.00						
delta-BHC [2C]	< 5.00		µg/kg wet	5.00						
gamma-BHC (Lindane)	< 3.00		µg/kg wet	3.00						
gamma-BHC (Lindane) [2C]	< 3.00		µg/kg wet	3.00						
Heptachlor	< 5.00		µg/kg wet	5.00						
Heptachlor [2C]	< 5.00		µg/kg wet	5.00						
Aldrin	< 5.00		µg/kg wet	5.00						
Aldrin [2C]	< 5.00		µg/kg wet	5.00						
Heptachlor epoxide	< 5.00		µg/kg wet	5.00						
Heptachlor epoxide [2C]	< 5.00		µg/kg wet	5.00						
Endosulfan I	< 5.00		µg/kg wet	5.00						
Endosulfan I [2C]	< 5.00		µg/kg wet	5.00						
Dieldrin	< 5.00		µg/kg wet	5.00						
Dieldrin [2C]	< 5.00		µg/kg wet	5.00						
4,4'-DDE (p,p')	< 5.00		µg/kg wet	5.00						
4,4'-DDE (p,p') [2C]	< 5.00		µg/kg wet	5.00						
Endrin	< 8.00		µg/kg wet	8.00						
Endrin [2C]	< 8.00		µg/kg wet	8.00						
Endosulfan II	< 8.00		µg/kg wet	8.00						
Endosulfan II [2C]	< 8.00		µg/kg wet	8.00						
4,4'-DDD (p,p')	< 8.00		µg/kg wet	8.00						
4,4'-DDD (p,p') [2C]	< 8.00		µg/kg wet	8.00						
Endosulfan sulfate	< 8.00		µg/kg wet	8.00						
Endosulfan sulfate [2C]	< 8.00		µg/kg wet	8.00						
4,4'-DDT (p,p')	< 8.00		µg/kg wet	8.00						
4,4'-DDT (p,p') [2C]	< 8.00		µg/kg wet	8.00						
Methoxychlor	< 8.00		µg/kg wet	8.00						
Methoxychlor [2C]	< 8.00		µg/kg wet	8.00						
Endrin ketone	< 8.00		µg/kg wet	8.00						
Endrin ketone [2C]	< 8.00		µg/kg wet	8.00						
Endrin aldehyde	< 8.00		µg/kg wet	8.00						
Endrin aldehyde [2C]	< 8.00		µg/kg wet	8.00						
alpha-Chlordane	< 5.00		µg/kg wet	5.00						
alpha-Chlordane [2C]	< 5.00		µg/kg wet	5.00						
gamma-Chlordane	< 5.00		µg/kg wet	5.00						
gamma-Chlordane [2C]	< 5.00		µg/kg wet	5.00						
Toxaphene	< 100		µg/kg wet	100						
Toxaphene [2C]	< 100		µg/kg wet	100						
Chlordane	< 20.0		µg/kg wet	20.0						
Chlordane [2C]	< 20.0		µg/kg wet	20.0						
Alachlor	< 5.00		µg/kg wet	5.00						
Alachlor [2C]	< 5.00		µg/kg wet	5.00						
Surrogate: Decachlorobiphenyl (Sr)	*10.8*		µg/kg wet		*13.3*		*81*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*11.9*		µg/kg wet		*13.3*		*89*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*10.2*		µg/kg wet		*13.3*		*77*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*9.93*		µg/kg wet		*13.3*		*74*	*30-150*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8081B										
Batch 2001088 - SW846 3546										
LCS (2001088-BS1)					Prepared: 13-Jul-20 Analyzed: 16-Jul-20					
alpha-BHC	**12.1**		µg/kg wet	5.00	13.3		90	40-140		
alpha-BHC [2C]	**12.5**		µg/kg wet	5.00	13.3		94	40-140		
beta-BHC	**12.4**		µg/kg wet	5.00	13.3		93	40-140		
beta-BHC [2C]	**13.9**		µg/kg wet	5.00	13.3		104	40-140		
delta-BHC	**8.43**		µg/kg wet	5.00	13.3		63	40-140		
delta-BHC [2C]	**8.82**		µg/kg wet	5.00	13.3		66	40-140		
gamma-BHC (Lindane)	**12.8**		µg/kg wet	3.00	13.3		96	40-140		
gamma-BHC (Lindane) [2C]	**12.7**		µg/kg wet	3.00	13.3		95	40-140		
Heptachlor	**12.2**		µg/kg wet	5.00	13.3		92	40-140		
Heptachlor [2C]	**13.0**		µg/kg wet	5.00	13.3		97	40-140		
Aldrin	**11.7**		µg/kg wet	5.00	13.3		88	40-140		
Aldrin [2C]	**12.1**		µg/kg wet	5.00	13.3		91	40-140		
Heptachlor epoxide	**11.7**		µg/kg wet	5.00	13.3		88	40-140		
Heptachlor epoxide [2C]	**12.3**		µg/kg wet	5.00	13.3		93	40-140		
Endosulfan I	**12.5**		µg/kg wet	5.00	13.3		94	40-140		
Endosulfan I [2C]	**13.2**		µg/kg wet	5.00	13.3		99	40-140		
Dieldrin	**12.0**		µg/kg wet	5.00	13.3		90	40-140		
Dieldrin [2C]	**13.2**		µg/kg wet	5.00	13.3		99	40-140		
4,4'-DDE (p,p')	**12.1**		µg/kg wet	5.00	13.3		91	40-140		
4,4'-DDE (p,p') [2C]	**13.1**		µg/kg wet	5.00	13.3		98	40-140		
Endrin	**15.1**		µg/kg wet	8.00	13.3		113	40-140		
Endrin [2C]	**16.1**		µg/kg wet	8.00	13.3		121	40-140		
Endosulfan II	**12.6**		µg/kg wet	8.00	13.3		95	40-140		
Endosulfan II [2C]	**14.1**		µg/kg wet	8.00	13.3		106	40-140		
4,4'-DDD (p,p')	**12.6**		µg/kg wet	8.00	13.3		95	40-140		
4,4'-DDD (p,p') [2C]	**13.7**		µg/kg wet	8.00	13.3		103	40-140		
Endosulfan sulfate	**12.9**		µg/kg wet	8.00	13.3		97	40-140		
Endosulfan sulfate [2C]	**14.3**		µg/kg wet	8.00	13.3		107	40-140		
4,4'-DDT (p,p')	**14.0**		µg/kg wet	8.00	13.3		105	40-140		
4,4'-DDT (p,p') [2C]	**14.4**		µg/kg wet	8.00	13.3		108	40-140		
Methoxychlor	**14.0**		µg/kg wet	8.00	13.3		105	40-140		
Methoxychlor [2C]	**14.1**		µg/kg wet	8.00	13.3		106	40-140		
Endrin ketone	**12.6**		µg/kg wet	8.00	13.3		94	40-140		
Endrin ketone [2C]	**14.0**		µg/kg wet	8.00	13.3		105	40-140		
Endrin aldehyde	**11.9**		µg/kg wet	8.00	13.3		89	40-140		
Endrin aldehyde [2C]	**14.0**		µg/kg wet	8.00	13.3		105	40-140		
alpha-Chlordane	**11.9**		µg/kg wet	5.00	13.3		89	40-140		
alpha-Chlordane [2C]	**13.2**		µg/kg wet	5.00	13.3		99	40-140		
gamma-Chlordane	**13.7**		µg/kg wet	5.00	13.3		103	40-140		
gamma-Chlordane [2C]	**13.5**		µg/kg wet	5.00	13.3		102	40-140		
Toxaphene	< 100		µg/kg wet	100				40-140		
Toxaphene [2C]	< 100		µg/kg wet	100				40-140		
Chlordane	< 20.0		µg/kg wet	20.0				40-140		
Chlordane [2C]	< 20.0		µg/kg wet	20.0				40-140		
Alachlor	**12.3**		µg/kg wet	5.00	13.3		92	40-140		
Alachlor [2C]	**12.7**		µg/kg wet	5.00	13.3		95	40-140		
Surrogate: Decachlorobiphenyl (Sr)	*11.1*		µg/kg wet		*13.3*		*83*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*11.3*		µg/kg wet		*13.3*		*85*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*10.3*		µg/kg wet		*13.3*		*77*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*10.4*		µg/kg wet		*13.3*		*78*	*30-150*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8081B										
Batch 2001088 - SW846 3546										
LCS Dup (2001088-BSD1)					Prepared: 13-Jul-20 Analyzed: 16-Jul-20					
alpha-BHC	**12.0**		µg/kg wet	5.00	13.3		90	40-140	0.4	30
alpha-BHC [2C]	**12.1**		µg/kg wet	5.00	13.3		91	40-140	3	30
beta-BHC	**12.6**		µg/kg wet	5.00	13.3		94	40-140	2	30
beta-BHC [2C]	**12.6**		µg/kg wet	5.00	13.3		95	40-140	10	30
delta-BHC	**8.57**		µg/kg wet	5.00	13.3		64	40-140	2	30
delta-BHC [2C]	**8.75**		µg/kg wet	5.00	13.3		66	40-140	0.8	30
gamma-BHC (Lindane)	**12.2**		µg/kg wet	3.00	13.3		92	40-140	4	30
gamma-BHC (Lindane) [2C]	**12.3**		µg/kg wet	3.00	13.3		93	40-140	3	30
Heptachlor	**12.4**		µg/kg wet	5.00	13.3		93	40-140	1	30
Heptachlor [2C]	**12.6**		µg/kg wet	5.00	13.3		95	40-140	3	30
Aldrin	**11.7**		µg/kg wet	5.00	13.3		88	40-140	0	30
Aldrin [2C]	**11.9**		µg/kg wet	5.00	13.3		89	40-140	2	30
Heptachlor epoxide	**12.0**		µg/kg wet	5.00	13.3		90	40-140	2	30
Heptachlor epoxide [2C]	**12.2**		µg/kg wet	5.00	13.3		92	40-140	1	30
Endosulfan I	**12.9**		µg/kg wet	5.00	13.3		97	40-140	3	30
Endosulfan I [2C]	**13.3**		µg/kg wet	5.00	13.3		100	40-140	0.6	30
Dieldrin	**12.4**		µg/kg wet	5.00	13.3		93	40-140	4	30
Dieldrin [2C]	**13.3**		µg/kg wet	5.00	13.3		100	40-140	0.5	30
4,4'-DDE (p,p')	**12.6**		µg/kg wet	5.00	13.3		95	40-140	4	30
4,4'-DDE (p,p') [2C]	**13.3**		µg/kg wet	5.00	13.3		99	40-140	1	30
Endrin	**15.6**		µg/kg wet	8.00	13.3		117	40-140	4	30
Endrin [2C]	**17.1**		µg/kg wet	8.00	13.3		128	40-140	6	30
Endosulfan II	**13.0**		µg/kg wet	8.00	13.3		98	40-140	3	30
Endosulfan II [2C]	**14.2**		µg/kg wet	8.00	13.3		107	40-140	0.7	30
4,4'-DDD (p,p')	**13.2**		µg/kg wet	8.00	13.3		99	40-140	4	30
4,4'-DDD (p,p') [2C]	**13.9**		µg/kg wet	8.00	13.3		104	40-140	1	30
Endosulfan sulfate	**13.5**		µg/kg wet	8.00	13.3		101	40-140	5	30
Endosulfan sulfate [2C]	**14.8**		µg/kg wet	8.00	13.3		111	40-140	4	30
4,4'-DDT (p,p')	**14.8**		µg/kg wet	8.00	13.3		111	40-140	5	30
4,4'-DDT (p,p') [2C]	**15.0**		µg/kg wet	8.00	13.3		113	40-140	4	30
Methoxychlor	**14.7**		µg/kg wet	8.00	13.3		111	40-140	5	30
Methoxychlor [2C]	**14.2**		µg/kg wet	8.00	13.3		107	40-140	1	30
Endrin ketone	**13.3**		µg/kg wet	8.00	13.3		100	40-140	6	30
Endrin ketone [2C]	**14.0**		µg/kg wet	8.00	13.3		105	40-140	0.02	30
Endrin aldehyde	**11.9**		µg/kg wet	8.00	13.3		90	40-140	0.6	30
Endrin aldehyde [2C]	**13.7**		µg/kg wet	8.00	13.3		103	40-140	3	30
alpha-Chlordane	**12.3**		µg/kg wet	5.00	13.3		92	40-140	3	30
alpha-Chlordane [2C]	**12.4**		µg/kg wet	5.00	13.3		93	40-140	6	30
gamma-Chlordane	**12.3**		µg/kg wet	5.00	13.3		92	40-140	10	30
gamma-Chlordane [2C]	**12.8**		µg/kg wet	5.00	13.3		96	40-140	6	30
Toxaphene	< 100		µg/kg wet	100				40-140		30
Toxaphene [2C]	< 100		µg/kg wet	100				40-140		30
Chlordane	< 20.0		µg/kg wet	20.0				40-140		30
Chlordane [2C]	< 20.0		µg/kg wet	20.0				40-140		30
Alachlor	**12.7**		µg/kg wet	5.00	13.3		95	40-140	3	30
Alachlor [2C]	**12.5**		µg/kg wet	5.00	13.3		94	40-140	1	30
Surrogate: Decachlorobiphenyl (Sr)	*10.8*		µg/kg wet		*13.3*		*81*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*11.3*		µg/kg wet		*13.3*		*85*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*9.68*		µg/kg wet		*13.3*		*73*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*9.74*		µg/kg wet		*13.3*		*73*	*30-150*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8081B										
Batch 2001088 - SW846 3546										
Duplicate (2001088-DUP1)			**Source: SC58794-02**		Prepared: 13-Jul-20 Analyzed: 16-Jul-20					
alpha-BHC	< 5.56		µg/kg dry	5.56		BRL				30
alpha-BHC [2C]	< 5.56		µg/kg dry	5.56		BRL				30
beta-BHC	< 5.56		µg/kg dry	5.56		BRL				30
beta-BHC [2C]	< 5.56		µg/kg dry	5.56		BRL				30
delta-BHC	< 5.56		µg/kg dry	5.56		BRL				30
delta-BHC [2C]	< 5.56		µg/kg dry	5.56		0.801				30
gamma-BHC (Lindane)	< 3.33		µg/kg dry	3.33		BRL				30
gamma-BHC (Lindane) [2C]	< 3.33		µg/kg dry	3.33		BRL				30
Heptachlor	< 5.56		µg/kg dry	5.56		BRL				30
Heptachlor [2C]	< 5.56		µg/kg dry	5.56		BRL				30
Aldrin	< 5.56		µg/kg dry	5.56		BRL				30
Aldrin [2C]	< 5.56		µg/kg dry	5.56		BRL				30
Heptachlor epoxide	**0.363**	J	µg/kg dry	5.56		0.382			5	30
Heptachlor epoxide [2C]	< 5.56		µg/kg dry	5.56		BRL				30
Endosulfan I	< 5.56		µg/kg dry	5.56		BRL				30
Endosulfan I [2C]	< 5.56		µg/kg dry	5.56		BRL				30
Dieldrin	< 5.56		µg/kg dry	5.56		BRL				30
Dieldrin [2C]	< 5.56		µg/kg dry	5.56		BRL				30
4,4'-DDE (p,p')	< 5.56		µg/kg dry	5.56		BRL				30
4,4'-DDE (p,p') [2C]	< 5.56		µg/kg dry	5.56		BRL				30
Endrin	< 8.89		µg/kg dry	8.89		BRL				30
Endrin [2C]	< 8.89		µg/kg dry	8.89		BRL				30
Endosulfan II	< 8.89		µg/kg dry	8.89		BRL				30
Endosulfan II [2C]	< 8.89		µg/kg dry	8.89		BRL				30
4,4'-DDD (p,p')	< 8.89		µg/kg dry	8.89		BRL				30
4,4'-DDD (p,p') [2C]	< 8.89		µg/kg dry	8.89		BRL				30
Endosulfan sulfate	< 8.89		µg/kg dry	8.89		BRL				30
Endosulfan sulfate [2C]	< 8.89		µg/kg dry	8.89		BRL				30
4,4'-DDT (p,p')	< 8.89		µg/kg dry	8.89		BRL				30
4,4'-DDT (p,p') [2C]	< 8.89		µg/kg dry	8.89		BRL				30
Methoxychlor	< 8.89		µg/kg dry	8.89		0.775				30
Methoxychlor [2C]	< 8.89		µg/kg dry	8.89		BRL				30
Endrin ketone	< 8.89		µg/kg dry	8.89		BRL				30
Endrin ketone [2C]	< 8.89		µg/kg dry	8.89		BRL				30
Endrin aldehyde	< 8.89		µg/kg dry	8.89		BRL				30
Endrin aldehyde [2C]	< 8.89		µg/kg dry	8.89		BRL				30
alpha-Chlordane	< 5.56		µg/kg dry	5.56		BRL				30
alpha-Chlordane [2C]	< 5.56		µg/kg dry	5.56		BRL				30
gamma-Chlordane	**0.637**	J	µg/kg dry	5.56		BRL				30
gamma-Chlordane [2C]	**0.370**	J	µg/kg dry	5.56		BRL				30
Toxaphene	< 111		µg/kg dry	111		BRL				30
Toxaphene [2C]	< 111		µg/kg dry	111		BRL				30
Chlordane	< 22.2		µg/kg dry	22.2		BRL				30
Chlordane [2C]	< 22.2		µg/kg dry	22.2		BRL				30
Alachlor	< 5.56		µg/kg dry	5.56		BRL				30
Alachlor [2C]	< 5.56		µg/kg dry	5.56		BRL				30
Surrogate: Decachlorobiphenyl (Sr)	*11.8*		µg/kg dry		*14.8*		*80*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*12.4*		µg/kg dry		*14.8*		*83*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*11.3*		µg/kg dry		*14.8*		*76*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*10.4*		µg/kg dry		*14.8*		*70*	*30-150*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8081B										
Batch 2001088 - SW846 3546										
Matrix Spike (2001088-MS1)			**Source: SC58794-02**		Prepared: 13-Jul-20 Analyzed: 16-Jul-20					
alpha-BHC	**11.9**		µg/kg dry	5.56	14.8	BRL	80	30-150		
alpha-BHC [2C]	**12.7**		µg/kg dry	5.56	14.8	BRL	86	30-150		
beta-BHC	**13.1**		µg/kg dry	5.56	14.8	BRL	88	30-150		
beta-BHC [2C]	**13.3**		µg/kg dry	5.56	14.8	BRL	89	30-150		
delta-BHC	**8.64**		µg/kg dry	5.56	14.8	BRL	58	30-150		
delta-BHC [2C]	**9.33**		µg/kg dry	5.56	14.8	0.801	57	30-150		
gamma-BHC (Lindane)	**12.5**		µg/kg dry	3.34	14.8	BRL	84	30-150		
gamma-BHC (Lindane) [2C]	**12.6**		µg/kg dry	3.34	14.8	BRL	85	30-150		
Heptachlor	**12.5**		µg/kg dry	5.56	14.8	BRL	84	30-150		
Heptachlor [2C]	**13.7**		µg/kg dry	5.56	14.8	BRL	93	30-150		
Aldrin	**12.1**		µg/kg dry	5.56	14.8	BRL	81	30-150		
Aldrin [2C]	**13.4**		µg/kg dry	5.56	14.8	BRL	90	30-150		
Heptachlor epoxide	**12.5**		µg/kg dry	5.56	14.8	0.382	82	30-150		
Heptachlor epoxide [2C]	**13.4**		µg/kg dry	5.56	14.8	BRL	91	30-150		
Endosulfan I	**13.1**		µg/kg dry	5.56	14.8	BRL	88	30-150		
Endosulfan I [2C]	**13.6**		µg/kg dry	5.56	14.8	BRL	92	30-150		
Dieldrin	**12.7**		µg/kg dry	5.56	14.8	BRL	86	30-150		
Dieldrin [2C]	**13.5**		µg/kg dry	5.56	14.8	BRL	91	30-150		
4,4'-DDE (p,p')	**12.8**		µg/kg dry	5.56	14.8	BRL	86	30-150		
4,4'-DDE (p,p') [2C]	**13.7**		µg/kg dry	5.56	14.8	BRL	92	30-150		
Endrin	**16.1**		µg/kg dry	8.90	14.8	BRL	109	30-150		
Endrin [2C]	**17.4**		µg/kg dry	8.90	14.8	BRL	117	30-150		
Endosulfan II	**12.8**		µg/kg dry	8.90	14.8	BRL	87	30-150		
Endosulfan II [2C]	**13.9**		µg/kg dry	8.90	14.8	BRL	94	30-150		
4,4'-DDD (p,p')	**13.2**		µg/kg dry	8.90	14.8	BRL	89	30-150		
4,4'-DDD (p,p') [2C]	**14.1**		µg/kg dry	8.90	14.8	BRL	95	30-150		
Endosulfan sulfate	**13.6**		µg/kg dry	8.90	14.8	BRL	91	30-150		
Endosulfan sulfate [2C]	**14.8**		µg/kg dry	8.90	14.8	BRL	100	30-150		
4,4'-DDT (p,p')	**15.4**		µg/kg dry	8.90	14.8	BRL	104	30-150		
4,4'-DDT (p,p') [2C]	**16.6**		µg/kg dry	8.90	14.8	BRL	112	30-150		
Methoxychlor	**15.0**		µg/kg dry	8.90	14.8	0.775	96	30-150		
Methoxychlor [2C]	**15.5**		µg/kg dry	8.90	14.8	BRL	105	30-150		
Endrin ketone	**13.2**		µg/kg dry	8.90	14.8	BRL	89	30-150		
Endrin ketone [2C]	**14.8**		µg/kg dry	8.90	14.8	BRL	100	30-150		
Endrin aldehyde	**11.3**		µg/kg dry	8.90	14.8	BRL	76	30-150		
Endrin aldehyde [2C]	**13.0**		µg/kg dry	8.90	14.8	BRL	88	30-150		
alpha-Chlordane	**12.4**		µg/kg dry	5.56	14.8	BRL	83	30-150		
alpha-Chlordane [2C]	**12.7**		µg/kg dry	5.56	14.8	BRL	86	30-150		
gamma-Chlordane	**21.6**		µg/kg dry	5.56	14.8	BRL	146	30-150		
gamma-Chlordane [2C]	**13.3**		µg/kg dry	5.56	14.8	BRL	90	30-150		
Toxaphene	< 111		µg/kg dry	111		BRL		30-150		
Toxaphene [2C]	< 111		µg/kg dry	111		BRL		30-150		
Chlordane	< 22.2		µg/kg dry	22.2		BRL		30-150		
Chlordane [2C]	< 22.2		µg/kg dry	22.2		BRL		30-150		
Alachlor	**14.7**		µg/kg dry	5.56	14.8	BRL	99	30-150		
Alachlor [2C]	**12.0**		µg/kg dry	5.56	14.8	BRL	81	30-150		
Surrogate: Decachlorobiphenyl (Sr)	*10.2*		µg/kg dry		*14.8*		*69*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*12.8*		µg/kg dry		*14.8*		*86*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*10.5*		µg/kg dry		*14.8*		*71*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*9.76*		µg/kg dry		*14.8*		*66*	*30-150*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8081B										
Batch 2001088 - SW846 3546										
Matrix Spike Dup (2001088-MSD1)			**Source: SC58794-02**		Prepared: 13-Jul-20 Analyzed: 16-Jul-20					
alpha-BHC	**12.5**		µg/kg dry	5.56	14.8	BRL	85	30-150	5	30
alpha-BHC [2C]	**13.2**		µg/kg dry	5.56	14.8	BRL	89	30-150	4	30
beta-BHC	**13.8**		µg/kg dry	5.56	14.8	BRL	93	30-150	6	30
beta-BHC [2C]	**13.8**		µg/kg dry	5.56	14.8	BRL	93	30-150	4	30
delta-BHC	**9.93**		µg/kg dry	5.56	14.8	BRL	67	30-150	14	30
delta-BHC [2C]	**9.81**		µg/kg dry	5.56	14.8	0.801	61	30-150	5	30
gamma-BHC (Lindane)	**13.3**		µg/kg dry	3.34	14.8	BRL	89	30-150	6	30
gamma-BHC (Lindane) [2C]	**13.2**		µg/kg dry	3.34	14.8	BRL	89	30-150	4	30
Heptachlor	**13.7**		µg/kg dry	5.56	14.8	BRL	92	30-150	9	30
Heptachlor [2C]	**13.8**		µg/kg dry	5.56	14.8	BRL	93	30-150	0.8	30
Aldrin	**13.2**		µg/kg dry	5.56	14.8	BRL	89	30-150	9	30
Aldrin [2C]	**13.0**		µg/kg dry	5.56	14.8	BRL	88	30-150	3	30
Heptachlor epoxide	**13.5**		µg/kg dry	5.56	14.8	0.382	88	30-150	7	30
Heptachlor epoxide [2C]	**13.8**		µg/kg dry	5.56	14.8	BRL	93	30-150	3	30
Endosulfan I	**13.9**		µg/kg dry	5.56	14.8	BRL	94	30-150	6	30
Endosulfan I [2C]	**14.5**		µg/kg dry	5.56	14.8	BRL	98	30-150	7	30
Dieldrin	**14.0**		µg/kg dry	5.56	14.8	BRL	94	30-150	10	30
Dieldrin [2C]	**14.3**		µg/kg dry	5.56	14.8	BRL	97	30-150	6	30
4,4'-DDE (p,p')	**13.9**		µg/kg dry	5.56	14.8	BRL	94	30-150	9	30
4,4'-DDE (p,p') [2C]	**14.7**		µg/kg dry	5.56	14.8	BRL	99	30-150	8	30
Endrin	**18.0**		µg/kg dry	8.90	14.8	BRL	121	30-150	11	30
Endrin [2C]	**18.6**		µg/kg dry	8.90	14.8	BRL	125	30-150	7	30
Endosulfan II	**14.4**		µg/kg dry	8.90	14.8	BRL	97	30-150	11	30
Endosulfan II [2C]	**14.8**		µg/kg dry	8.90	14.8	BRL	100	30-150	6	30
4,4'-DDD (p,p')	**14.8**		µg/kg dry	8.90	14.8	BRL	100	30-150	12	30
4,4'-DDD (p,p') [2C]	**15.4**		µg/kg dry	8.90	14.8	BRL	104	30-150	9	30
Endosulfan sulfate	**15.1**		µg/kg dry	8.90	14.8	BRL	102	30-150	11	30
Endosulfan sulfate [2C]	**15.3**		µg/kg dry	8.90	14.8	BRL	103	30-150	3	30
4,4'-DDT (p,p')	**17.3**		µg/kg dry	8.90	14.8	BRL	117	30-150	12	30
4,4'-DDT (p,p') [2C]	**17.4**		µg/kg dry	8.90	14.8	BRL	117	30-150	5	30
Methoxychlor	**14.9**		µg/kg dry	8.90	14.8	0.775	95	30-150	0.6	30
Methoxychlor [2C]	**16.3**		µg/kg dry	8.90	14.8	BRL	110	30-150	5	30
Endrin ketone	**14.7**		µg/kg dry	8.90	14.8	BRL	99	30-150	10	30
Endrin ketone [2C]	**16.2**		µg/kg dry	8.90	14.8	BRL	109	30-150	9	30
Endrin aldehyde	**12.8**		µg/kg dry	8.90	14.8	BRL	87	30-150	13	30
Endrin aldehyde [2C]	**13.8**		µg/kg dry	8.90	14.8	BRL	93	30-150	6	30
alpha-Chlordane	**13.4**		µg/kg dry	5.56	14.8	BRL	90	30-150	8	30
alpha-Chlordane [2C]	**13.6**		µg/kg dry	5.56	14.8	BRL	92	30-150	7	30
gamma-Chlordane	**15.5**		µg/kg dry	5.56	14.8	BRL	105	30-150	33	30
gamma-Chlordane [2C]	**13.8**		µg/kg dry	5.56	14.8	BRL	93	30-150	4	30
Toxaphene	< 111		µg/kg dry	111		BRL		30-150		30
Toxaphene [2C]	< 111		µg/kg dry	111		BRL		30-150		30
Chlordane	< 22.2		µg/kg dry	22.2		BRL		30-150		30
Chlordane [2C]	< 22.2		µg/kg dry	22.2		BRL		30-150		30
Alachlor	**14.2**		µg/kg dry	5.56	14.8	BRL	96	30-150	4	30
Alachlor [2C]	**12.7**		µg/kg dry	5.56	14.8	BRL	86	30-150	6	30
Surrogate: Decachlorobiphenyl (Sr)	*11.6*		µg/kg dry		*14.8*		*78*	*30-150*		
Surrogate: Decachlorobiphenyl (Sr) [2C]	*12.2*		µg/kg dry		*14.8*		*82*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS)	*10.5*		µg/kg dry		*14.8*		*71*	*30-150*		
Surrogate: 2,4,5,6-TC-M-Xylene (IS) [2C]	*10.1*		µg/kg dry		*14.8*		*68*	*30-150*		

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8100Mod.										
Batch 2001092 - SW846 3546										
Blank (2001092-BLK1)					Prepared: 14-Jul-20 Analyzed: 15-Jul-20					
Total Petroleum Hydrocarbons	< 13.3		mg/kg wet	13.3						
Surrogate: o-Terphenyl	*5.32*		mg/kg wet		*6.67*		*80*	*40-140*		
Surrogate: 1-Chlorooctadecane	*7.04*		mg/kg wet		*6.67*		*106*	*40-140*		
LCS (2001092-BS1)					Prepared: 14-Jul-20 Analyzed: 15-Jul-20					
Total Petroleum Hydrocarbons	**276**		mg/kg wet	13.3	333		83	40-140		
Surrogate: o-Terphenyl	*5.97*		mg/kg wet		*6.67*		*90*	*40-140*		
Surrogate: 1-Chlorooctadecane	*7.88*		mg/kg wet		*6.67*		*118*	*40-140*		
Duplicate (2001092-DUP1)			**Source: SC58794-03**		Prepared: 14-Jul-20 Analyzed: 15-Jul-20					
Total Petroleum Hydrocarbons	**107**		mg/kg dry	16.4		109			2	50
Surrogate: o-Terphenyl	*6.79*		mg/kg dry		*8.23*		*82*	*40-140*		
Surrogate: 1-Chlorooctadecane	*8.75*		mg/kg dry		*8.23*		*106*	*40-140*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 6010C										
Batch 2001078 - SW846 3050B										
Blank (2001078-BLK1)					Prepared & Analyzed: 15-Jul-20					
Vanadium	< 1.47		mg/kg wet	1.47						
Nickel	< 0.977		mg/kg wet	0.977						
Zinc	< 2.93		mg/kg wet	2.93						
Selenium	< 1.47		mg/kg wet	1.47						
Lead	< 1.47		mg/kg wet	1.47						
Chromium	< 0.977		mg/kg wet	0.977						
Cadmium	< 0.488		mg/kg wet	0.488						
Antimony	< 4.88		mg/kg wet	4.88						
Beryllium	< 0.488		mg/kg wet	0.488						
Thallium	< 2.93		mg/kg wet	2.93						
Arsenic	< 1.47		mg/kg wet	1.47						
Silver	< 2.93		mg/kg wet	2.93						
Barium	< 0.977		mg/kg wet	0.977						
Duplicate (2001078-DUP1)			**Source: SC58794-02**		Prepared & Analyzed: 15-Jul-20					
Thallium	< 3.10		mg/kg dry	3.10		BRL				20
Vanadium	**23.9**		mg/kg dry	1.55		24.5			2	20
Selenium	< 1.55		mg/kg dry	1.55		BRL				20
Antimony	< 5.17		mg/kg dry	5.17		BRL				20
Lead	**21.4**		mg/kg dry	1.55		19.3			10	20
Nickel	**53.0**	QR6	mg/kg dry	1.03		71.4			30	20
Chromium	**19.8**		mg/kg dry	1.03		19.4			2	20
Cadmium	< 0.517		mg/kg dry	0.517		BRL				20
Beryllium	**0.264**	J	mg/kg dry	0.517		0.262			0.9	20
Arsenic	**49.0**		mg/kg dry	1.55		55.9			13	20
Silver	< 3.10		mg/kg dry	3.10		BRL				20
Zinc	**53.5**		mg/kg dry	3.10		58.5			9	20
Barium	**23.1**		mg/kg dry	1.03		22.5			3	20
Matrix Spike (2001078-MS1)			**Source: SC58794-02**		Prepared & Analyzed: 15-Jul-20					
Beryllium	**119**		mg/kg dry	0.528	132	0.262	90	75-125		
Vanadium	**156**		mg/kg dry	1.59	132	24.5	100	75-125		
Zinc	**171**		mg/kg dry	3.17	132	58.5	85	75-125		
Thallium	**117**		mg/kg dry	3.17	132	BRL	89	75-125		
Selenium	**104**		mg/kg dry	1.59	132	BRL	79	75-125		
Antimony	**67.7**	QM8	mg/kg dry	5.28	132	BRL	51	75-125		
Lead	**119**		mg/kg dry	1.59	132	19.3	76	75-125		
Nickel	**173**		mg/kg dry	1.06	132	71.4	77	75-125		
Cadmium	**106**		mg/kg dry	0.528	132	BRL	80	75-125		
Arsenic	**171**		mg/kg dry	1.59	132	55.9	87	75-125		
Silver	**104**		mg/kg dry	3.17	132	BRL	78	75-125		
Chromium	**150**		mg/kg dry	1.06	132	19.4	99	75-125		
Barium	**157**		mg/kg dry	1.06	132	22.5	102	75-125		
Matrix Spike Dup (2001078-MSD1)			**Source: SC58794-02**		Prepared & Analyzed: 15-Jul-20					
Selenium	**104**		mg/kg dry	1.60	134	BRL	78	75-125	0.2	20
Zinc	**170**		mg/kg dry	3.21	134	58.5	83	75-125	0.5	20
Antimony	**70.0**	QM8	mg/kg dry	5.35	134	BRL	52	75-125	3	20
Lead	**120**		mg/kg dry	1.60	134	19.3	75	75-125	0.4	20
Arsenic	**174**		mg/kg dry	1.60	134	55.9	89	75-125	2	20
Thallium	**117**		mg/kg dry	3.21	134	BRL	88	75-125	0.06	20
Silver	**104**		mg/kg dry	3.21	134	BRL	78	75-125	0.3	20
Nickel	**171**		mg/kg dry	1.07	134	71.4	75	75-125	1	20

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 6010C										
Batch 2001078 - SW846 3050B										
Matrix Spike Dup (2001078-MSD1)			**Source: SC58794-02**			Prepared & Analyzed: 15-Jul-20				
Chromium	**150**		mg/kg dry	1.07	134	19.4	98	75-125	0.1	20
Cadmium	**107**		mg/kg dry	0.535	134	BRL	80	75-125	1	20
Beryllium	**119**		mg/kg dry	0.535	134	0.262	89	75-125	0.3	20
Vanadium	**156**		mg/kg dry	1.60	134	24.5	98	75-125	0.003	20
Barium	**159**		mg/kg dry	1.07	134	22.5	102	75-125	1	20
Post Spike (2001078-PS1)			**Source: SC58794-02**			Prepared & Analyzed: 15-Jul-20				
Selenium	**120**		mg/kg dry	1.67	139	BRL	86	80-120		
Thallium	**130**		mg/kg dry	3.35	139	BRL	93	80-120		
Vanadium	**170**		mg/kg dry	1.67	139	24.5	105	80-120		
Antimony	**119**		mg/kg dry	5.58	139	BRL	86	80-120		
Lead	**134**		mg/kg dry	1.67	139	19.3	82	80-120		
Chromium	**157**		mg/kg dry	1.12	139	19.4	99	80-120		
Cadmium	**125**		mg/kg dry	0.558	139	BRL	89	80-120		
Beryllium	**133**		mg/kg dry	0.558	139	0.262	95	80-120		
Arsenic	**181**		mg/kg dry	1.67	139	55.9	90	80-120		
Silver	**113**		mg/kg dry	3.35	139	BRL	81	80-120		
Zinc	**177**		mg/kg dry	3.35	139	58.5	85	80-120		
Barium	**160**		mg/kg dry	1.12	139	22.5	99	80-120		
Reference (2001078-SRM1)						Prepared & Analyzed: 15-Jul-20				
Lead	**56.3**	QM9	mg/kg wet	1.50	68.4		82	82.9-117.1		
Antimony	**32.9**		mg/kg wet	5.00	83.1		40	25-196.4		
Selenium	**38.0**		mg/kg wet	1.50	46.3		82	79.2-120.6		
Thallium	**51.9**		mg/kg wet	3.00	54.2		96	80.7-119.5		
Zinc	**210**		mg/kg wet	3.00	245		86	80.7-119.3		
Beryllium	**83.5**		mg/kg wet	0.500	89.7		93	83.4-116.7		
Vanadium	**53.0**		mg/kg wet	1.50	54.0		98	79-121		
Nickel	**68.7**		mg/kg wet	1.00	82.9		83	82.4-117.4		
Cadmium	**113**		mg/kg wet	0.500	131		86	74-117		
Chromium	**148**		mg/kg wet	1.00	155		95	81.4-118		
Arsenic	**164**		mg/kg wet	1.50	187		88	82.7-117.3		
Silver	**55.8**		mg/kg wet	3.00	65.9		85	79.7-120.1		
Barium	**249**		mg/kg wet	1.00	250		99	82.6-117.8		
Reference (2001078-SRM2)						Prepared & Analyzed: 15-Jul-20				
Lead	**59.8**		mg/kg wet	1.50	69.1		86	82.9-117.1		
Antimony	**33.6**		mg/kg wet	5.00	83.9		40	25-196.4		
Nickel	**71.3**		mg/kg wet	1.00	83.7		85	82.4-117.4		
Selenium	**40.2**		mg/kg wet	1.50	46.7		86	79.2-120.6		
Vanadium	**55.8**		mg/kg wet	1.50	54.5		102	79-121		
Beryllium	**87.6**		mg/kg wet	0.500	90.6		97	83.4-116.7		
Zinc	**218**		mg/kg wet	3.00	247		88	80.7-119.3		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 6010C										
Batch 2001078 - SW846 3050B										
Reference (2001078-SRM2)					Prepared & Analyzed: 15-Jul-20					
Thallium	**55.0**		mg/kg wet	3.00	54.8		100	80.7-119.5		
Arsenic	**172**		mg/kg wet	1.50	189		91	82.7-117.3		
Silver	**57.6**		mg/kg wet	3.00	66.6		87	79.7-120.1		
Chromium	**154**		mg/kg wet	1.00	156		98	81.4-118		
Cadmium	**118**		mg/kg wet	0.500	132		89	74-117		
Barium	**259**		mg/kg wet	1.00	253		103	82.6-117.8		
SW846 7471B										
Batch 2001079 - EPA200/SW7000 Series										
Blank (2001079-BLK1)					Prepared & Analyzed: 13-Jul-20					
Mercury	< 0.114		mg/kg wet	0.114						
Duplicate (2001079-DUP1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Mercury	< 0.125		mg/kg dry	0.125		BRL				20
Matrix Spike (2001079-MS1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Mercury	**0.275**	QM7	mg/kg dry	0.0978	0.204	BRL	135	75-125		
Matrix Spike Dup (2001079-MSD1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Mercury	**0.241**		mg/kg dry	0.116	0.241	BRL	100	75-125	13	20
Post Spike (2001079-PS1)			**Source: SC58794-01**		Prepared & Analyzed: 13-Jul-20					
Mercury	**0.225**		mg/kg dry	0.115	0.241	BRL	94	80-120		
Reference (2001079-SRM1)					Prepared & Analyzed: 13-Jul-20					
Mercury	**1.79**	D	mg/kg wet	0.600	1.42		126	65-135		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SM2540 G (11) Mod.										
Batch 2001075 - General Preparation										
Duplicate (2001075-DUP1)			**Source: SC58794-01**			Prepared: 10-Jul-20 Analyzed: 14-Jul-20				
% Solids	**89.0**		%			89.3			0.4	5
Duplicate (2001075-DUP2)			**Source: SC58794-02**			Prepared: 10-Jul-20 Analyzed: 14-Jul-20				
% Solids	**90.1**		%			88.8			1	5
Duplicate (2001075-DUP3)			**Source: SC58794-03**			Prepared: 10-Jul-20 Analyzed: 14-Jul-20				
% Solids	**78.6**		%			80.1			2	5

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 9045D										
Batch 2001081 - General Preparation										
Duplicate (2001081-DUP1)			**Source: SC58794-01**			Prepared & Analyzed: 14-Jul-20				
pH	**5.96**		pH Units			5.99			0.5	5
Reference (2001081-SRM1)						Prepared & Analyzed: 14-Jul-20				
pH	**6.04**		pH Units		6.00		101	97.5-102.5		
Reference (2001081-SRM2)						Prepared & Analyzed: 14-Jul-20				
pH	**6.03**		pH Units		6.00		100	97.5-102.5		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW8151A										
Batch 537166A - SW8151A										
Blank (CG32331-BLK)					Prepared: 13-Jul-20 Analyzed: 14-Jul-20					
MCPP	**ND**		ug/kg	3300			ND	-		
MCPA	**ND**		ug/kg	3300			ND	-		
Dinoseb	**ND**		ug/kg	80			ND	-		
Dichloroprop	**ND**		ug/kg	80			ND	-		
Dicamba	**ND**		ug/kg	80			ND	-		
Dalapon	**ND**		ug/kg	80			ND	-		
2,4-DB	**ND**		ug/kg	80			ND	-		
2,4-D	**ND**		ug/kg	80			ND	-		
2,4,5-TP (Silvex)	**ND**		ug/kg	80			ND	-		
2,4,5-T	**ND**		ug/kg	80			ND	-		
Surrogate: % DCAA	*56*		ug/kg		*2000*		*56*	*30-150*		
LCS (CG32331-LCS)					Prepared: 13-Jul-20 Analyzed: 14-Jul-20					
2,4-D	**159.1**		ug/kg	80	200		80	40-140		30
Dicamba	**78.39**		ug/kg	80	100		78	40-140		30
2,4,5-TP (Silvex)	**78.41**		ug/kg	80	100		78	40-140		30
2,4-DB	**751.8**		ug/kg	80	1000		75	40-140		30
Dalapon	**65.02**		ug/kg	80	100		65	40-140		30
Dichloroprop	**184.8**		ug/kg	80	200		92	40-140		30
MCPP	**26120**		ug/kg	3300	30000		87	40-140		30
MCPA	**24560**		ug/kg	3300	30000		82	40-140		30
Dinoseb	**68.51**		ug/kg	80	100		69	10-110		20
2,4,5-T	**79.54**		ug/kg	80	100		80	40-140		30
Surrogate: % DCAA	*1286*		ug/kg		*2000*		*64*	*30-150*		
LCS Dup (CG32331-LCSD)			**Source: CG32331-LCS**		Prepared: 13-Jul-20 Analyzed: 14-Jul-20					
2,4-D	**180.3**		ug/kg	80	200		90	40-140	11.8	30
Dicamba	**78.02**		ug/kg	80	100		78	40-140	0.0	30
2,4,5-T	**87.28**		ug/kg	80	100		87	40-140	8.4	30
2,4,5-TP (Silvex)	**83.74**		ug/kg	80	100		84	40-140	7.4	30
Dalapon	**60.50**		ug/kg	80	100		60	40-140	8.0	30
2,4-DB	**826.8**		ug/kg	80	1000		83	40-140	10.1	30
Dichloroprop	**184.2**		ug/kg	80	200		92	40-140	0.0	30
Dinoseb	**70.63**		ug/kg	80	100		71	10-110	2.9	20
MCPA	**24850**		ug/kg	3300	30000		83	40-140	1.2	30
MCPP	**26980**		ug/kg	3300	30000		90	40-140	3.4	30
Surrogate: % DCAA	*1285*		ug/kg		*2000*		*64*	*30-150*		
Matrix Spike (CG32331-MS)			**Source: SC58794-06**		Prepared: 13-Jul-20 Analyzed: 14-Jul-20					
Dalapon	**65.39**		ug/kg	80	100	BRL	65	30-150		30
2,4,5-T	**83.50**		ug/kg	80	100	BRL	83	30-150		30
2,4,5-TP (Silvex)	**81.66**		ug/kg	80	100	BRL	82	30-150		30
2,4-DB	**848.8**		ug/kg	80	1000	BRL	85	30-150		30
Dicamba	**82.17**		ug/kg	80	100	BRL	82	30-150		30
Dichloroprop	**184.1**		ug/kg	80	200	BRL	92	30-150		30
Dinoseb	**75.89**		ug/kg	80	100	BRL	76	10-110		20
MCPA	**25340**		ug/kg	3300	30000	BRL	84	30-150		30
MCPP	**26510**		ug/kg	3300	30000	BRL	88	30-150		30
2,4-D	**169.9**		ug/kg	80	200	BRL	85	30-150		30
Surrogate: % DCAA	*1323*		ug/kg		*2000*		*66*	*30-150*		
Matrix Spike Dup (CG32331-MSD)			**Source: SC58794-06**		Prepared: 13-Jul-20 Analyzed: 14-Jul-20					
Dalapon	**65.78**		ug/kg	80	100	BRL	66	30-150	1.5	30

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW8151A										
Batch 537166A - SW8151A										
Matrix Spike Dup (CG32331-MSD)			**Source: SC58794-06**		Prepared: 13-Jul-20 Analyzed: 14-Jul-20					
2,4,5-T	**84.20**		ug/kg	80	100	BRL	84	30-150	1.2	30
MCPA	**25630**		ug/kg	3300	30000	BRL	85	30-150	1.2	30
Dinoseb	**78.86**		ug/kg	80	100	BRL	79	10-110	3.9	20
Dichloroprop	**195.8**		ug/kg	80	200	BRL	98	30-150	6.3	30
2,4-DB	**808.3**		ug/kg	80	1000	BRL	81	30-150	4.8	30
2,4-D	**171.1**		ug/kg	80	200	BRL	86	30-150	1.2	30
2,4,5-TP (Silvex)	**83.44**		ug/kg	80	100	BRL	83	30-150	1.2	30
MCPP	**27140**		ug/kg	3300	30000	BRL	90	30-150	2.2	30
Dicamba	**79.35**		ug/kg	80	100	BRL	79	30-150	3.7	30
Surrogate: % DCAA	*1320*		ug/kg		*2000*		*66*	*30-150*		
Batch 537320A - SW8151A										
Blank (CG33195-BLK)					Prepared: 14-Jul-20 Analyzed: 15-Jul-20					
2,4,5-T	**ND**		ug/kg	83			ND	-		
MCPA	**ND**		ug/kg	25000			ND	-		
Dinoseb	**ND**		ug/kg	83			ND	-		
Dichloroprop	**ND**		ug/kg	83			ND	-		
Dicamba	**ND**		ug/kg	83			ND	-		
Dalapon	**ND**		ug/kg	83			ND	-		
2,4-DB	**ND**		ug/kg	1700			ND	-		
2,4,5-TP (Silvex)	**ND**		ug/kg	83			ND	-		
MCPP	**ND**		ug/kg	25000			ND	-		
2,4-D	**ND**		ug/kg	170			ND	-		
Surrogate: % DCAA	*85*		ug/kg		*2000*		*85*	*30-150*		
LCS (CG33195-LCS)					Prepared: 14-Jul-20 Analyzed: 15-Jul-20					
2,4,5-T	**71.82**		ug/kg	83	100		72	40-140		30
2,4,5-TP (Silvex)	**68.89**		ug/kg	83	100		69	40-140		30
2,4-D	**142.4**		ug/kg	170	200		71	40-140		30
2,4-DB	**598.6**		ug/kg	1700	1000		60	40-140		30
Dalapon	**60.16**		ug/kg	83	100		60	40-140		30
Dicamba	**71.66**		ug/kg	83	100		72	40-140		30
Dichloroprop	**166.8**		ug/kg	83	200		83	40-140		30
Dinoseb	**39.15**	r	ug/kg	83	100		39	10-110		20
MCPP	**23770**		ug/kg	25000	30000		79	40-140		30
MCPA	**21880**		ug/kg	25000	30000		73	40-140		30
Surrogate: % DCAA	*1161*		ug/kg		*2000*		*58*	*30-150*		
LCS Dup (CG33195-LCSD)			**Source: CG33195-LCS**		Prepared: 14-Jul-20 Analyzed: 15-Jul-20					
2,4,5-TP (Silvex)	**82.44**		ug/kg	83	100		82	40-140	17.2	30
MCPP	**24500**		ug/kg	25000	30000		82	40-140	3.7	30
2,4,5-T	**87.03**		ug/kg	83	100		87	40-140	18.9	30
2,4-D	**164.0**		ug/kg	170	200		82	40-140	14.4	30
Dalapon	**61.29**		ug/kg	83	100		61	40-140	1.7	30
Dicamba	**82.87**		ug/kg	83	100		83	40-140	14.2	30
Dichloroprop	**189.0**		ug/kg	83	200		94	40-140	12.4	30
2,4-DB	**802.5**		ug/kg	1700	1000		80	40-140	28.6	30
MCPA	**25310**		ug/kg	25000	30000		84	40-140	14.0	30
Dinoseb	**75.51**	r	ug/kg	83	100		76	10-110	64.3	20
Surrogate: % DCAA	*1357*		ug/kg		*2000*		*68*	*30-150*		
SW846 7.3.3.1/90										

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 7.3.3.1/90										
Batch 537292A - SW846 7.3.3.1/90										
Blank (CG32326-BLK)						Prepared & Analyzed: 14-Jul-20				
Reactivity Cyanide	< 5		mg/kg	5			BRL	-		
Duplicate (CG32326-DUP)			**Source: SC58794-01**			Prepared & Analyzed: 14-Jul-20				
Reactivity Cyanide	< 6.0		mg/kg	6.0		BRL		-	NC	20
LCS (CG32326-LCS)						Prepared & Analyzed: 14-Jul-20				
Reactivity Cyanide	**0.4460**		mg/kg	5	0.44		101	80-120		20
Batch 537434A - SW846 7.3.3.1/90										
Blank (CG30622-BLK)						Prepared & Analyzed: 15-Jul-20				
Reactivity Cyanide	< 5		mg/kg	5			BRL	-		
LCS (CG30622-LCS)						Prepared & Analyzed: 15-Jul-20				
Reactivity Cyanide	**0.4390**		mg/kg	5	0.44		99.8	80-120		20
SW846 CH7										
Batch 537292B - SW846 7.3.3.1/90										
Blank (CG32326-BLK)						Prepared & Analyzed: 14-Jul-20				
Reactivity Sulfide	< 20		mg/kg	20			BRL	-		
Duplicate (CG32326-DUP)			**Source: SC58794-01**			Prepared & Analyzed: 14-Jul-20				
Reactivity Sulfide	< 20		mg/kg	20		BRL		-	NC	20
LCS (CG32326-LCS)						Prepared & Analyzed: 14-Jul-20				
Reactivity Sulfide	**0**		mg/kg	20	40		95.0	80-120		20
Batch 537434B - SW846 7.3.3.1/90										
Blank (CG30622-BLK)						Prepared & Analyzed: 15-Jul-20				
Reactivity Sulfide	< 20		mg/kg	20			BRL	-		
LCS (CG30622-LCS)						Prepared & Analyzed: 15-Jul-20				
Reactivity Sulfide	**0**		mg/kg	20	40		95.0	80-120		20

Analyte(s)	Column	% Breakdown	Limit

Notes and Definitions

D	Data reported from a dilution
QC2	Analyte out of acceptance range in QC spike but no reportable concentration present in sample.
QC6	Analyte is out of acceptance range in the QC spike but the total number of out of range analytes is within overall method criteria.
QM7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QM8	The spike recovery exceeded the QC control limits for the MS and/or MSD. The batch was accepted based upon acceptable PS and /or LCS recovery.
QM9	The spike recovery for this QC sample is outside the established control limits. The sample results for the QC batch were accepted based on LCS/LCSD or SRM recoveries within the control limits.
QR6	The RPD exceeded the QC control limits; however precision is demonstrated with acceptable RPD values for MS/MSD.
r	This parameter is outside laboratory rpd specified recovery limits.
Z-2	The closing calibration verification was below control limits, <20%, for the analyte 4,4-DDT, but greater than 50% recovery. This low recovery is due to sample matrix interference, which was confirmed by re-analysis.
dry	Sample results reported on a dry weight basis
NR	Not Reported
RPD	Relative Percent Difference
[2C]	Indicates concentration was reported from the secondary, confirmation column.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
pH	The method for pH does not stipulate a specific holding time other than to state that the samples should be analyzed as soon as possible. For aqueous samples the 40 CFR 136 specifies a holding time of 15 minutes from sampling to analysis. Therefore all aqueous pH samples not analyzed in the field are considered out of hold time at the time of sample receipt. All soil samples are analyzed as soon as possible after sample receipt.

Interpretation of Total Petroleum Hydrocarbon Report

Petroleum identification is determined by comparing the GC fingerprint obtained from the sample with a library of GC fingerprints obtained from analyses of various petroleum products. Possible match categories are as follows:

Gasoline - includes regular, unleaded, premium, etc.
Fuel Oil #2 - includes home heating oil, #2 fuel oil, and diesel
Fuel Oil #4 - includes #4 fuel oil
Fuel Oil #6 - includes #6 fuel oil and bunker "C" oil
Motor Oil - includes virgin and waste automobile oil
Ligroin - includes mineral spirits, petroleum naphtha, vm&p naphtha
Aviation Fuel - includes kerosene, Jet A and JP-4
Other Oil - includes lubricating and cutting oil, and silicon oil

At times, the unidentified petroleum product is quantified using a calibration that most closely approximates the distribution of compounds in the sample. When this occurs, the result is qualified as Calculated as.

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Continuing Calibration Verification: The calibration relationship established during the initial calibration must be verified at periodic intervals. Concentrations, intervals, and criteria are method specific.

SC58794 EM

COC # 4610

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CHAIN OF CUSTODY RECORD

Page 1 of 2

Special Handling:

☑ Standard TAT - 7 to 10 business days
☐ Rush TAT - Date Needed:
- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report to: Kevin Kavanaugh
ECMS, Inc.
288 Grove St. #391
Braintree, MA 02184

Project Mgr.: Kevin Kavanaugh

Invoice to: Kevin Kavanaugh
ECMS, Inc.
288 Grove St. #391
Braintree, MA 02184

P.O. No: RQN: 9802

Project No.: 1009.073
Site Name: Cashman School
Location: Amesbury, MA
Sampler(s): Kevin Kavanaugh

G=Grab C=Composite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: 8 oz Amber Glass (none)	VOA Vial CH3OH	4 oz Amber Glass (none)	Analyses: 8081 Pesticides	8082 PCBs	8151 Herbicides	8260 Full List	8270 Full List	Ignitability-1030	MCP 14 Metals Total	pH	Reactivity Cyanide/Sulfide	TPH 8100 by GC	QA Reporting Notes: (check if needed)
SC58794-01	SS-1	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1
-02	SS-2	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1
-03	SSS-10	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1
-04	SSS-11	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1
-05	SSS-12	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1
-06	SSS-13	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1
-07	SSS-14	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1
-08	SSS-16	7/9/2020		G	Soil		2	••	X	X	X	X	X	X	X	X	X	X	MA RCS-1
-09	SSS-17	7/9/2020		G	Soil		2	••	X	X	X	X	X	X	X	X	X	X	MA RCS-1
-10	SSS-3	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1
-11	SSS-4	7/9/2020		G	Soil	2	2		X	X	X	X	X	X	X	X	X	X	MA RCS-1

QA Reporting Notes: (check if needed)
☑ Provide MA DEP MCP CAM Report
☐ Provide CT DPH RCP Report

QA/QC Reporting Levels
Standard

State specific reporting standards:
Mass RCS-1

☐ E-mail to:
EDD Format:

Condition upon receipt:
☐ Ambient ☒ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Relinquished by:	Received by:	Date:	Time:	Temp °C
[signature]	Storage Office 4°C	7/9/20	2:30 pm	3.3
[signature]	David Dec	7/10/20	13:16	-1
David Dec	[signature]	7/10/20	~~3.3/-1/2.3~~ 15:28	2.3

126 Myron Street · West Springfield, Massachusetts 01089 · 413-789-9018 · www.eurofinsus.com/Spectrum

#6

SC 38794 EM

COC # 4610

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CHAIN OF CUSTODY RECORD

Page 2 of 2

Special Handling:

☑ Standard TAT - 7 to 10 business days
☐ Rush TAT - Date Needed:
- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report to: Kevin Kavanaugh
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P.O. No: RQN: 9802

Project No.: 1009.073
Site Name: Cashman School
Location: Amesbury, MA
Sampler(s): Kevin Kavanaugh

G=Grab C=Composite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: 8 oz Amber Glass (none)	VOA Vial CH3OH	4 oz Amber Glass (none)						Analyses: 8081 Pesticides	8082 PCBs	8151 Herbicides	8260 Full List	8270 Full List	Ignitability-1030	MCP 14 Metals Total	pH	Reactivity Cyanide/Sulfide	TPH 8100 by GC			QA Reporting Notes: (check if needed)
-12	SSS-5	7/9/2020		G	Soil	2	2							X	X	X	X	X	X	X	X	X	X			MA RCS-1
-13	SSS-6	7/9/2020		G	Soil	2	2							X	X	X	X	X	X	X	X	X	X			MA RCS-1
-14	SSS-7	7/9/2020		G	Soil	2	2							X	X	X	X	X	X	X	X	X	X			MA RCS-1
-15	SSS-8	7/9/2020		G	Soil	2	2							X	X	X	X	X	X	X	X	X	X			MA RCS-1
-16	SSS-9	7/9/2020		G	Soil	2	2							X	X	X	X	X	X	X	X	X	X			MA RCS-1
-17	SSS-15	7/9/2020		G	Soil	1	2	2						X	X	X	X	X	X	X	X	X	X			MA RCS-1

QA Reporting Notes (check if needed):
☑ Provide MA DEP MCP CAM Report
☐ Provide CT DPH RCP Report

QA/QC Reporting Levels
Standard

State specific reporting standards:
Mass RCS-1

☐ E-mail to:
EDD Format:

Condition upon receipt:
☐ Ambient ☒ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Relinquished by:	Received by:	Date:	Time:	Temp °C
	Storage offsite 4°C	7/10/20	2:30 pm	3.3
		7/10/20	13:16	-1
		7/10/20	15:28	2.3

Batch Summary

'[none]'

Subcontracted Analyses

SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001074

Toxicity Characteristics

2001074-DUP1
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001075

General Chemistry Parameters

2001075-DUP1
2001075-DUP2
2001075-DUP3
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001076

Volatile Organic Compounds

2001076-BLK1
2001076-BS1
2001076-BSD1
2001076-DUP1
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001078

Total Metals by EPA 6000/7000 Series Methods

2001078-BLK1
2001078-DUP1
2001078-MS1
2001078-MSD1
2001078-PS1
2001078-SRM1
2001078-SRM2
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001079

Total Metals by EPA 6000/7000 Series Methods

2001079-BLK1
2001079-DUP1
2001079-MS1
2001079-MSD1
2001079-PS1
2001079-SRM1
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001081

Toxicity Characteristics

2001081-DUP1
2001081-SRM1
2001081-SRM2
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001083

Semivolatile Organic Compounds by GCMS

2001083-BLK1
2001083-BS1
2001083-BSD1
2001083-DUP1
2001083-MS1
2001083-MSD1
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001087

Semivolatile Organic Compounds by GC

2001087-BLK1
2001087-BS1
2001087-BSD1
2001087-DUP1
2001087-MS1
2001087-MSD1
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001088

Pesticides

2001088-BLK1
2001088-BS1
2001088-BSD1
2001088-DUP1
2001088-MS1
2001088-MSD1
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

2001092

Extractable Petroleum Hydrocarbons

2001092-BLK1
2001092-BS1
2001092-DUP1
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

537166A

Subcontracted Analyses

CG32331-BLK
CG32331-LCS
CG32331-LCSD
CG32331-MS
CG32331-MSD
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)

537292A

Subcontracted Analyses

CG32326-BLK
CG32326-DUP
CG32326-LCS
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)

537292B

Subcontracted Analyses

CG32326-BLK
CG32326-DUP
CG32326-LCS
SC58794-01 (SS-1)
SC58794-02 (SS-2)
SC58794-03 (SSS-10)
SC58794-04 (SSS-11)
SC58794-05 (SSS-12)
SC58794-06 (SSS-13)
SC58794-07 (SSS-14)
SC58794-08 (SSS-16)
SC58794-09 (SSS-17)
SC58794-10 (SSS-3)
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)

537320A

Subcontracted Analyses

CG33195-BLK
CG33195-LCS
CG33195-LCSD
SC58794-11 (SSS-4)
SC58794-12 (SSS-5)
SC58794-13 (SSS-6)
SC58794-14 (SSS-7)
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

537434A

Subcontracted Analyses

CG30622-BLK
CG30622-LCS
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

537434B

Subcontracted Analyses

CG30622-BLK
CG30622-LCS
SC58794-15 (SSS-8)
SC58794-16 (SSS-9)
SC58794-17 (SSS-15)

eurofins | Environment Testing New England

☑ Final Report
☐ Revised Report

Report Date:
20-Aug-20 17:12

Laboratory Report
SC59063

ECMS, Inc.
639 Granite Street, Suite 407
Braintree, MA 02184
Attn: Kevin Kavanaugh

Project: Cashman School - Amesbury, MA
Project #: 1009.073

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.
All applicable NELAC requirements have been met.

Massachusetts # RI907
New York # 11393
Rhode Island # LAI00368
USDA # P330-20-00109

Authorized by:

Agnes Huntley
Project Manager



Eurofins Environment Testing New England holds primary certification in the State of Massachusetts for the analytes as indicated with an X in the "Cert." column within this report. Please note that the State of Massachusetts does not offer certification for all analytes. Please refer to our website for specific certification holdings in each state.
Please note that this report contains 17 pages of analytical data plus Chain of Custody document(s). When the Laboratory Report is indicated as revised, this report supersedes any previously dated reports for the laboratory ID(s) referenced above. Where this report identifies subcontracted analyses, copies of the subcontractor's test report are available upon request. This report may not be reproduced, except in full, without written approval from Eurofins Environment Testing New England.

Eurofins Environment Testing New England is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Eurofins Environment Testing New England is currently accredited for the specific method or analyte indicated. Please refer to our "Quality" web page at www.eurofinsus.com/Spectrum for a full listing of our current certifications and fields of accreditation.

Please contact the Laboratory or Technical Director at 413-789-9018 with any questions regarding the data contained in this laboratory report.

Sample Summary

Work Order: SC59063

Project: Cashman School - Amesbury, MA

Project Number: 1009.073

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
SC59063-01	SSS-26	Soil	12-Aug-20 08:40	13-Aug-20 17:30
SC59063-02	SSS-27	Soil	12-Aug-20 08:45	13-Aug-20 17:30
SC59063-03	SSS-28	Soil	12-Aug-20 09:15	13-Aug-20 17:30
SC59063-04	SSS-29	Soil	12-Aug-20 09:35	13-Aug-20 17:30
SC59063-05	SSS-30	Soil	12-Aug-20 09:45	13-Aug-20 17:30
SC59063-06	SSS-31	Soil	12-Aug-20 10:00	13-Aug-20 17:30
SC59063-07	SSS-32	Soil	12-Aug-20 10:15	13-Aug-20 17:30
SC59063-08	SSS-33	Soil	12-Aug-20 10:30	13-Aug-20 17:30

MassDEP Analytical Protocol Certification Form

Laboratory Name: Eurofins Spectrum Analytical, Inc.	**Project #:** 1009.073
Project Location: Cashman School - Amesbury, MA	**RTN:**
This form provides certifications for the following data set:	SC59063-01 through SC59063-08
Matrices: Soil	

CAM Protocol

8260 VOC CAM II A	✓ 7470/7471 Hg CAM III B	MassDEP VPH CAM IV A	8081 Pesticides CAM V B	7196 Hex Cr CAM VI B	MassDEP APH CAM IX A
8270 SVOC CAM II B	7010 Metals CAM III C	MassDEP EPH CAM IV B	8151 Herbicides CAM V C	8330 Explosives CAM VIII A	TO-15 VOC CAM IX B
✓ 6010 Metals CAM III A	6020 Metals CAM III D	8082 PCB CAM V A	9012 Total Cyanide/PAC CAM VI A	9014 Total Cyanide/PAC CAM VI A	6860 Perchlorate CAM VIII B

Affirmative responses to questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain of Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	✓ Yes No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	✓ Yes No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	✓ Yes No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	✓ Yes No
E	a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	Yes No Yes No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to questions A through E)?	✓ Yes No

Responses to questions G, H and I below are required for "Presumptive Certainty" status

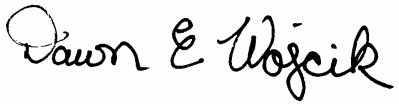
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	Yes ✓ No

<u>Data User Note:</u> Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.

H	Were all QC performance standards specified in the CAM protocol(s) achieved?	Yes ✓ No
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	✓ Yes No

All negative responses are addressed in a case narrative on the cover page of this report.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.



Dawn E. Wojcik
Laboratory Director
Date: 8/20/2020

CASE NARRATIVE:

Data has been reported to the RDL. This report excludes estimated concentrations detected below the RDL and above the MDL (J-Flag).

All non-detects and all results below the reporting limit are reported as "<" (less than) the reporting limit in this report.

The samples were received 2.4 degrees Celsius, please refer to the Chain of Custody for details specific to temperature upon receipt. An infrared thermometer with a tolerance of +/- 1.0 degrees Celsius was used immediately upon receipt of the samples.

If a Matrix Spike (MS), Matrix Spike Duplicate (MSD) or Duplicate (DUP) was not requested on the Chain of Custody, method criteria may have been fulfilled with a source sample not of this Sample Delivery Group. If method or program required MS/MSD/Dup were not performed, sufficient sample was not provided to the laboratory.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method. Regulatory limits may not be achieved if specific method and/or technique was not requested on the Chain of Custody.

According to WSC-CAM 5/2009 Rev.1, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although they may still be within the recommended recovery range, a range has been set based on historical control limits.

Some target analytes which are not listed as exceptions in the Summary of CAM Reporting Limits may exceed the recommended RL based on sample initial volume or weight provided, % moisture content, or responsiveness of a particular analyte to purge and trap instrumentation.

See below for any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

SW846 6010C

Laboratory Control Samples:

2001427 SRM/SRMD

Lead percent recoveries (176/81) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

SSS-26
SSS-27
SSS-28
SSS-29
SSS-30
SSS-31
SSS-32
SSS-33

Silver percent recoveries (82/72) are outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

SSS-26
SSS-27
SSS-28
SSS-29
SSS-30
SSS-31
SSS-32
SSS-33

Spikes:

2001427-MS1 *Source: SC59063-06*

SW846 6010C

Spikes:

2001427-MS1 *Source: SC59063-06*

The spike recovery exceeded the QC control limits for the MS and/or MSD. The batch was accepted based upon acceptable PS and /or LCS recovery.

Antimony

2001427-MSD1 *Source: SC59063-06*

The spike recovery exceeded the QC control limits for the MS and/or MSD. The batch was accepted based upon acceptable PS and /or LCS recovery.

Antimony

Duplicates:

2001427-DUP1 *Source: SC59063-06*

MRL raised to correlate to batch QC reporting limits.

Vanadium
Zinc

Samples:

SC59063-01 *SSS-26*

MRL raised to correlate to batch QC reporting limits.

Vanadium
Zinc

SC59063-02 *SSS-27*

MRL raised to correlate to batch QC reporting limits.

Vanadium
Zinc

SC59063-03 *SSS-28*

MRL raised to correlate to batch QC reporting limits.

Vanadium

SC59063-04 *SSS-29*

MRL raised to correlate to batch QC reporting limits.

Vanadium
Zinc

SC59063-05 *SSS-30*

MRL raised to correlate to batch QC reporting limits.

Vanadium
Zinc

SC59063-06 *SSS-31*

MRL raised to correlate to batch QC reporting limits.

Vanadium
Zinc

SC59063-07 *SSS-32*

SW846 6010C

Samples:

SC59063-07 *SSS-32*

MRL raised to correlate to batch QC reporting limits.

Vanadium
Zinc

SC59063-08 *SSS-33*

MRL raised to correlate to batch QC reporting limits.

Vanadium
Zinc

SW846 7471B

Spikes:

2001428-MSD1 *Source: SC59063-03*

The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

Mercury

Sample Acceptance Check Form

Client:	ECMS, Inc.
Project:	Cashman School - Amesbury, MA / 1009.073
Work Order:	SC59063
Sample(s) received on:	8/13/2020

The following outlines the condition of samples for the attached Chain of Custody upon receipt.

	Yes	No	N/A
Were custody seals present?	☐	☑	☐
Were custody seals intact?	☐	☐	☑
Were samples received at a temperature of ≤ 6°C?	☑	☐	☐
Were samples refrigerated upon transfer to laboratory representative?	☑	☐	☐
Were sample containers received intact?	☑	☐	☐
Were samples properly labeled (labels affixed to sample containers and include sample ID, site location, and/or project number and the collection date)?	☑	☐	☐
Were samples accompanied by a Chain of Custody document?	☑	☐	☐
Does Chain of Custody document include proper, full, and complete documentation, which shall include sample ID, site location, and/or project number, date and time of collection, collector's name, preservation type, sample matrix and any special remarks concerning the sample?	☑	☐	☐
Did sample container labels agree with Chain of Custody document?	☑	☐	☐
Were samples received within method-specific holding times?	☑	☐	☐

Summary of Hits

Lab ID: SC59063-01 **Client ID:** SSS-26

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	56.1		1.60	mg/kg	SW846 6010C
Barium	24.6		1.07	mg/kg	SW846 6010C
Chromium	32.0		1.07	mg/kg	SW846 6010C
Lead	40.0		1.60	mg/kg	SW846 6010C
Nickel	52.2		1.07	mg/kg	SW846 6010C
Vanadium	33.5	R06	2.35	mg/kg	SW846 6010C
Zinc	56.6	R06	26.7	mg/kg	SW846 6010C
Mercury	0.0764		0.0344	mg/kg	SW846 7471B

Lab ID: SC59063-02 **Client ID:** SSS-27

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	65.5		1.65	mg/kg	SW846 6010C
Barium	26.8		1.10	mg/kg	SW846 6010C
Chromium	32.8		1.10	mg/kg	SW846 6010C
Lead	35.4		1.65	mg/kg	SW846 6010C
Nickel	61.9		1.10	mg/kg	SW846 6010C
Vanadium	29.4	R06	2.42	mg/kg	SW846 6010C
Zinc	57.7	R06	27.5	mg/kg	SW846 6010C
Mercury	0.0655		0.0312	mg/kg	SW846 7471B

Lab ID: SC59063-03 **Client ID:** SSS-28

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	4.89		1.48	mg/kg	SW846 6010C
Barium	16.4		0.985	mg/kg	SW846 6010C
Chromium	7.71		0.985	mg/kg	SW846 6010C
Lead	2.80		1.48	mg/kg	SW846 6010C
Nickel	4.15		0.985	mg/kg	SW846 6010C
Vanadium	7.97	R06	2.17	mg/kg	SW846 6010C
Zinc	7.36		2.95	mg/kg	SW846 6010C

Lab ID: SC59063-04 **Client ID:** SSS-29

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	27.7		1.56	mg/kg	SW846 6010C
Barium	37.3		1.04	mg/kg	SW846 6010C
Beryllium	0.590		0.521	mg/kg	SW846 6010C
Chromium	35.6		1.04	mg/kg	SW846 6010C
Lead	29.6		1.56	mg/kg	SW846 6010C
Nickel	25.4		1.04	mg/kg	SW846 6010C
Vanadium	33.9	R06	2.29	mg/kg	SW846 6010C
Zinc	44.5	R06	26.1	mg/kg	SW846 6010C
Mercury	0.0650		0.0336	mg/kg	SW846 7471B

Lab ID: SC59063-05 **Client ID:** SSS-30

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	31.2		1.70	mg/kg	SW846 6010C
Barium	33.3		1.14	mg/kg	SW846 6010C
Chromium	32.3		1.14	mg/kg	SW846 6010C
Lead	25.9		1.70	mg/kg	SW846 6010C
Nickel	25.6		1.14	mg/kg	SW846 6010C
Vanadium	29.7	R06	2.50	mg/kg	SW846 6010C
Zinc	38.6	R06	28.4	mg/kg	SW846 6010C
Mercury	0.0583		0.0356	mg/kg	SW846 7471B

Lab ID: SC59063-06 **Client ID:** SSS-31

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	74.8		1.71	mg/kg	SW846 6010C
Barium	32.1		1.14	mg/kg	SW846 6010C
Chromium	60.3		1.14	mg/kg	SW846 6010C
Lead	32.3		1.71	mg/kg	SW846 6010C
Nickel	41.3		1.14	mg/kg	SW846 6010C
Vanadium	23.6	R06	2.51	mg/kg	SW846 6010C
Zinc	66.2	R06	28.5	mg/kg	SW846 6010C
Mercury	0.541		0.0217	mg/kg	SW846 7471B

Lab ID: SC59063-07 **Client ID:** SSS-32

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	89.6		1.58	mg/kg	SW846 6010C
Barium	26.2		1.05	mg/kg	SW846 6010C
Chromium	50.5		1.05	mg/kg	SW846 6010C
Lead	30.7		1.58	mg/kg	SW846 6010C
Nickel	41.2		1.05	mg/kg	SW846 6010C
Vanadium	24.2	R06	2.31	mg/kg	SW846 6010C
Zinc	62.2	R06	26.3	mg/kg	SW846 6010C
Mercury	0.471		0.0296	mg/kg	SW846 7471B

Lab ID: SC59063-08 **Client ID:** SSS-33

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Arsenic	62.3		1.67	mg/kg	SW846 6010C
Barium	27.9		1.11	mg/kg	SW846 6010C
Chromium	24.7		1.11	mg/kg	SW846 6010C
Lead	13.7		1.67	mg/kg	SW846 6010C
Nickel	52.9		1.11	mg/kg	SW846 6010C
Vanadium	23.4	R06	2.45	mg/kg	SW846 6010C
Zinc	64.5	R06	27.8	mg/kg	SW846 6010C

Please note that because there are no reporting limits associated with hazardous waste characterizations or micro analyses, this summary does not include hits from these analyses if included in this work order.

Sample Identification
SSS-26
SC59063-01

Client Project #: 1009.073 | Matrix: Soil | Collection Date/Time: 12-Aug-20 08:40 | Received: 13-Aug-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.20		mg/kg dry	3.20	0.173	1	SW846 6010C	17-Aug-20	20-Aug-20	PMH/EDT	2001427	
7440-38-2	Arsenic	**56.1**		mg/kg dry	1.60	0.203	1	"	"	19-Aug-20	"	"	
7440-39-3	Barium	**24.6**		mg/kg dry	1.07	0.126	1	"	"	"	"	"	
7440-41-7	Beryllium	< 0.534		mg/kg dry	0.534	0.0268	1	"	"	"	"	"	
7440-43-9	Cadmium	< 0.534		mg/kg dry	0.534	0.0277	1	"	"	"	"	"	
7440-47-3	Chromium	**32.0**		mg/kg dry	1.07	0.142	1	"	"	"	"	"	
7439-97-6	Mercury	**0.0764**		mg/kg dry	0.0344	0.0095	1	SW846 7471B	"	20-Aug-20	edt	2001428	
Prepared by method SW846 3050B													
7440-02-0	Nickel	**52.2**		mg/kg dry	1.07	0.123	1	SW846 6010C	"	19-Aug-20	EDT	2001427	
7439-92-1	Lead	**40.0**		mg/kg dry	1.60	0.226	1	"	"	"	"	"	
7440-36-0	Antimony	< 5.34		mg/kg dry	5.34	0.402	1	"	"	"	"	"	
7782-49-2	Selenium	< 1.60		mg/kg dry	1.60	0.306	1	"	"	"	"	"	
7440-28-0	Thallium	< 3.20		mg/kg dry	3.20	1.18	1	"	"	"	"	"	
7440-62-2	Vanadium	**33.5**	R06	mg/kg dry	2.35	0.284	1	"	"	"	"	"	
7440-66-6	Zinc	**56.6**	R06	mg/kg dry	26.7	0.827	1	"	"	"	"	"	
General Chemistry Parameters													
	% Solids	**93.3**		%			1	SM2540 G (11) Mod.	13-Aug-20	17-Aug-20	PN	2001425	

Sample Identification
SSS-27
SC59063-02

Client Project #: 1009.073 | Matrix: Soil | Collection Date/Time: 12-Aug-20 08:45 | Received: 13-Aug-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.30		mg/kg dry	3.30	0.178	1	SW846 6010C	17-Aug-20	20-Aug-20	PMH/EDT	2001427	
7440-38-2	Arsenic	**65.5**		mg/kg dry	1.65	0.209	1	"	"	19-Aug-20	"	"	
7440-39-3	Barium	**26.8**		mg/kg dry	1.10	0.130	1	"	"	"	"	"	
7440-41-7	Beryllium	< 0.550		mg/kg dry	0.550	0.0276	1	"	"	"	"	"	
7440-43-9	Cadmium	< 0.550		mg/kg dry	0.550	0.0285	1	"	"	"	"	"	
7440-47-3	Chromium	**32.8**		mg/kg dry	1.10	0.146	1	"	"	"	"	"	
7439-97-6	Mercury	**0.0655**		mg/kg dry	0.0312	0.0087	1	SW846 7471B	"	20-Aug-20	edt	2001428	
Prepared by method SW846 3050B													
7440-02-0	Nickel	**61.9**		mg/kg dry	1.10	0.126	1	SW846 6010C	"	19-Aug-20	EDT	2001427	
7439-92-1	Lead	**35.4**		mg/kg dry	1.65	0.233	1	"	"	"	"	"	
7440-36-0	Antimony	< 5.50		mg/kg dry	5.50	0.413	1	"	"	"	"	"	
7782-49-2	Selenium	< 1.65		mg/kg dry	1.65	0.314	1	"	"	"	"	"	
7440-28-0	Thallium	< 3.30		mg/kg dry	3.30	1.21	1	"	"	"	"	"	
7440-62-2	Vanadium	**29.4**	R06	mg/kg dry	2.42	0.292	1	"	"	"	"	"	
7440-66-6	Zinc	**57.7**	R06	mg/kg dry	27.5	0.851	1	"	"	"	"	"	
General Chemistry Parameters													
	% Solids	**93.1**		%			1	SM2540 G (11) Mod.	13-Aug-20	17-Aug-20	PN	2001425	

Sample Identification
SSS-28
SC59063-03

Client Project #: 1009.073 | Matrix: Soil | Collection Date/Time: 12-Aug-20 09:15 | Received: 13-Aug-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 2.95		mg/kg dry	2.95	0.160	1	SW846 6010C	17-Aug-20	20-Aug-20	PMH/EDT	2001427	
7440-38-2	Arsenic	**4.89**		mg/kg dry	1.48	0.187	1	"	"	19-Aug-20	"	"	
7440-39-3	Barium	**16.4**		mg/kg dry	0.985	0.116	1	"	"	"	"	"	
7440-41-7	Beryllium	< 0.492		mg/kg dry	0.492	0.0247	1	"	"	"	"	"	
7440-43-9	Cadmium	< 0.492		mg/kg dry	0.492	0.0255	1	"	"	"	"	"	
7440-47-3	Chromium	**7.71**		mg/kg dry	0.985	0.131	1	"	"	"	"	"	
7439-97-6	Mercury	< 0.0337		mg/kg dry	0.0337	0.0094	1	SW846 7471B	"	20-Aug-20	edt	2001428	
Prepared by method SW846 3050B													
7440-02-0	Nickel	**4.15**		mg/kg dry	0.985	0.113	1	SW846 6010C	"	19-Aug-20	EDT	2001427	
7439-92-1	Lead	**2.80**		mg/kg dry	1.48	0.209	1	"	"	"	"	"	
7440-36-0	Antimony	< 4.92		mg/kg dry	4.92	0.370	1	"	"	"	"	"	
7782-49-2	Selenium	< 1.48		mg/kg dry	1.48	0.282	1	"	"	"	"	"	
7440-28-0	Thallium	< 2.95		mg/kg dry	2.95	1.09	1	"	"	"	"	"	
7440-62-2	Vanadium	**7.97**	R06	mg/kg dry	2.17	0.262	1	"	"	"	"	"	
7440-66-6	Zinc	**7.36**		mg/kg dry	2.95	0.762	1	"	"	20-Aug-20	"	"	
General Chemistry Parameters													
	% Solids	**95.6**		%			1	SM2540 G (11) Mod.	13-Aug-20	17-Aug-20	PN	2001425	

Sample Identification
SSS-29
SC59063-04

Client Project #: 1009.073 | Matrix: Soil | Collection Date/Time: 12-Aug-20 09:35 | Received: 13-Aug-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.13		mg/kg dry	3.13	0.169	1	SW846 6010C	17-Aug-20	20-Aug-20	PMH/EDT	2001427	
7440-38-2	Arsenic	**27.7**		mg/kg dry	1.56	0.198	1	"	"	19-Aug-20	"	"	
7440-39-3	Barium	**37.3**		mg/kg dry	1.04	0.123	1	"	"	"	"	"	
7440-41-7	Beryllium	**0.590**		mg/kg dry	0.521	0.0262	1	"	"	"	"	"	
7440-43-9	Cadmium	< 0.521		mg/kg dry	0.521	0.0270	1	"	"	"	"	"	
7440-47-3	Chromium	**35.6**		mg/kg dry	1.04	0.139	1	"	"	"	"	"	
7439-97-6	Mercury	**0.0650**		mg/kg dry	0.0336	0.0093	1	SW846 7471B	"	20-Aug-20	edt	2001428	
Prepared by method SW846 3050B													
7440-02-0	Nickel	**25.4**		mg/kg dry	1.04	0.120	1	SW846 6010C	"	19-Aug-20	EDT	2001427	
7439-92-1	Lead	**29.6**		mg/kg dry	1.56	0.221	1	"	"	"	"	"	
7440-36-0	Antimony	< 5.21		mg/kg dry	5.21	0.392	1	"	"	"	"	"	
7782-49-2	Selenium	< 1.56		mg/kg dry	1.56	0.298	1	"	"	"	"	"	
7440-28-0	Thallium	< 3.13		mg/kg dry	3.13	1.15	1	"	"	"	"	"	
7440-62-2	Vanadium	**33.9**	R06	mg/kg dry	2.29	0.277	1	"	"	"	"	"	
7440-66-6	Zinc	**44.5**	R06	mg/kg dry	26.1	0.807	1	"	"	"	"	"	
General Chemistry Parameters													
	% Solids	**89.8**		%			1	SM2540 G (11) Mod.	13-Aug-20	17-Aug-20	PN	2001425	

Sample Identification
SSS-30
SC59063-05

Client Project #: 1009.073 | Matrix: Soil | Collection Date/Time: 12-Aug-20 09:45 | Received: 13-Aug-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.41		mg/kg dry	3.41	0.184	1	SW846 6010C	17-Aug-20	20-Aug-20	PMH/EDT	2001427	
7440-38-2	Arsenic	**31.2**		mg/kg dry	1.70	0.216	1	"	"	19-Aug-20	"	"	
7440-39-3	Barium	**33.3**		mg/kg dry	1.14	0.134	1	"	"	"	"	"	
7440-41-7	Beryllium	< 0.568		mg/kg dry	0.568	0.0285	1	"	"	"	"	"	
7440-43-9	Cadmium	< 0.568		mg/kg dry	0.568	0.0294	1	"	"	"	"	"	
7440-47-3	Chromium	**32.3**		mg/kg dry	1.14	0.151	1	"	"	"	"	"	
7439-97-6	Mercury	**0.0583**		mg/kg dry	0.0356	0.0099	1	SW846 7471B	"	20-Aug-20	edt	2001428	
Prepared by method SW846 3050B													
7440-02-0	Nickel	**25.6**		mg/kg dry	1.14	0.131	1	SW846 6010C	"	19-Aug-20	EDT	2001427	
7439-92-1	Lead	**25.9**		mg/kg dry	1.70	0.241	1	"	"	"	"	"	
7440-36-0	Antimony	< 5.68		mg/kg dry	5.68	0.427	1	"	"	"	"	"	
7782-49-2	Selenium	< 1.70		mg/kg dry	1.70	0.325	1	"	"	"	"	"	
7440-28-0	Thallium	< 3.41		mg/kg dry	3.41	1.25	1	"	"	"	"	"	
7440-62-2	Vanadium	**29.7**	R06	mg/kg dry	2.50	0.302	1	"	"	"	"	"	
7440-66-6	Zinc	**38.6**	R06	mg/kg dry	28.4	0.880	1	"	"	"	"	"	
General Chemistry Parameters													
	% Solids	**84.7**		%			1	SM2540 G (11) Mod.	13-Aug-20	17-Aug-20	PN	2001425	

Sample Identification
SSS-31
SC59063-06

Client Project #: 1009.073 | Matrix: Soil | Collection Date/Time: 12-Aug-20 10:00 | Received: 13-Aug-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.42		mg/kg dry	3.42	0.185	1	SW846 6010C	17-Aug-20	20-Aug-20	PMH/EDT	2001427	
7440-38-2	Arsenic	**74.8**		mg/kg dry	1.71	0.216	1	"	"	19-Aug-20	"	"	
7440-39-3	Barium	**32.1**		mg/kg dry	1.14	0.134	1	"	"	"	"	"	
7440-41-7	Beryllium	< 0.570		mg/kg dry	0.570	0.0286	1	"	"	"	"	"	
7440-43-9	Cadmium	< 0.570		mg/kg dry	0.570	0.0295	1	"	"	"	"	"	
7440-47-3	Chromium	**60.3**		mg/kg dry	1.14	0.152	1	"	"	"	"	"	
7439-97-6	Mercury	**0.541**		mg/kg dry	0.0217	0.0060	1	SW846 7471B	"	20-Aug-20	edt	2001428	
Prepared by method SW846 3050B													
7440-02-0	Nickel	**41.3**		mg/kg dry	1.14	0.131	1	SW846 6010C	"	19-Aug-20	EDT	2001427	
7439-92-1	Lead	**32.3**		mg/kg dry	1.71	0.241	1	"	"	"	"	"	
7440-36-0	Antimony	< 5.70		mg/kg dry	5.70	0.428	1	"	"	"	"	"	
7782-49-2	Selenium	< 1.71		mg/kg dry	1.71	0.326	1	"	"	"	"	"	
7440-28-0	Thallium	< 3.42		mg/kg dry	3.42	1.26	1	"	"	"	"	"	
7440-62-2	Vanadium	**23.6**	R06	mg/kg dry	2.51	0.303	1	"	"	"	"	"	
7440-66-6	Zinc	**66.2**	R06	mg/kg dry	28.5	0.882	1	"	"	"	"	"	
General Chemistry Parameters													
	% Solids	**90.2**		%			1	SM2540 G (11) Mod.	13-Aug-20	17-Aug-20	PN	2001425	

Sample Identification
SSS-32
SC59063-07

Client Project #: 1009.073 | Matrix: Soil | Collection Date/Time: 12-Aug-20 10:15 | Received: 13-Aug-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.15		mg/kg dry	3.15	0.170	1	SW846 6010C	17-Aug-20	20-Aug-20	PMH/EDT	2001427	
7440-38-2	Arsenic	**89.6**		mg/kg dry	1.58	0.200	1	"	"	19-Aug-20	"	"	
7440-39-3	Barium	**26.2**		mg/kg dry	1.05	0.124	1	"	"	"	"	"	
7440-41-7	Beryllium	< 0.525		mg/kg dry	0.525	0.0264	1	"	"	"	"	"	
7440-43-9	Cadmium	< 0.525		mg/kg dry	0.525	0.0272	1	"	"	"	"	"	
7440-47-3	Chromium	**50.5**		mg/kg dry	1.05	0.140	1	"	"	"	"	"	
7439-97-6	Mercury	**0.471**		mg/kg dry	0.0296	0.0082	1	SW846 7471B	"	20-Aug-20	edt	2001428	
Prepared by method SW846 3050B													
7440-02-0	Nickel	**41.2**		mg/kg dry	1.05	0.121	1	SW846 6010C	"	19-Aug-20	EDT	2001427	
7439-92-1	Lead	**30.7**		mg/kg dry	1.58	0.223	1	"	"	"	"	"	
7440-36-0	Antimony	< 5.25		mg/kg dry	5.25	0.395	1	"	"	"	"	"	
7782-49-2	Selenium	< 1.58		mg/kg dry	1.58	0.300	1	"	"	"	"	"	
7440-28-0	Thallium	< 3.15		mg/kg dry	3.15	1.16	1	"	"	"	"	"	
7440-62-2	Vanadium	**24.2**	R06	mg/kg dry	2.31	0.279	1	"	"	"	"	"	
7440-66-6	Zinc	**62.2**	R06	mg/kg dry	26.3	0.813	1	"	"	"	"	"	
General Chemistry Parameters													
	% Solids	**94.9**		%			1	SM2540 G (11) Mod.	13-Aug-20	17-Aug-20	PN	2001425	

Sample Identification
SSS-33
SC59063-08

Client Project #: 1009.073 | Matrix: Soil | Collection Date/Time: 12-Aug-20 10:30 | Received: 13-Aug-20

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Total Metals by EPA 6000/7000 Series Methods													
Prepared by method SW846 3050B													
7440-22-4	Silver	< 3.33		mg/kg dry	3.33	0.180	1	SW846 6010C	17-Aug-20	20-Aug-20	PMH/EDT	2001427	
7440-38-2	Arsenic	**62.3**		mg/kg dry	1.67	0.211	1	"	"	19-Aug-20	"	"	
7440-39-3	Barium	**27.9**		mg/kg dry	1.11	0.131	1	"	"	"	"	"	
7440-41-7	Beryllium	< 0.556		mg/kg dry	0.556	0.0279	1	"	"	"	"	"	
7440-43-9	Cadmium	< 0.556		mg/kg dry	0.556	0.0288	1	"	"	"	"	"	
7440-47-3	Chromium	**24.7**		mg/kg dry	1.11	0.148	1	"	"	"	"	"	
7439-97-6	Mercury	< 0.0305		mg/kg dry	0.0305	0.0085	1	SW846 7471B	"	20-Aug-20	edt	2001428	
Prepared by method SW846 3050B													
7440-02-0	Nickel	**52.9**		mg/kg dry	1.11	0.128	1	SW846 6010C	"	19-Aug-20	EDT	2001427	
7439-92-1	Lead	**13.7**		mg/kg dry	1.67	0.236	1	"	"	"	"	"	
7440-36-0	Antimony	< 5.56		mg/kg dry	5.56	0.418	1	"	"	"	"	"	
7782-49-2	Selenium	< 1.67		mg/kg dry	1.67	0.318	1	"	"	"	"	"	
7440-28-0	Thallium	< 3.33		mg/kg dry	3.33	1.23	1	"	"	"	"	"	
7440-62-2	Vanadium	**23.4**	R06	mg/kg dry	2.45	0.296	1	"	"	"	"	"	
7440-66-6	Zinc	**64.5**	R06	mg/kg dry	27.8	0.860	1	"	"	"	"	"	
General Chemistry Parameters													
	% Solids	**89.6**		%			1	SM2540 G (11) Mod.	13-Aug-20	17-Aug-20	PN	2001425	

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 6010C										
Batch 2001427 - SW846 3050B										
Blank (2001427-BLK1)					Prepared: 17-Aug-20 Analyzed: 19-Aug-20					
Selenium	< 1.58		mg/kg wet	1.58						
Arsenic	< 1.58		mg/kg wet	1.58						
Silver	< 3.16		mg/kg wet	3.16						
Zinc	< 26.3		mg/kg wet	26.3						
Thallium	< 3.16		mg/kg wet	3.16						
Antimony	< 5.27		mg/kg wet	5.27						
Lead	< 1.58		mg/kg wet	1.58						
Nickel	< 1.05		mg/kg wet	1.05						
Chromium	< 1.05		mg/kg wet	1.05						
Cadmium	< 0.527		mg/kg wet	0.527						
Beryllium	< 0.527		mg/kg wet	0.527						
Vanadium	< 2.32		mg/kg wet	2.32						
Barium	< 1.05		mg/kg wet	1.05						
Duplicate (2001427-DUP1)			**Source: SC59063-06**		Prepared: 17-Aug-20 Analyzed: 19-Aug-20					
Lead	**33.9**		mg/kg dry	1.74		32.3			5	20
Antimony	< 5.79		mg/kg dry	5.79		BRL				20
Silver	< 3.47		mg/kg dry	3.47		BRL				20
Zinc	**67.8**	R06	mg/kg dry	29.0		66.2			2	20
Vanadium	**24.2**	R06	mg/kg dry	2.55		23.6			2	20
Thallium	< 3.47		mg/kg dry	3.47		BRL				20
Nickel	**42.4**		mg/kg dry	1.16		41.3			3	20
Chromium	**61.9**		mg/kg dry	1.16		60.3			3	20
Cadmium	< 0.579		mg/kg dry	0.579		BRL				20
Beryllium	**0.412**	J	mg/kg dry	0.579		0.404			2	20
Arsenic	**77.4**		mg/kg dry	1.74		74.8			3	20
Selenium	< 1.74		mg/kg dry	1.74		BRL				20
Barium	**34.1**		mg/kg dry	1.16		32.1			6	20
Matrix Spike (2001427-MS1)			**Source: SC59063-06**		Prepared: 17-Aug-20 Analyzed: 19-Aug-20					
Cadmium	**129**		mg/kg dry	0.593	148	BRL	87	75-125		
Silver	**114**		mg/kg dry	3.56	148	BRL	77	75-125		
Zinc	**205**		mg/kg dry	29.6	148	66.2	94	75-125		
Vanadium	**161**		mg/kg dry	2.61	148	23.6	93	75-125		
Thallium	**139**		mg/kg dry	3.56	148	BRL	94	75-125		
Selenium	**135**		mg/kg dry	1.78	148	BRL	91	75-125		
Antimony	**89.6**	QM8	mg/kg dry	5.93	148	BRL	60	75-125		
Lead	**160**		mg/kg dry	1.78	148	32.3	86	75-125		
Chromium	**215**		mg/kg dry	1.19	148	60.3	104	75-125		
Beryllium	**141**		mg/kg dry	0.593	148	0.404	95	75-125		
Arsenic	**211**		mg/kg dry	1.78	148	74.8	92	75-125		
Nickel	**164**		mg/kg dry	1.19	148	41.3	83	75-125		
Barium	**192**		mg/kg dry	1.19	148	32.1	108	75-125		
Matrix Spike Dup (2001427-MSD1)			**Source: SC59063-06**		Prepared: 17-Aug-20 Analyzed: 19-Aug-20					
Cadmium	**123**		mg/kg dry	0.565	141	BRL	87	75-125	5	20
Arsenic	**209**		mg/kg dry	1.70	141	74.8	95	75-125	1	20
Thallium	**132**		mg/kg dry	3.39	141	BRL	94	75-125	5	20
Beryllium	**132**		mg/kg dry	0.565	141	0.404	93	75-125	6	20
Silver	**107**		mg/kg dry	3.39	141	BRL	76	75-125	7	20
Vanadium	**152**		mg/kg dry	2.49	141	23.6	91	75-125	5	20
Selenium	**127**		mg/kg dry	1.70	141	BRL	90	75-125	6	20
Antimony	**81.7**	QM8	mg/kg dry	5.65	141	BRL	58	75-125	9	20

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 6010C										
Batch 2001427 - SW846 3050B										
Matrix Spike Dup (2001427-MSD1)			**Source: SC59063-06**			Prepared: 17-Aug-20 Analyzed: 19-Aug-20				
Lead	**153**		mg/kg dry	1.70	141	32.3	85	75-125	4	20
Nickel	**158**		mg/kg dry	1.13	141	41.3	82	75-125	4	20
Chromium	**205**		mg/kg dry	1.13	141	60.3	102	75-125	5	20
Zinc	**197**		mg/kg dry	28.3	141	66.2	92	75-125	4	20
Barium	**182**		mg/kg dry	1.13	141	32.1	106	75-125	5	20
Reference (2001427-SRM1)						Prepared: 17-Aug-20 Analyzed: 19-Aug-20				
Thallium	**81.9**		mg/kg wet	3.00	77.3		106	74.4-109.4		
Lead	**139**	QM9	mg/kg wet	1.50	79.0		176	73-116.9		
Vanadium	**86.0**		mg/kg wet	2.20	88.9		97	73.8-112.5		
Silver	**28.7**		mg/kg wet	3.00	35.0		82	79.3-117.3		
Selenium	**35.3**		mg/kg wet	1.50	38.5		92	74.1-112.2		
Antimony	**52.8**		mg/kg wet	5.00	195		27	4.8-102.6		
Chromium	**138**		mg/kg wet	1.00	132		104	72.3-111.6		
Cadmium	**125**		mg/kg wet	0.500	127		98	75.2-106.7		
Beryllium	**100**		mg/kg wet	0.500	94.9		105	76.8-108.1		
Arsenic	**79.2**		mg/kg wet	1.50	88.9		89	76.1-107.7		
Nickel	**52.6**		mg/kg wet	1.00	55.7		94	75.8-107.8		
Zinc	**330**		mg/kg wet	25.0	336		98	75.8-112		
Barium	**296**		mg/kg wet	1.00	273		108	77.2-110.3		
Reference (2001427-SRM2)						Prepared: 17-Aug-20 Analyzed: 19-Aug-20				
Nickel	**57.1**		mg/kg wet	1.00	65.7		87	75.8-107.8		
Silver	**29.9**	QM9	mg/kg wet	3.00	41.3		72	79.3-117.3		
Zinc	**350**		mg/kg wet	25.0	396		88	75.8-112		
Vanadium	**88.2**		mg/kg wet	2.20	105		84	73.8-112.5		
Thallium	**89.6**		mg/kg wet	3.00	91.2		98	74.4-109.4		
Selenium	**36.7**		mg/kg wet	1.50	45.5		81	74.1-112.2		
Lead	**75.6**		mg/kg wet	1.50	93.2		81	73-116.9		
Chromium	**148**		mg/kg wet	1.00	156		95	72.3-111.6		
Cadmium	**138**		mg/kg wet	0.500	150		92	75.2-106.7		
Beryllium	**112**		mg/kg wet	0.500	112		100	76.8-108.1		
Arsenic	**82.4**		mg/kg wet	1.50	105		79	76.1-107.7		
Antimony	**56.4**		mg/kg wet	5.00	230		25	4.8-102.6		
Barium	**292**		mg/kg wet	1.00	323		91	77.2-110.3		
SW846 7471B										
Batch 2001428 - EPA200/SW7000 Series										
Blank (2001428-BLK1)						Prepared: 17-Aug-20 Analyzed: 20-Aug-20				

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 7471B										
Batch 2001428 - EPA200/SW7000 Series										
Blank (2001428-BLK1)						Prepared: 17-Aug-20 Analyzed: 20-Aug-20				
Mercury	< 0.0302		mg/kg wet	0.0302						
Duplicate (2001428-DUP1)			**Source: SC59063-03**			Prepared: 17-Aug-20 Analyzed: 20-Aug-20				
Mercury	< 0.0282		mg/kg dry	0.0282		BRL				20
Matrix Spike (2001428-MS1)			**Source: SC59063-03**			Prepared: 17-Aug-20 Analyzed: 20-Aug-20				
Mercury	**0.260**		mg/kg dry	0.0307	0.213	BRL	122	75-125		
Matrix Spike Dup (2001428-MSD1)			**Source: SC59063-03**			Prepared: 17-Aug-20 Analyzed: 20-Aug-20				
Mercury	**0.260**	QM7	mg/kg dry	0.0296	0.206	BRL	126	75-125	0.2	20
Reference (2001428-SRM1)						Prepared: 17-Aug-20 Analyzed: 20-Aug-20				
Mercury	**9.10**	D	mg/kg wet	0.600	9.38		97	42.1-100		

Notes and Definitions

D	Data reported from a dilution
QM7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QM8	The spike recovery exceeded the QC control limits for the MS and/or MSD. The batch was accepted based upon acceptable PS and /or LCS recovery.
QM9	The spike recovery for this QC sample is outside the established control limits. The sample results for the QC batch were accepted based on LCS/LCSD or SRM recoveries within the control limits.
R06	MRL raised to correlate to batch QC reporting limits.
dry	Sample results reported on a dry weight basis
NR	Not Reported
RPD	Relative Percent Difference
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Continuing Calibration Verification: The calibration relationship established during the initial calibration must be verified at periodic intervals. Concentrations, intervals, and criteria are method specific.

SC 59063 EM

eurofins

CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling:

☑ Standard TAT - 7 to 10 business days
☐ Rush TAT - Date Needed:

- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report to: Kevin Kavanaugh
ECMS, Inc.
288 Grove Street #391
Braintree, MA 02184

Project Mgr.: Kevin Kavanaugh

Invoice to: Kevin Kavanaugh
ECMS, Inc.
288 Grove Street #391
Braintree, MA 02184

P.O. No: RQN: 9802

Project No.: 1009.073
Site Name: Cashman School
Location: Amesbury, MA
Sampler(s): Kevin Kavanaugh

G=Grab C=Composite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: 4 oz Amber Glass (none)	Analyses: MCP 14 Metals Total	QA Reporting Notes: (check if needed)
SC59063-01	SSS-26	8/12/2020	08:40	G	Soil	1	X	MA RCS-1
-02	SSS-27	8/12/2020	08:45	G	Soil	1	X	MA RCS-1
-03	SSS-28	8/12/2020	09:15	G	Soil	1	X	MA RCS-1
-04	SSS-29	8/12/2020	09:35	G	Soil	1	X	MA RCS-1
-05	SSS-30	8/12/2020	09:45	G	Soil	1	X	MA RCS-1
-06	SSS-31	8/12/2020	10:00	G	Soil	1	X	MA RCS-1
-07	SSS-32	8/12/2020	10:15	G	Soil	1	X	MA RCS-1
-08	SSS-33	8/12/2020	10:30	G	Soil	1	X	MA RCS-1

QA Reporting Notes (check if needed):
☑ Provide MA DEP MCP CAM Rep
☐ Provide CT DPH RCP Report

QA/QC Reporting Levels
Standard

State specific reporting standard
MA RCS-1

☐ E-mail to:
EDD Format:

Condition upon receipt:
☐ Ambient ☐ Iced ☑ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Relinquished by:	Received by:	Date:	Time:
	Storage after 4°C	8/12/20	15:35
		8/13/20	13:18
		8/13/20	17:8

1-C/1/12.4 #6

Batch Summary

2001425

General Chemistry Parameters

SC59063-01 (SSS-26)
SC59063-02 (SSS-27)
SC59063-03 (SSS-28)
SC59063-04 (SSS-29)
SC59063-05 (SSS-30)
SC59063-06 (SSS-31)
SC59063-07 (SSS-32)
SC59063-08 (SSS-33)

2001427

Total Metals by EPA 6000/7000 Series Methods

2001427-BLK1
2001427-DUP1
2001427-MS1
2001427-MSD1
2001427-SRM1
2001427-SRM2
SC59063-01 (SSS-26)
SC59063-02 (SSS-27)
SC59063-03 (SSS-28)
SC59063-04 (SSS-29)
SC59063-05 (SSS-30)
SC59063-06 (SSS-31)
SC59063-07 (SSS-32)
SC59063-08 (SSS-33)

2001428

Total Metals by EPA 6000/7000 Series Methods

2001428-BLK1
2001428-DUP1
2001428-MS1
2001428-MSD1
2001428-SRM1
SC59063-01 (SSS-26)
SC59063-02 (SSS-27)
SC59063-03 (SSS-28)
SC59063-04 (SSS-29)
SC59063-05 (SSS-30)
SC59063-06 (SSS-31)
SC59063-07 (SSS-32)
SC59063-08 (SSS-33)

APPENDIX I

COPY OF MASSDEP SOIL SAMPLE ALPHA LABORATORY REPORT

ANALYTICAL REPORT

Lab Number:	L2033028
Client:	Massachusetts DEP 205B Lowell Street Wilmington, MA 01887
ATTN:	John Fitzgerald
Phone:	(978) 694-3308
Project Name:	RTN 3-0036397
Project Number:	102006.00
Report Date:	08/20/20

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Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: RTN 3-0036397
Project Number: 102006.00

Lab Number: L2033028
Report Date: 08/20/20

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2033028-01	DEP S-1 LITTLE LEAGUE	SOIL	Not Specified	08/12/20 08:15	08/13/20
L2033028-02	DEP S-2 LITTLE LEAGUE FIELD	SOIL	Not Specified	08/12/20 08:30	08/13/20
L2033028-03	DEP S-3 BACKGROUND	SOIL	Not Specified	08/12/20 08:40	08/13/20
L2033028-04	DEP S-4 BACKGROUND	SOIL	Not Specified	08/12/20 08:45	08/13/20

Project Name:	RTN 3-0036397	**Lab Number:**	L2033028
Project Number:	102006.00	**Report Date:**	08/20/20

MADEP MCP Response Action Analytical Report Certification

This form provides certifications for all samples performed by MCP methods. Please refer to the Sample Results and Container Information sections of this report for specification of MCP methods used for each analysis. The following questions pertain only to MCP Analytical Methods.

An affirmative response to questions A through F is required for "Presumptive Certainty" status		
A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	NO
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	YES
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	YES
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data?"	YES
E a.	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	N/A
E b.	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	N/A
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	YES

A response to questions G, H and I is required for "Presumptive Certainty" status		
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	YES
H	Were all QC performance standards specified in the CAM protocol(s) achieved?	NO
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	NO

For any questions answered "No", please refer to the case narrative section on the following page(s).

Please note that sample matrix information is located in the Sample Results section of this report.

Project Name:	RTN 3-0036397	**Lab Number:**	L2033028
Project Number:	102006.00	**Report Date:**	08/20/20

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	RTN 3-0036397	**Lab Number:**	L2033028
Project Number:	102006.00	**Report Date:**	08/20/20

Case Narrative (continued)

MCP Related Narratives

Sample Receipt

The Metals analyses performed were specified by the client.

In reference to question A:

The samples were received at the laboratory above the required temperature range and were not on ice.

In reference to question H:

A Matrix Spike was not submitted for the analysis of Total Metals.

Total Metals

In reference to question I:

All samples were analyzed for a subset of MCP analytes per client request.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Caitlin Walukevich

Caitlin Walukevich

Title: Technical Director/Representative

Date: 08/20/20

QC OUTLIER SUMMARY REPORT

Project Name: RTN 3-0036397
Project Number: 102006.00

Lab Number: L2033028
Report Date: 08/20/20

Method	Client ID (Native ID)	Lab ID	Parameter	QC Type	Recovery/RPD (%)	QC Limits (%)	Associated Samples	Data Quality Assessment

There are no QC Outliers associated with this report.

METALS

Project Name: RTN 3-0036397 **Lab Number:** L2033028

Project Number: 102006.00 **Report Date:** 08/20/20

SAMPLE RESULTS

Lab ID: L2033028-01 Date Collected: 08/12/20 08:15

Client ID: DEP S-1 LITTLE LEAGUE Date Received: 08/13/20

Sample Location: Not Specified Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 97%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Arsenic, Total	46.1		mg/kg	0.405	--	1	08/15/20 09:40	08/17/20 11:59	EPA 3050B	97,6010D	GD
Lead, Total	14.2		mg/kg	2.02	--	1	08/15/20 09:40	08/17/20 11:59	EPA 3050B	97,6010D	GD

Project Name: RTN 3-0036397 **Lab Number:** L2033028

Project Number: 102006.00 **Report Date:** 08/20/20

SAMPLE RESULTS

Lab ID: L2033028-02 Date Collected: 08/12/20 08:30

Client ID: DEP S-2 LITTLE LEAGUE FIELD Date Received: 08/13/20

Sample Location: Not Specified Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 94%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Arsenic, Total	45.2		mg/kg	0.416	--	1	08/15/20 09:40	08/17/20 12:04	EPA 3050B	97,6010D	GD
Lead, Total	10.9		mg/kg	2.08	--	1	08/15/20 09:40	08/17/20 12:04	EPA 3050B	97,6010D	GD

Project Name: RTN 3-0036397 **Lab Number:** L2033028

Project Number: 102006.00 **Report Date:** 08/20/20

SAMPLE RESULTS

Lab ID: L2033028-03 Date Collected: 08/12/20 08:40

Client ID: DEP S-3 BACKGROUND Date Received: 08/13/20

Sample Location: Not Specified Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Arsenic, Total	57.3		mg/kg	0.437	--	1	08/15/20 09:40	08/17/20 12:08	EPA 3050B	97,6010D	GD
Lead, Total	38.8		mg/kg	2.18	--	1	08/15/20 09:40	08/17/20 12:08	EPA 3050B	97,6010D	GD

Project Name: RTN 3-0036397 **Lab Number:** L2033028

Project Number: 102006.00 **Report Date:** 08/20/20

SAMPLE RESULTS

Lab ID: L2033028-04 Date Collected: 08/12/20 08:45

Client ID: DEP S-4 BACKGROUND Date Received: 08/13/20

Sample Location: Not Specified Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 94%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Arsenic, Total	66.6		mg/kg	0.399	--	1	08/15/20 09:40	08/17/20 12:13	EPA 3050B	97,6010D	GD
Lead, Total	29.5		mg/kg	2.00	--	1	08/15/20 09:40	08/17/20 12:13	EPA 3050B	97,6010D	GD

Project Name: RTN 3-0036397 **Lab Number:** L2033028

Project Number: 102006.00 **Report Date:** 08/20/20

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab for sample(s): 01-04 Batch: WG1399011-1										
Arsenic, Total	ND		mg/kg	0.400	--	1	08/15/20 09:40	08/16/20 13:52	97,6010D	PE
Lead, Total	ND		mg/kg	2.00	--	1	08/15/20 09:40	08/16/20 13:52	97,6010D	PE

Prep Information

Digestion Method: EPA 3050B

Lab Control Sample Analysis

Batch Quality Control

Project Name: RTN 3-0036397

Project Number: 102006.00

Lab Number: L2033028

Report Date: 08/20/20

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Total Metals - Mansfield Lab Associated sample(s): 01-04 Batch: WG1399011-2 WG1399011-3 SRM Lot Number: D109-540								
Arsenic, Total	105		99		70-130	6		30
Lead, Total	96		92		72-128	4		30

INORGANICS
&
MISCELLANEOUS

Project Name: RTN 3-0036397
Project Number: 102006.00

Lab Number: L2033028
Report Date: 08/20/20

SAMPLE RESULTS

Lab ID: L2033028-01
Client ID: DEP S-1 LITTLE LEAGUE
Sample Location: Not Specified

Date Collected: 08/12/20 08:15
Date Received: 08/13/20
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	97.3		%	0.100	NA	1	-	08/14/20 11:51	121,2540G	RI

Project Name: RTN 3-0036397
Project Number: 102006.00

Lab Number: L2033028
Report Date: 08/20/20

SAMPLE RESULTS

Lab ID: L2033028-02
Client ID: DEP S-2 LITTLE LEAGUE FIELD
Sample Location: Not Specified

Date Collected: 08/12/20 08:30
Date Received: 08/13/20
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	94.3		%	0.100	NA	1	-	08/14/20 11:51	121,2540G	RI

Project Name: RTN 3-0036397
Project Number: 102006.00

Lab Number: L2033028
Report Date: 08/20/20

SAMPLE RESULTS

Lab ID: L2033028-03
Client ID: DEP S-3 BACKGROUND
Sample Location: Not Specified

Date Collected: 08/12/20 08:40
Date Received: 08/13/20
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.0		%	0.100	NA	1	-	08/14/20 11:51	121,2540G	RI

Project Name: RTN 3-0036397
Project Number: 102006.00

Lab Number: L2033028
Report Date: 08/20/20

SAMPLE RESULTS

Lab ID: L2033028-04
Client ID: DEP S-4 BACKGROUND
Sample Location: Not Specified

Date Collected: 08/12/20 08:45
Date Received: 08/13/20
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	94.0		%	0.100	NA	1	-	08/14/20 11:51	121,2540G	RI

Project Name: RTN 3-0036397
Project Number: 102006.00

Lab Number: L2033028
Report Date: 08/20/20

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2033028-01A	Plastic 2oz unpreserved for TS	A	NA		20.3	Y	Absent		TS(7)
L2033028-01B	Metals Only-Glass 60mL/2oz unpreserved	A	NA		20.3	Y	Absent		MCP-AS-6010T-10(180),MCP-PB-6010T-10(180)
L2033028-02A	Plastic 2oz unpreserved for TS	A	NA		20.3	Y	Absent		TS(7)
L2033028-02B	Metals Only-Glass 60mL/2oz unpreserved	A	NA		20.3	Y	Absent		MCP-AS-6010T-10(180),MCP-PB-6010T-10(180)
L2033028-03A	Plastic 2oz unpreserved for TS	A	NA		20.3	Y	Absent		TS(7)
L2033028-03B	Metals Only-Glass 60mL/2oz unpreserved	A	NA		20.3	Y	Absent		MCP-AS-6010T-10(180),MCP-PB-6010T-10(180)
L2033028-04A	Plastic 2oz unpreserved for TS	A	NA		20.3	Y	Absent		TS(7)
L2033028-04B	Metals Only-Glass 60mL/2oz unpreserved	A	NA		20.3	Y	Absent		MCP-AS-6010T-10(180),MCP-PB-6010T-10(180)

*Values in parentheses indicate holding time in days

Project Name:	RTN 3-0036397	**Lab Number:**	L2033028
Project Number:	102006.00	**Report Date:**	08/20/20

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

Report Format: Data Usability Report

Project Name:	RTN 3-0036397	**Lab Number:**	L2033028
Project Number:	102006.00	**Report Date:**	08/20/20

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration

Report Format: Data Usability Report

Project Name:	RTN 3-0036397	**Lab Number:**	L2033028
Project Number:	102006.00	**Report Date:**	08/20/20

Data Qualifiers

Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Report Format: Data Usability Report

Project Name:	RTN 3-0036397	**Lab Number:**	L2033028
Project Number:	102006.00	**Report Date:**	08/20/20

REFERENCES

97 EPA Test Methods (SW-846) with QC Requirements & Performance Standards for the Analysis of EPA SW-846 Methods under the Massachusetts Contingency Plan, WSC-CAM-IIA, IIB, IIIA, IIIB, IIIC, IIID, VA, VB, VC, VIA, VIB, VIIIA and VIIIB, July 2010.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
EPA TO-12 Non-methane organics
EPA 3C Fixed gases
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb**,** As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Protection
Senator William X. Wall Experiment Station

Sample Tracking & Chain-of-Custody Record

Cooler Temperature at Receipt _____ °C

WES Sample Log-In Batch # _____

Agency-Bureau-Division-Region

Bureau: MassDEP
Division/Unit: BWSC

- ☐ DEP WES
- ☑ DEP NERO
- ☐ DEP CERO
- ☐ DEP Boston
- ☐ DEP SERO
- ☐ DEP WERO
- ☐ Other Agency: _____

Project Description

Name: Cashman School
Coordinator: Giddings
Phone #: 857-5218
Fax #: _____
RTN: _____
Case #: _____

Analytical Laboratory *(for samples sent to a laboratory other than WES)*

Name: _____
Address: _____
Contact: _____
MA Cert#: _____
Phone #: _____

Sample Lab ID (Batch # above plus # below)	Sample Field ID	Site Name	Field Locator (Within Site)	Sample Matrix Code*	Collector (last name, first initial)	Collection Date	Collection Time	Sample Preserv. Code #**	G/C***	Chlorine Residual (yes/no)	Analysis Requested
1	DEP S-1	Cashman School	Little league	soil	Giddings	8/12/20	8:15	N/A	G	—	AS
2	DEP S-2	↓	field, Little league field	↓	↓	↓	8:30	↓	↓	—	
3	DEP S-3	↓	Background	↓	↓	↓	8:40	↓	↓	—	
4	DEP S4	↓	Background	↓	↓	↓	8:45	↓	↓	—	

Remarks:

Chain of Custody: *(Required, including signatures, for all samples submitted to WES Laboratories)*

Relinquished by: Printed name	Signature	Org.	Date	Time	Received by: Printed name	Signature	Org.	Date	Time
Paul Giddings	[signature]	MassDEP	8/13/20	9:56a	[signature]	GEOFFREY GRACE	[signature]	8/12/20	9:56

*** Matrix Codes**
AC = Air Canister
ACT = Air Cartridge Tube
AF = Air Filter
CPL = Commercial Product Liquid
CPS = Commercial Product Solid
DW = Drinking Water *(Treatment or distrib system)*
FBT = Fish/Biological Tissue
FEC = Feces/fecal matter
GRYW = Gray water
GW = Ground water
GWS = GW source for DW *(Incl. private wells)*
IWW = Industrial wastewater *(raw or treated)*
LL = Landfill leachate
LW = Liquid waste
ME = Marine/estuarine water
PT = Proficiency test sample
SED = Sediment
SOIL = Soil
SRW = Surface water
SRWS = SRW source for DW
STW = Storm water/CSO
SW = Solid waste
TB or FB = Trip or field blank *(usually Type I Reagent Water)*
UN = Unspecified water/wastewater
WO = Waste oil
WW = Domestic wastewater *(raw or treated)*
WWS = Wastewater sludge *(raw or treated biosolids)*

**** Sample Preserv Codes**
1 = Cool ≤ 4° C
2 = pH < 2 with H_2SO_4
3 = pH < 2 with HNO_3
4 = pH < 2 with HCl
5 = pH > 12 with NaOH
6 = Ascorbic acid
7 = Filtered (0.45-µm pore size)
8 = Sodium thiosulfate ($Na_2S_2O_3$)
9 = Mercuric chloride ($HgCl_2$)
10 = Sodium sulfite (Na_2S)
11 = Ammonium chloride (NH_4Cl)
12 = Ethylenediamine
13 = EDTA
14 = Methanol
15 = Reagent Water (Type I)

***** G/C = Grab/Composite**

Rev. #3.1, March 2007
Document1

APPENDIX J

ARSENIC AND URANIUM IN WATER FROM PRIVATE WELL COMPLETED IN BEDROCK OF EAST-CENTRAL MASSACHUSETTS – CONCENTRATIONS, CORRELATIONS WITH BEDROCK UNITS, AND ESTIMATED PROBABILITY MAPS, JOHN A. COLMAN, USGS, SCIENTIFIC INVESTIGATIONS REPORT 2011-5013

USGS
science for a changing world

Prepared in cooperation with the
Massachusetts Department of Environmental Protection
and the Massachusetts Department of Public Health

Arsenic and Uranium in Water from Private Wells Completed in Bedrock of East-Central Massachusetts—Concentrations, Correlations with Bedrock Units, and Estimated Probability Maps



Scientific Investigations Report 2011–5013

U.S. Department of the Interior
U.S. Geological Survey

Cover photos:

A quartz-diorite bedrock formation at the road cut northeast of the I-495, I-290 intersection, in Marlborough, Massachusetts. Photos by Marcus Waldron.

Arsenic and Uranium in Water from Private Wells Completed in Bedrock of East-Central Massachusetts—Concentrations, Correlations with Bedrock Units, and Estimated Probability Maps

By John A. Colman

Prepared in cooperation with the
Massachusetts Department of Environmental Protection and the
Massachusetts Department of Public Health

Scientific Investigations Report 2011–5013

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
KEN SALAZAR, Secretary

U.S. Geological Survey
Marcia K. McNutt, Director

U.S. Geological Survey, Reston, Virginia: 2011

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Conversion Factors and Datums

Multiply	By	To obtain
	Area	
square kilometer (km^2)	0.6214	square mile (mi^2)

Temperature in degrees Celsius (°C) can be converted to degrees Fahrenheit (°F) as follows: $°F = (1.8 \times °C) + 32$
Specific conductance is given in microsiemens per centimeter at 25 degrees Celsius (µS/cm at 25 °C).
Concentrations of chemical constituents in water are given in micrograms per liter (µg/L).

Acronyms and Additional Abbreviations

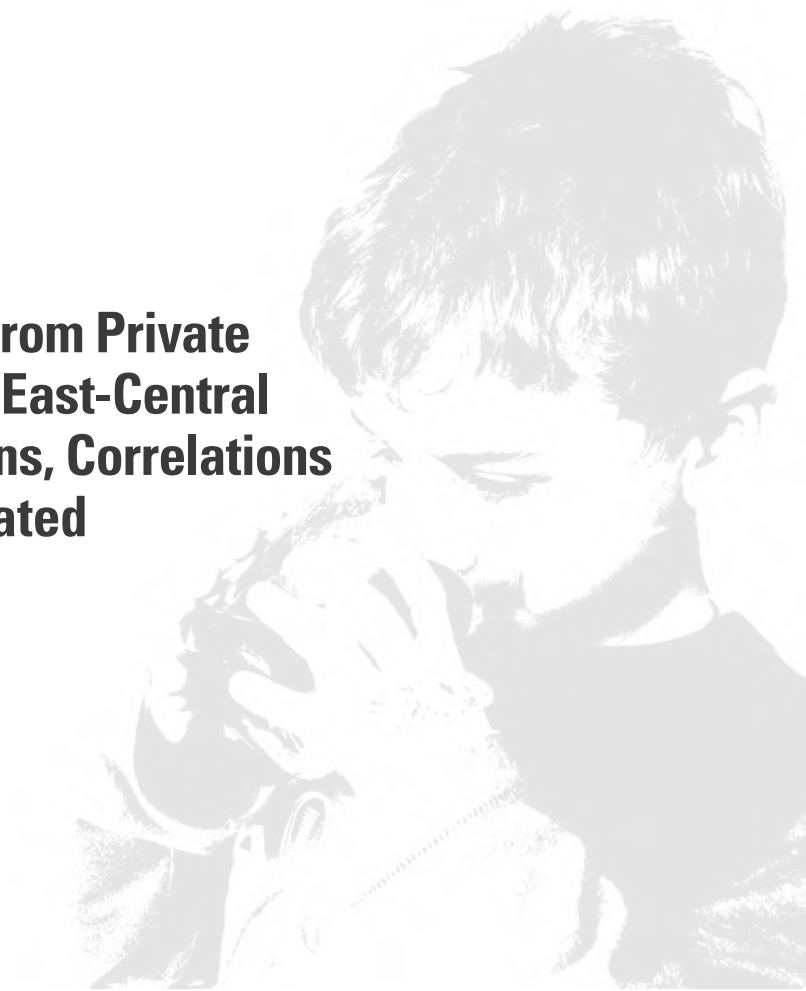
ANOVA	analysis of variance
GIS	Geographic Information System
MDEP	Massachusetts Department of Environmental Protection
MDPH	Massachusetts Department of Public Health
MCL	maximum contaminant level
µg/L	micrograms per liter
µS/cm	microsiemens per centimeter
mL	milliliter
NWQL	National Water Quality Laboratory
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey

Acknowledgments

This investigation would not have been possible without the participation of the many well users who sent in water samples for analysis. Discussion and project planning with the late Elaine Krueger was instrumental for development of the project. Support from the Massachusetts Department of Environmental Protection and the Massachusetts Department of Public Health is greatly appreciated.

Arsenic and Uranium in Water from Private Wells Completed in Bedrock of East-Central Massachusetts—Concentrations, Correlations with Bedrock Units, and Estimated Probability Maps

By John A. Colman



Abstract

Two U.S. Environmental Protection Agency drinking-water standards for public supplies involving groundwater contaminants that may derive from bedrock sources were promulgated between 2003 and 2006. A new arsenic drinking-water standard, a maximum contaminant level (MCL) of 10 micrograms per liter, became effective in January 2006. The non-radon radionuclides final standard took effect in December 2003, with an MCL for uranium of 30 micrograms per liter. This investigation, conducted in cooperation with the Massachusetts Department of Environmental Protection and the Massachusetts Department of Public Health, assessed the concentration ranges of arsenic and uranium in bedrock wells with reference to the new concentration standards, and associations of arsenic and uranium with bedrock units of the wells of east-central Massachusetts. The investigation focused on east-central Massachusetts, because State public bedrock-well databases indicate that arsenic concentrations in bedrock well water are elevated in that area. The project exploited the wide areal coverage of private wells to give the first detailed look at concentration distributions of arsenic and uranium through the high-arsenic zone of Massachusetts. The results establish statistical probabilities for elevated concentrations by bedrock unit at the scale of the State geologic map (1:250,000), which can guide future well-water testing, treatment, and supply development.

Well sampling was from 478 randomly selected wells by private-well users who were sent sampling-kit bottles with instructions and a water-use questionnaire. Results indicated that 13 percent of the randomly selected wells contained water with concentrations greater than the drinking-water standard established for public wells for arsenic, and 3.5 percent were greater than the standard for uranium. Arsenic and uranium did not in general co-occur in water of a given well. Of the wells with concentrations exceeding the standards, the questionnaire results indicated that 66 percent were being used for drinking water without treatment for arsenic, and 93 percent were being used without treatment for uranium.

Statistical analysis of the results indicated that distributions of arsenic and uranium concentrations grouped by bedrock unit were log normal. Statistically significant differences were found among distributions by bedrock unit for both arsenic and uranium. However, a zone of elevated concentrations of arsenic was found in groundwater west of the Clinton-Newbury fault (a boundary between two geologic terranes), where correlation between arsenic concentrations and the bedrock units was not significant.

Increased sampling in the investigation was directed in the regions of three 1:24,000 (7.5-minute) quadrangles where recent detailed geologic mapping had been conducted. Improved correlations of arsenic and uranium with bedrock unit were measured for two of the three quadrangles compared to the correlations made for the statewide map.

Cumulative distribution frequencies of concentrations grouped by rock unit or area (zone of elevated arsenic concentration) were used to assess the probability of wells having concentrations exceeding the drinking-water standards. The probabilities were mapped and applied to the estimated number of private wells in the study area to determine the likely number of wells in the study area with concentrations exceeding the standards. For arsenic and uranium, respectively, about 5,700 and 3,300 wells were estimated to contain concentrations exceeding the standards. Estimates for arsenic may approach the total number for the State, because the study area covered the principal known area of elevated arsenic concentrations.

Introduction

Two U.S. Environmental Protection Agency (USEPA) drinking-water standards involving groundwater contaminants that may derive from bedrock sources were promulgated between 2003 and 2006. A new maximum contaminant level (MCL) standard of 10 micrograms per liter (µg/L) for arsenic in drinking water became effective in February 2002, with compliance required by January 2006. The non-radon radionuclides final rule took effect in December 2003, with an MCL for uranium of 30 µg/L. The standards apply to public water supplies. In Massachusetts, the Massachusetts Department of Environmental Protection (MDEP) recommends that the standards also be used as guidelines for private supplies (Massachusetts Department of Environmental Protection, 2008).

Private water supply in Massachusetts, exclusive of the sand and gravel aquifers of the southeastern part of the State, is obtained primarily from wells drilled in bedrock (Hansen and Simcox, 1994). Bedrock water sources also are used for small commercial water supplies and, in some locations, for moderate to large municipal and industrial supplies (Hansen and Simcox, 1994; Lyford, and others 2003). Tens of thousands of private and public bedrock wells are used in the State —91,000 private bedrock wells were estimated for the bedrock geologic units investigated in this study.

Arsenic has long been known to be present in water from bedrock wells in east-central Massachusetts (Zuena and Keane, 1985; Ayotte and others, 2003; 2006), and the State straddles an arsenic belt that extends from Connecticut to New Brunswick, Canada. Elevated uranium concentrations in water from bedrock wells have been associated with igneous rock throughout New England, but also are present in water from other crystalline rock aquifers in the region (Ayotte and others, 2007). This investigation, conducted by the U.S. Geological Survey (USGS) in cooperation with the Massachusetts Department of Environmental Protection (MDEP) and the Massachusetts Department of Public Health (MDPH), was designed to assess the concentration ranges and associations of arsenic and uranium with reference to the new concentration standards and to the classifications of the bedrock geologic units (hereafter bedrock units) in which the wells are drilled. The results can be used to establish statistical probabilities for elevated concentrations by bedrock unit, which can guide future well-water testing, treatment, and supply development.

Purpose and Scope

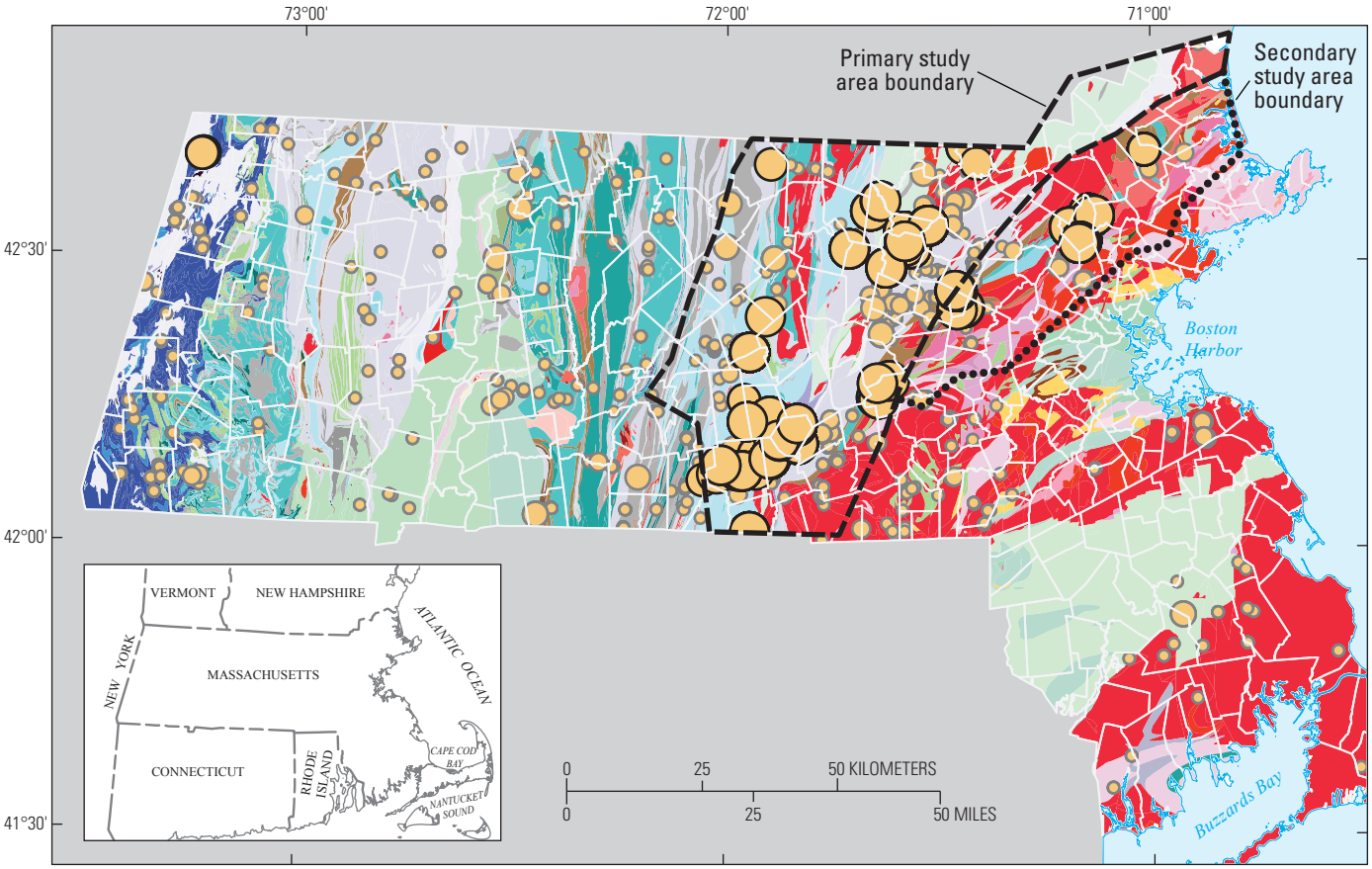
Information about bedrock associations of arsenic and uranium with bedrock well water are needed in Massachusetts to guide future well-water testing, treatment, and supply development. Probability distributions of well-water contaminants by bedrock unit will indicate the likelihood of contamination at a given concentration. Maps of these probabilities can be used to determine the likelihood of the presence of elevated arsenic or uranium concentrations in water of new wells in a given location or for directing testing priorities for existing wells.

The study encompasses the east-central arsenic belt in Massachusetts (fig. 1), the location of nearly all contamination of bedrock wells in the State by arsenic from a natural source. Many but not all wells contaminated by uranium are included in the same area, although igneous rocks, and likely uranium contamination, also occur outside the arsenic belt.

The principal focus of this report is the collection and interpretation of new data from 478 private bedrock wells. The amount of existing unpublished MDEP data from public bedrock wells is large, however, and may substantially supplement the number of observations per bedrock unit. The public bedrock-well data were used for qualitative analysis of the extent of contamination of bedrock units. The newly collected data were used to compute statistics of contaminant distribution. A reporting goal is to produce maps showing the probability statistic that concentrations of arsenic or uranium in well water exceed the drinking-water standards.

Health Effects of Arsenic and Uranium

Health effects from exposure to elevated concentrations of arsenic in drinking water have been established from studies in countries with very elevated levels of arsenic in water supplies, especially Taiwan (Smith and others, 1992; Lamm and others, 2003). Inorganic arsenic is well documented as a human carcinogen of the bladder, lungs, and skin (Centeno and others, 2007). Inorganic arsenic has also been demonstrated to affect many other organ systems, including the gastrointestinal, hepatic, cardiovascular, nervous, renal, and hematopoietic systems. A recent interest in arsenic in drinking water in the northeastern part of the United States relates to possible correlations with increased rates of bladder cancer in the region (Devasa and others, 1999; Ayotte and others, 2006). Epidemiological results demonstrating links between arsenic and health problems involve concentrations greater than the current USEPA drinking-water standard by an order of magnitude or more (National Research Council, 2001). Risk levels at



Base geology from Zen and others (1983), digitized by Nicholson and others (2007), scale 1:250,000, NAD 1983, StatePlane Massachusetts Mainland FIPS 2001, Lambert Conformal Conic projection

EXPLANATION

Town boundary

Arsenic, in micrograms per liter—Black-border symbols indicate concentrations greater than the U.S. Environmental Protection Agency public drinking-water standard

- < 1
- 1 – < 5
- 5 – < 10
- 10 – < 20
- 20 – 1,000

Figure 1. Arsenic concentrations in public bedrock wells in Massachusetts, 2008. Data from the Massachusetts Department of Environmental Protection. See figure 3 and appendix 1 for explanation of bedrock units in the east-central part of Massachusetts. <, less than

the standard are determined by extrapolation from the higher exposure studies. The National Research Council review for the National Academy of Science estimated the bladder cancer risk at about 12 to 23 per 10,000 persons with lifetime consumption of drinking water at 10 µg/L, the current public supply drinking-water standard. Lung cancer risk is estimated at about 14 to 19 per 10,000 persons at 10 µg/L (National Research Council, 2001).

Little is known about the long-term health effects on humans of exposure to low-level environmental uranium. Studies of occupationally exposed persons, such as uranium miners, have shown that the major health effect of uranium in the body is renal (kidney) toxicity (Leggett, 1989; Taylor and Taylor, 1997).

A discussion of the health effects of uranium in New England can also consider the effects of radium and radon, which are associated with uranium in crystalline bedrock aquifers (Ayotte and others, 2007). The association arises from the radioactive decay chain of uranium, which results in radium, through several radioactive decay product precursors. Radium decays directly to short-half-lived radon (3.8 days). Decay of radon results in four short-lived daughters and then longer-lived lead (22 years). Where uranium in drinking water is measured greater than the standard, analyses for radium and radon also could be done. Depending on the analysis technique, differential costs of analyses of the radionuclides means that uranium analysis may be an inexpensive indicator (when compared to gross alpha analysis) for determining the presence or absence of other radionuclides.

Previous Investigations

Several previous water-quality investigations exist for arsenic in New England and areas of Massachusetts. Investigations of uranium are more limited and cover the entire Northeast. The first published investigation to address the concerns of arsenic concentrations in private bedrock wells of New England referred to southeastern New Hampshire (Boudette and others, 1985). Bedrock and anthropogenic sources were analyzed, and the conclusion was drawn that the source was probably anthropogenic. A similar investigation of arsenic wells in Buxton, Maine, concluded that the likely source was bedrock (Marvinney and others, 1994). A three-town investigation in southern New Hampshire, very similar to the present Massachusetts investigation, reported the percentages of arsenic samples with concentrations greater than the 10 µg/L standard by bedrock unit (Montgomery and others, 2003). Several New England-based investigations have evaluated the risk for arsenic occurrence in the region—number of wells affected and probability maps of concentrations greater than or equal to 5 µg/L (for example, Karagas and others, 2002; Ayotte and others, 2003; 2006). Ayotte (2006) used a logistic regression based on many geologic, hydrologic, and anthropologic statistics for the region. A nationwide investigation of contaminants in private wells of selected aquifers included distribution plots of arsenic concentrations for the New England bedrock aquifer (DeSimone, 2009). The New England aquifer was the only aquifer investigated in the eastern United States with elevated concentrations of arsenic in private wells.

One survey of arsenic in private wells from Massachusetts is available from an investigation in Pepperell, Massachusetts (SEA Consultants, 1985). Water was analyzed from 300 wells, and 12 percent of them had concentrations that exceeded the 50-µg/L USEPA standard that was in effect at that time. Attempts to distinguish natural sources of arsenic in bedrock from anthropogenic sources, such as pesticides applied to orchards, were not successful.

Finally, a geologically based review of arsenic presence in the Northeast was published by Peters (2008). The investigation discusses arsenic presence in overburden and bedrock wells from natural and anthropogenic sources. Peters (2008) showed that arsenic concentrations were not correlated with iron concentrations in bedrock well water, and that elevated arsenic concentrations were associated with contacts between metamorphic and intrusive igneous rock.

Uranium was included in the DeSimone (2009) survey of private wells, including several overstandard samples in the New England crystalline-rock aquifers, but the study involved few samples from Massachusetts. In an investigation summarizing uranium and radon data from the northern United States, a correlation was found between uranium, radium, and radon in the New England bedrock aquifer (Ayotte and others 2007). Of the nine northern aquifers investigated, median concentrations of radon and uranium were highest and third highest, respectively, in the New England bedrock aquifer.

Investigative Design

The investigative design followed that of Montgomery and others (2003) in southeastern New Hampshire, addressing the correlations between bedrock units and concentrations of arsenic and uranium. The intent in this study was to cover the known elevated-arsenic areas in Massachusetts so that the assessment of arsenic contamination in the State would be advanced as much as possible. However, future studies may be necessary to characterize other parts of the State with limited areas of elevated arsenic.

Study Area

The primary study area (fig. 1), in east-central Massachusetts, was chosen to include the area of elevated results (greater than or equal to the USEPA drinking-water standard for public supplies, 10 µg/L) of arsenic in public wells (primarily bedrock) published from the MDEP database (Ayotte and others, 2003). Data reviewed after initiation of the project (J.A. Cerutti, Massachusetts Department of Environmental Protection, written commun., 2008; Ayotte,

2006) indicated additional elevated concentrations to the east of the principal study area and one elevated value in the northwest (fig. 1). The primary study area was augmented with a secondary study area (fig. 1) to cover the elevated concentrations in the east. By including the areas of known elevated concentration, the investigation would define arsenic occurrence in the principal areas of Massachusetts where concentrations could be expected to exceed the drinking-water standard.

Although the project study areas were determined on the basis of concentrations of arsenic in bedrock wells, the areas were also appropriate for investigation of uranium (fig. 2). MDEP data show that the arsenic-defined areas include many of the elevated concentrations of uranium in the State. The MDEP uranium coverage is less extensive than that for arsenic, so uranium concentrations are unknown in some areas. Not all of the bedrock units that may have elevated uranium were characterized in the present investigation; however, enough elevated-concentration units were included that correlations between uranium and bedrock unit would be apparent if uranium were controlled by rock type.

The distribution of bedrock units of crystalline igneous and metamorphic rocks in the study area is complex (fig. 3). The study area is crossed by major faults that divide parts of three geologic terranes that include the Merrimack belt, the Nashoba zone and the Milford-Dedham zone (Hatch, 1991, p. v, fig. 2). The primary study area includes most of the Merrimack belt, which extends from the Connecticut Valley belt (indicated by the Merrimack belt western boundary in fig. 3) to the Clinton-Newbury fault (fig. 3), and the western half of the Nashoba zone, which extends from the Clinton-Newbury fault to the Bloody Bluff fault (fig. 3). The secondary study area includes the remainder of the Nashoba zone and the western edge of the Milford-Dedham zone, which begins at the Bloody Bluff fault and extends to the east.

Geologic units are as defined in the digitized version (Nicholson and others, 2007) of the bedrock map of Massachusetts (Zen and others, 1983). The use of these maps to define geologic units for wells is, of course, only as accurate as could be determined from a 1:250,000-scale map. There is the chance that wells near a bedrock boundary may not be correctly assigned to a bedrock unit. Bedrock wells are on the order of 100 m deep and unscreened in their bedrock portions. As such, they may encounter geologic units at depth that are different from units as mapped at the surface. But, due to the scale of the map (1:250,000), only the major rock type is shown at the location of the borehole. For example, a borehole study in a 305-m deep well in Tyngsborough, Mass., is located in the Ayer Granite bedrock unit SOad, but the borehole contains xenoliths of the host metasedimentary Berwick Formation (unit Sb) (Pierce and others, 2007). The level of detail seen in boreholes cannot be displayed on a State-scale map, and detailed studies of individual boreholes are beyond the scope of this regional study.

Sampling Distribution

Well locations were chosen for the study areas by stratified random selection across the bedrock units. Previous arsenic-concentration data (Ayotte and others, 2003; Joseph Cerutti, unpub. data, 2008) indicated that arsenic was more prevalent in the 69 bedrock units of the primary study area, so more sampling was directed at this area. One sampling objective was to collect at least seven samples per bedrock unit so that statistical inference could be made even for small units. So that large units would have coverage throughout their extent, a second objective was applied to supplement the initial seven samples by an additional one sample per 20 km^2 for units 20 km^2 and larger. The largest unit, the Paxton Formation (Sp), is 822 km^2, so the sampling objective for this unit was 48 wells. In the secondary area, the selection objective was 5 wells for each of the 12 bedrock units investigated.

Although a minimum of seven sites per unit in the primary study area was desired, some small units did not have this number of private wells (or even residences) available. Also, areas with public water supplies were necessarily excluded from the investigation, which left gaps in data for some units. These unavoidable exclusions of sampled areas biased the study toward areas where bedrock wells existed.

Wells were selected using randomly generated geo-coordinates and matching closest Google-Earth determined locations of well addresses to well lists provided by the Massachusetts Department of Conservation and Recreation. Locations of the selected sites were moved from the street locations provided by Google Earth to positions of the building at that address using field observations of addresses and buildings, and georeferenced ORTHO photos (Massachusetts Office of Geographic Information (MassGIS), 2005).

Increased sampling in the investigation was directed in the regions of three 1:24,000 (7.5 minute) quadrangles where recent detailed geologic mapping had been conducted. Comparisons of correlations of arsenic and uranium with geologic units based on 1:250,000-scale mapping to those based on more recent 1:24,000-scale mapping could indicate the efficacy of remapping for arsenic and uranium delineation and for correlation with bedrock.

Sample Collection and the Well-User Questionnaire

Samples were collected by private well users during spring and summer of 2009, using bottles included in a sampling kit mailed to the residence at the location of the well. The kit included two labeled 125-mL bottles, a business reply Tyvek® envelope, and a questionnaire to determine water-use practices at the site, as well as to inform the bottle recipients about the program and how to collect the water sample (app. 2). Twice as many sampling kits were mailed out compared to the number required to meet the sampling

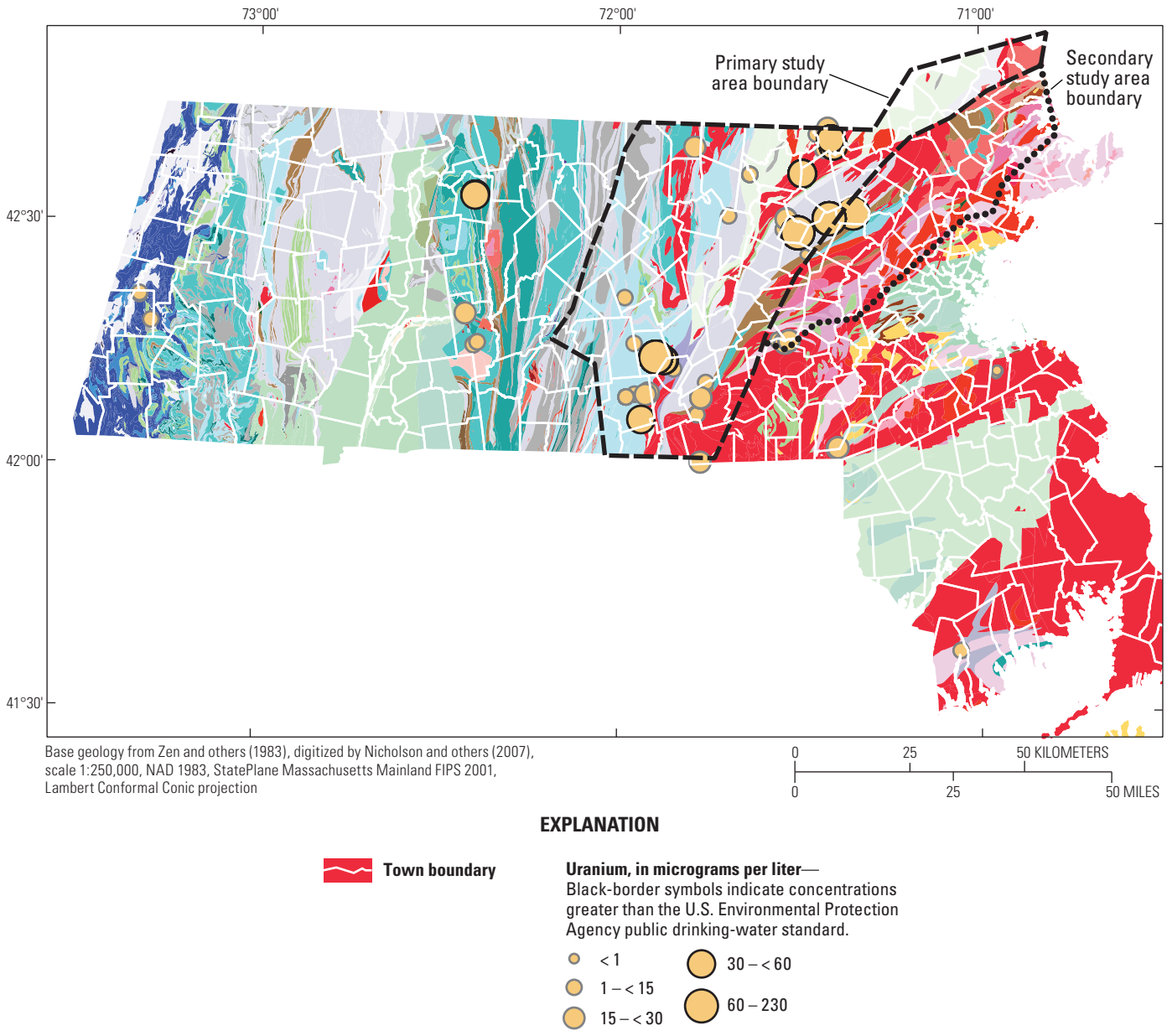


Figure 2. Uranium concentrations in public bedrock wells in Massachusetts, 2008. Data from the Massachusetts Department of Environmental Protection. See figure 3 and appendix 1 for explanation of bedrock units in the east-central part of Massachusetts. <, less than

objective for each rock type. A 50-percent return rate was expected, based on return rates from a similar investigation in New Hampshire (Montgomery and others, 2003). Well users were given 1 month to reply before a followup card was sent. If no reply had been received by 2 months after the followup card, the site was dropped from the study.

Sample Processing and Analytical Methods

All samples were collected by the residents living at the addresses selected for sampling. The samples were returned in a Tyvek® envelope by mail to the USGS office in Northborough, Mass. Samples intended for trace-constituent analysis were acidified to a pH less than 2 in the Northborough laboratory with 0.4-mL analytical-grade concentrated nitric acid (HNO_3). The acidified samples were sent to the USGS National Water Quality Laboratory (NWQL) in Denver, Colo., for analysis as listed in table 1. At the laboratory, samples were subject to an in-bottle acid digestion before analysis so that results represented total constituent values.

Supplemental Data

Additional data (1997 to 2007) on arsenic and uranium in bedrock wells were retrieved from the database of the MDEP (Joseph Cerutti, unpub. data, 2008) (figs. 1 and 2). The data were from analyses of water in public wells and were screened to include only data from bedrock wells. Although the results likely were relevant to the investigation, some differences prevented a simple combination of the data with that collected during this investigation. Different and multiple laboratories (State certified) were used for the analyses for MDEP data than were used for the USGS data. Greater water use may be expected from the public wells in the MDEP database compared to the private wells in the USGS database. The MDEP data were used to help define the areal distribution of arsenic and uranium but were not used in statistical summaries of occurrence of these constituents.

Statistical Comparisons

Parametric statistical tests were used, which are appropriate if normality or any other specific distribution (log normal in this investigation) can be assumed (Iman and Conover, 1983). Analysis of associations of concentration with bedrock unit was determined by one-way analysis of variance (ANOVA) on log-transformed concentration data, using the statistical software package Minitab 16®. Cumulative distribution functions with 95-percent confidence intervals were determined for concentration populations grouped by bedrock unit by fitting data to a log-normal distribution, using the statistical software package Minitab 16® with the options for distribution analysis, and arbitrary data censoring. For bedrock units with fewer than five analyses with concentrations exceeding the analytical reporting limit, the option to assume a common scale was used in the distribution fitting.

The statistical software package SPLUS® was used to compare geologic mapping techniques and the correlation with arsenic and uranium concentrations. The comparisons were made with a multiple linear regression of log-transformed data.

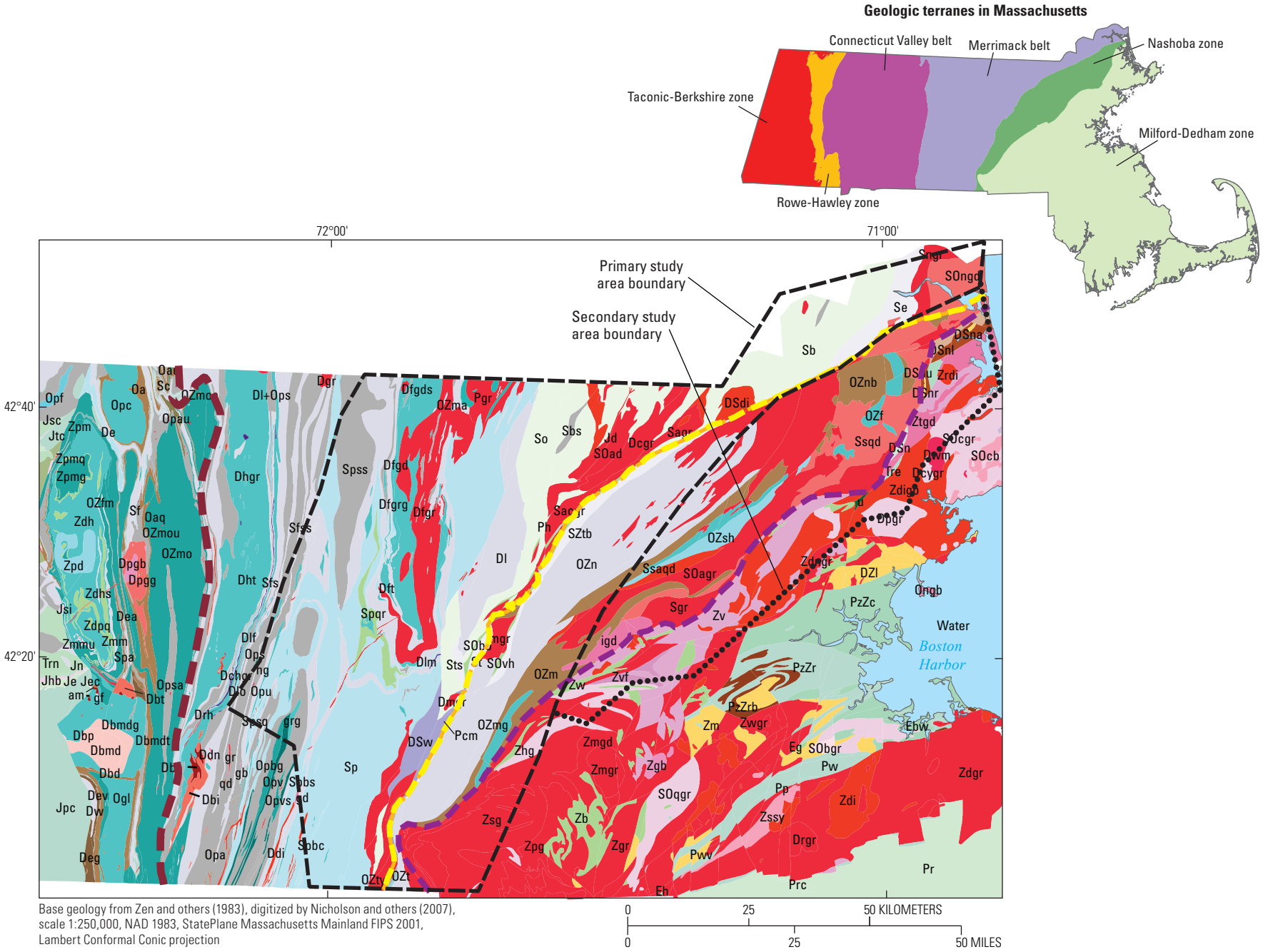
Arsenic and Uranium Concentrations and Correlations with Bedrock Units

The ranges and correlations of arsenic and uranium concentrations among bedrock units are the focus of this project. The project objective is to use the correlations to guide future well-water testing, treatment, and supply development.

Quality Assurance and Other Data Attributes

During the investigation, 60 quality-assurance samples were analyzed for iron, manganese, arsenic, and uranium. The quality-assurance samples included sampling-bottle and preservation-acid blanks, a standard-reference sample, resampling, duplicate sampling, and sample splits (table 2). Quality-assurance results of the blank samples showed that possible contamination did not occur during sampling, during sample handing, or from sampling materials (the bottles and preservation acid). All concentrations measured for the four sampling-bottle blanks during the study were below the reporting limits (table 1) for the respective analytes (table 2). Four samples of standard reference solution (USGS T-195) submitted to the NWQL as blind samples were generally within 5 percent of the known values. Average percent errors (average, in percent, of the absolute difference between replicate pairs divided by the average of the replicates) increased for all elements in the comparison series: split samples, duplicate samples separated by 5 minutes, and duplicate samples separated by months (average interval of 80 days). The error increase reflected variability in samples over time—small, but measureable for samples collected within 5 minutes, and larger for samples collected months apart.

Variability of concentrations over time was investigated by analysis of 48 duplicate samples. USGS personnel visited 12 randomly chosen wells where three samples were collected at each well: duplicate samples within 5 minutes and a third sample to compare with the original sample collected by the well user. Results showed that repeatability for samples collected sequentially at one visit was very good, but that substantial variation can occur for a well sampled over time (fig. 4). Sampling error from additional sources is possible in resampling over time, including the possibility of sampling from different water taps by mistake.



Base geology from Zen and others (1983), digitized by Nicholson and others (2007), scale 1:250,000, NAD 1983, StatePlane Massachusetts Mainland FIPS 2001, Lambert Conformal Conic projection

EXPLANATION

Rock type	Bedrock
alkali-granite (alaskite)	Dcygr Dpgr SOcgr SOqgr Zagr Zhg
amphibolite	am Dea Oa Opa OZm OZmoa OZnb Spa
andesite	DSna
argillite	Ebw Eh PzZc
arkose	Jm Jn Trn
augen gneiss	Opau
basalt	DSnl
biotite gneiss	Opau Opvs OZfm OZmo Zpm Zpmg
calc-silicate rock	Sfs
conglomerate	Jec
dacite	Dbd
diabase	Jd
diorite	Ddi Ddn di DSdi Ssaqd Zdi Zdigb Zrdi
felsic gneiss	Dlf Opf
felsic metavolcanic rock	Zvf
gabbro	Dpgb gb Ongb Zgb
gneiss	Drh OZsh OZtf Zpd
granite	Dcgr Cmgr Drgr gr mgr Pgr Sacgr Sagr Sgr Sngr SOad SOagr Zdgr Zdngr Zgr Zmgd Zmgr Zpg Zsg Zwgr
granitic gneiss	Dbmdg Dchgr Dfgd Dfgds Dfgrg Dhgr Dht grg Ogl Opc OZf OZmg Zdh

Rock type	Bedrock
granodiorite	Dgd gd igd Ztgd
granofels	De gf Sf Sp Spbc Spbs
granulite	Deg
hornblendite	Dbh Oau
mafic gneiss	Dchh Dlo hg Opv
mafic volcanic rock	PzZrb
marble	Dlm
metasedimentary rock	Sb So
metavolcanic rock	Zv
mica schist	Dev Dl+Ops Ops Opsa OZty Sbs Sfss
monzonite	Dwm
mudstone	DSnu
mylonite	Jfg
paragneiss	OZma
pegmatite	Dpe
peridotite	Dbp OZmou Zmmu
phyllite	Dgm Se SObo Sts SZtb
porphyry	SObgr
quartz diorite	Dbi
quartz monzodiorite	Dbmd Dbmdt

Rock type	Bedrock
quartzite	Eg Oaq PZfmg SOvh Soqr St Zb Zdpq Zpmq Zw
rhyolite	DSnr DZl Pwv Zm
sandstone	Je Jsm Jt Pr Prc
schist	Dl Dw OZn OZt Spsq Zdhs Zmm
sedimentary breccia	Jma
sedimentary rock	DSn
serpentinite	u
slate	DSw Pcm
syenite	SOcb Zssy
tonalite	Dbt Dft Dpgg SOngd Ssqd
tuff	Jgb
ultramafic intrusive rock	Opu

Merrimack belt western boundary

Bloody Bluff fault

Clinton-Newbury fault

Figure 3. Bedrock units and principal faults in the project study area of east-central Massachusetts. See appendix 1 for explanation of bedrock units. Map colors from Moyer and others, 2005.

Table 1. Chemical analytical methods used in the arsenic and uranium study, east-central Massachusetts, 2009.

[NWQL, U.S. Geological Survey National Water Quality Laboratory, Denver, Colo.; NA, not applicable; ºC, degrees Celsius]

Constituent	Units	Method	Reporting limit	Method reference
Acid neutralizing capacity	Milligrams per liter as calcium carbonate	Auto titrator at the USGS Northborough lab	NA	Rounds, 2006
Conductance	Microsiemens per centimeter at 25 °C	Orion conductance probe at the USGS Northborough lab	NA	Radtke and others, 2005
pH	pH log units	Initial pH from alkalinity titration at the USGS Northborough lab	NA	Ritz and Collins, 2008
Arsenic	Micrograms per liter	In-bottle acid digestion followed by collision/reaction cell inductively coupled plasma/collider mass spectrometry at NWQL	0.2	Garbarino and others, 2006; Garbarino and Struzeski, 1998
Iron	Micrograms per liter	In-bottle acid digestion followed by inductively coupled plasma-atomic emission spectroscopy at NWQL	14	Garbarino and others, 2006; Garbarino and Struzeski, 1998
Manganese	Micrograms per liter	In-bottle acid digestion followed by inductively coupled plasma/collider mass spectrometry at NWQL	0.4	Garbarino and others, 2006; Garbarino and Struzeski, 1998
Uranium	Micrograms per liter	In-bottle acid digestion followed by inductively coupled plasma/mass spectrometry at NWQL	0.02	Garbarino and others, 2006; Garbarino and Struzeski, 1998

Return Rates for the Water Samples

Of the total 1,580 sample kits sent to well users, samples from 478 wells were returned, a 30-percent return rate. The low return rate resulted in several bedrock units that had too few samples for statistical analysis.

Water Use and Water Quality at Sampled Wells

Results from the returned questionnaires indicate that 91 percent of the respondents use their well water for drinking. Many users treat the water in some way including softening, radon removal, arsenic removal, and reverse osmosis. Of the respondents with wells having arsenic concentrations exceeding the drinking-water standard, however, 66 percent were using water for drinking without treatment. Of the respondents with wells having uranium concentrations exceeding the standard, 93 percent were using water for drinking without treatment. The statistic included one respondent that was not using the water for drinking because it had not been tested. Thus, none of the respondents with wells having uranium concentrations exceeding the standard were treating the water for uranium removal.

Arsenic Concentrations

Arsenic concentrations in the complete dataset ranged from less than 0.2 µg/L (less than the laboratory reporting limit) in 24 percent of all samples tested to 1,540 µg/L. Of the 344 randomly selected samples (excluding intensive quadrangle sampling), 13 percent exceeded the 10 µg/L drinking-water standard. For randomly selected samples from the primary study area, a slightly larger fraction of samples,

Table 2. Quality-assurance results for arsenic, iron, manganese, and uranium.

[USGS, U.S. Geological Survey]

Quality-assurance measure	Details	Number of samples	Result
Bottle blanks	Sample bottles had been sent out in mailers, and were preserved with acid	4	All concentrations were less than the method detection limit
Standard reference samples	USGS standard reference water sample, number T-195	4	Mean relative errors were Arsenic: 4.9 percent Iron: 2.4 percent Manganese: 0.62 percent Uranium: 5.6 percent
Sample splits	One sample split for two analyses	13	Mean relative errors were Arsenic: 3.8 percent Iron: 1.8 percent Manganese: 6.2 percent Uranium: 0.74 percent
Duplicates at one time	Samples collected sequentially on one sampling occasion	13	Mean relative errors were Arsenic: 5.8 percent Iron: 11.3 percent Manganese: 15.1 percent Uranium: 3.3 percent
Duplicates over time	Two samples collected on different sampling days	13	Mean relative errors were Arsenic: 49.5 percent Iron: 80.1 percent Manganese: 61.2 percent Uranium: 74.3 percent

15 percent, exceeded the standard. Concentrations of arsenic were not elevated in the 18 samples west of the primary study area, but some elevated concentrations were measured in the secondary study area, located east of the primary study area (fig. 5). Elevated concentrations can exist near low concentrations in the same bedrock unit, similar to distributions measured in other New England studies (Montgomery and others, 2003).

Arsenic Correlations with Bedrock Units

Arsenic concentrations in well water vary depending on the bedrock unit (fig. 6). Generally, concentrations are not narrowly distributed but rather extend above and below the median concentration for the bedrock unit by an order of magnitude or more. Although there are no bedrock units with elevated concentrations that do not also include low concentrations, there are some units with only low concentrations. One of the lowest-concentration units, Ops, is on the western edge of the study area, confirming the western limit to the elevated-concentration area in east-central Massachusetts. Each of the rock classifications of metamorphic, metamorphic with igneous intrusive, and igneous includes low-concentration and elevated-concentration units.

The variation within a bedrock unit indicates that median concentrations cannot be used for accurate predictions of concentrations in a unit. Concentrations in bedrock units are generally log normally distributed, so parametric statistical tests can be used to determine whether bedrock units and concentrations are related, or if distributions among bedrock units are significantly different. If a relation exists, probabilities of a bedrock well containing a given concentration may be calculated for each bedrock unit from cumulative distribution frequencies.

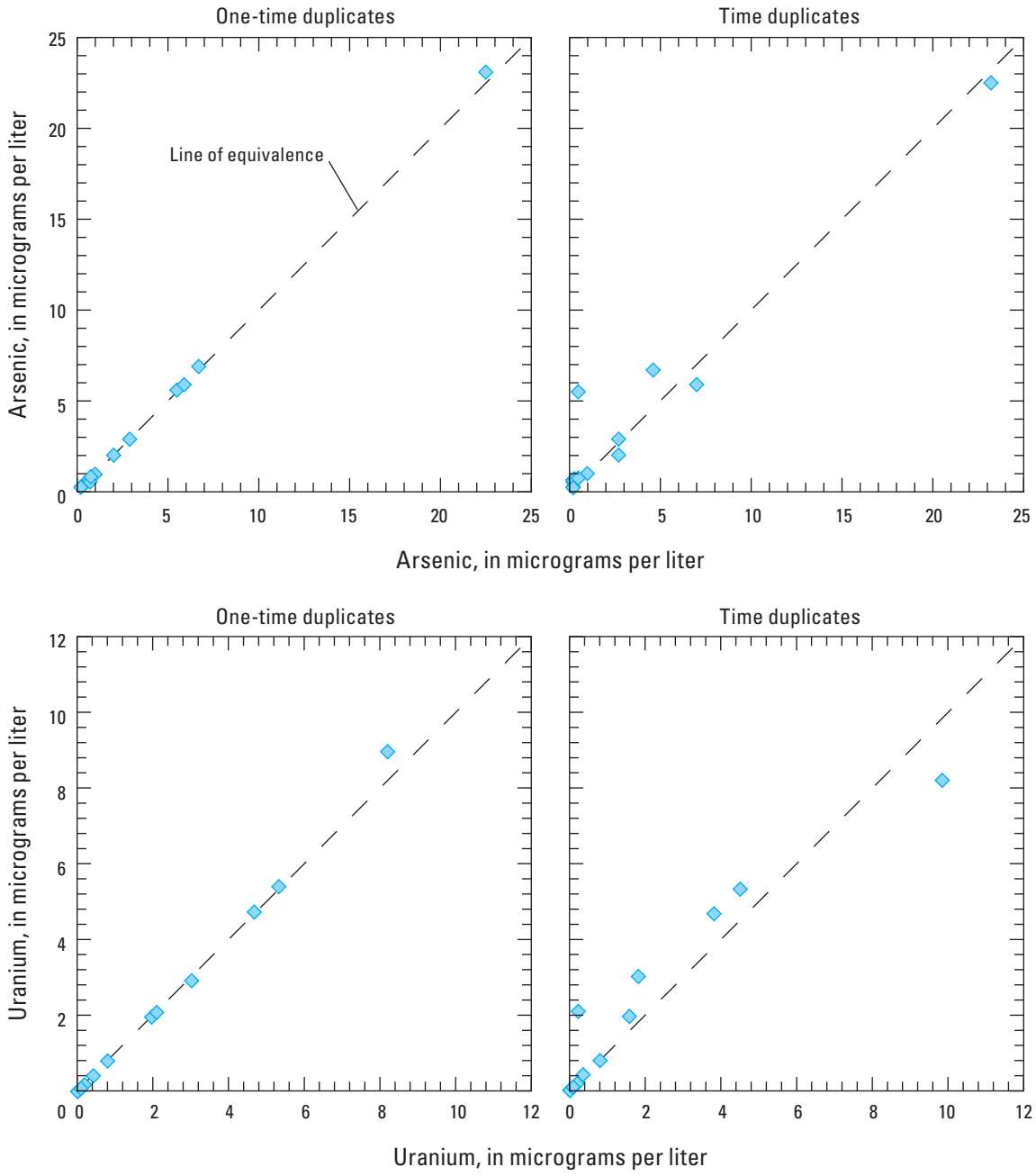


Figure 4. Arsenic and uranium sample duplicates collected on the same day and after about 80 days, east-central Massachusetts, 2009.

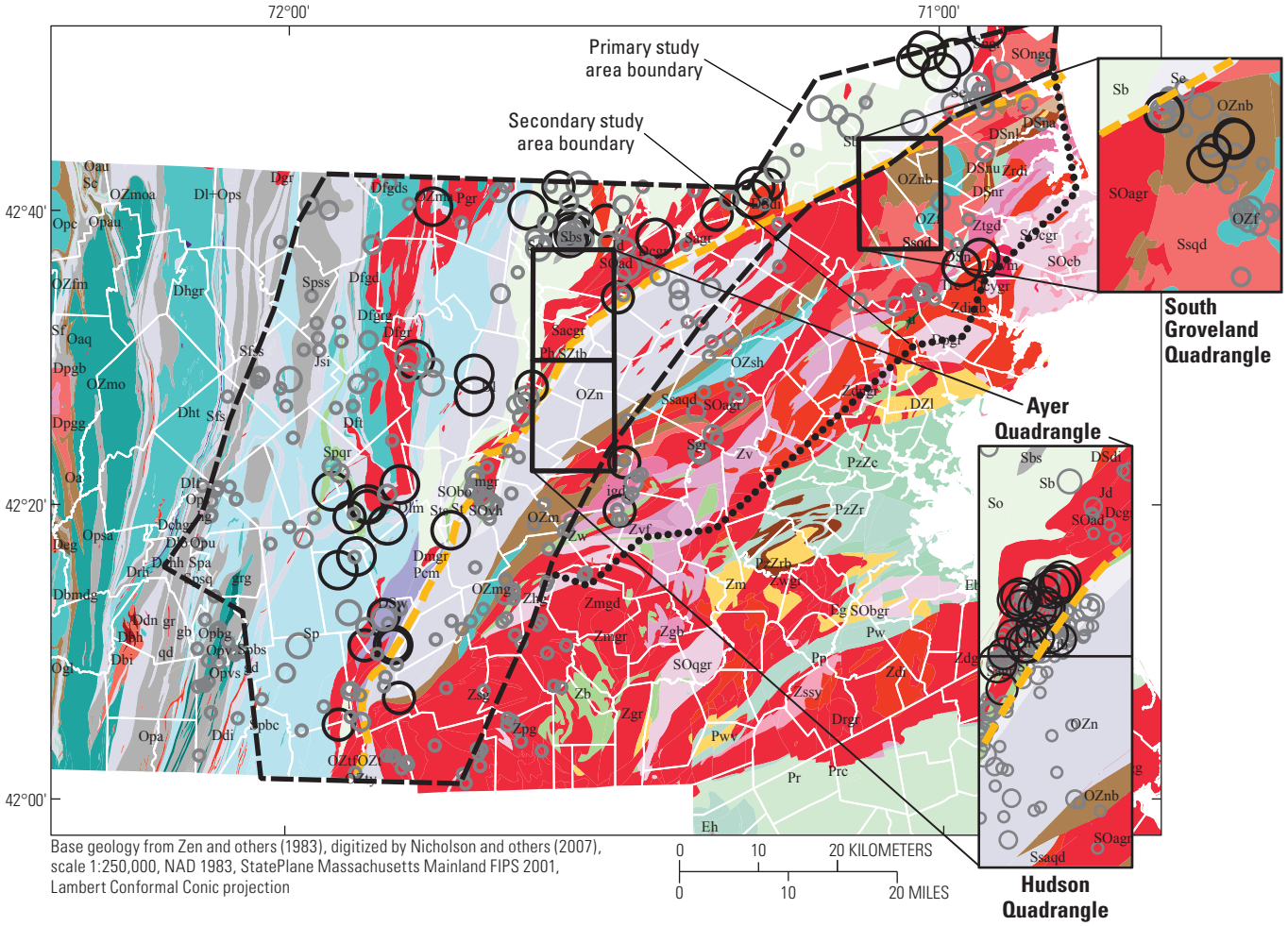


Figure 5. Arsenic concentrations in east-central Massachusetts, 2009. Sampling coverage was increased in the areas of the insert maps where geology was mapped at the 1:24,000 scale. See figure 3 and appendix 1 for explanation of bedrock units. <, less than

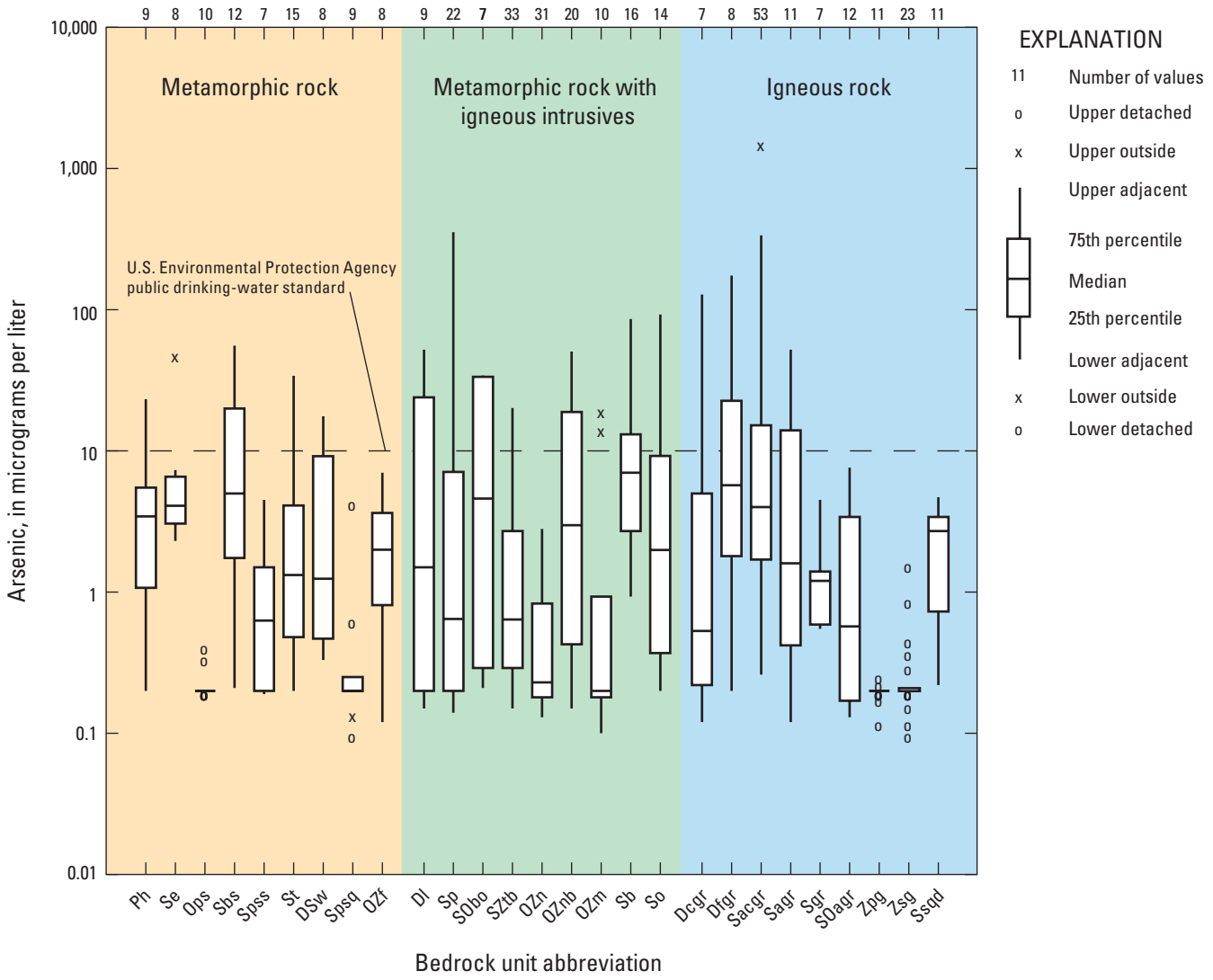


Figure 6. Distribution of arsenic concentrations by bedrock unit, with seven or more samples, in the primary and secondary study areas, east-central Massachusetts, 2009. See figure 3 and appendix 1 for explanation of bedrock units.

Arsenic concentrations north and west of the Clinton-Newbury fault are elevated (fig. 5). The fault marks a boundary between the Merrimack belt and Nashoba zone (fig. 3), and bedrock units do not extend across the fault boundary. The elevated arsenic concentrations extend approximately 20 km west and northwest of the fault. Within the 20-km zone, elevated concentrations were measured across a variety of bedrock unit rock types. Beyond the 20-km distance, sometimes within a rock type that has elevated concentrations near the fault, concentrations decrease. Lower concentrations of arsenic were measured in the large bedrock unit (OZn) east of the Clinton-Newbury fault. However, some elevated arsenic concentrations occur east of the fault, particularly in the OZnb unit.

An elevated-concentration area was defined as being bounded on the east by the Clinton-Newbury fault and extending westward to include all the concentrations measured greater than 10 µg/L (fig. 7). MDEP data were combined with the USGS data to define the western part of the elevated-concentration area. One-way ANOVA analysis was used to assess the relations between concentration and bedrock unit in the elevated-concentration area. Within the elevated-concentration area, there was no statistically significant difference at the 5-percent level between log-transformed concentration distributions, grouped by bedrock unit (fig. 8).

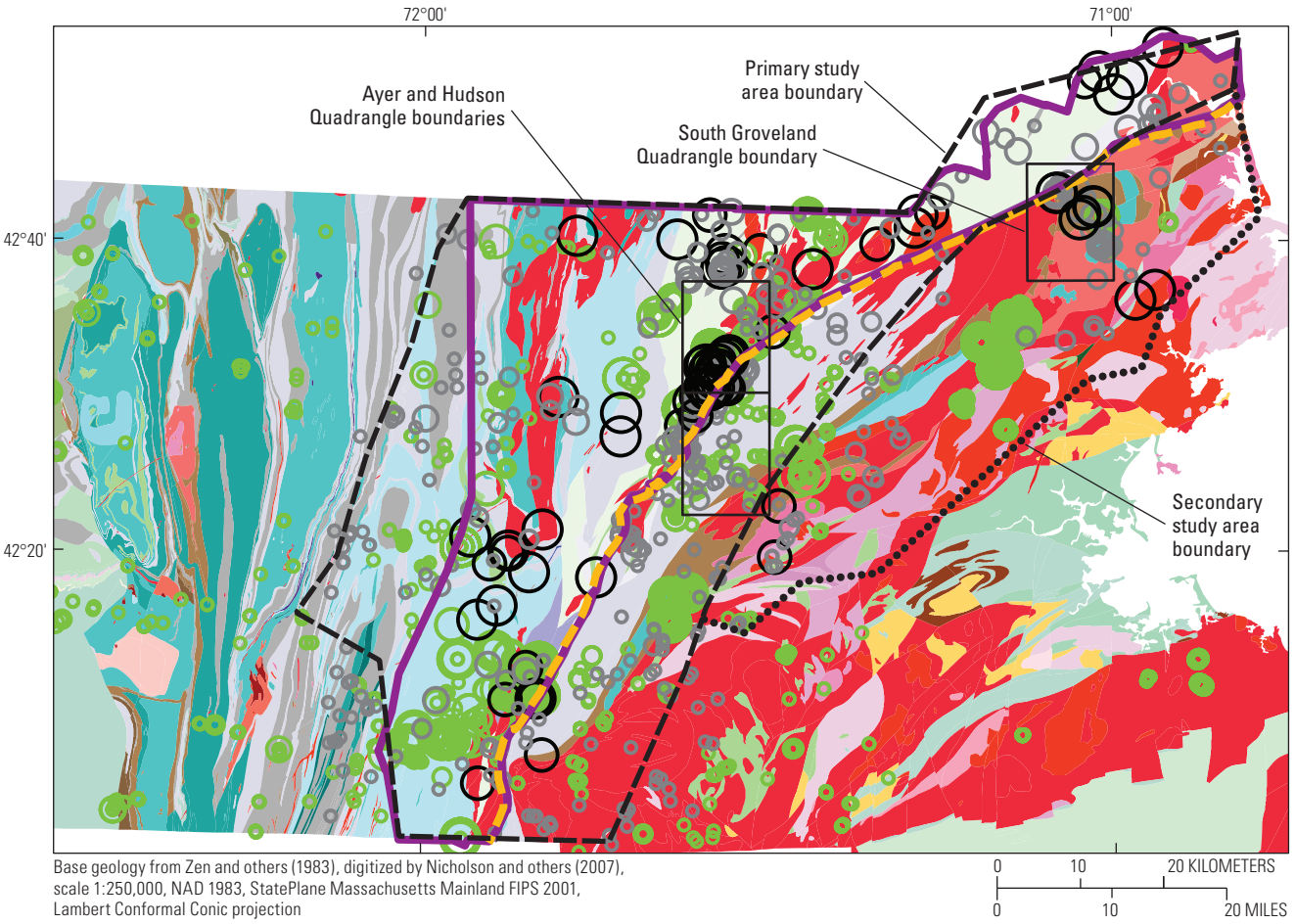


Figure 7. Arsenic concentrations, including Massachusetts Department of Environmental Protection data, showing elevated concentrations west of the Clinton-Newbury fault, east-central Massachusetts. <, less than

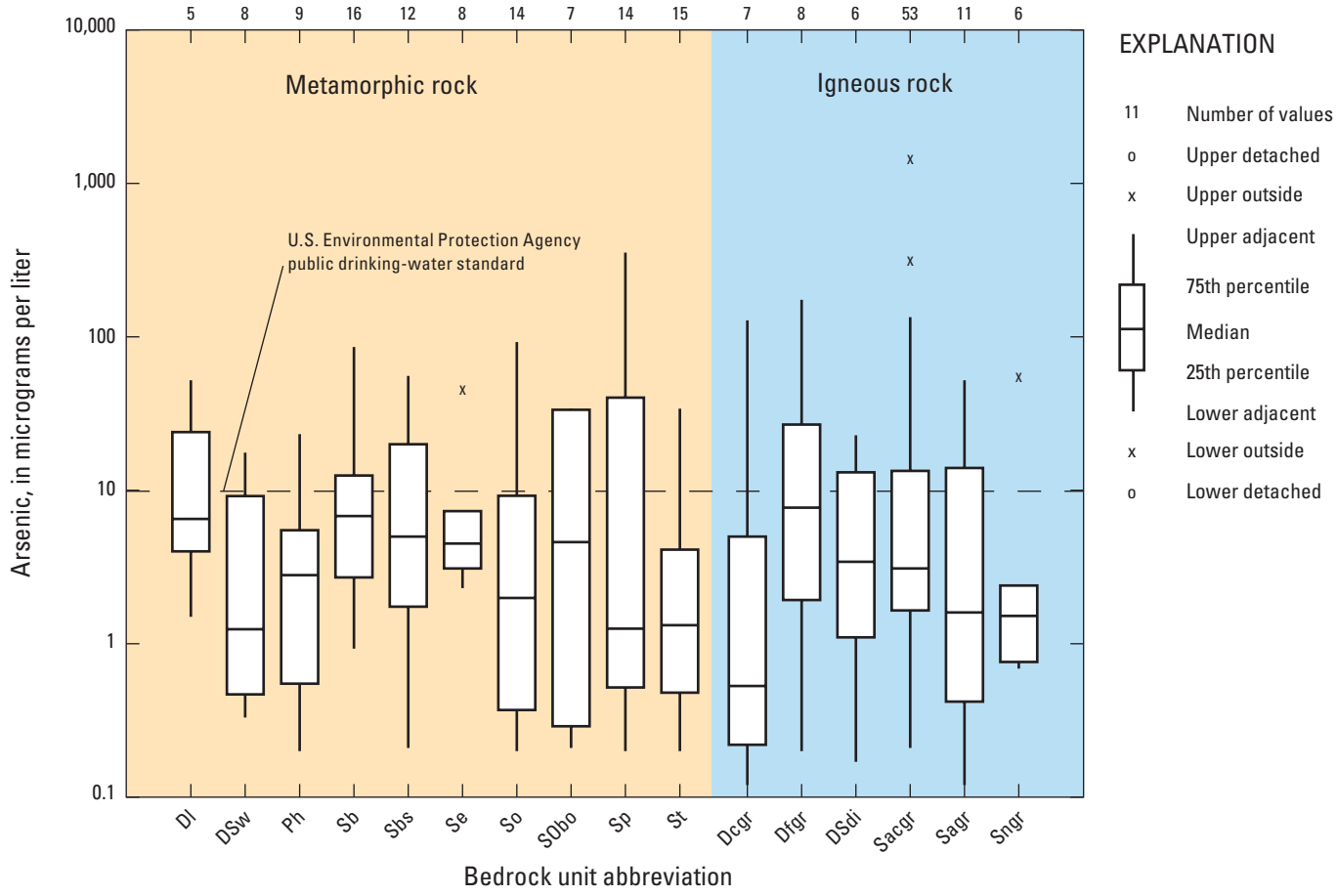


Figure 8. Distribution of arsenic concentrations by rock type in the elevated-concentration area, where differences in concentrations by unit were not significant, east-central Massachusetts. See figure 3 and appendix 1 for explanation of bedrock units.

Two of the bedrock units (Sp and Dl) inside the elevated-concentration area also extend outside the elevated-concentration area, where no concentrations exceeded the standard (fig. 9). Comparison of the data in the two units that cross the area boundary indicated that the difference across the elevated-concentration boundary, but within a bedrock unit, was statistically significant (fig. 10). These statistics indicate that the high-concentration area is within the Merrimack belt, but does not extend to the western boundary of the belt (fig. 9).

Three bedrock units with seven or more samples (Ops, Spss, and Spsq) were west or mostly west of the elevated-arsenic area. Concentrations in these bedrock units were significantly different from the grouped elevated arsenic area adjacent to the west.

A different pattern is observed east of the fault. Most striking is the difference between the bedrock unit SZtb, aligned with the Clinton-Newbury fault, and the bedrock unit OZn, adjacent to the east (fig. 5). Because of extra sampling in the area of the remapped quadrangles, there is an excellent

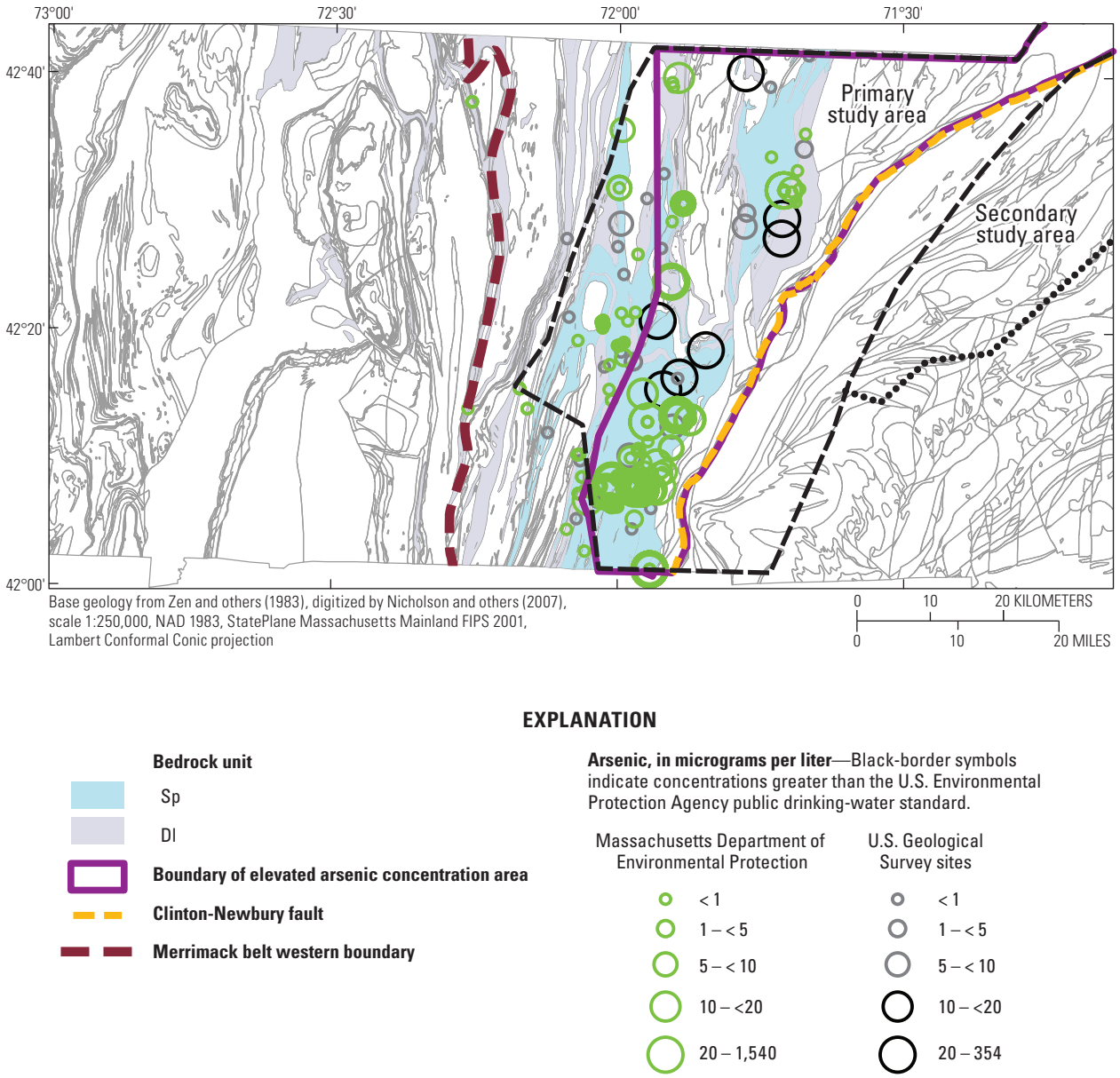


Figure 9. Arsenic concentrations inside and outside the elevated-arsenic area in bedrock units Dl and Sp. Data from the U.S. Geological Survey and the Massachusetts Department of Environmental Protection. See figure 3 and appendix 1 for explanation of bedrock units. <, less than

visual indication of arsenic concentration association with geology (inset map, fig. 5). One-way ANOVA analysis shows significant concentration differences between lower-concentration (OZn, Zhg, Zpg, Zsg, and Zw) and higher-concentration (SZtb and OZnb) units. The amphibolite-bearing rocks, OZnb, have elevated arsenic. Although not used for statistics, the MDEP dataset includes elevated concentrations in the southern parts of the amphibolite unit (fig. 7), which appears to indicate that the association is rock specific, not region specific as was found in the elevated concentration area in the west.

One-way ANOVA analysis of log-arsenic concentration in the rocks east of the Clinton-Newbury fault indicates that the arsenic concentrations in the OZnb unit are significantly higher than in the OZn unit (fig. 11). In this region east of the Clinton-Newbury fault, the mapped bedrock units indictate the distribution of arsenic concentrations. The OZnb unit extends well outside the primary study area and, as such, extends the area where elevated arsenic concentrations may be expected in Massachusetts from previous estimates (Ayotte and others, 2003).

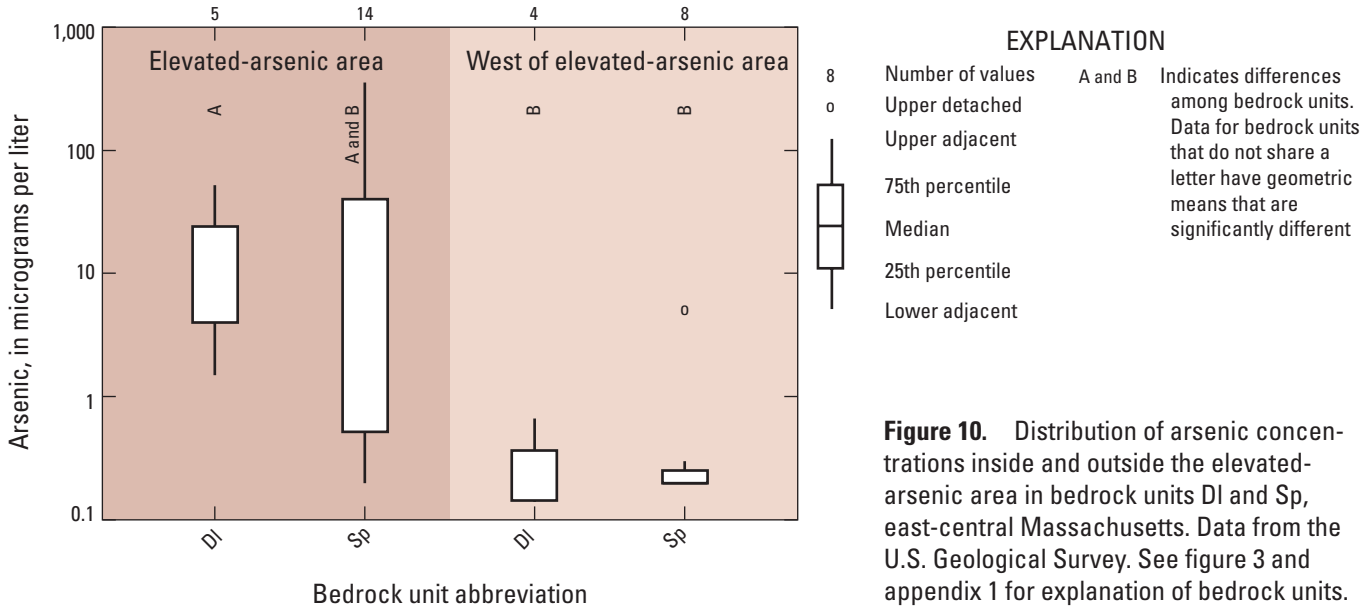


Figure 10. Distribution of arsenic concentrations inside and outside the elevated-arsenic area in bedrock units Dl and Sp, east-central Massachusetts. Data from the U.S. Geological Survey. See figure 3 and appendix 1 for explanation of bedrock units.

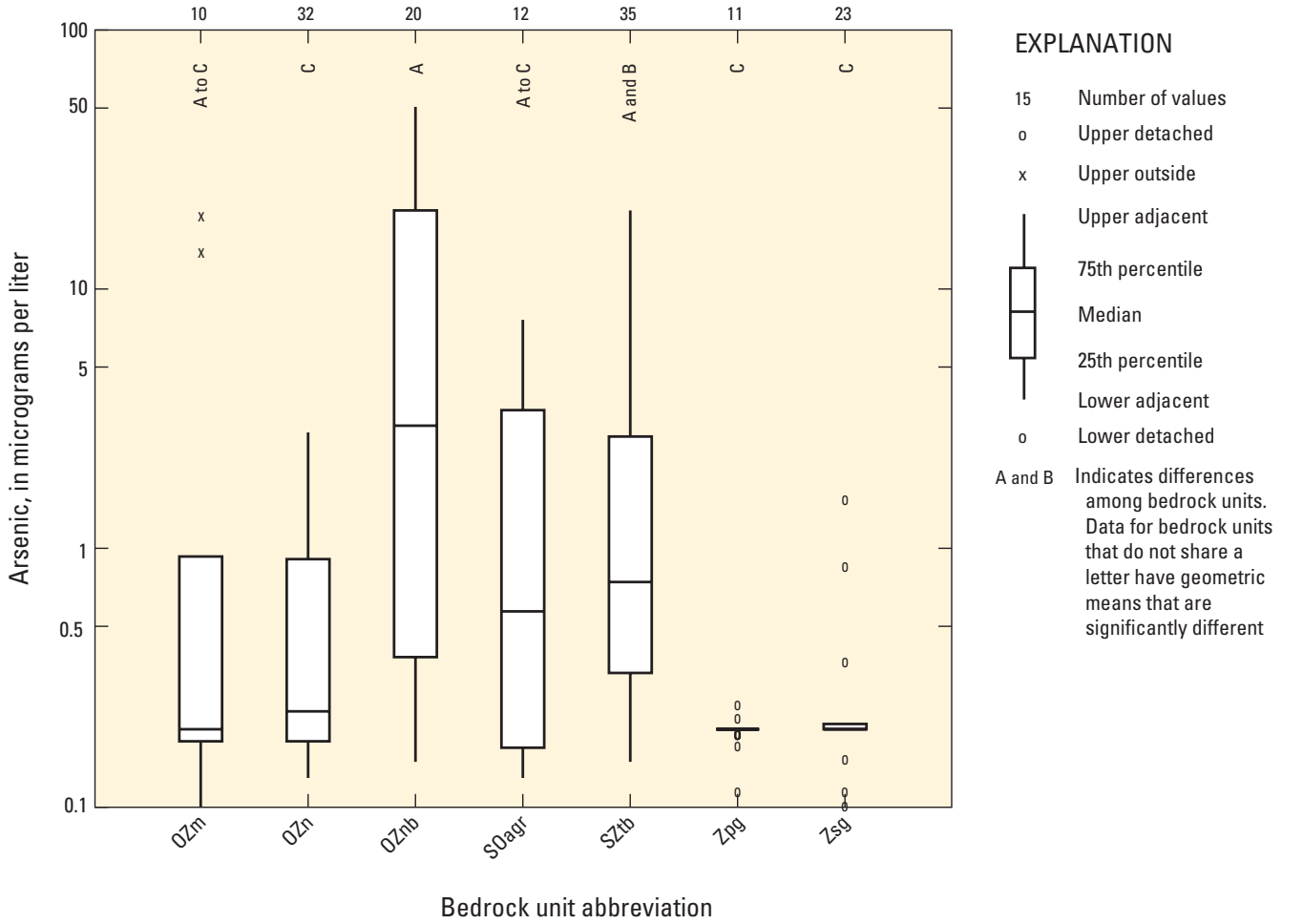


Figure 11. Distribution of arsenic concentrations by bedrock unit east of the Clinton-Newbury fault, east-central Massachusetts. See figure 3 and appendix 1 for explanation of bedrock units.

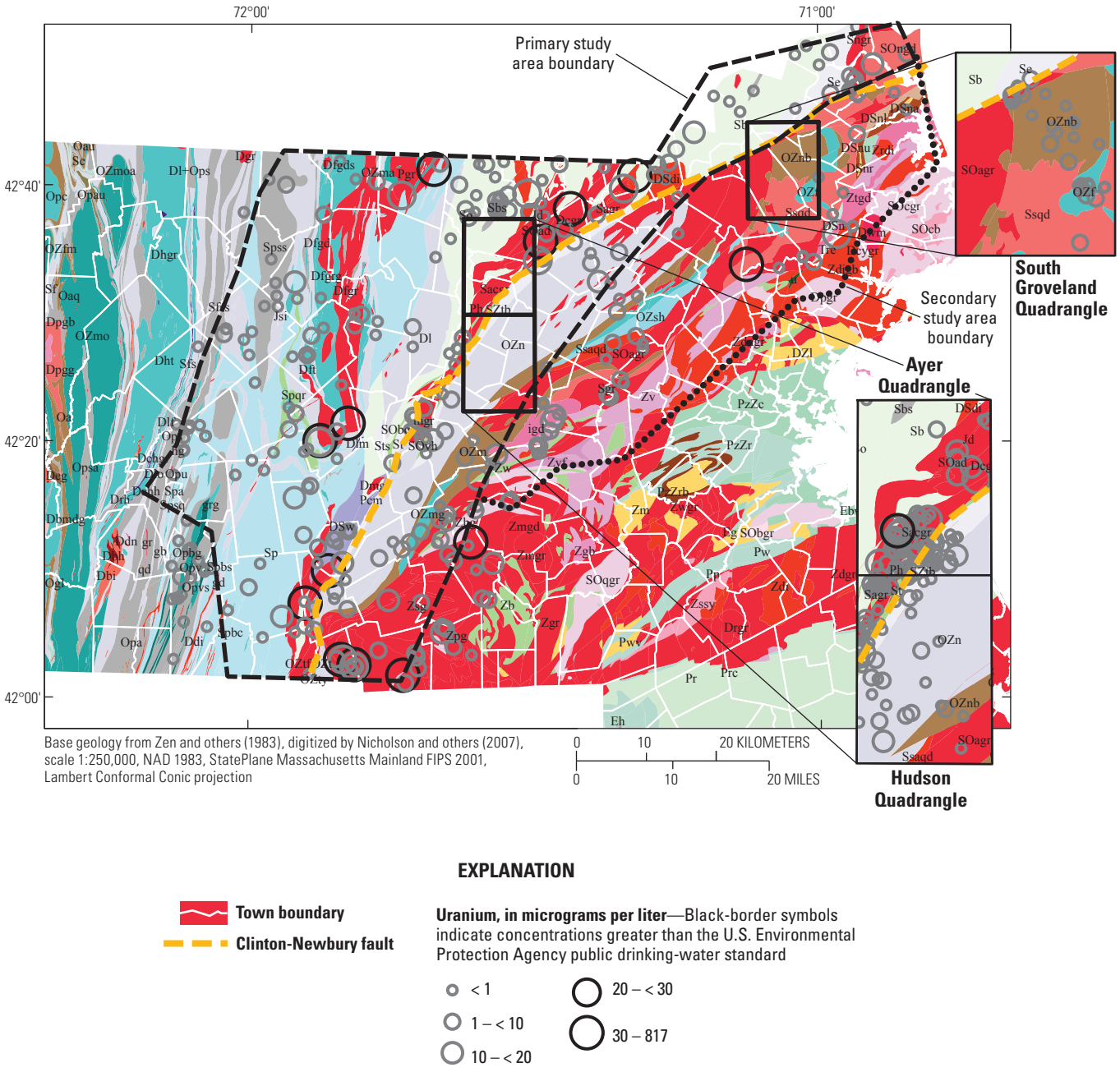


Figure 12. Uranium concentrations in east-central Massachusetts, 2009. Sampling coverage was increased in the areas of the insert maps where geology was mapped at the 1:24,000 scale. See figure 3 and appendix 1 for explanation of bedrock units. <, less than

Uranium Concentrations

Uranium concentrations ranged from less than the analytical reporting limit, 0.02 µg/L, to 817 µg/L. The low reporting limit allows description of uranium concentration variability in virtually all ranges of occurrence. Of 344 samples from the stratified random sampling, 12 samples (3.5 percent) exceeded the drinking-water standard of 30 µg/L. With the samples from the intensive sampling included, concentrations in 13 of the total of 478 samples (2.7 percent) were greater than the drinking-water standard. Elevated concentrations of uranium were widely distributed across the study area (fig. 12). As with arsenic, elevated uranium concentrations can be in close proximity to low concentrations in the same unit. Some units, however, had consistently low concentrations.

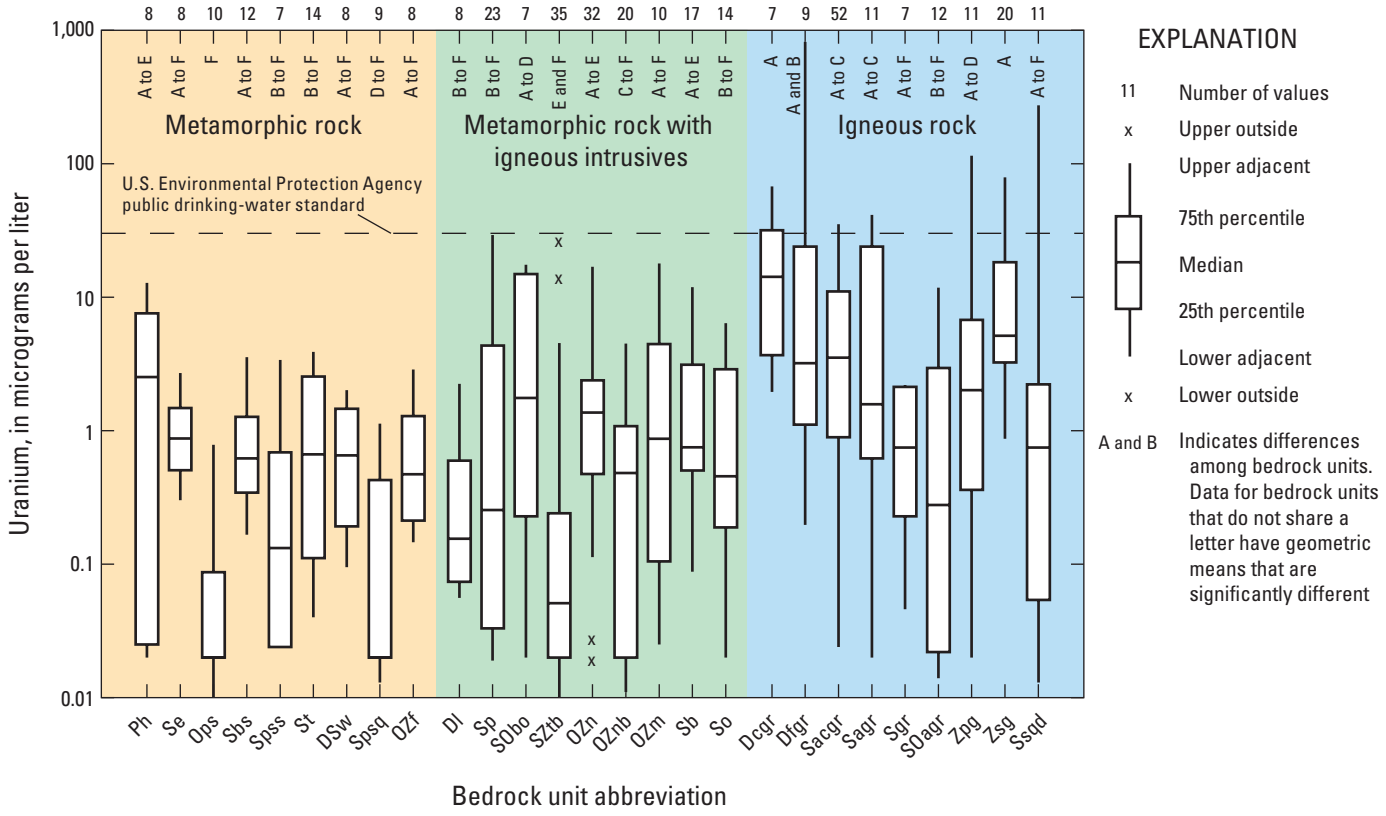


Figure 13. Distribution of uranium concentrations by bedrock unit, with seven or more samples, in the primary and secondary study area, east-central Massachusetts, 2009. See figure 3 and appendix 1 for explanation of bedrock units.

Uranium Correlations with Bedrock Units

Variation of uranium concentration by bedrock unit is apparent in units sampled seven or more times, a threshold used to increase statistical significance (fig. 13). Median concentrations are generally greater in igneous rock than in metamorphic rock (fig. 13). Concentrations in metamorphic rock intruded by igneous rock were intermediate. Concentrations were lowest in the unintruded metamorphic rock. Uranium concentrations exceeded the 30 µg/L drinking-water standard only in the igneous units.

The visual differences (fig. 13) were confirmed by one-way ANOVA analysis applied to the log-transformed uranium concentrations for bedrock units with seven or more samples, using rock type as a discrete independent variable. Significant differences were noted in concentrations among the rock types, indicating the association of rock type with distribution of uranium concentrations. Several bedrock units west of the Clinton-Newbury fault, such as Dcgr and Dl, were significantly different from each other.

Bedrock units classified as metamorphic, but intruded by igneous rocks, occasionally might be expected to reflect the elevated igneous concentrations. Well boreholes might intersect igneous rock even though the unit was classified as metamorphic, although this investigation did not find standard exceedences in metamorphic rock intruded by igneous rock. Intruded rock, however, did include concentrations that were greater than in unintruded rock.

Detailed Geologic Quadrangle Mapping of Bedrock Units

Several of the 1:24,000 quadrangles within the study area were remapped recently (three are shown in fig. 14). Some of the contacts between bedrock units are changed on the new maps compared to the State map (Zen and others, 1983; Nicholson and others, 2007). Bedrock unit identifications of some of the polygons also have changed. Correlations between arsenic and uranium concentration and the remapped units may be stronger than that of the State map if the newly identified units more accurately represent rock boundaries and if the concentrations are controlled by bedrock unit type.

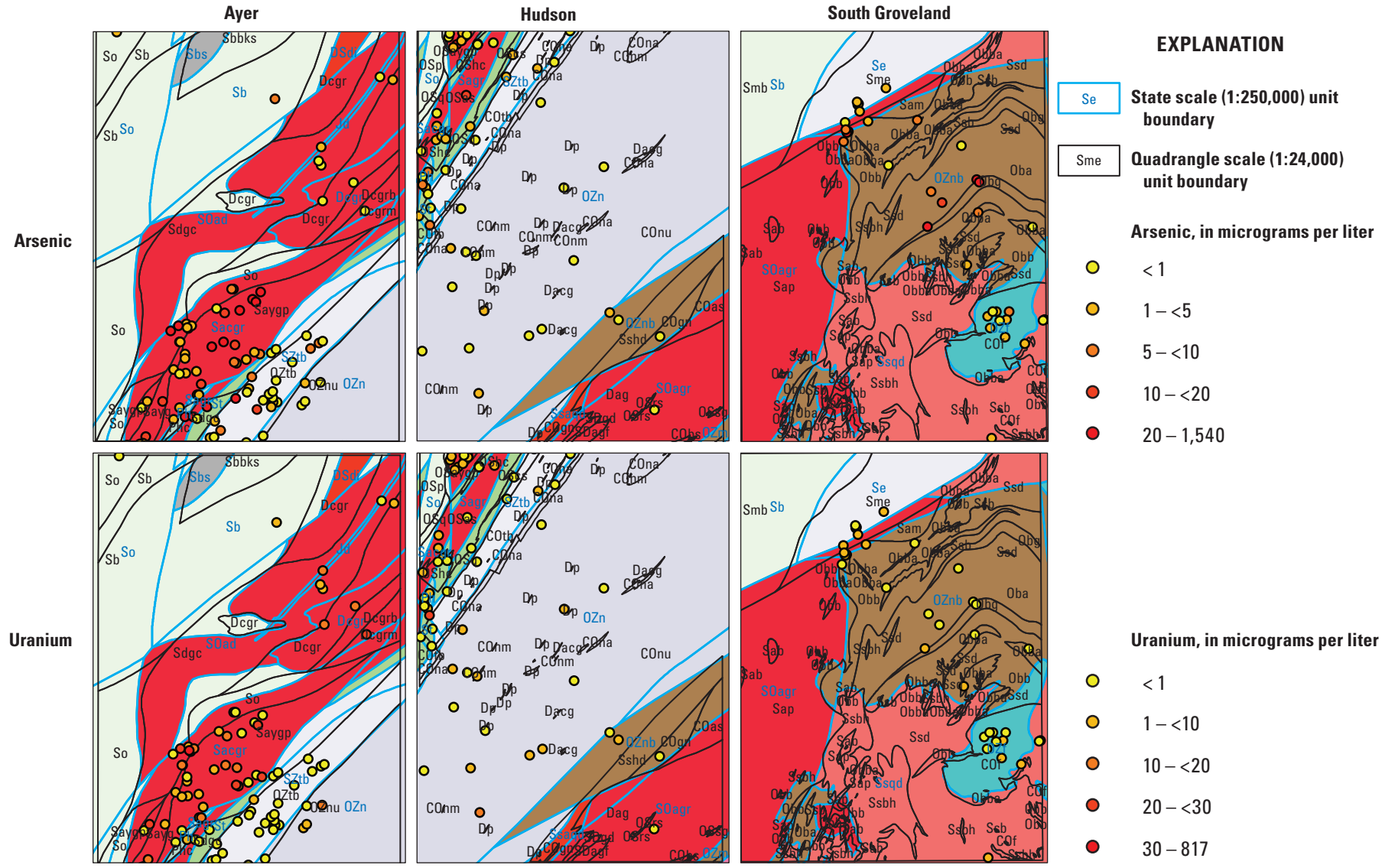


Figure 14. Details of change in geologic remapping of the Ayer, Hudson, and South Groveland 7.5-minute quadrangles compared to the statewide mapping of Zen and others (1983). <, less than

This effort reflects an attempt to test if the analysis of arsenic and uranium concentrations might be scale-dependent, as the 1:250,000 statewide map and 1:24,000 quadrangles differ significantly in scale. In New Hampshire, statewide analysis of well yield found that detailed (1:24,000) geologic maps improved the results of a predictive well-yield probability model over a statewide (1:250,000) model (Moore and others, 2002).

Correlations were compared by considering adjusted R-squared values for multiple linear regression of log concentration on bedrock unit for each pair of maps, that is, the map of Zen and others (1983) published in digital form by Nicholson and others (2007) compared to (1) the Ayer quadrangle (Kopera, 2006), (2) the Hudson quadrangle (Kopera, 2005) and (3) the South Groveland quadrangle (Castle and others, 2005) (table 3). Changes in renaming bedrock units alone would not change the value of the adjusted R-squared. Only a regrouping of well sites could change the R-squared value.

The adjusted R-squared value is a measure of the fraction of variance in the data that is explained by the regression variables. Results of the regressions indicate that no more variance of log-arsenic concentration is explained in the Ayer and Hudson quadrangles by the detailed (1:24,000) geologic mapping than by the statewide (1:250,000) mapping. For uranium, the adjusted R-squared value is about the same for the two mapping scales in the Ayer quadrangle but increases in the Hudson quadrangle with the 1:24,000 mapping. In the South Groveland quadrangle, more variance is explained with the new mapping than the old for both arsenic and uranium. One explanation for these results is the Clinton-Newbury fault that cuts though each quadrangle. In the Ayer and Hudson quadrangles, about half of the wells were in the elevated-arsenic zone where correlation with individual bedrock units was lacking. In the South Groveland quadrangle, only four wells were in the high arsenic zone, and all of these were in the same bedrock unit. Thus, arsenic would not improve with remapping for Ayer and Hudson because of a general lack of correlation by bedrock unit in much of the quadrangles. Uranium, by contrast, improved in two of the quadrangles with remapping and stayed about the same in the third. Overall, these results suggest that detailed mapping improves the ability to explain variance in uranium concentrations by bedrock unit, but that when variability in arsenic concentrations occurs at the terrane-scale, detailed mapping is less useful.

Table 3. Constituent correlation with bedrock units in statewide scale (1:250,000) and quadrangle scale (1:24,000), east-central Massachusetts.

[As, arsenic; U, uranium]

Geologic quadrangle	Regression	Adjusted R-squared	P value
Ayer	Log As, statewide scale	0.31	0.0001
Ayer	Log As, quadrangle scale	0.15	0.0198
Ayer	Log U, statewide scale	0.59	0.0000
Ayer	Log U, quadrangle scale	0.53	0.0000
Hudson	Log As, statewide scale	0.06	0.1952
Hudson	Log As, quadrangle scale	0.04	0.2997
Hudson	Log U, statewide scale	0.16	0.0225
Hudson	Log U, quadrangle scale	0.32	0.0010
South Groveland	Log As, statewide scale	0.03	0.3375
South Groveland	Log As, quadrangle scale	0.22	0.0578
South Groveland	Log U, statewide scale	0.05	0.2673
South Groveland	Log U, quadrangle scale	0.17	0.1006

Water-Quality Correlations with Ancillary Constituents

Analysis of ancillary constituents, acid neutralizing capacity, iron, manganese, and conductance was used to assess geochemical associations of arsenic and uranium occurrences. This was done using two-parameter plots (fig. 15). The plot matrix shows virtually no correlations among constituents. Some constituents appear to be mutually exclusive, particularly arsenic and iron, uranium and iron, and arsenic and uranium (fig. 15). This is in contrast to the relation found in overburden samples, where arsenic and iron are commonly correlated (Stollenwerk and Colman, 2003).

Peters (2008) attributes the difference in iron-arsenic association between overburden and bedrock as reflecting the lack of organic carbon likely present in bedrock units. Iron and arsenic associate in coatings deposited from oxic weathering of arsenic minerals, such as arsenopyrite. These coatings remain in place unless reducing conditions occur, such as associated with the presence of anthropogenic organic carbon (Stollenwerk and Colman, 2003; Peters, 2008). Iron concentrations were elevated in the water of some of the tested wells. The reducing conditions associated with these wells, however, were likely associated with sediments of wetlands or lakes that are providing recharge to the bedrock.

Bedrock Units, Geologic Terranes, and Geologic Sources of Arsenic and Uranium

The MDEP and the USGS data indicate that elevated arsenic in bedrock well water is associated primarily with two terranes in Massachusetts, the Merrimack belt and the Nashoba zone (figs. 1, 3, and 5). Within the terranes of elevated arsenic concentration, arsenic appeared to be correlated with bedrock

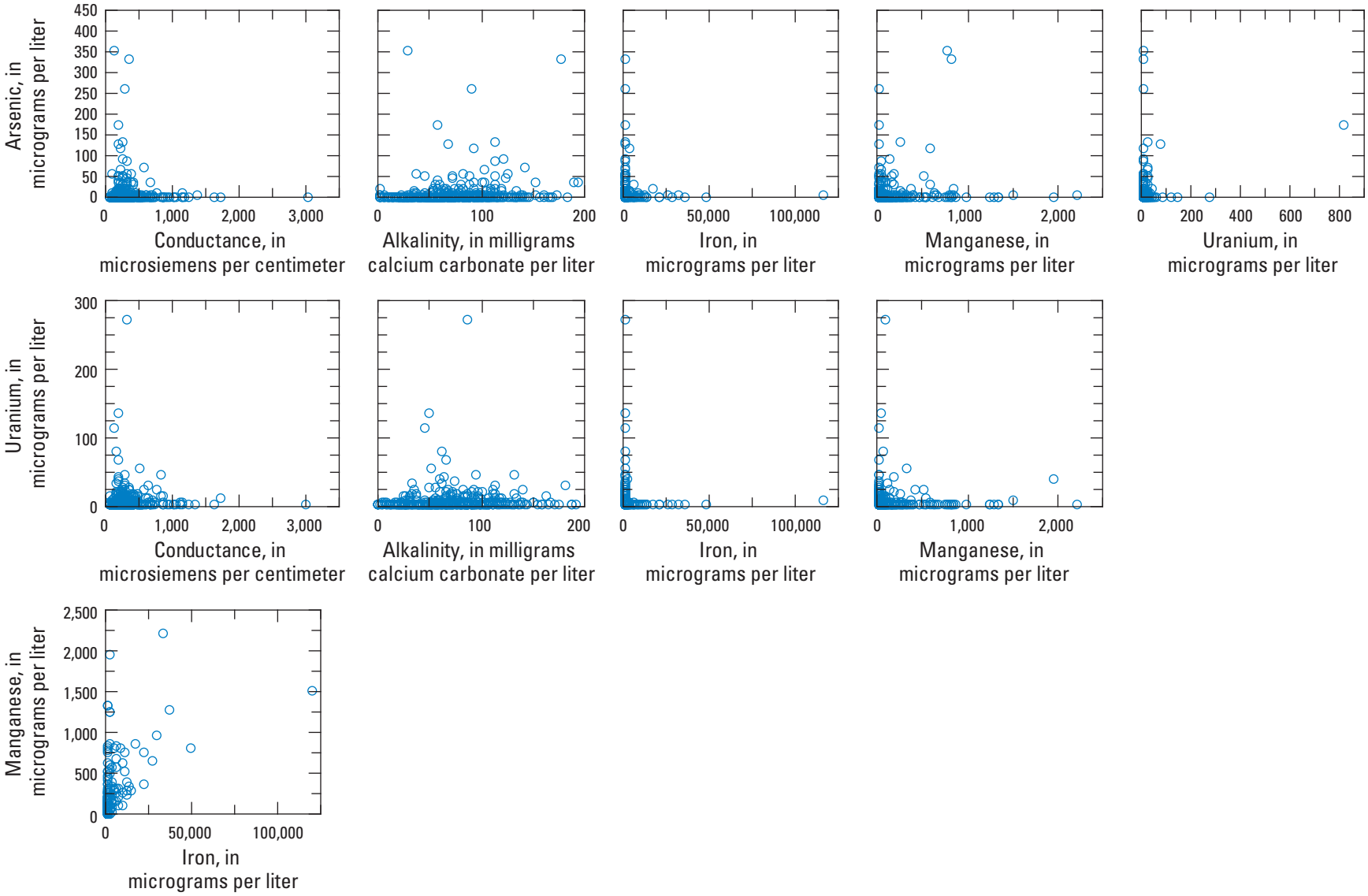


Figure 15. Associations among constituents measured in bedrock wells in east-central Massachusetts, 2009.

units in some parts of the study area and not correlated in other parts (note the elevated-concentration area of fig. 7). Sources of the arsenic in the areas that correlated with bedrock units could be in the rock protolith; however, the arsenic source in areas without bedrock correlation could have resulted from relatively equal redistribution of arsenic by metamorphic and/or metasomatic fluids from an original rock source (Henke, 2009). Although associated with the Merrimack belt, the elevated arsenic did not extend to the western border of the belt (fig. 9). The processes responsible for distributing the arsenic that is present in well water did not operate throughout the terrane.

In the Nashoba zone, where correlation between bedrock unit and arsenic concentrations was more prevalent, bedrock units with elevated arsenic extended to the Bloody Bluff fault, the eastern boundary of the zone. Two elevated arsenic concentrations were measured east of the Bloody Bluff fault in the Milford-Dedham zone, indicating that elevated arsenic concentrations are possible east of the Nashoba zone. Little previous data on arsenic in bedrock wells is available from this area where much of the water supply is public.

In the north, the elevated-arsenic area in Massachusetts abuts New Hampshire towns included in the private bedrock-well study by Montgomery and others (2003). In contrast to Massachusetts where units were grouped for concentration-probability analysis, units were grouped by fraction of samples greater than 10 µg/L in the New Hampshire study. The different statistical approaches prevent exact comparisons of data between the two States. Clearly, however, both States have elevated arsenic concentrations in the border area.

The association of igneous rock with uranium results from its deposition during magma cooling (Keevil and others, 1944). Uranium is one of the last elements to come out of solution, and it associates with rock surfaces from which mobilization into well water can occur. A report on uranium potential in two-mica granites of New England indicates that certain mineralized granites in New Hampshire and Massachusetts contain secondary uranyl-phosphate minerals (Boudette, 1977). Mobilization of uranium can occur in oxic conditions that are common in New England bedrock aquifers.

Maps of Estimated Probability for Elevated Arsenic and Uranium in Groundwater

Arsenic

Determination of probability of wells yielding water with arsenic concentration greater than the USEPA public drinking-water standard (10 µg/L) could help guide development of new supplies—domestic and public—and the testing of existing wells. Because of correlations of arsenic with bedrock unit and with groups of bedrock units described in a previous section on correlations, concentration distributions can be defined by bedrock unit. Cumulative distribution functions can be used to determine overstandard probabilities as well as probabilities of wells yielding water at levels of concentration greater than any given value (fig. 16). The distribution for each unit fits a log-normal distribution, and 95-percent confidence intervals based on the log-normal distribution can be computed (apps. 3 and 4).

The confidence interval of probability estimates depends on the number of samples for the bedrock unit and the concentration for which the probability is of interest. Probability distributions based on randomly selected samples of a population become more accurate as the sample size gets larger. Therefore, confidence intervals are a function of the number of samples. Finally, the probabilities can

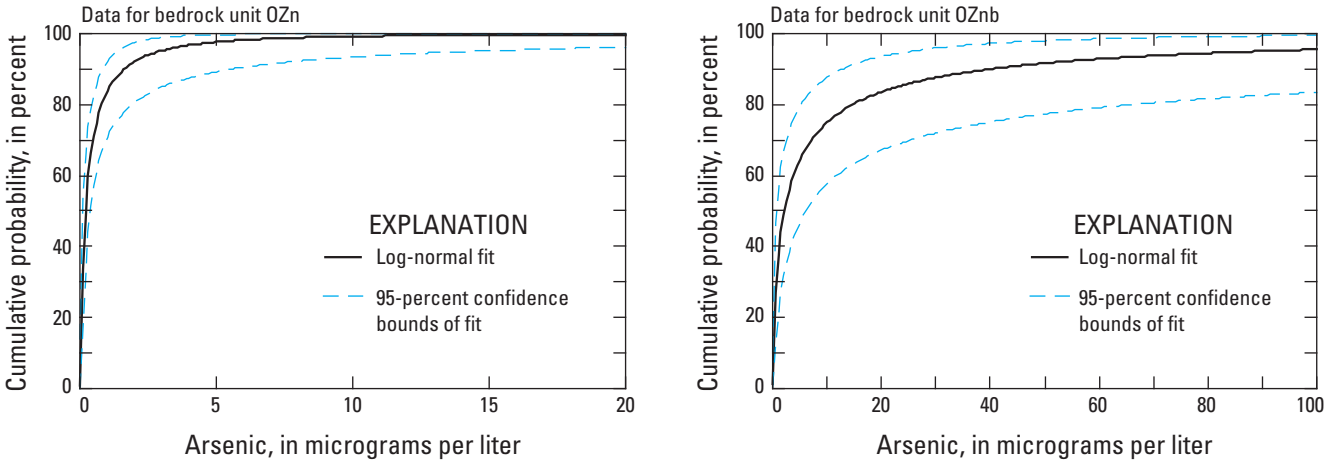


Figure 16. Cumulative probabilities for arsenic for two bedrock units east of the Clinton-Newbury fault.

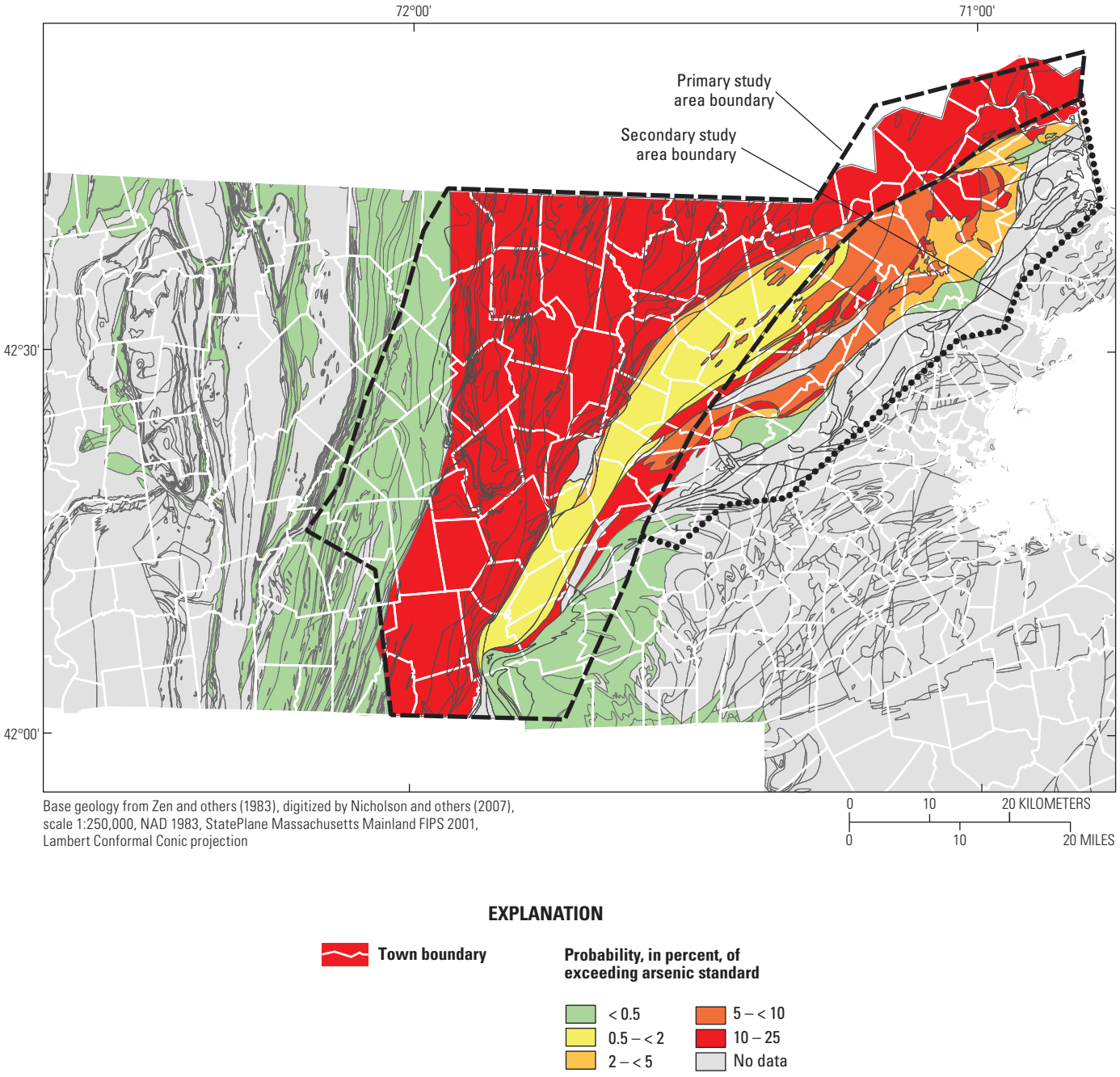


Figure 17. Probabilities of arsenic concentrations in bedrock well water being greater than 10 micrograms per liter, the U.S. Environmental Protection Agency drinking-water standard for public supplies, east-central Massachusetts. <, less than

be mapped so that areas with higher or lower probabilities of concentration than a given level (such as the USEPA drinking-water standard for public water supply) can be known (fig. 17). For example, the probability that a well in the OZn bedrock unit will contain water with an arsenic concentration greater than 10 µg/L (equal to 100 percent minus the cumulative probabililty) is low—0.79 percent with 95-percent confidence interval of 0.05 to 6.6 percent (fig. 16 and app. 3). The probability that a well will contain water with arsenic concentration greater than 10 µg/L for OZnb, an elevated-concentration unit, is 26 percent with a 95-percent confidence interval of 13 to 43 percent.

Bedrock units in the elevated-concentration area (fig. 7) were grouped for computing cumulative probabilities. The probability of well water being greater than 10 µg/L for the elevated-concentration grouping of units was 23 percent, exceeded only by OZnb at 25 percent.

Uranium

In this study, uranium is more generally correlated to bedrock unit than is arsenic, so uranium associations can be mapped exclusively by bedrock unit. Distributions of uranium concentration in a bedrock unit are log normal. Cumulative log-normal distributions indicate the probability of concentrations occurring for the whole range of concentrations, including the probability of exceeding 30 µg/L, the USEPA drinking-water standard for public supplies. The 95-percent confidence intervals of the probability estimates can also be determined from the log-normal fits (fig. 18, apps. 5 and 6). The uncertainty of the predictions—that is, the size of the confidence interval—decreases at high and low ends of the concentration range (fig. 18).

Example probabilities of encountering a concentration greater than 30 µg/L (fig. 18) range from 0.0001 percent (95-percent confidence interval of 0.0 to 0.005 percent) for Ops, to 21 percent (95-percent confidence interval of 5.5 to 50 percent) for Dcgr. Areas with granitic rock have higher probabilities (figs. 5 and 19).

Estimates of the Number of Wells that Exceed USEPA Drinking-Water Standards

Estimates of the number of wells affected can be determined by the product of the probability for well water to exceed the USEPA standard and the estimated number of wells per bedrock unit.

Estimates of private well distributions were made for the MDPH by Weston & Sampson Engineers, Inc., during 2005 (fig. 20). Potential private wells were identified by cross-referencing addresses in property-tax-assessment databases

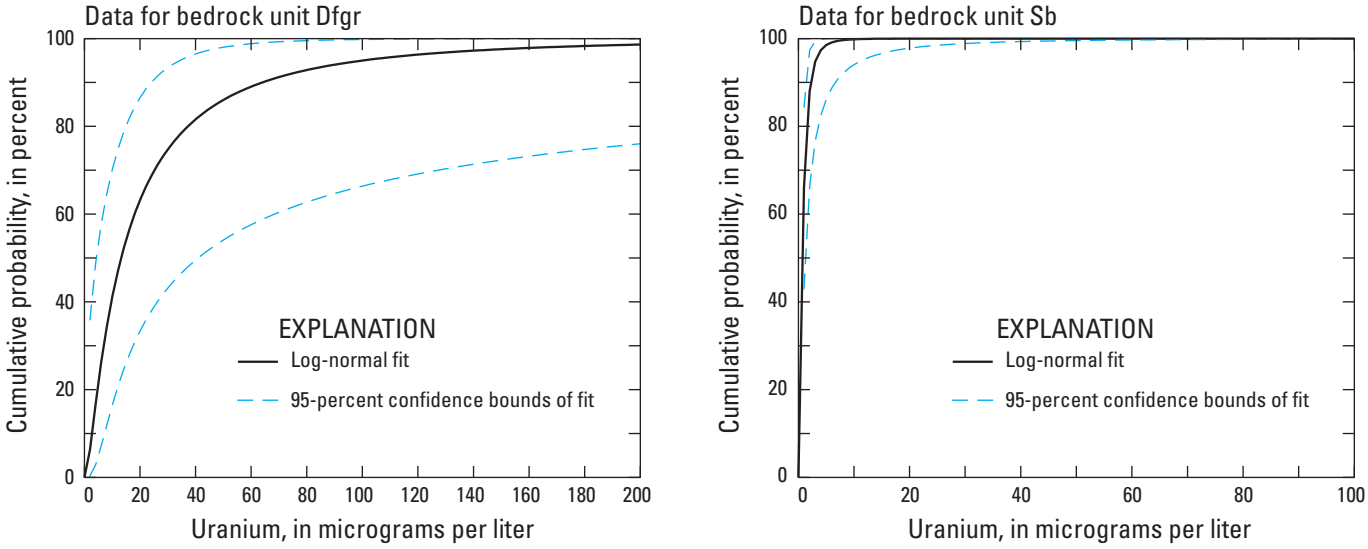


Figure 18. Cumulative log-normal distribution functions for uranium in an elevated-concentration bedrock unit, Dfgr, and a low-concentration bedrock unit, Sb, east-central Massachusetts.

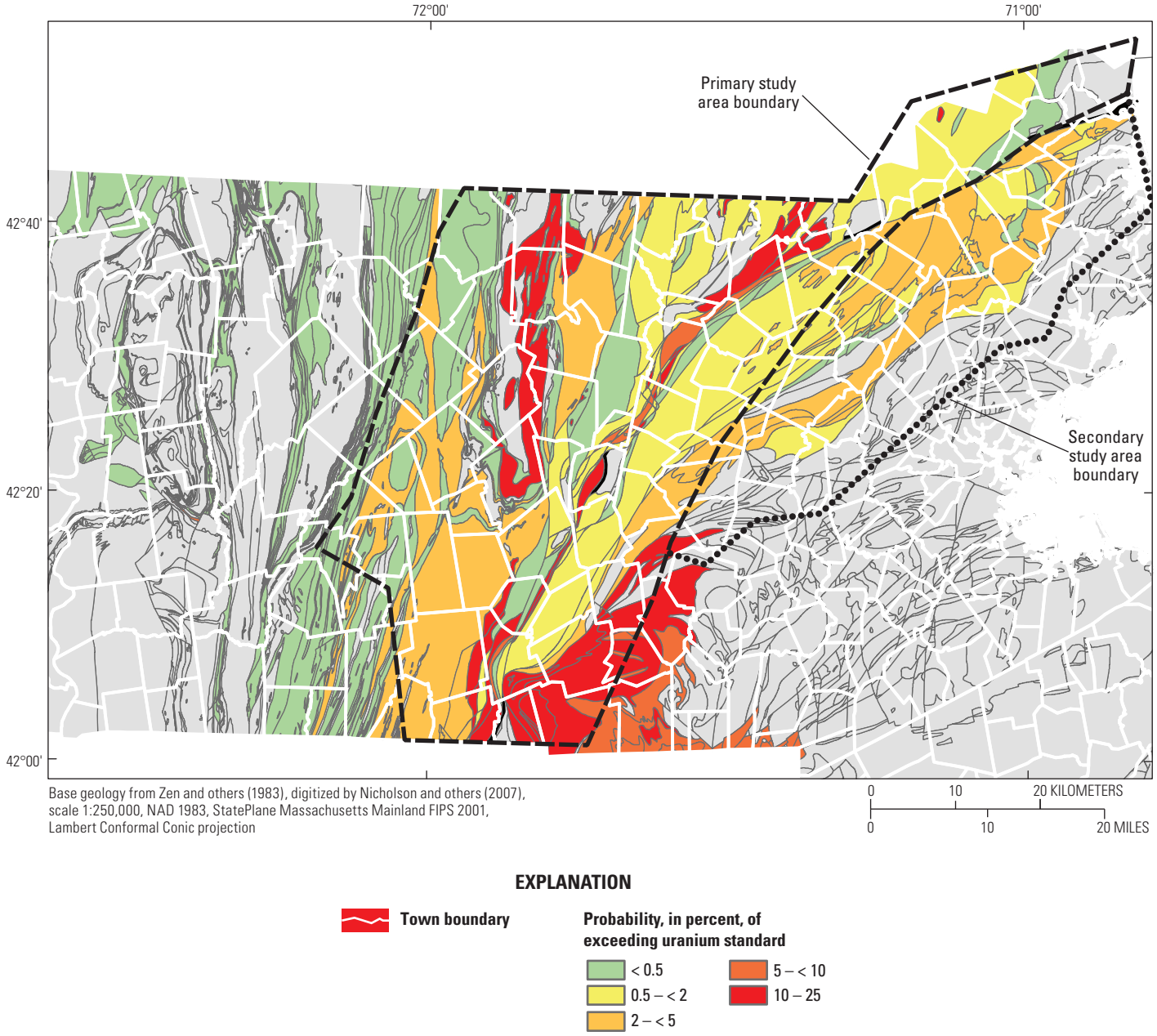


Figure 19. Probabilities of uranium concentrations in bedrock well water being greater than 30 micrograms per liter, the U.S. Environmental Protection Agency drinking water standard for public supplies, east-central Massachusetts. <, less than

with those in water-billing databases. The addresses in the tax-assessment databases that did not have a match in the water-billing databases were classified as potential private wells. In communities not served by a public water supply, all addresses contained in the tax-assessment data were classified as potential private wells. For the purposes of the estimate, all the inferred private wells were assumed to be bedrock wells. All the potential private well addresses were geocoded using the GDT/TeleAtlas Batch Geocoding Service®.

Not all towns in the study area were included in the MDPH inferred private-well investigation (fig. 20). The 1990 census, which provided information about households per census track and percentage of households on public or private water, was used to supplement well estimates in locations not covered by MDPH (U.S. Census, 1992). The census areas in towns not covered by the MDPH study were intersected with the bedrock data using Geographic Information System (GIS) techniques to delineate parts of census tracts that were in each

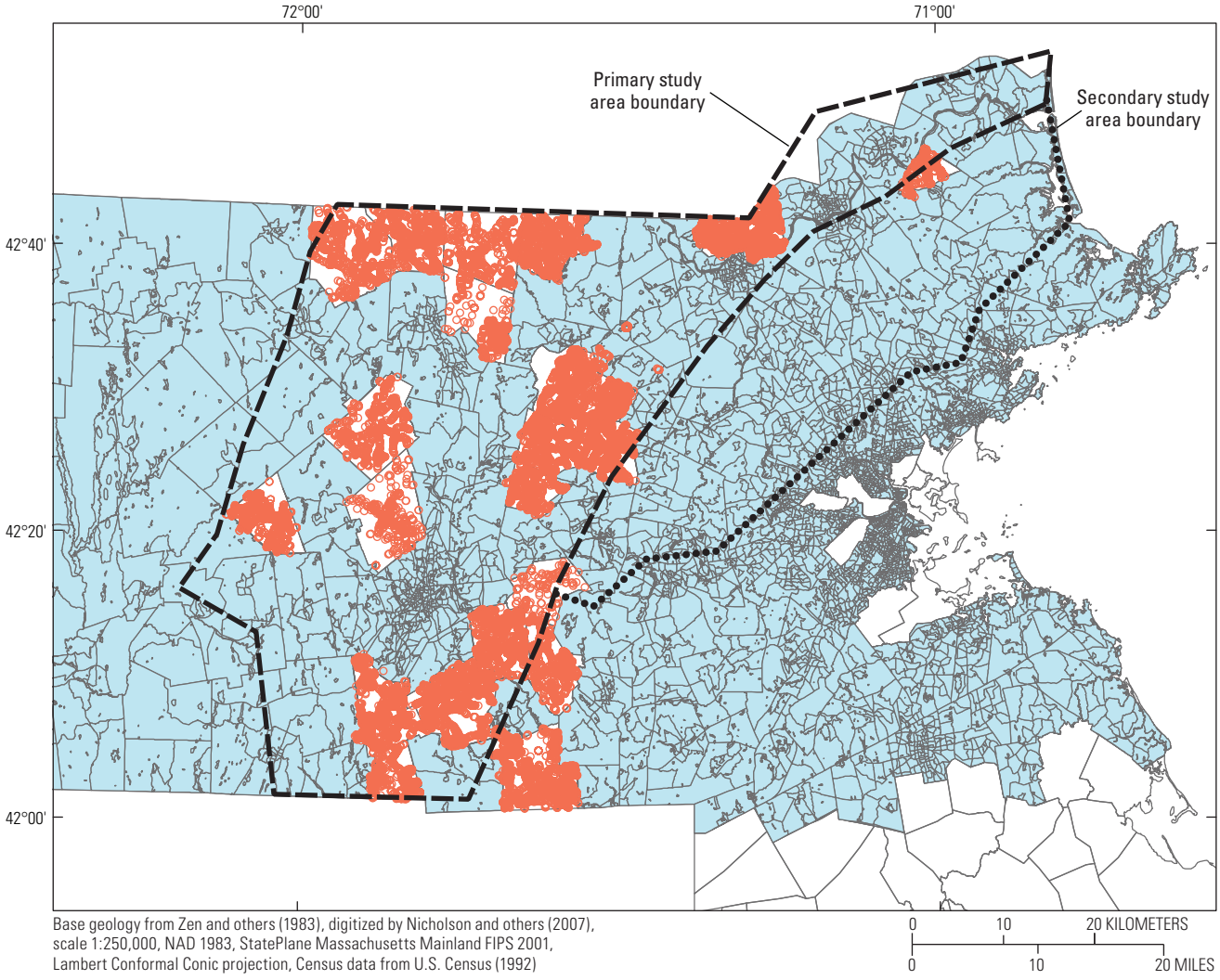


Figure 20. Inferred locations of private wells and census tracts for towns not included in the inferred private-well study, east-central Massachusetts.

Table 4. Number of wells in each bedrock unit and estimates of number of wells exceeding the arsenic and uranium U.S. Environmental Protection Agency drinking-water standards for public supplies, east-central Massachusetts.

[* , bedrock unit within the high-arsenic zone; —, no data; MDPH, Massachusetts Department of Public Health; µg/L, micrograms per liter; standard, U.S.Environmental Protection Agency public drinking-water standard]

Bedrock unit	Total number of MDPH wells	Total number of estimated census wells	Probability of arsenic concentrations greater than 10 µg/L, in percent	Probability of uranium concentrations greater than 30 µg/L, in percent	Estimated number of wells exceeding the 10 µg/L standard for arsenic	Estimated number of wells exceeding the 30 µg/L standard for uranium
Grouped elevated-arsenic units	13,500	5,763	23.08	—	4,445	—
Dcgr*	418	1,275	—	21.01	—	356
Dfgr*	1,522	702	—	13.97	—	311
Dl	2,010	8,024	0.00	0.03	0	3
DSw*	382	629	—	0.13	—	1
Ops	770	7,707	0.10	0.00	8	0
OZf	0	507	7.64	0.01	39	0
OZm	735	679	10.83	4.64	153	66
OZn	7,007	5,621	0.79	0.89	100	113
OZnb	930	1,357	25.50	0.70	583	16
Ph*	60	0	—	11.99	—	7
Sacgr*	884	373	—	8.43	—	106
Sagr*	971	1,013	—	12.54	—	249
Sb*	2,315	4,594	—	0.69	—	47
Sbs*	67	133	—	0.00	—	0
Se*	305	492	—	0.00	—	0
Sgr	0	533	0.00	0.64	0	3
So*	1,374	2,406	—	1.55	—	59
SOagr	569	2,326	6.92	4.11	200	119
SObo*	0	236	—	12.42	—	29
Sp	2,862	10,343	0.00	4.61	0	609
Spsq	85	238	0.14	0.07	0	0
Spss	908	723	0.38	0.18	6	3
Ssqd	224	2,982	4.63	2.53	148	81
St*	245	150	—	0.76	—	3
SZtb	861	464	3.68	0.17	49	2
Zpg	2,197	1,361	0.02	6.94	1	247
Zsg	5,012	2,972	0.10	10.61	8	847
Totals	**32,713**	**57,840**			**5,741**	**3,277**

bedrock unit. The number of wells per census tract was then adjusted by the proportional area of the tract that was in the bedrock unit. Finally, all the wells in the parts of tracts in a bedrock unit were added to determine the number of wells in each unit. The number of wells estimated to exceed a standard was determined by multiplying the probability of exceeding a standard for that bedrock unit by the sum of the number of wells determined from the MDPH assessment and the census assessment (table 4).

Arsenic

For arsenic, no probability was given in table 4 for bedrock units that were within the elevated-arsenic area. Rather, the probabilities for the units in this area are covered by the grouped-units estimate (top of table 4).

The number of wells with arsenic concentrations that exceeded the USEPA drinking-water standard was estimated to be 5,741. Because the study area covered most of the known elevated-concentration areas for the State, this estimate is likely appropriate for the entire State. Several small units within the study area did not have enough data for probability statistics to be computed; however, these would not greatly alter the total.

Uranium

For uranium, correlations were strictly with bedrock units rather than grouped units (table 4). The number of wells with uranium concentrations that exceeded the standard for uranium was estimated to be 3,277. Most of these wells are in igneous rock. Because units west of the Clinton-Newbury fault were not grouped on an areal basis for uranium, several more bedrock units were excluded from the calculation of probability statistics than for arsenic.

Igneous bedrock units in Massachusetts are not confined to the primary and secondary study areas of this investigation. The statewide number of wells affected by uranium is likely larger than the number reported herein, based on the bedrock units in the study areas.

Implications for New Supplies, Testing, and Treatment

Locating Future Bedrock Water Supplies

Few private well owners have options regarding choosing locations that have favorable bedrock. For private supply, the probability maps (figs. 17 and 19) can be used to guide well-water testing.

Although the data collected were from private wells, the data could be used to assess conditions likely in public as well as private bedrock water supplies. Commonly, there are several site options for locating public wells. Consideration of the bedrock unit when selecting sites for public supplies could result in substantially decreased probabilities of concentrations exceeding the drinking-water standard. Towns that straddle the Clinton-Newbury fault, such as Harvard and Westford, could make use of the result that there is a lower probability of elevated arsenic concentration in the rocks east of the fault than those to the west.

Directing Resources for Water Testing

The numbers of overstandard water supplies without treatment can be computed by using the fraction of households currently using water without treatment for arsenic (66 percent of 5,741 = 3,789) and uranium (93 percent of 3,277 = 3,047). If testing could be directed toward the elevated-concentration areas, these numbers of untreated supplies would presumably decrease. By testing all wells that are in bedrock units with probabilities of elevated arsenic concentration greater than 10 percent, 90 percent of the wells exceeding the standard could be identified. Applied to data collected in this investigation, for example, all but two wells exceeding the standard (which are in SZtb with concentrations of 10 and 20 µg/L) would have been tested. This approach is likely to include testing of the highest concentration wells, because the elevated concentrations are associated with bedrock units that have the highest probabilities of overstandard concentrations. For example, of the two wells that were missed by this approach, one had a concentration at the standard and one had a concentration twice the standard; the highest concentration well tested in this study had a concentration 150 times the standard.

Because health risk increases with increasing concentration, a testing routine that likely includes the highest concentrations is beneficial. The 10-percent probability testing algorithm would result in testing 26 percent of all the wells estimated to be in the study areas. As a fraction of wells statewide, the percentage of wells tested would, of course, be much smaller.

For uranium, to determine 90 percent of wells greater than the standard, all units with overstandard probability of 4 percent or greater would need to be analyzed. This would involve testing about 40 percent of the wells in the study area.

Defining Natural Background Concentrations

A problem for site-contamination assessment in areas where arsenic occurs naturally is whether concentrations at a given site are caused by natural conditions or are the result of human-induced activity. In cases where there is a possibility that the bedrock has been contaminated with anthropogenic arsenic, the distribution frequencies of concentration for a given bedrock unit could be used to assess whether or not the distribution frequency of concentration at a site that is suspected of contamination is significantly different from natural conditions.

Summary

This investigation is the first regional-scale study of arsenic concentrations in water from private wells completed in bedrock throughout east-central Massachusetts, the region of elevated-arsenic concentrations in the State. Measurements of uranium concentrations also were included in the investigation, because uranium, similar to arsenic, likely has a bedrock source. Although private water supplies are not subject to new U.S. Environmental Protection Agency (USEPA) drinking-water standards for public-water supplies, such as those established for arsenic and uranium in the last 7 years of 10 and 30 micrograms per liter, respectively, the standards are thresholds whereby private well users can assess the need for water treatment. Concentration data are needed for arsenic and uranium concentrations to (1) assess the geographic distribution of elevated concentrations, (2) guide testing of existing supplies, and (3) develop new supplies. These needs were addressed by correlating concentrations of arsenic and uranium with bedrock units and applying the correlations to the mapped distributions of wells. For arsenic, the number of overstandard wells estimated by these methods in the study area would account for most of the overstandard wells in the State. For uranium, the number of overstandard wells estimated for the study area would be less than the total for the State, because bedrock units with elevated concentrations of uranium are also expected outside of the region of this study.

Samples were collected by private well users that responded to sampling kits that were mailed to randomly selected well addresses. An instruction sheet and water-use questionnaire were included in the sampling kit. Of the wells randomly sampled, 13 percent had concentrations that exceeded the drinking-water standard for arsenic, and 3.5 percent exceeded the drinking-water standard for uranium.

One-way ANOVA analysis of log-transformed concentration data indicated significant differences for arsenic and for uranium concentration populations grouped by bedrock unit in most of the study area. However, an area of elevated arsenic concentrations was identified west of the Clinton-Newbury fault, where there were no significant differences in arsenic concentrations among the bedrock units. Lack of correlation with individual bedrock units in this area could have resulted from relatively equal redistribution of arsenic by metamorphic and/or metasomatic fluids.

Concentrations of arsenic and uranium fit log-normal distributions for populations separated by bedrock unit. For each bedrock unit, log-normal fits of the data were used to determine probabilities of concentrations exceeding the drinking-water standards. Overstandard probabilities were as great as 26 percent for arsenic in a unit containing amphibolite and 21 percent for uranium in a granitic unit.

Water-use data from the well users indicated that most of the overstandard wells were being used for drinking water without treatment—66 percent for arsenic and 93 percent for uranium. This data together with probability and well-distribution data were used to estimate the potential total number of wells in the study area used for drinking water without treatment: approximately 3,800 for arsenic and 3,000 for uranium.

Probability and well-distribution data were also used to determine the sampling effort required to locate 90 percent of the estimated overstandard wells. For arsenic, this could be achieved by sampling wells in those bedrock units with an overstandard probability of 10 percent or greater. This would involve sampling 26 percent of the total number of wells in the study area. For uranium, 90 percent of overstandard wells could be determined by sampling wells in bedrock units with an overstandard probability of 4 percent or greater. This would involve sampling 40 percent of all the wells in the study area.

Increased sampling in the investigation was directed in the regions of three 1:24,000 quadrangles where recent detailed geologic mapping had been conducted. Improved correlations of arsenic and uranium with bedrock unit were measured for two of the three quadrangles compared to the correlations made with the statewide map.

The correlations with bedrock are compatible with a natural bedrock source of the contaminants. By addressing the potential for contamination of bedrock wells in areas of increased contamination probability, well owners and resource managers can better assess risk.

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Appendix 1. Abbreviations and Descriptions for Bedrock Units in and Adjacent to the Study Area

Appendix 1. Abbreviations and descriptions for bedrock units in and adjacent to the study area.

[Fm, formation; Mbr, member; bedrock unit abbreviations and descriptions are from Zen and others, 1983]

Bedrock unit abbreviation	Age	Bedrock unit descriptions
Cbw	Cambrian	Braintree Argillite and Weymouth Fm—argillite, with some rare limestone
Cg	Cambrian	Green Lodge Fm of Rhodes and Graves (1931)—quartzite and slate
Ch	Cambrian	Hoppin Fm—quartzite, argillite, and minor limestone
cu	Unknown age	Cumberlandite—rock containing magnetite, ilmenite, olivine, labradorite, and spinel
Dcgr	Devonian	Chelmsford Granite—muscovite-biotite granite
Dchgr	Devonian	Coys Hill Porphyritic Granite Gneiss—microcline granite gneiss
Dchh	Devonian	Coys Hill Porphyritic Granite Gneiss— hornblende gneiss inclusions
Dcygr	Devonian	Cherry Hill Granite—alaskite granite containing ferro-hornblende
Ddi	Devonian	Hardwick Tonalite: Biotite-hornblende diorite and quartz-bearing diorite
Ddn	Devonian	Hardwick Tonalite: Meladiorite and norite
Dfgd	Devonian	Fitchburg Complex—biotite granodiorite to tonalite gneiss
Dfgds	Devonian	Fitchburg Complex—biotite-muscovite granitic gneiss with mica schist and feldspathic granulite inclusions
Dfgr	Devonian	Fitchburg Complex—muscovite-biotite granite
Dfgrg	Devonian	Fitchburg Complex—biotite-muscovite granite to granodiorite gneiss
Dft	Devonian	Fitchburg Complex—biotite-hornblende tonalite inclusions
Dgd	Devonian	Granodiorite
Dgr	Devonian	Biotite-muscovite granite
Dhgr	Devonian	Hardwick Tonalite—porhyritic microcline-biotite granite gneiss
Dht	Devonian	Hardwick Tonalite—biotite tonalite to granodiorite gneiss
Dl	Devonian	Littleton Fm
Dl+Ops	Devonian	Littleton and Partridge Fms, interfolded
Dl+Ops	Devonian	Partridge Fm—interfolded Littleton and Partridge Fms
Dlf	Devonian	Littleton Fm—quartz-feldspar-garnet gneiss, probably felsic metavolcanic rock
Dlm	Devonian	Littleton Fm—calcitic marble
Dlo	Devonian	Littleton Fm—orthopyroxene-biotite gneiss, probably intermediate metavolcanic rock
Dmgr	Devonian	Muscovite-biotite granite
DOgr	Devonian/Ordovician	Alkalic granite in Franklin
Dpgr	Devonian	Peabody Granite—alkalic granite containing ferro-hornblende
Drgr	Devonian	Granite of Rattlesnake Hill pluton—biotite-granite and fin -grained riebeckite granite
Drh	Devonian	Hardwick Tonalite: Biotite-garnet-feldspar gneiss of Ragged Hill
DSdi	Devonian/Silurian	Diorite and tonalite
DSn	Devonian/Silurian	Newbury Volcanic Complex—undivided sedimentray and volcanic rocks
DSna	Devonian/Silurian	Newbury Volcanic Complex—porphyritic andesite, includes tuffaceous mudstone
DSnl	Devonian/Silurian	Newbury Volcanic Complex—basalt, andesite, rhyolite, and tuff
DSnr	Devonian/Silurian	Newbury Volcanic Complex—micrographic rhyolite
DSnu	Devonian/Silurian	Newbury Volcanic Complex—calcareous mudstone, red mudstone, and siliceous siltstone
DSw	Devonian/Silurian	Worcester Fm—carbonaceous slate and phyllite and minor metagraywacke
Dwm	Devonian	Wenham Monzonite—monzonite containing ferro-hornblende
DZl	Devonian	Lynn Volcanic Complex—rhyolite, agglomerate, and tuff
fgr	Unknown age	Fine-grained granite and granite porphyry

Appendix 1. Abbreviations and descriptions for bedrock units in and adjacent to the study area. —Continued

[Fm, formation; Mbr, member; bedrock unit abbreviations and descriptions are from Zen and others, 1983]

Bedrock unit abbreviation	Age	Bedrock unit descriptions
gb	Precambrian to Paleozoic	Hornblende-olivine gabbro
Cbw	Cambrian	Braintree Argillite and Weymouth Fm—argillite, with some rare limestone
Cg	Cambrian	Green Lodge Fm of Rhodes and Graves (1931)—quartzite and slate
Ch	Cambrian	Hoppin Fm—quartzite, argillite, and minor limestone
cu	Unknown age	Cumberlandite—rock containing magnetite, ilmenite, olivine, labradorite, and spinel
Dcgr	Devonian	Chelmsford Granite—muscovite-biotite granite
Dchgr	Devonian	Coys Hill Porphyritic Granite Gneiss—microcline granite gneiss
Dchh	Devonian	Coys Hill Porphyritic Granite Gneiss— hornblende gneiss inclusions
Dcygr	Devonian	Cherry Hill Granite—alaskite granite containing ferro-hornblende
Ddi	Devonian	Hardwick Tonalite: Biotite-hornblende diorite and quartz-bearing diorite
Ddn	Devonian	Hardwick Tonalite: Meladiorite and norite
Dfgd	Devonian	Fitchburg Complex—biotite granodiorite to tonalite gneiss
Dfgds	Devonian	Fitchburg Complex—biotite-muscovite granitic gneiss with mica schist and feldspathic granulite inclusions
Dfgr	Devonian	Fitchburg Complex—muscovite-biotite granite
Dfgrg	Devonian	Fitchburg Complex—biotite-muscovite granite to granodiorite gneiss
Dft	Devonian	Fitchburg Complex—biotite-hornblende tonalite inclusions
Dgd	Devonian	Granodiorite
Dgr	Devonian	Biotite-muscovite granite
Dhgr	Devonian	Hardwick Tonalite—porhyritic microcline-biotite granite gneiss
Dht	Devonian	Hardwick Tonalite—biotite tonalite to granodiorite gneiss
Dl	Devonian	Littleton Fm
Dl+Ops	Devonian	Littleton and Partridge Fms, interfolded
Dl+Ops	Devonian	Partridge Fm—interfolded Littleton and Partridge Fms
Dlf	Devonian	Littleton Fm—quartz-feldspar-garnet gneiss, probably felsic metavolcanic rock
Dlm	Devonian	Littleton Fm—calcitic marble
Dlo	Devonian	Littleton Fm—orthopyroxene-biotite gneiss, probably intermediate metavolcanic rock
Dmgr	Devonian	Muscovite-biotite granite
DOgr	Devonian/Ordovician	Alkalic granite in Franklin
Dpgr	Devonian	Peabody Granite—alkalic granite containing ferro-hornblende
Drgr	Devonian	Granite of Rattlesnake Hill pluton—biotite-granite and fin -grained riebeckite granite
Drh	Devonian	Hardwick Tonalite: Biotite-garnet-feldspar gneiss of Ragged Hill
DSdi	Devonian/Silurian	Diorite and tonalite
DSn	Devonian/Silurian	Newbury Volcanic Complex—undivided sedimentray and volcanic rocks
DSna	Devonian/Silurian	Newbury Volcanic Complex—porphyritic andesite, includes tuffaceous mudstone
DSnl	Devonian/Silurian	Newbury Volcanic Complex—basalt, andesite, rhyolite, and tuff
DSnr	Devonian/Silurian	Newbury Volcanic Complex—micrographic rhyolite
DSnu	Devonian/Silurian	Newbury Volcanic Complex—calcareous mudstone, red mudstone, and siliceous siltstone
DSw	Devonian/Silurian	Worcester Fm—carbonaceous slate and phyllite and minor metagraywacke
Dwm	Devonian	Wenham Monzonite—monzonite containing ferro-hornblende
DZl	Devonian	Lynn Volcanic Complex—rhyolite, agglomerate, and tuff

Appendix 1. Abbreviations and descriptions for bedrock units in and adjacent to the study area. —Continued

[Fm, formation; Mbr, member; bedrock unit abbreviations and descriptions are from Zen and others, 1983]

Bedrock unit abbreviation	Age	Bedrock unit descriptions
fgr	Unknown age	Fine-grained granite and granite porphyry
gb	Precambrian to Paleozoic	Hornblende-olivine gabbro
gd	Precambrian to Paleozoic	Granodiorite
gr	Precambrian to Paleozoic	Granite
grg	Devonian	Biotite granitic gneiss
hg	Precambrian to Paleozoic	Hornblende-plagioclase gneiss
igd	Precambrian to Paleozoic	Granodiorite of the Indian Head pluton—biotite granodiorite and hornblende-biotite tonalite
Jd	Jurassic	Diabase dikes and sills
Jsi	Jurassic	Silicified faul -breccia or strongly silicified metamorphic rock
K	Cretaceous	Cretaceous sediments—clay, silt, sand, and gravel, mostly non-marine and near-shore
mgr	Precambrian to Silurian	Muscovite granite
Ogl	Ordovician	Glastonbury Gneiss—granitic gneiss
Ongb	Ordovician	Nahant Gabbro and gabbro at Salem Neck—labradorite-pyroxene gabbro, hornblende gabbro, and hornblende diorite
Opa	Ordovician	Partridge Fm—amphibolite
Opau	Ordovician	Partridge Fm—sillimanite-feldspar augen gneiss
Opbg	Ordovician	Partridge Fm—biotite gneiss
Opc	Ordovician	Pauchaug Gneiss—granitic gneiss
Opf	Ordovician	Partridge Fm—felsic gneiss, metavolcanic, and minor amphibolite
Ops	Ordovician	Partridge Fm—sulfidic mica schist and subordinate amphibolit
Opsa	Ordovician	Partridge Fm—sulfidic mica schist and abundant amphibolit
Opsc	Ordovician	Partridge Fm—sulfidic schist and abundant cal -silicate
Opsg	Ordovician	Partridge Fm—felsic gneiss and schist
Opu	Ordovician	Partridge Fm—ultramafic lenses, commonly hornblendite
Opv	Ordovician	Partridge Fm—mafic and felsic gneisses, metavolcanic, with cal -silicate granofels
Opvs	Ordovician	Partridge Fm—biotite gneiss, metavolcanic; minor amphibolite and sulfidic schis
OZf	Neoproterozoic	Fish Brook Gneiss—biotite-plagioclase quartz gneiss
OZm	Neoproterozoic	Marlboro Fm—amphibolite, biotite schist and gneiss, minor calc-silicate granofels and felsic granofels
OZma	Neoproterozoic	Massabesic Gneiss Complex—biotite feldspar paragneiss intruded by potassium-feldspar-rich gneiss
OZmg	Neoproterozoic	Marlboro Fm—feldspathic gneiss
OZn	Neoproterozoic	Nashoba Fm—sillimanite schist and gneiss, partly sulfidc, amphibolite, biotite gneiss, cal -silicate gneiss, and marble
OZnb	Neoproterozoic	Nashoba Fm: Boxford Mbr—massive amphibolite, minor biotite gneiss
OZq	Neoproterozoic	Quinebaug Fm—amphibolite, biotite, and hornblende gneiss, felsic gneiss, and calc-silicate gneiss
OZsh	Neoproterozoic	Shawsheen Gneiss—sillimanite gneiss, sulfidic at base; minor amphibolit
OZt	Neoproterozoic	Tatnic Hill Fm—sulfidic sillimanite schist, sillimanite schist and gneiss, biotite gneiss; minor amphibolite, calc-silicate gneiss and marble
OZtf	Neoproterozoic	Tatnic Hill Fm: Fly Pond Mbr—calc-silicate gneiss and marble

Appendix 1. Abbreviations and descriptions for bedrock units in and adjacent to the study area. —Continued

[Fm, formation; Mbr, member; bedrock unit abbreviations and descriptions are from Zen and others, 1983]

Bedrock unit abbreviation	Age	Bedrock unit descriptions
OZty	Neoproterozoic	Tatnic Hill Fm: Yantic Mbr—grey mica schist
Pcm	Pennsylvanian	Coal Mine Brook Fm—carbonaceous slate and garnet phyllite; lens of meta-anthracite; conglomerate and arkose
Pd	Pennsylvanian	Dighton Conglomerate—coarse conglomerate having sandy matrix; minor sandstone
Pgr	Pennsylvanian	Biotite granite, with magnetite-bearing pegmatite
Ph	Pennsylvanian	Harvard Conglomerate—conglomerate and chloritoid-hematite phyllite
Pp	Pennsylvanian	Pondville Conglomerate—quartz conglomerate having abundant sandy matrix; boulder conglomerate; arkose
Pr	Pennsylvanian	Rhode Island Fm—sandstone, graywacke, shale, and conglomerate; minor beds of meta-antracite
Prc	Pennsylvanian	Rhode Island Fm—conglomerate, sandstone, and graywacke
Pw	Pennsylvanian	Wamsutta Fm—red to pink conglomerate, graywacke, sandstone, and shale
Pwv	Pennsylvanian	Wamsutta Fm—rhyolite and mafic volcanic rock
PZb	Unknown age	Bellingham Conglomerate—red and gray metamorphosed conglomerate, sandstone, graywacke, and shale
PzZc	Proterozoic Z to earliest Paleozoic	Cambridge Argillite—gray argillite and minor quartzite; rare sandstone and conglomerate
PzZr	Proterozoic Z to earliest Paleozoic	Roxbury Conglomerate—conglomerate, sandstone, siltstone, argillite, and melaphyre
PzZrb	Proterozoic Z to earliest Paleozoic	Roxbury Conglomerate—melaphyre
q	Unknown age	Massive quartz and silicified roc
qd	Precambrian to Phanerozoic	Quartz diorite
Sacgr	Silurian	Ayer Granite—Clinton facies, porphyritic biotite granite
Sagr	Silurian	Ayer Granite—granite to tonalite
Sb	Silurian	Berwick Fm—metamorphosed calcareous sandstone, silstone, and minor muscovite schist (1 polygon)
Sb	Silurian	Berwick Fm—metamorphosed calcareous sandstone, silstone, and minor muscovite schist
Sbs	Silurian	Berwick Fm—mica schist
Se	Silurian	Eliot Fm—phyllite and calcareous phyllite
Sfs	Silurian	Fitch Fm—sulfidic cal -silicate and minor sulfidic schist
Sfss	Silurian	Fitch Fm—sulfidic mica schis
Sgr	Silurian	Rusty-weathering biotite granite to granodiorite
Sngr	Silurian	Newburyport Complex—porphyritic granite with microcline phenocrysts
So	Silurian	Oakdale Fm—metamorphosed pelitic and calcareous siltsone and muscovite schist
SOad	Silurian	Ayer Granite—Devens-Long Pond facies, porphyritic gneissic biotite granite and granodiorite
SOagr	Silurian	Andover Granite—muscovite-biotite granite
SObgr	Silurian	Blue Hill Granite Porphyry—microperthite-quartz porphyry
SObo	Silurian	Boylston Schist—carbonaceous phyllite and schist, locally sulfidic; quartzite; calc-silicate beds
SOcb	Silurian	Cape Ann Complex: Beverly Syenite
SOcgr	Silurian	Cape Ann Complex—alkalic granite to quartz syenite containing ferro-hornblende
SOcsm	Silurian	Cape Ann Complex: Squam Granite—monzodiorite
SOk	Silurian	Kittery Fm—quartzite, partly calcareous; phyllite, schist

Appendix 1. Abbreviations and descriptions for bedrock units in and adjacent to the study area. —Continued

[Fm, formation; Mbr, member; bedrock unit abbreviations and descriptions are from Zen and others, 1983]

Bedrock unit abbreviation	Age	Bedrock unit descriptions
SOngd	Silurian	Newburyport Complex—tonalite and granodiorite
SOqgr	Silurian	Quincy Granite—alkalic granite containing riebeckite and aegirine
SOrh	Silurian	Reubens Hill Fm—amphibolite, hornblende-chlorite schist, and feldspathic schist; includes metamorphosed diorite
SOvh	Silurian	Vaughn Hills Quartzite—quartzite, phyllite, conglomerate, and chlorite schist
Sp	Silurian	Paxton Fm—biotite granofels, calc-silicate granofels, and sulfidic schist
Spa	Silurian	Paxton Fm—amphibolite
Spbc	Silurian	Paxton Fm—diopside calc-silicate granofels
Spbs	Silurian	Paxton Fm: Bigelow Brook Mbr—biotite granofels, sulfidic schist, and minor cal -silicate granofels
Spqr	Silurian	Paxton Fm—rusty-weathering sulfidic quartzite and sulfidic schi
Spso	Silurian	Paxton Fm: Southbridge Mbr—biotite granofels and calc-silicate granofels
Spsq	Silurian	Paxton Fm—sulfidic magnesian biotite and magnesian cordierite schist and sillimanite quartzite
Spss	Silurian	Paxton Fm—sulfidic mica schis
Ssaqd	Silurian	Straw Hollow Diorite and Assabet Quartz Diorite, undifferentiated—biotite-hornblende diorite and quartz diorite
Ssqd	Silurian	Sharpners Pond Diorite—biotite-hornblende tonalite and diorite
St	Silurian	Tower Hill Quartzite—quartzite and phyllite
Sts	Silurian	Tower Hill Quartzite—gray phyllite
SZtb	Silurian	Tadmuck Brook Schist—andalusite phyllite and sillimanite schist, partly sulfidic; local quartzite
T	Tertiary	Tertiary sediments—unconsolidated sand, silt, and clay in discontinuous patches
TRe	Triassic	Red arkosic conglomerate, sandstone, and siltstone
u	Precambrian to Phanerozoic	Serpentinite
Zagr	Neoproterozoic	Alaskite—mafi -poor gneissic granite, commonly containing muscovite
Zb	Proterozoic Z	Blackstone Group—undivided, quartzite, schist, phyllite, marble, and metavolcanic rocks
Zbq	Proterozoic Z	Blackstone Group: Quinnville Quartzite
Zbs	Proterozoic Z	Blackstone Group—mica schist and phyllite
Zbv	Proterozoic Z	Blackstone Group—greenstone and amphibolite
Zdgr	Proterozoic Z	Dedham Granite—granite; includes dioritic rock
Zdi	Proterozoic Z	Diorite—hornblende diorite metamorhosed in part to amphibolite and hornblende gneiss
Zdigb	Proterozoic Z	Diorite and gabbro—complex of diorite and gabbro, sub. metavolcanic rocks and intrusive granite and granodiorite
Zdngr	Proterozoic Z	Dedham Granite—granite to granodiorite
Zegr	Proterozoic Z	Esmond Granite—biotite granite
Zfgr	Proterozoic Z	Granite of the Fall River pluton—biotite granite, in part mafic poo
Zfm	Proterozoic Z	Felsic and mafic volcanic rock
Zgb	Proterozoic Z	Gabbro—hornblende gabbro and hornblende-pyroxene gabbro metamorphosed in part to hornblende gneiss and amphibolite
Zgg	Proterozoic Z	Granite, gneiss, and schist, undivided—plutonic and metamorphic rocks
Zgmgd	Proterozoic Z	Grant Mills Granodiorite—porphyritic granodiorite

Appendix 1. Abbreviations and descriptions for bedrock units in and adjacent to the study area. —Continued

[Fm, formation; Mbr, member; bedrock unit abbreviations and descriptions are from Zen and others, 1983]

Bedrock unit abbreviation	Age	Bedrock unit descriptions
Zgn	Proterozoic Z	Biotite gneiss near New Bedford—feldspathic gneiss
Zgr	Proterozoic Z	Biotite granite
Zgs	Proterozoic Z	Gneiss and schist near New Bedford—hornblende and biotite schist and gneiss, amphibolite
Zhg	Proterozoic Z	Hope Valley Alaskite Gneiss—mafi -poor gneissic granite, locally containing muscovite
Zm	Proterozoic Z	Mattapan Volcanic Complex—rhyolite, melaphyre, agglomerate, and tuff
Zmgd	Proterozoic Z	Milford Granite—seriate to subporphyritic granite to granodiorite, locally gneissic
Zmgr	Proterozoic Z	Milford Granite—biotite granite, locally gneissic
Zp	Proterozoic Z	Plainfield Fm—quartzite, pelitic schist, minor cal -silicate rock and amphibolite
Zpg	Proterozoic Z	Ponaganset Gneiss—gneissic biotite granite containing megacrysts of microcline
Zpgr	Proterozoic Z	Porphyritic granite—seriate to porphyritic biotite granite with epidote and sphene and mafic inclusions
Zrdi	Proterozoic Z	Diorite at Rowley—hornblende diorite
Zsg	Proterozoic Z	Scituate Granite Gneiss—gneissic granite containing biotite
Zssy	Proterozoic Z	Sharon Syenite—syenite containing microperthite, oligoclase, and clinopyroxene, mixed with ferro-gabbro
Ztgd	Proterozoic Z	Topsfield Granodiorite—porphyritic granodiorite
Zv	Proterozoic Z	Metamorphosed mafic to felsic fl , and volcaniclastic and hypabyssal intrusive rocks
Zvf	Proterozoic Z	Metamorphosed felsic metavolcanic rocks
Zw	Proterozoic Z	Westboro Fm—quartzite, schist, calc-silicate quartzite, and amphibolite
Zwgr	Proterozoic Z	Westwood Granite

Appendix 2. Letter to Potential Participants in the Study

Appendix 2. Letter to potential participants in the study.

OMB Control Number 1028-0086

USGS Study on Arsenic and Uranium in Bedrock Wells of East Central Massachusetts

Dear Resident Well User:

The U.S. Geological Survey (USGS) and the Massachusetts Department of Environmental Protection (MDEP) are conducting a study of drinking water to assess the extent of possible elevated concentrations of naturally occurring arsenic and uranium in bedrock aquifers that provide drinking water in east central Massachusetts. The well at your address has been chosen by a random selection process to be included in the study.

The study, conducted by John Colman, U.S. Geological Survey (508 490 5027), will indicate relationships between arsenic and uranium concentrations and type of bedrock in which a well is drilled. This information will help guide future water-supply development, well-water testing, and estimates of total numbers of wells affected.

Your participation is completely voluntary, and results from your well will be kept completely confidential (by Exemption 9, well data is not subject to the Freedom of Information Act) and will only be used for the purpose of this study.

We will report results to you with information about health effects of drinking water greater than standards and ways to decrease concentrations. If you have any questions, please do not hesitate to contact the project leader John Colman at: (508) 490 5027.

Questionnaires will be mailed to a small number of the selected well addresses by the Massachusetts Department of Public Health (MDPH). The MDPH questionnaire offers a second program of biomonitoring for some participants concerned about uranium and arsenic effects on health. Participation in the MDPH program is also voluntary and is not required for well testing by USGS.

In Parts 1 and 3 of the survey we want to know a little about your water and where it comes from. In Part 2, there are instructions about how to collect a water sample. When you are done, please use the enclosed business reply envelope to mail your survey and water samples back to the USGS. **Please mail in the bottles and survey soon, if possible within 2 weeks. If it goes longer, however, we are still interested.**

PART 1 - Water Sources and Supplies

The majority of residential water supply wells in east-central Massachusetts are private wells that tap ground water aquifers in fractured bedrock formations. In the first part of this study, we would like to ask you a few questions about your water source and supply.

1. Is your home supplied with water from a private (bedrock) well?

   ☐ Yes (go to question 2)

   ☐ No. My house supply is town water or another source other than bedrock well.

   Please **STOP** here. You do not have to mail back bottles or a water sample.

Appendix 2. Letter to potential participants in the study.—Continued

2. Is your well water treated?

☐ Yes

What is the treatment? _____

☐ No

3. How many people are in your household? *(This question is to determine the amount of water use in your household).*

_____ People live in this household .

4. Do you use your well water for drinking water and/or cooking?

☐ Yes

☐ No, because of water quality issues (Select all that apply):

☐ **Arsenic** ☐ **Uranium**

☐ **Iron** ☐ **Sediment**

☐ **Manganese** ☐ **Taste**

☐ **Other**_____

Part 2 - Water Sampling Instructions

Although collecting a water sample is a relatively simple task, there are several steps that must be taken to ensure accurate results. Please follow the instructions in steps 1-6 below to complete the next section of the survey.

Sampling Objective

The objective is to get a water sample that represents the water in the bedrock aquifer as closely as possible, so please select a tap that does not have treatment. Both bottles should be filled from the same faucet, one that does not have a water treatment system. Sample bottle screw threads and cap should not be contaminated with dirt from hands or the tap.

Once the bottles are filled, please mail the samples and questionnaire in the enclosed, prepaid business reply envelope.

Appendix 2. Letter to potential participants in the study.—Continued

Instructions

1. Collect your water sample **in the sample containers provided by the USGS**. Samples collected in any other container will not meet lab standards and cannot be processed.
2. **Choose a location to sample your water.** If you **do not** have any water treatment devices, such as a water softener or a reverse osmosis filter, take the sample from a cold water tap where you get your drinking water. If you **do** have treatment devices on your water system, (other than a whole-house filter for sediment) please locate a faucet which is attached to the water line before the treatment system.
3. Please avoid contamination of your samples, and do not touch the inside of the bottle or cap.
4. **Turn on the cold water and let it run for 1 minute** to flush the water out of the pipes. Turn the faucet down to a pencil size stream of water and fill the sample container.
5. Place the bottles and your completed survey in the enclosed postage-paid, business-reply envelope.
6. Mail the envelope to the USGS.

PART 3 - Location and Time of Water Sample

Please tell us where and when you collected the water for this sample.

- ☐ Basement Faucet
- ☐ Outside Spigot
- ☐ Bathroom Faucet
- ☐ Kitchen Faucet
- ☐ Other _____

Date and time of sampling_____

We would like to conduct follow-up sampling with a visit to a small number of participants. Would you be willing to participate in the follow-up visit?

- ☐ Yes, I would like to participate in a follow-up visit.
  Please contact me by phone: _____
  Or by email: _____
- ☐ No, I would not like to participate in a follow-up visit.

We would like to thank you for taking the time to participate in this important study.

PAPERWORK REDUCTION ACT STATEMENT: The Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et. seq.) requires us to inform you that this information is being collected to inform a study on arsenic and uranium in bedrock wells of east central Massachusetts. The estimated burden for this collection of information is estimated to average 20 minutes per response, including the time for reviewing instructions, answering questions, collecting water samples. The response to this request is voluntary. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB Control Number. Comments regarding the burden estimate or any other aspect of this collection of information should be directed to: John Colman at (508) 490 5027.

Appendix 3. Probability of Arsenic Exceeding a Given Concentration by Bedrock Unit

Appendix 3. Probability of arsenic exceeding a given concentration, by bedrock unit.

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Arsenic, in micrograms per liter	Grouped bedrock units with elevated arsenic concentration			Bedrock unit abbreviation					
				Ops*			OZf		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
1	0.66442	0.60023	0.72414	0.03526	0.00377	0.17241	0.55522	0.27338	0.81066
2	0.52993	0.46620	0.59290	0.01398	0.00108	0.09179	0.36942	0.15070	0.64306
3	0.44855	0.38670	0.51167	0.00764	0.00049	0.06006	0.27105	0.09073	0.54658
4	0.39190	0.33202	0.45446	0.00484	0.00027	0.04334	0.21023	0.05795	0.48441
5	0.34942	0.29143	0.41117	0.00334	0.00017	0.03316	0.16912	0.03875	0.44042
6	0.31604	0.25983	0.37687	0.00244	0.00011	0.02639	0.13965	0.02687	0.40719
7	0.28893	0.23440	0.34879	0.00186	0.00008	0.02161	0.11763	0.01919	0.38091
8	0.26637	0.21342	0.32525	0.00146	0.00006	0.01809	0.10064	0.01406	0.35941
9	0.24723	0.19578	0.30515	0.00117	0.00004	0.01540	0.08721	0.01051	0.34138
10	**0.23076**	**0.18073**	**0.28772**	**0.00096**	**0.00003**	**0.01329**	**0.07637**	**0.00801**	**0.32594**
11	0.21641	0.16771	0.27242	0.00080	0.00003	0.01161	0.06748	0.00619	0.31252
12	0.20376	0.15633	0.25886	0.00068	0.00002	0.01024	0.06008	0.00486	0.30069
13	0.19253	0.14630	0.24673	0.00058	0.00002	0.00910	0.05384	0.00386	0.29017
14	0.18247	0.13739	0.23581	0.00050	0.00001	0.00815	0.04854	0.00310	0.28071
15	0.17341	0.12942	0.22590	0.00043	0.00001	0.00735	0.04399	0.00251	0.27214
16	0.16520	0.12225	0.21687	0.00038	0.00001	0.00666	0.04005	0.00205	0.26434
17	0.15772	0.11576	0.20860	0.00034	0.00001	0.00607	0.03661	0.00169	0.25718
18	0.15088	0.10986	0.20098	0.00030	0.00001	0.00555	0.03360	0.00140	0.25058
19	0.14459	0.10448	0.19395	0.00027	0.00001	0.00510	0.03094	0.00117	0.24447
20	0.13878	0.09954	0.18742	0.00024	0.00001	0.00470	0.02857	0.00099	0.23879
21	0.13341	0.09501	0.18135	0.00022	0.00001	0.00435	0.02647	0.00084	0.23349
22	0.12843	0.09082	0.17568	0.00020	0.00000	0.00403	0.02459	0.00071	0.22853
23	0.12379	0.08694	0.17037	0.00018	0.00000	0.00375	0.02289	0.00061	0.22387
24	0.11945	0.08334	0.16540	0.00016	0.00000	0.00350	0.02136	0.00052	0.21949
25	0.11540	0.08000	0.16072	0.00015	0.00000	0.00327	0.01998	0.00045	0.21535
26	0.11160	0.07687	0.15631	0.00014	0.00000	0.00307	0.01872	0.00039	0.21143
27	0.10802	0.07396	0.15215	0.00013	0.00000	0.00288	0.01758	0.00034	0.20772
28	0.10466	0.07123	0.14821	0.00012	0.00000	0.00271	0.01653	0.00030	0.20419
29	0.10149	0.06866	0.14448	0.00011	0.00000	0.00256	0.01557	0.00026	0.20083
30	0.09849	0.06625	0.14093	0.00010	0.00000	0.00241	0.01469	0.00023	0.19763
31	0.09565	0.06398	0.13756	0.00009	0.00000	0.00228	0.01388	0.00020	0.19458
32	0.09296	0.06184	0.13436	0.00009	0.00000	0.00216	0.01313	0.00018	0.19166
33	0.09040	0.05982	0.13130	0.00008	0.00000	0.00205	0.01244	0.00016	0.18886
34	0.08798	0.05791	0.12839	0.00008	0.00000	0.00195	0.01180	0.00014	0.18618
35	0.08567	0.05609	0.12560	0.00007	0.00000	0.00185	0.01120	0.00012	0.18361

Appendix 3. Probability of arsenic exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Arsenic, in micrograms per liter	Grouped bedrock units with elevated arsenic concentration			Bedrock unit abbreviation					
				Ops*			OZf		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
36	0.08346	0.05438	0.12293	0.00007	0.00000	0.00176	0.01065	0.00011	0.18113
37	0.08136	0.05274	0.12038	0.00006	0.00000	0.00168	0.01014	0.00010	0.17875
38	0.07936	0.05119	0.11793	0.00006	0.00000	0.00160	0.00966	0.00009	0.17646
39	0.07744	0.04972	0.11558	0.00006	0.00000	0.00153	0.00921	0.00008	0.17425
40	0.07561	0.04831	0.11332	0.00005	0.00000	0.00146	0.00879	0.00007	0.17212
41	0.07385	0.04697	0.11115	0.00005	0.00000	0.00140	0.00840	0.00006	0.17006
42	0.07216	0.04569	0.10906	0.00005	0.00000	0.00134	0.00803	0.00006	0.16807
43	0.07055	0.04446	0.10705	0.00004	0.00000	0.00129	0.00768	0.00005	0.16615
44	0.06900	0.04329	0.10512	0.00004	0.00000	0.00123	0.00736	0.00005	0.16428
45	0.06750	0.04217	0.10325	0.00004	0.00000	0.00119	0.00705	0.00004	0.16248
46	0.06607	0.04110	0.10144	0.00004	0.00000	0.00114	0.00676	0.00004	0.16073
47	0.06469	0.04007	0.09970	0.00004	0.00000	0.00110	0.00649	0.00004	0.15903
48	0.06336	0.03908	0.09802	0.00003	0.00000	0.00105	0.00623	0.00003	0.15738
49	0.06208	0.03813	0.09639	0.00003	0.00000	0.00102	0.00599	0.00003	0.15578
50	0.06084	0.03722	0.09481	0.00003	0.00000	0.00098	0.00576	0.00003	0.15423
55	0.05526	0.03316	0.08765	0.00002	0.00000	0.00082	0.00478	0.00002	0.14706
60	0.05054	0.02978	0.08147	0.00002	0.00000	0.00070	0.00402	0.00001	0.14075
65	0.04647	0.02692	0.07609	0.00002	0.00000	0.00060	0.00341	0.00001	0.13514
70	0.04295	0.02447	0.07136	0.00001	0.00000	0.00052	0.00293	0.00001	0.13011
75	0.03987	0.02237	0.06716	0.00001	0.00000	0.00046	0.00253	0.00000	0.12556
80	0.03715	0.02054	0.06341	0.00001	0.00000	0.00040	0.00221	0.00000	0.12143
85	0.03474	0.01894	0.06005	0.00001	0.00000	0.00036	0.00194	0.00000	0.11764
90	0.03258	0.01752	0.05700	0.00001	0.00000	0.00032	0.00171	0.00000	0.11416
95	0.03065	0.01627	0.05424	0.00001	0.00000	0.00029	0.00152	0.00000	0.11094
100	0.02890	0.01515	0.05172	0.00001	0.00000	0.00026	0.00136	0.00000	0.10796
110	0.02587	0.01325	0.04729	0.00000	0.00000	0.00021	0.00109	0.00000	0.10259
120	0.02334	0.01170	0.04351	0.00000	0.00000	0.00018	0.00090	0.00000	0.09788
130	0.02120	0.01041	0.04026	0.00000	0.00000	0.00015	0.00074	0.00000	0.09370
140	0.01937	0.00932	0.03744	0.00000	0.00000	0.00013	0.00062	0.00000	0.08997
150	0.01779	0.00841	0.03495	0.00000	0.00000	0.00011	0.00053	0.00000	0.08660
160	0.01641	0.00762	0.03275	0.00000	0.00000	0.00010	0.00045	0.00000	0.08354
170	0.01520	0.00694	0.03079	0.00000	0.00000	0.00009	0.00039	0.00000	0.08075
180	0.01413	0.00635	0.02904	0.00000	0.00000	0.00008	0.00034	0.00000	0.07819
190	0.01318	0.00583	0.02746	0.00000	0.00000	0.00007	0.00030	0.00000	0.07582
200	0.01233	0.00538	0.02602	0.00000	0.00000	0.00006	0.00026	0.00000	0.07364

Appendix 3. Probability of arsenic exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Arsenic, in micrograms per liter	Grouped bedrock units with elevated arsenic concentration			Bedrock unit abbreviation					
				Ops*			OZf		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
210	0.01157	0.00497	0.02472	0.00000	0.00000	0.00005	0.00023	0.00000	0.07161
220	0.01087	0.00461	0.02352	0.00000	0.00000	0.00005	0.00020	0.00000	0.06971
230	0.01025	0.00429	0.02243	0.00000	0.00000	0.00004	0.00018	0.00000	0.06794
240	0.00968	0.00400	0.02142	0.00000	0.00000	0.00004	0.00016	0.00000	0.06628
250	0.00916	0.00374	0.02050	0.00000	0.00000	0.00004	0.00015	0.00000	0.06472
260	0.00868	0.00350	0.01964	0.00000	0.00000	0.00003	0.00013	0.00000	0.06325
270	0.00824	0.00329	0.01884	0.00000	0.00000	0.00003	0.00012	0.00000	0.06186
280	0.00784	0.00309	0.01810	0.00000	0.00000	0.00003	0.00011	0.00000	0.06055
290	0.00747	0.00291	0.01740	0.00000	0.00000	0.00003	0.00010	0.00000	0.05930
300	0.00712	0.00275	0.01676	0.00000	0.00000	0.00002	0.00009	0.00000	0.05811

Appendix 3. Probability of arsenic exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Arsenic, in micrograms per liter	Bedrock unit abbreviation								
	OZm			OZn			OZnb		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
1	0.23792	0.07581	0.50313	0.16282	0.07832	0.29137	0.63210	0.44055	0.79514
2	0.19207	0.05460	0.44482	0.07879	0.02495	0.19331	0.51498	0.33884	0.68819
3	0.16795	0.04320	0.41687	0.04795	0.01088	0.15020	0.44518	0.27992	0.62072
4	0.15207	0.03587	0.39961	0.03262	0.00562	0.12468	0.39654	0.23959	0.57260
5	0.14047	0.03069	0.38756	0.02373	0.00322	0.10742	0.35986	0.20970	0.53578
6	0.13144	0.02681	0.37852	0.01807	0.00199	0.09480	0.33080	0.18642	0.50628
7	0.12413	0.02380	0.37140	0.01422	0.00130	0.08510	0.30699	0.16769	0.48187
8	0.11803	0.02137	0.36559	0.01148	0.00089	0.07737	0.28700	0.15224	0.46118
9	0.11283	0.01938	0.36074	0.00946	0.00063	0.07103	0.26990	0.13926	0.44331
10	**0.10832**	**0.01771**	**0.35659**	**0.00792**	**0.00046**	**0.06573**	**0.25505**	**0.12819**	**0.42764**
11	0.10435	0.01630	0.35299	0.00672	0.00034	0.06122	0.24199	0.11862	0.41375
12	0.10082	0.01508	0.34983	0.00577	0.00026	0.05733	0.23039	0.11026	0.40129
13	0.09765	0.01402	0.34701	0.00501	0.00020	0.05393	0.22000	0.10291	0.39003
14	0.09478	0.01309	0.34449	0.00438	0.00015	0.05093	0.21063	0.09638	0.37979
15	0.09217	0.01227	0.34221	0.00386	0.00012	0.04827	0.20211	0.09055	0.37040
16	0.08977	0.01154	0.34013	0.00342	0.00010	0.04589	0.19434	0.08530	0.36175
17	0.08756	0.01088	0.33823	0.00305	0.00008	0.04374	0.18720	0.08057	0.35374
18	0.08552	0.01029	0.33647	0.00274	0.00007	0.04179	0.18063	0.07627	0.34630
19	0.08361	0.00975	0.33485	0.00247	0.00005	0.04001	0.17454	0.07235	0.33935
20	0.08184	0.00926	0.33335	0.00224	0.00005	0.03839	0.16889	0.06877	0.33285
21	0.08018	0.00882	0.33194	0.00203	0.00004	0.03689	0.16363	0.06547	0.32674
22	0.07862	0.00841	0.33062	0.00185	0.00003	0.03551	0.15871	0.06244	0.32098
23	0.07715	0.00803	0.32939	0.00170	0.00003	0.03423	0.15410	0.05964	0.31555
24	0.07576	0.00768	0.32823	0.00156	0.00002	0.03305	0.14977	0.05704	0.31040
25	0.07445	0.00736	0.32713	0.00143	0.00002	0.03194	0.14569	0.05463	0.30552
26	0.07320	0.00706	0.32609	0.00132	0.00002	0.03091	0.14185	0.05238	0.30088
27	0.07202	0.00679	0.32511	0.00123	0.00001	0.02995	0.13821	0.05028	0.29646
28	0.07089	0.00653	0.32417	0.00114	0.00001	0.02904	0.13477	0.04832	0.29224
29	0.06982	0.00629	0.32328	0.00106	0.00001	0.02819	0.13151	0.04648	0.28821
30	0.06880	0.00606	0.32243	0.00099	0.00001	0.02739	0.12841	0.04476	0.28435
31	0.06782	0.00585	0.32162	0.00092	0.00001	0.02663	0.12545	0.04314	0.28065
32	0.06688	0.00565	0.32084	0.00086	0.00001	0.02591	0.12264	0.04161	0.27711
33	0.06598	0.00546	0.32010	0.00081	0.00001	0.02523	0.11996	0.04017	0.27370
34	0.06511	0.00528	0.31939	0.00076	0.00001	0.02459	0.11740	0.03881	0.27042
35	0.06428	0.00511	0.31870	0.00071	0.00001	0.02398	0.11494	0.03752	0.26726

Appendix 3. Probability of arsenic exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Arsenic, in micrograms per liter	Bedrock unit abbreviation								
	OZm			OZn			OZnb		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
36	0.06348	0.00495	0.31804	0.00067	0.00000	0.02339	0.11260	0.03631	0.26422
37	0.06271	0.00480	0.31741	0.00063	0.00000	0.02284	0.11035	0.03515	0.26128
38	0.06197	0.00466	0.31680	0.00060	0.00000	0.02231	0.10819	0.03405	0.25844
39	0.06125	0.00452	0.31621	0.00056	0.00000	0.02181	0.10612	0.03301	0.25570
40	0.06056	0.00439	0.31564	0.00053	0.00000	0.02132	0.10412	0.03202	0.25305
41	0.05989	0.00427	0.31509	0.00050	0.00000	0.02086	0.10220	0.03108	0.25048
42	0.05924	0.00415	0.31455	0.00048	0.00000	0.02042	0.10036	0.03018	0.24799
43	0.05861	0.00404	0.31404	0.00045	0.00000	0.02000	0.09858	0.02932	0.24558
44	0.05801	0.00393	0.31354	0.00043	0.00000	0.01959	0.09686	0.02850	0.24324
45	0.05742	0.00383	0.31305	0.00041	0.00000	0.01920	0.09521	0.02771	0.24097
46	0.05685	0.00374	0.31258	0.00039	0.00000	0.01882	0.09361	0.02696	0.23876
47	0.05629	0.00364	0.31213	0.00037	0.00000	0.01846	0.09206	0.02624	0.23661
48	0.05575	0.00355	0.31168	0.00035	0.00000	0.01811	0.09057	0.02556	0.23452
49	0.05523	0.00347	0.31125	0.00034	0.00000	0.01778	0.08912	0.02490	0.23249
50	0.05472	0.00338	0.31083	0.00032	0.00000	0.01745	0.08772	0.02426	0.23051
55	0.05236	0.00302	0.30889	0.00026	0.00000	0.01600	0.08133	0.02145	0.22133
60	0.05028	0.00271	0.30718	0.00021	0.00000	0.01476	0.07581	0.01912	0.21319
65	0.04843	0.00246	0.30564	0.00018	0.00000	0.01370	0.07099	0.01717	0.20589
70	0.04676	0.00224	0.30426	0.00015	0.00000	0.01277	0.06674	0.01551	0.19930
75	0.04525	0.00205	0.30300	0.00012	0.00000	0.01196	0.06297	0.01409	0.19331
80	0.04387	0.00189	0.30185	0.00011	0.00000	0.01124	0.05959	0.01286	0.18782
85	0.04261	0.00175	0.30079	0.00009	0.00000	0.01060	0.05654	0.01178	0.18277
90	0.04145	0.00162	0.29981	0.00008	0.00000	0.01003	0.05378	0.01084	0.17810
95	0.04037	0.00151	0.29890	0.00007	0.00000	0.00951	0.05128	0.01001	0.17376
100	0.03937	0.00141	0.29805	0.00006	0.00000	0.00905	0.04898	0.00928	0.16972
110	0.03757	0.00124	0.29650	0.00005	0.00000	0.00823	0.04494	0.00803	0.16240
120	0.03598	0.00111	0.29514	0.00004	0.00000	0.00754	0.04149	0.00702	0.15593
130	0.03457	0.00099	0.29391	0.00003	0.00000	0.00696	0.03851	0.00620	0.15015
140	0.03330	0.00089	0.29280	0.00003	0.00000	0.00645	0.03590	0.00551	0.14494
150	0.03215	0.00081	0.29179	0.00002	0.00000	0.00601	0.03361	0.00493	0.14022
160	0.03111	0.00074	0.29086	0.00002	0.00000	0.00562	0.03158	0.00443	0.13591
170	0.03016	0.00068	0.29000	0.00002	0.00000	0.00527	0.02976	0.00401	0.13195
180	0.02928	0.00063	0.28921	0.00001	0.00000	0.00497	0.02813	0.00364	0.12830
190	0.02848	0.00058	0.28847	0.00001	0.00000	0.00469	0.02665	0.00332	0.12492
200	0.02773	0.00054	0.28778	0.00001	0.00000	0.00444	0.02531	0.00304	0.12178

Appendix 3. Probability of arsenic exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Arsenic, in micrograms per liter	Bedrock unit abbreviation								
	OZm			OZn			OZnb		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
210	0.02703	0.00050	0.28713	0.00001	0.00000	0.00422	0.02409	0.00280	0.11885
220	0.02638	0.00047	0.28652	0.00001	0.00000	0.00401	0.02297	0.00258	0.11610
230	0.02577	0.00044	0.28595	0.00001	0.00000	0.00382	0.02195	0.00238	0.11353
240	0.02519	0.00041	0.28541	0.00001	0.00000	0.00365	0.02100	0.00221	0.11110
250	0.02465	0.00038	0.28489	0.00001	0.00000	0.00349	0.02012	0.00206	0.10881
260	0.02414	0.00036	0.28440	0.00001	0.00000	0.00335	0.01931	0.00192	0.10665
270	0.02366	0.00034	0.28393	0.00000	0.00000	0.00321	0.01856	0.00179	0.10460
280	0.02320	0.00032	0.28349	0.00000	0.00000	0.00308	0.01786	0.00167	0.10266
290	0.02277	0.00031	0.28307	0.00000	0.00000	0.00297	0.01720	0.00157	0.10080
300	0.02236	0.00029	0.28266	0.00000	0.00000	0.00286	0.01658	0.00147	0.09904

Appendix 3. Probability of arsenic exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Arsenic, in micrograms per liter	Bedrock unit abbreviation								
	Sgr			SOagr			Spsq		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
1	0.43165	0.15898	0.74354	0.32722	0.14632	0.56242	0.06350	0.01045	0.22900
2	0.06143	0.01062	0.21710	0.22397	0.08084	0.45292	0.02471	0.00212	0.14221
3	0.00952	0.00061	0.07257	0.17337	0.05237	0.39760	0.01316	0.00066	0.10868
4	0.00179	0.00004	0.02970	0.14228	0.03691	0.36223	0.00811	0.00026	0.09011
5	0.00040	0.00000	0.01393	0.12094	0.02746	0.33686	0.00546	0.00012	0.07803
6	0.00010	0.00000	0.00719	0.10525	0.02121	0.31738	0.00390	0.00006	0.06940
7	0.00003	0.00000	0.00399	0.09318	0.01686	0.30173	0.00291	0.00003	0.06287
8	0.00001	0.00000	0.00234	0.08358	0.01370	0.28876	0.00224	0.00002	0.05771
9	0.00000	0.00000	0.00143	0.07575	0.01134	0.27773	0.00177	0.00001	0.05351
10	**0.00000**	**0.00000**	**0.00091**	**0.06923**	**0.00952**	**0.26820**	**0.00142**	**0.00001**	**0.05001**
11	0.00000	0.00000	0.00060	0.06371	0.00809	0.25983	0.00117	0.00001	0.04704
12	0.00000	0.00000	0.00040	0.05898	0.00695	0.25239	0.00097	0.00000	0.04447
13	0.00000	0.00000	0.00028	0.05487	0.00602	0.24571	0.00082	0.00000	0.04223
14	0.00000	0.00000	0.00020	0.05127	0.00527	0.23967	0.00069	0.00000	0.04026
15	0.00000	0.00000	0.00014	0.04809	0.00463	0.23416	0.00060	0.00000	0.03850
16	0.00000	0.00000	0.00010	0.04526	0.00410	0.22911	0.00052	0.00000	0.03692
17	0.00000	0.00000	0.00008	0.04273	0.00366	0.22445	0.00045	0.00000	0.03549
18	0.00000	0.00000	0.00006	0.04045	0.00327	0.22013	0.00040	0.00000	0.03420
19	0.00000	0.00000	0.00004	0.03838	0.00294	0.21611	0.00035	0.00000	0.03301
20	0.00000	0.00000	0.00003	0.03650	0.00266	0.21236	0.00031	0.00000	0.03192
21	0.00000	0.00000	0.00003	0.03478	0.00241	0.20884	0.00028	0.00000	0.03092
22	0.00000	0.00000	0.00002	0.03321	0.00219	0.20553	0.00025	0.00000	0.02999
23	0.00000	0.00000	0.00002	0.03176	0.00200	0.20241	0.00022	0.00000	0.02912
24	0.00000	0.00000	0.00001	0.03042	0.00183	0.19946	0.00020	0.00000	0.02832
25	0.00000	0.00000	0.00001	0.02918	0.00168	0.19667	0.00018	0.00000	0.02756
26	0.00000	0.00000	0.00001	0.02803	0.00155	0.19401	0.00017	0.00000	0.02686
27	0.00000	0.00000	0.00001	0.02695	0.00143	0.19149	0.00015	0.00000	0.02620
28	0.00000	0.00000	0.00001	0.02595	0.00132	0.18908	0.00014	0.00000	0.02557
29	0.00000	0.00000	0.00000	0.02502	0.00123	0.18678	0.00013	0.00000	0.02498
30	0.00000	0.00000	0.00000	0.02414	0.00114	0.18458	0.00012	0.00000	0.02443
31	0.00000	0.00000	0.00000	0.02332	0.00106	0.18247	0.00011	0.00000	0.02390
32	0.00000	0.00000	0.00000	0.02254	0.00099	0.18045	0.00010	0.00000	0.02340
33	0.00000	0.00000	0.00000	0.02181	0.00092	0.17851	0.00009	0.00000	0.02292
34	0.00000	0.00000	0.00000	0.02112	0.00086	0.17665	0.00009	0.00000	0.02247
35	0.00000	0.00000	0.00000	0.02047	0.00081	0.17485	0.00008	0.00000	0.02204

Appendix 3. Probability of arsenic exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Arsenic, in micrograms per liter	Bedrock unit abbreviation								
	Sgr			SOagr			Spsq		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
36	0.00000	0.00000	0.00000	0.01986	0.00076	0.17312	0.00007	0.00000	0.02162
37	0.00000	0.00000	0.00000	0.01927	0.00071	0.17145	0.00007	0.00000	0.02123
38	0.00000	0.00000	0.00000	0.01872	0.00067	0.16984	0.00006	0.00000	0.02085
39	0.00000	0.00000	0.00000	0.01819	0.00063	0.16828	0.00006	0.00000	0.02049
40	0.00000	0.00000	0.00000	0.01769	0.00060	0.16678	0.00006	0.00000	0.02014
41	0.00000	0.00000	0.00000	0.01721	0.00056	0.16532	0.00005	0.00000	0.01981
42	0.00000	0.00000	0.00000	0.01675	0.00053	0.16390	0.00005	0.00000	0.01949
43	0.00000	0.00000	0.00000	0.01632	0.00050	0.16253	0.00005	0.00000	0.01918
44	0.00000	0.00000	0.00000	0.01590	0.00048	0.16120	0.00004	0.00000	0.01888
45	0.00000	0.00000	0.00000	0.01551	0.00045	0.15991	0.00004	0.00000	0.01860
46	0.00000	0.00000	0.00000	0.01512	0.00043	0.15866	0.00004	0.00000	0.01832
47	0.00000	0.00000	0.00000	0.01476	0.00041	0.15744	0.00004	0.00000	0.01806
48	0.00000	0.00000	0.00000	0.01441	0.00039	0.15625	0.00003	0.00000	0.01780
49	0.00000	0.00000	0.00000	0.01408	0.00037	0.15509	0.00003	0.00000	0.01755
50	0.00000	0.00000	0.00000	0.01375	0.00035	0.15397	0.00003	0.00000	0.01731
55	0.00000	0.00000	0.00000	0.01232	0.00028	0.14875	0.00002	0.00000	0.01622
60	0.00000	0.00000	0.00000	0.01112	0.00022	0.14412	0.00002	0.00000	0.01527
65	0.00000	0.00000	0.00000	0.01011	0.00018	0.13996	0.00002	0.00000	0.01445
70	0.00000	0.00000	0.00000	0.00925	0.00015	0.13619	0.00001	0.00000	0.01373
75	0.00000	0.00000	0.00000	0.00851	0.00013	0.13277	0.00001	0.00000	0.01308
80	0.00000	0.00000	0.00000	0.00786	0.00011	0.12962	0.00001	0.00000	0.01251
85	0.00000	0.00000	0.00000	0.00729	0.00009	0.12673	0.00001	0.00000	0.01198
90	0.00000	0.00000	0.00000	0.00679	0.00008	0.12405	0.00001	0.00000	0.01151
95	0.00000	0.00000	0.00000	0.00634	0.00007	0.12155	0.00001	0.00000	0.01108
100	0.00000	0.00000	0.00000	0.00594	0.00006	0.11922	0.00000	0.00000	0.01068
110	0.00000	0.00000	0.00000	0.00526	0.00005	0.11500	0.00000	0.00000	0.00998
120	0.00000	0.00000	0.00000	0.00470	0.00004	0.11124	0.00000	0.00000	0.00938
130	0.00000	0.00000	0.00000	0.00423	0.00003	0.10788	0.00000	0.00000	0.00886
140	0.00000	0.00000	0.00000	0.00383	0.00002	0.10484	0.00000	0.00000	0.00839
150	0.00000	0.00000	0.00000	0.00349	0.00002	0.10207	0.00000	0.00000	0.00798
160	0.00000	0.00000	0.00000	0.00320	0.00002	0.09954	0.00000	0.00000	0.00762
170	0.00000	0.00000	0.00000	0.00295	0.00001	0.09721	0.00000	0.00000	0.00729
180	0.00000	0.00000	0.00000	0.00272	0.00001	0.09505	0.00000	0.00000	0.00699
190	0.00000	0.00000	0.00000	0.00253	0.00001	0.09305	0.00000	0.00000	0.00671
200	0.00000	0.00000	0.00000	0.00235	0.00001	0.09118	0.00000	0.00000	0.00646

Appendix 3. Probability of arsenic exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Arsenic, in micrograms per liter	Bedrock unit abbreviation								
	Sgr			SOagr			Spsq		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
210	0.00000	0.00000	0.00000	0.00220	0.00001	0.08942	0.00000	0.00000	0.00623
220	0.00000	0.00000	0.00000	0.00206	0.00001	0.08778	0.00000	0.00000	0.00602
230	0.00000	0.00000	0.00000	0.00193	0.00001	0.08624	0.00000	0.00000	0.00583
240	0.00000	0.00000	0.00000	0.00182	0.00000	0.08478	0.00000	0.00000	0.00564
250	0.00000	0.00000	0.00000	0.00171	0.00000	0.08339	0.00000	0.00000	0.00547
260	0.00000	0.00000	0.00000	0.00162	0.00000	0.08208	0.00000	0.00000	0.00531
270	0.00000	0.00000	0.00000	0.00153	0.00000	0.08084	0.00000	0.00000	0.00517
280	0.00000	0.00000	0.00000	0.00145	0.00000	0.07966	0.00000	0.00000	0.00503
290	0.00000	0.00000	0.00000	0.00138	0.00000	0.07853	0.00000	0.00000	0.00489
300	0.00000	0.00000	0.00000	0.00131	0.00000	0.07745	0.00000	0.00000	0.00477

Appendix 3. Probability of arsenic exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Arsenic, in micrograms per liter	Bedrock unit abbreviation								
	Spss			Ssqd			SZtb		
	Probability of concentration being greater than concentration listed	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
1	0.23273	0.06670	0.51638	0.64322	0.38238	0.84930	0.44216	0.31151	0.57949
2	0.09457	0.01492	0.32491	0.40139	0.19993	0.63395	0.26095	0.15832	0.38996
3	0.04903	0.00450	0.24303	0.27074	0.10603	0.51066	0.17621	0.09343	0.29462
4	0.02895	0.00165	0.19660	0.19308	0.05819	0.43523	0.12812	0.06020	0.23651
5	0.01857	0.00069	0.16620	0.14340	0.03328	0.38371	0.09772	0.04117	0.19710
6	0.01262	0.00032	0.14451	0.10983	0.01980	0.34569	0.07710	0.02941	0.16851
7	0.00896	0.00016	0.12816	0.08619	0.01221	0.31611	0.06240	0.02172	0.14678
8	0.00658	0.00008	0.11533	0.06898	0.00776	0.29222	0.05152	0.01648	0.12970
9	0.00496	0.00005	0.10495	0.05611	0.00507	0.27240	0.04323	0.01277	0.11591
10	**0.00382**	**0.00003**	**0.09636**	**0.04628**	**0.00339**	**0.25560**	**0.03676**	**0.01009**	**0.10455**
11	0.00300	0.00002	0.08913	0.03863	0.00232	0.24112	0.03161	0.00809	0.09504
12	0.00239	0.00001	0.08294	0.03257	0.00162	0.22848	0.02744	0.00657	0.08696
13	0.00194	0.00001	0.07758	0.02771	0.00115	0.21731	0.02403	0.00540	0.08001
14	0.00159	0.00000	0.07289	0.02377	0.00082	0.20735	0.02119	0.00449	0.07397
15	0.00131	0.00000	0.06874	0.02053	0.00060	0.19840	0.01880	0.00376	0.06869
16	0.00110	0.00000	0.06505	0.01785	0.00044	0.19031	0.01679	0.00318	0.06403
17	0.00092	0.00000	0.06174	0.01561	0.00033	0.18294	0.01506	0.00271	0.05988
18	0.00078	0.00000	0.05875	0.01372	0.00025	0.17620	0.01358	0.00232	0.05618
19	0.00067	0.00000	0.05604	0.01212	0.00019	0.17000	0.01229	0.00200	0.05284
20	0.00058	0.00000	0.05357	0.01076	0.00015	0.16427	0.01117	0.00174	0.04984
21	0.00050	0.00000	0.05131	0.00958	0.00011	0.15897	0.01019	0.00151	0.04711
22	0.00043	0.00000	0.04923	0.00857	0.00009	0.15403	0.00932	0.00133	0.04462
23	0.00038	0.00000	0.04731	0.00769	0.00007	0.14943	0.00856	0.00117	0.04235
24	0.00033	0.00000	0.04554	0.00693	0.00006	0.14512	0.00787	0.00103	0.04026
25	0.00029	0.00000	0.04389	0.00625	0.00004	0.14108	0.00727	0.00091	0.03834
26	0.00026	0.00000	0.04236	0.00567	0.00004	0.13728	0.00672	0.00081	0.03657
27	0.00023	0.00000	0.04093	0.00515	0.00003	0.13370	0.00623	0.00072	0.03493
28	0.00021	0.00000	0.03959	0.00468	0.00002	0.13032	0.00579	0.00065	0.03341
29	0.00018	0.00000	0.03833	0.00428	0.00002	0.12713	0.00539	0.00058	0.03200
30	0.00016	0.00000	0.03715	0.00391	0.00002	0.12409	0.00503	0.00052	0.03068
31	0.00015	0.00000	0.03604	0.00358	0.00001	0.12122	0.00470	0.00047	0.02945
32	0.00013	0.00000	0.03499	0.00329	0.00001	0.11848	0.00440	0.00043	0.02830
33	0.00012	0.00000	0.03400	0.00303	0.00001	0.11588	0.00412	0.00039	0.02722
34	0.00011	0.00000	0.03306	0.00279	0.00001	0.11339	0.00387	0.00035	0.02620
35	0.00010	0.00000	0.03217	0.00258	0.00001	0.11102	0.00364	0.00032	0.02525

Appendix 3. Probability of arsenic exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Arsenic, in micrograms per liter	Bedrock unit abbreviation								
	Spss			Ssqd			SZtb		
	Probability of concentration being greater than concentration listed	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
36	0.00009	0.00000	0.03133	0.00239	0.00001	0.10875	0.00342	0.00029	0.02435
37	0.00008	0.00000	0.03053	0.00221	0.00000	0.10658	0.00323	0.00027	0.02351
38	0.00008	0.00000	0.02977	0.00205	0.00000	0.10450	0.00305	0.00025	0.02271
39	0.00007	0.00000	0.02904	0.00191	0.00000	0.10251	0.00288	0.00023	0.02195
40	0.00006	0.00000	0.02834	0.00177	0.00000	0.10059	0.00272	0.00021	0.02123
41	0.00006	0.00000	0.02768	0.00165	0.00000	0.09875	0.00258	0.00019	0.02055
42	0.00005	0.00000	0.02705	0.00154	0.00000	0.09698	0.00244	0.00018	0.01991
43	0.00005	0.00000	0.02644	0.00144	0.00000	0.09527	0.00232	0.00016	0.01930
44	0.00005	0.00000	0.02586	0.00135	0.00000	0.09363	0.00220	0.00015	0.01871
45	0.00004	0.00000	0.02530	0.00126	0.00000	0.09205	0.00210	0.00014	0.01816
46	0.00004	0.00000	0.02477	0.00118	0.00000	0.09052	0.00199	0.00013	0.01763
47	0.00004	0.00000	0.02426	0.00111	0.00000	0.08905	0.00190	0.00012	0.01712
48	0.00003	0.00000	0.02376	0.00104	0.00000	0.08762	0.00181	0.00011	0.01664
49	0.00003	0.00000	0.02329	0.00098	0.00000	0.08624	0.00173	0.00010	0.01618
50	0.00003	0.00000	0.02283	0.00092	0.00000	0.08491	0.00165	0.00010	0.01574
55	0.00002	0.00000	0.02078	0.00069	0.00000	0.07884	0.00132	0.00007	0.01380
60	0.00002	0.00000	0.01905	0.00053	0.00000	0.07360	0.00107	0.00005	0.01222
65	0.00001	0.00000	0.01757	0.00041	0.00000	0.06904	0.00089	0.00004	0.01090
70	0.00001	0.00000	0.01630	0.00032	0.00000	0.06502	0.00074	0.00003	0.00980
75	0.00001	0.00000	0.01519	0.00026	0.00000	0.06145	0.00062	0.00002	0.00886
80	0.00001	0.00000	0.01421	0.00021	0.00000	0.05826	0.00053	0.00002	0.00805
85	0.00000	0.00000	0.01334	0.00017	0.00000	0.05539	0.00045	0.00001	0.00736
90	0.00000	0.00000	0.01256	0.00014	0.00000	0.05279	0.00039	0.00001	0.00675
95	0.00000	0.00000	0.01186	0.00011	0.00000	0.05042	0.00034	0.00001	0.00622
100	0.00000	0.00000	0.01124	0.00010	0.00000	0.04826	0.00030	0.00001	0.00575
110	0.00000	0.00000	0.01015	0.00007	0.00000	0.04444	0.00023	0.00001	0.00496
120	0.00000	0.00000	0.00923	0.00005	0.00000	0.04118	0.00018	0.00000	0.00432
130	0.00000	0.00000	0.00846	0.00004	0.00000	0.03836	0.00015	0.00000	0.00380
140	0.00000	0.00000	0.00780	0.00003	0.00000	0.03589	0.00012	0.00000	0.00337
150	0.00000	0.00000	0.00722	0.00002	0.00000	0.03372	0.00010	0.00000	0.00301
160	0.00000	0.00000	0.00672	0.00002	0.00000	0.03178	0.00008	0.00000	0.00271
170	0.00000	0.00000	0.00628	0.00001	0.00000	0.03005	0.00007	0.00000	0.00245
180	0.00000	0.00000	0.00588	0.00001	0.00000	0.02850	0.00006	0.00000	0.00222
190	0.00000	0.00000	0.00553	0.00001	0.00000	0.02709	0.00005	0.00000	0.00203
200	0.00000	0.00000	0.00522	0.00001	0.00000	0.02581	0.00004	0.00000	0.00186

Appendix 3. Probability of arsenic exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Arsenic, in micrograms per liter	Bedrock unit abbreviation								
	Spss			Ssqd			SZtb		
	Probability of concentration being greater than concentration listed	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
210	0.00000	0.00000	0.00493	0.00001	0.00000	0.02464	0.00004	0.00000	0.00171
220	0.00000	0.00000	0.00467	0.00001	0.00000	0.02356	0.00003	0.00000	0.00158
230	0.00000	0.00000	0.00444	0.00000	0.00000	0.02257	0.00003	0.00000	0.00146
240	0.00000	0.00000	0.00422	0.00000	0.00000	0.02166	0.00003	0.00000	0.00135
250	0.00000	0.00000	0.00402	0.00000	0.00000	0.02082	0.00002	0.00000	0.00126
260	0.00000	0.00000	0.00384	0.00000	0.00000	0.02003	0.00002	0.00000	0.00118
270	0.00000	0.00000	0.00367	0.00000	0.00000	0.01930	0.00002	0.00000	0.00110
280	0.00000	0.00000	0.00352	0.00000	0.00000	0.01862	0.00002	0.00000	0.00103
290	0.00000	0.00000	0.00337	0.00000	0.00000	0.01798	0.00001	0.00000	0.00097
300	0.00000	0.00000	0.00324	0.00000	0.00000	0.01738	0.00001	0.00000	0.00091

Appendix 3. Probability of arsenic exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Arsenic, in micrograms per liter	Bedrock unit abbreviation					
	Zpg*			Zsg		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
1	0.01393	0.00098	0.09648	0.04051	0.00712	0.14958
2	0.00446	0.00022	0.04351	0.01576	0.00089	0.12002
3	0.00213	0.00008	0.02561	0.00848	0.00020	0.10841
4	0.00122	0.00004	0.01708	0.00529	0.00006	0.10152
5	0.00078	0.00002	0.01227	0.00361	0.00002	0.09673
6	0.00053	0.00001	0.00926	0.00261	0.00001	0.09310
7	0.00038	0.00001	0.00724	0.00197	0.00000	0.09020
8	0.00028	0.00001	0.00582	0.00153	0.00000	0.08780
9	0.00022	0.00000	0.00478	0.00122	0.00000	0.08577
10	**0.00017**	**0.00000**	**0.00400**	**0.00099**	**0.00000**	**0.08400**
11	0.00014	0.00000	0.00339	0.00082	0.00000	0.08245
12	0.00011	0.00000	0.00291	0.00069	0.00000	0.08107
13	0.00009	0.00000	0.00252	0.00059	0.00000	0.07982
14	0.00008	0.00000	0.00220	0.00050	0.00000	0.07869
15	0.00007	0.00000	0.00194	0.00044	0.00000	0.07766
16	0.00006	0.00000	0.00172	0.00038	0.00000	0.07670
17	0.00005	0.00000	0.00154	0.00033	0.00000	0.07582
18	0.00004	0.00000	0.00138	0.00030	0.00000	0.07500
19	0.00004	0.00000	0.00125	0.00026	0.00000	0.07424
20	0.00003	0.00000	0.00113	0.00023	0.00000	0.07352
21	0.00003	0.00000	0.00103	0.00021	0.00000	0.07285
22	0.00003	0.00000	0.00094	0.00019	0.00000	0.07221
23	0.00002	0.00000	0.00086	0.00017	0.00000	0.07161
24	0.00002	0.00000	0.00079	0.00016	0.00000	0.07104
25	0.00002	0.00000	0.00073	0.00014	0.00000	0.07050
26	0.00002	0.00000	0.00068	0.00013	0.00000	0.06998
27	0.00001	0.00000	0.00063	0.00012	0.00000	0.06949
28	0.00001	0.00000	0.00058	0.00011	0.00000	0.06901
29	0.00001	0.00000	0.00054	0.00010	0.00000	0.06856
30	0.00001	0.00000	0.00051	0.00009	0.00000	0.06813
31	0.00001	0.00000	0.00047	0.00009	0.00000	0.06771
32	0.00001	0.00000	0.00044	0.00008	0.00000	0.06731
33	0.00001	0.00000	0.00042	0.00008	0.00000	0.06693
34	0.00001	0.00000	0.00039	0.00007	0.00000	0.06656
35	0.00001	0.00000	0.00037	0.00007	0.00000	0.06620

Appendix 3. Probability of arsenic exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Arsenic, in micrograms per liter	Bedrock unit abbreviation					
	Zpg*			Zsg		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
36	0.00001	0.00000	0.00035	0.00006	0.00000	0.06585
37	0.00001	0.00000	0.00033	0.00006	0.00000	0.06551
38	0.00001	0.00000	0.00031	0.00005	0.00000	0.06519
39	0.00001	0.00000	0.00029	0.00005	0.00000	0.06488
40	0.00001	0.00000	0.00028	0.00005	0.00000	0.06457
41	0.00000	0.00000	0.00026	0.00004	0.00000	0.06427
42	0.00000	0.00000	0.00025	0.00004	0.00000	0.06399
43	0.00000	0.00000	0.00024	0.00004	0.00000	0.06371
44	0.00000	0.00000	0.00023	0.00004	0.00000	0.06344
45	0.00000	0.00000	0.00022	0.00004	0.00000	0.06317
46	0.00000	0.00000	0.00021	0.00003	0.00000	0.06291
47	0.00000	0.00000	0.00020	0.00003	0.00000	0.06266
48	0.00000	0.00000	0.00019	0.00003	0.00000	0.06242
49	0.00000	0.00000	0.00018	0.00003	0.00000	0.06218
50	0.00000	0.00000	0.00017	0.00003	0.00000	0.06195
55	0.00000	0.00000	0.00014	0.00002	0.00000	0.06086
60	0.00000	0.00000	0.00011	0.00002	0.00000	0.05988
65	0.00000	0.00000	0.00010	0.00001	0.00000	0.05900
70	0.00000	0.00000	0.00008	0.00001	0.00000	0.05820
75	0.00000	0.00000	0.00007	0.00001	0.00000	0.05746
80	0.00000	0.00000	0.00006	0.00001	0.00000	0.05677
85	0.00000	0.00000	0.00005	0.00001	0.00000	0.05614
90	0.00000	0.00000	0.00005	0.00001	0.00000	0.05554
95	0.00000	0.00000	0.00004	0.00001	0.00000	0.05499
100	0.00000	0.00000	0.00004	0.00000	0.00000	0.05447
110	0.00000	0.00000	0.00003	0.00000	0.00000	0.05351
120	0.00000	0.00000	0.00002	0.00000	0.00000	0.05265
130	0.00000	0.00000	0.00002	0.00000	0.00000	0.05187
140	0.00000	0.00000	0.00002	0.00000	0.00000	0.05116
150	0.00000	0.00000	0.00001	0.00000	0.00000	0.05051
160	0.00000	0.00000	0.00001	0.00000	0.00000	0.04990
170	0.00000	0.00000	0.00001	0.00000	0.00000	0.04934
180	0.00000	0.00000	0.00001	0.00000	0.00000	0.04882
190	0.00000	0.00000	0.00001	0.00000	0.00000	0.04833
200	0.00000	0.00000	0.00001	0.00000	0.00000	0.04787

Appendix 3. Probability of arsenic exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Arsenic, in micrograms per liter	Bedrock unit abbreviation					
	Zpg*			Zsg		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
210	0.00000	0.00000	0.00001	0.00000	0.00000	0.04743
220	0.00000	0.00000	0.00000	0.00000	0.00000	0.04702
230	0.00000	0.00000	0.00000	0.00000	0.00000	0.04663
240	0.00000	0.00000	0.00000	0.00000	0.00000	0.04626
250	0.00000	0.00000	0.00000	0.00000	0.00000	0.04591
260	0.00000	0.00000	0.00000	0.00000	0.00000	0.04557
270	0.00000	0.00000	0.00000	0.00000	0.00000	0.04525
280	0.00000	0.00000	0.00000	0.00000	0.00000	0.04494
290	0.00000	0.00000	0.00000	0.00000	0.00000	0.04464
300	0.00000	0.00000	0.00000	0.00000	0.00000	0.04436

Appendix 4. Arsenic Log-Normal Fit Statistics by Bedrock Unit

Appendix 4. Arsenic log-normal fit statistics by bedrock unit.

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Grouped bedrock units with elevated-arsenic concentration					Bedrock unit abbreviation				
					Ops*				
Censoring information	Count				Censoring information	Count			
Uncensored value	142				Uncensored value	2			
Left censored value	13				Left censored value	8			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	0.842088	0.160891	0.526746	1.15743	Location	-3.21928	0.787011	-4.7618	-1.67677
Scale	1.98346	0.122107	1.75801	2.23782	Scale	1.78003	0.0901298	1.61186	1.96574
Log-likelihood		-484.214			Log-likelihood		-4.305		
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	0.431				Anderson-Darling (adjusted)	2.245			
Correlation coefficien	0.999				Correlation coefficien	1			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	16.5957	4.65715	9.57473	28.7649	Mean	0.194946	0.152905	0.041906	0.906885
Standard deviation	117.486	59.1549	43.7925	315.189	Standard deviation	0.93028	0.759049	0.18797	4.60404
Median	2.32121	0.373462	1.69341	3.18174	Median	0.0399836	0.0314676	0.0085502	0.186977
First quartile (Q1)	0.609123	0.113368	0.422943	0.877259	First quartile (Q1)	0.0120355	0.0095863	0.0025262	0.0573391
Third quartile (Q3)	8.84551	1.54983	6.27455	12.4699	Third quartile (Q3)	0.132832	0.103893	0.0286776	0.615262
Interquartile range (IQR)	8.23639	1.48626	5.78278	11.7311	Interquartile range (IQR)	0.120796	0.0944301	0.0261001	0.559067

Appendix 4. Arsenic log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
OZf					OZm				
Censoring information	Count				Censoring information	Count			
Uncensored value	7				Uncensored value	4			
Left censored value	1				Left censored value	6			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	0.203812	0.537881	-0.850415	1.25804	Location	-3.14197	2.2943	-7.63872	1.35477
Scale	1.46776	0.444717	0.810489	2.65803	Scale	4.40671	2.19624	1.65915	11.7042
Log-likelihood	-19.146				Log-likelihood	-20.355			
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	3.106				Anderson-Darling (adjusted)	2.122			
Correlation coefficien	0.922				Correlation coefficien	0.956			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	3.60011	2.6815	0.836197	15.4997	Mean	711.633	5.84×10^3	0.0000725	6.99×10^9
Standard deviation	9.93912	13.636	0.675371	146.269	Standard deviation	1.17×10^7	2.09×10^8	0	1.68×10^{22}
Median	1.22607	0.659479	0.427238	3.51852	Median	0.0431974	0.0991078	0.0004814	3.87586
First quartile (Q1)	0.455585	0.306663	0.121789	1.70424	First quartile (Q1)	0.0022111	0.0077461	0.0000023	2.1211
Third quartile (Q3)	3.29959	1.82372	1.11684	9.7483	Third quartile (Q3)	0.843922	1.3722	0.0348552	20.4332
Interquartile range (IQR)	2.84401	1.67949	0.89385	9.04891	Interquartile range (IQR)	0.841711	1.36804	0.0348095	20.353

Appendix 4. Arsenic log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
OZn					OZnb				
Censoring information	Count				Censoring information	Count			
Uncensored value	19				Uncensored value	17			
Left censored value	12				Left censored value	3			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	-1.58309	0.352176	-2.27334	-0.892837	Location	0.779948	0.531552	-0.261874	1.82177
Scale	1.6106	0.349339	1.05283	2.46384	Scale	2.31159	0.437248	1.59552	3.34903
Log-likelihood		-33.677			Log-likelihood		-67.412		
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)		3.307			Anderson-Darling (adjusted)		1.281		
Correlation coefficien		0.981			Correlation coefficien		0.98		
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	0.751202	0.37721	0.280759	2.00993	Mean	31.5531	33.5261	3.93202	253.203
Standard deviation	2.64349	2.77567	0.337609	20.6986	Standard deviation	455.321	914.887	8.87111	2.34×10^4
Median	0.20534	0.0723157	0.102968	0.409492	Median	2.18136	1.1595	0.769608	6.18279
First quartile (Q1)	0.0692924	0.035228	0.0255822	0.187687	First quartile (Q1)	0.458775	0.297545	0.128689	1.63553
Third quartile (Q3)	0.608499	0.193027	0.326771	1.13312	Third quartile (Q3)	10.3718	5.85262	3.43193	31.3452
Interquartile range (IQR)	0.539207	0.180896	0.279377	1.04069	Interquartile range (IQR)	9.91304	5.69917	3.21246	30.5898

Appendix 4. Arsenic log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
Sgr					SOagr				
Censoring information	Count				Censoring information	Count			
Uncensored value	7				Uncensored value	7			
Left censored value	0				Left censored value	5			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	-0.0870687	0.221555	-0.521308	0.347171	Location	-0.996819	0.724544	-2.4169	0.423261
Scale	0.505699	0.101615	0.341076	0.749778	Scale	2.22697	0.632122	1.27674	3.88443
Log-likelihood	-9.715				Log-likelihood	-24.772			
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	3.111				Anderson-Darling (adjusted)	1.726			
Correlation coefficien	0.954				Correlation coefficien	0.947			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	1.04164	0.20888	0.703116	1.54315	Mean	4.40564	5.98493	0.307381	63.1452
Standard deviation	0.562298	0.142746	0.341884	0.924815	Standard deviation	52.4085	140.438	0.274442	1.00×10^4
Median	0.916614	0.20308	0.593743	1.41506	Median	0.369052	0.267394	0.0891978	1.52693
First quartile (Q1)	0.651709	0.171367	0.389252	1.09113	First quartile (Q1)	0.0821762	0.078262	0.0127084	0.531378
Third quartile (Q3)	1.2892	0.252714	0.877936	1.89311	Third quartile (Q3)	1.6574	1.17954	0.410814	6.68669
Interquartile range (IQR)	0.637489	0.136533	0.418955	0.970013	Interquartile range (IQR)	1.57523	1.14191	0.380445	6.5222

Appendix 4. Arsenic log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
Spsq*					Spss				
Censoring information	Count				Censoring information	Count			
Uncensored value	4				Uncensored value	5			
Left censored value	5				Left censored value	2			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	-2.41045	0.846842	-4.07023	-0.750667	Location	-0.867381	0.508521	-1.86406	0.129302
Scale	1.57953	0.495804	0.853772	2.92223	Scale	1.18838	0.332903	0.686285	2.0578
Log-likelihood	-10.109				Log-likelihood	-10.976			
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	2.121				Anderson-Darling (adjusted)	2.799			
Correlation coefficien	0.966				Correlation coefficien	0.982			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	0.312551	0.199818	0.0892766	1.09422	Mean	0.851069	0.428686	0.317112	2.28411
Standard deviation	1.04229	1.26353	0.0968518	11.2168	Standard deviation	1.4997	1.27936	0.281753	7.98256
Median	0.0897751	0.0760253	0.0170735	0.472051	Median	0.42005	0.213604	0.155041	1.13803
First quartile (Q1)	0.0309363	0.0342062	0.0035424	0.270172	First quartile (Q1)	0.188449	0.119276	0.0545049	0.651556
Third quartile (Q3)	0.260522	0.171901	0.0714813	0.9495	Third quartile (Q3)	0.936287	0.436567	0.375418	2.33509
Interquartile range (IQR)	0.229585	0.144786	0.0667025	0.790216	Interquartile range (IQR)	0.747838	0.362431	0.289256	1.93345

Appendix 4. Arsenic log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
Ssqd					SZtb				
Censoring information	Count				Censoring information	Count			
Uncensored value	11				Uncensored value	29			
Left censored value	0				Left censored value	4			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	0.412493	0.343881	-0.261502	1.08649	Location	-0.203752	0.250689	-0.695093	0.287588
Scale	1.1237	0.320478	0.642518	1.96522	Scale	1.40051	0.187371	1.07747	1.8204
Log-likelihood	-21.008				Log-likelihood	-62.075			
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	2.392				Anderson-Darling (adjusted)	0.892			
Correlation coefficien	0.951				Correlation coefficien	0.992			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	2.8401	1.28763	1.16794	6.90631	Mean	2.17486	0.715688	1.1411	4.14514
Standard deviation	4.52184	3.94286	0.818658	24.9763	Standard deviation	5.3757	3.10934	1.7302	16.7023
Median	1.51058	0.51946	0.769894	2.96385	Median	0.815664	0.204478	0.499028	1.33321
First quartile (Q1)	0.707917	0.308919	0.30098	1.66505	First quartile (Q1)	0.317149	0.0951949	0.176104	0.571161
Third quartile (Q3)	3.22333	1.20405	1.55005	6.70291	Third quartile (Q3)	2.09778	0.545174	1.26051	3.49117
Interquartile range (IQR)	2.51541	1.10396	1.06423	5.94541	Interquartile range (IQR)	1.78063	0.49387	1.03392	3.06662

Appendix 4. Arsenic log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
Zpg*					Zsg				
Censoring information	Count				Censoring information	Count			
Uncensored value	2				Uncensored value	7			
Left censored value	9				Left censored value	16			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	-3.66411	0.771435	-5.17609	-2.15212	Location	-2.98176	0.999948	-4.94162	-1.0219
Scale	1.66617	0.100537	1.48032	1.87534	Scale	1.70893	0.748103	0.724607	4.03039
Log-likelihood	-3.006				Log-likelihood	-14.871			
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	2.214				Anderson-Darling (adjusted)	2.733			
Correlation coefficien	1				Correlation coefficien	0.982			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	0.102689	0.0779394	0.0231993	0.454541	Mean	0.218376	0.130661	0.0675934	0.705514
Standard deviation	0.398461	0.313134	0.0854009	1.85913	Standard deviation	0.914828	1.64495	0.0269649	31.037
Median	0.0256271	0.0197696	0.0056501	0.116237	Median	0.0507034	0.0507008	0.007143	0.35991
First quartile (Q1)	0.0083298	0.0065524	0.0017826	0.0389236	First quartile (Q1)	0.016012	0.0234942	0.0009026	0.284057
Third quartile (Q3)	0.0788433	0.0600783	0.0177073	0.351056	Third quartile (Q3)	0.160557	0.0958063	0.049855	0.517073
Interquartile range (IQR)	0.0705135	0.0536348	0.0158789	0.313129	Interquartile range (IQR)	0.144545	0.0768037	0.0510177	0.409532

Appendix 5. Probability of Uranium Exceeding a Given Concentration by Bedrock Unit

Appendix 5. Probability of uranium exceeding a given concentration by bedrock unit.

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	Dcgr			Dfgr			Dl		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
1	0.95614	0.51366	0.99964	0.64549	0.32667	0.88405	0.15706	0.03907	0.40068
2	0.88401	0.43605	0.99464	0.53055	0.24734	0.79848	0.06707	0.00759	0.28505
3	0.81477	0.38671	0.98120	0.46145	0.20378	0.73716	0.03710	0.00226	0.23244
4	0.75269	0.34946	0.96018	0.41300	0.17473	0.69003	0.02333	0.00085	0.20043
5	0.69779	0.31902	0.93403	0.37627	0.15347	0.65213	0.01588	0.00037	0.17825
6	0.64925	0.29304	0.90509	0.34705	0.13703	0.62065	0.01140	0.00018	0.16167
7	0.60617	0.27025	0.87509	0.32303	0.12384	0.59389	0.00852	0.00010	0.14867
8	0.56776	0.24991	0.84521	0.30281	0.11296	0.57073	0.00656	0.00005	0.13812
9	0.53332	0.23154	0.81621	0.28545	0.10381	0.55040	0.00517	0.00003	0.12932
10	0.50229	0.21481	0.78853	0.27033	0.09599	0.53235	0.00416	0.00002	0.12185
11	0.47420	0.19950	0.76239	0.25702	0.08921	0.51615	0.00340	0.00001	0.11540
12	0.44867	0.18543	0.73789	0.24516	0.08328	0.50151	0.00282	0.00001	0.10976
13	0.42537	0.17247	0.71502	0.23452	0.07804	0.48817	0.00237	0.00001	0.10476
14	0.40402	0.16051	0.69373	0.22490	0.07337	0.47595	0.00201	0.00000	0.10031
15	0.38440	0.14947	0.67395	0.21615	0.06918	0.46470	0.00172	0.00000	0.09631
16	0.36631	0.13925	0.65557	0.20815	0.06541	0.45429	0.00148	0.00000	0.09268
17	0.34958	0.12980	0.63849	0.20079	0.06199	0.44461	0.00129	0.00000	0.08937
18	0.33407	0.12106	0.62261	0.19400	0.05887	0.43558	0.00112	0.00000	0.08635
19	0.31966	0.11296	0.60782	0.18771	0.05602	0.42713	0.00099	0.00000	0.08356
20	0.30623	0.10545	0.59404	0.18186	0.05341	0.41920	0.00087	0.00000	0.08099
21	0.29369	0.09850	0.58116	0.17640	0.05100	0.41173	0.00078	0.00000	0.07860
22	0.28197	0.09206	0.56912	0.17129	0.04877	0.40469	0.00069	0.00000	0.07638
23	0.27098	0.08609	0.55784	0.16650	0.04670	0.39802	0.00062	0.00000	0.07431
24	0.26066	0.08055	0.54726	0.16199	0.04478	0.39170	0.00056	0.00000	0.07236
25	0.25095	0.07541	0.53731	0.15775	0.04299	0.38569	0.00050	0.00000	0.07054
26	0.24181	0.07064	0.52794	0.15374	0.04132	0.37997	0.00046	0.00000	0.06882
27	0.23319	0.06621	0.51910	0.14994	0.03976	0.37453	0.00042	0.00000	0.06721
28	0.22505	0.06209	0.51074	0.14635	0.03830	0.36932	0.00038	0.00000	0.06568
29	0.21735	0.05827	0.50284	0.14293	0.03692	0.36435	0.00035	0.00000	0.06423
30	**0.21005**	**0.05471**	**0.49534**	**0.13968**	**0.03562**	**0.35958**	**0.00032**	**0.00000**	**0.06285**
31	0.20313	0.05140	0.48822	0.13659	0.03440	0.35501	0.00029	0.00000	0.06155
32	0.19657	0.04832	0.48146	0.13364	0.03325	0.35062	0.00027	0.00000	0.06031
33	0.19033	0.04545	0.47502	0.13082	0.03216	0.34640	0.00025	0.00000	0.05912
34	0.18439	0.04277	0.46887	0.12813	0.03113	0.34234	0.00023	0.00000	0.05799
35	0.17874	0.04028	0.46301	0.12555	0.03015	0.33843	0.00021	0.00000	0.05691

Appendix 5. Probability of uranium exceeding a given concentration by bedrock unit. —Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	Dcgr			Dfgr			Dl		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
36	0.17335	0.03795	0.45740	0.12308	0.02922	0.33466	0.00020	0.00000	0.05588
37	0.16821	0.03577	0.45204	0.12071	0.02834	0.33103	0.00018	0.00000	0.05489
38	0.16331	0.03374	0.44690	0.11843	0.02750	0.32751	0.00017	0.00000	0.05394
39	0.15862	0.03185	0.44196	0.11624	0.02670	0.32411	0.00016	0.00000	0.05302
40	0.15413	0.03007	0.43723	0.11414	0.02593	0.32082	0.00015	0.00000	0.05215
41	0.14984	0.02841	0.43267	0.11211	0.02521	0.31764	0.00014	0.00000	0.05130
42	0.14573	0.02686	0.42829	0.11016	0.02451	0.31455	0.00013	0.00000	0.05049
43	0.14179	0.02540	0.42407	0.10828	0.02385	0.31156	0.00012	0.00000	0.04971
44	0.13801	0.02404	0.42001	0.10646	0.02321	0.30866	0.00011	0.00000	0.04896
45	0.13438	0.02275	0.41608	0.10470	0.02260	0.30584	0.00011	0.00000	0.04823
46	0.13090	0.02155	0.41229	0.10301	0.02202	0.30310	0.00010	0.00000	0.04752
47	0.12755	0.02043	0.40863	0.10137	0.02146	0.30044	0.00009	0.00000	0.04684
48	0.12433	0.01937	0.40508	0.09978	0.02093	0.29785	0.00009	0.00000	0.04619
49	0.12123	0.01837	0.40165	0.09824	0.02041	0.29533	0.00008	0.00000	0.04555
50	0.11825	0.01743	0.39833	0.09676	0.01992	0.29287	0.00008	0.00000	0.04493
55	0.10488	0.01351	0.38316	0.08995	0.01770	0.28149	0.00006	0.00000	0.04212
60	0.09366	0.01058	0.36997	0.08406	0.01586	0.27140	0.00005	0.00000	0.03968
65	0.08415	0.00836	0.35838	0.07890	0.01430	0.26236	0.00004	0.00000	0.03754
70	0.07600	0.00667	0.34806	0.07434	0.01297	0.25420	0.00003	0.00000	0.03565
75	0.06897	0.00537	0.33880	0.07028	0.01183	0.24678	0.00002	0.00000	0.03397
80	0.06286	0.00435	0.33042	0.06664	0.01083	0.23999	0.00002	0.00000	0.03245
85	0.05751	0.00355	0.32278	0.06335	0.00996	0.23375	0.00002	0.00000	0.03108
90	0.05281	0.00292	0.31578	0.06037	0.00919	0.22798	0.00001	0.00000	0.02983
95	0.04864	0.00241	0.30932	0.05765	0.00851	0.22263	0.00001	0.00000	0.02869
100	0.04493	0.00201	0.30335	0.05516	0.00790	0.21764	0.00001	0.00000	0.02765
110	0.03865	0.00141	0.29260	0.05076	0.00687	0.20862	0.00001	0.00000	0.02579
120	0.03356	0.00101	0.28316	0.04699	0.00603	0.20064	0.00001	0.00000	0.02419
130	0.02938	0.00073	0.27479	0.04373	0.00534	0.19352	0.00000	0.00000	0.02279
140	0.02590	0.00054	0.26728	0.04087	0.00476	0.18712	0.00000	0.00000	0.02156
150	0.02298	0.00040	0.26048	0.03835	0.00427	0.18131	0.00000	0.00000	0.02047
160	0.02050	0.00031	0.25429	0.03610	0.00385	0.17601	0.00000	0.00000	0.01949
170	0.01839	0.00024	0.24862	0.03409	0.00349	0.17115	0.00000	0.00000	0.01860
180	0.01656	0.00018	0.24339	0.03229	0.00318	0.16666	0.00000	0.00000	0.01780
190	0.01498	0.00014	0.23855	0.03065	0.00290	0.16251	0.00000	0.00000	0.01708
200	0.01361	0.00011	0.23404	0.02916	0.00266	0.15865	0.00000	0.00000	0.01641

Appendix 5. Probability of uranium exceeding a given concentration by bedrock unit. —Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	Dcgr			Dfgr			Dl		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
210	0.01240	0.00009	0.22983	0.02780	0.00245	0.15505	0.00000	0.00000	0.01579
220	0.01134	0.00007	0.22589	0.02655	0.00226	0.15168	0.00000	0.00000	0.01523
230	0.01040	0.00006	0.22219	0.02541	0.00210	0.14852	0.00000	0.00000	0.01470
240	0.00956	0.00005	0.21869	0.02435	0.00195	0.14554	0.00000	0.00000	0.01422
250	0.00881	0.00004	0.21539	0.02337	0.00181	0.14273	0.00000	0.00000	0.01376
260	0.00815	0.00003	0.21227	0.02245	0.00169	0.14007	0.00000	0.00000	0.01334
270	0.00755	0.00003	0.20930	0.02161	0.00158	0.13755	0.00000	0.00000	0.01294
280	0.00700	0.00002	0.20648	0.02082	0.00148	0.13516	0.00000	0.00000	0.01257
290	0.00651	0.00002	0.20379	0.02007	0.00139	0.13289	0.00000	0.00000	0.01222
300	0.00607	0.00002	0.20122	0.01938	0.00130	0.13073	0.00000	0.00000	0.01189

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	DSw			Ops*			OZf		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
1	0.27948	0.09368	0.55948	0.0035097	0.0002758	0.0263434	0.22587	0.07024	0.48763
2	0.14055	0.02225	0.44187	0.0009592	0.0000546	0.0097475	0.08718	0.01214	0.32133
3	0.08590	0.00696	0.39223	0.0004182	0.0000196	0.005111	0.04339	0.00294	0.25130
4	0.05806	0.00263	0.36239	0.0002247	0.0000091	0.0031409	0.02476	0.00089	0.21056
5	0.04181	0.00114	0.34152	0.0001362	0.0000049	0.0021176	0.01542	0.00032	0.18314
6	0.03145	0.00054	0.32567	0.0000894	0.0000029	0.0015181	0.01021	0.00013	0.16310
7	0.02444	0.00028	0.31299	0.0000621	0.0000019	0.0011371	0.00708	0.00006	0.14764
8	0.01948	0.00015	0.30248	0.000045	0.0000013	0.0008804	0.00509	0.00003	0.13527
9	0.01584	0.00009	0.29355	0.0000337	0.0000009	0.0006995	0.00376	0.00001	0.12510
10	0.01309	0.00005	0.28580	0.000026	0.0000007	0.0005675	0.00285	0.00001	0.11655
11	0.01097	0.00003	0.27898	0.0000204	0.0000005	0.0004683	0.00220	0.00000	0.10924
12	0.00930	0.00002	0.27290	0.0000163	0.0000004	0.0003921	0.00173	0.00000	0.10290
13	0.00797	0.00001	0.26742	0.0000133	0.0000003	0.0003324	0.00138	0.00000	0.09735
14	0.00689	0.00001	0.26245	0.000011	0.0000002	0.0002847	0.00111	0.00000	0.09243
15	0.00600	0.00001	0.25790	0.0000091	0.0000002	0.0002462	0.00091	0.00000	0.08804
16	0.00526	0.00000	0.25372	0.0000077	0.0000001	0.0002146	0.00075	0.00000	0.08409
17	0.00464	0.00000	0.24984	0.0000066	0.0000001	0.0001884	0.00062	0.00000	0.08052
18	0.00412	0.00000	0.24624	0.0000056	0.0000001	0.0001665	0.00052	0.00000	0.07727
19	0.00368	0.00000	0.24288	0.0000049	0.0000001	0.000148	0.00044	0.00000	0.07429
20	0.00329	0.00000	0.23973	0.0000042	0.0000001	0.0001322	0.00038	0.00000	0.07156
21	0.00296	0.00000	0.23676	0.0000037	0.0000001	0.0001187	0.00032	0.00000	0.06904
22	0.00268	0.00000	0.23397	0.0000033	0.0000001	0.000107	0.00028	0.00000	0.06670
23	0.00243	0.00000	0.23132	0.0000029	0.0000000	0.0000969	0.00024	0.00000	0.06453
24	0.00221	0.00000	0.22882	0.0000026	0.0000000	0.0000881	0.00021	0.00000	0.06251
25	0.00202	0.00000	0.22643	0.0000023	0.0000000	0.0000803	0.00018	0.00000	0.06062
26	0.00184	0.00000	0.22417	0.000002	0.0000000	0.0000734	0.00016	0.00000	0.05885
27	0.00169	0.00000	0.22200	0.0000018	0.0000000	0.0000674	0.00014	0.00000	0.05719
28	0.00156	0.00000	0.21993	0.0000017	0.0000000	0.000062	0.00012	0.00000	0.05563
29	0.00143	0.00000	0.21795	0.0000015	0.0000000	0.0000572	0.00011	0.00000	0.05416
30	**0.00133**	**0.00000**	**0.21606**	**0.0000014**	0.0000000	**0.0000528**	**0.00010**	**0.00000**	**0.05276**
31	0.00123	0.00000	0.21423	0.0000012	0.0000000	0.000049	0.00009	0.00000	0.05145
32	0.00114	0.00000	0.21248	0.0000011	0.0000000	0.0000455	0.00008	0.00000	0.05020
33	0.00106	0.00000	0.21079	0.000001	0.0000000	0.0000423	0.00007	0.00000	0.04901
34	0.00099	0.00000	0.20917	0.0000009	0.0000000	0.0000394	0.00006	0.00000	0.04788
35	0.00092	0.00000	0.20760	0.0000009	0.0000000	0.0000368	0.00006	0.00000	0.04681

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	DSw			Ops*			OZf		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
36	0.00086	0.00000	0.20608	0.0000008	0.0000001	0.0000344	0.00005	0.00000	0.04578
37	0.00080	0.00000	0.20462	0.0000007	0.0000001	0.0000323	0.00005	0.00000	0.04480
38	0.00075	0.00000	0.20320	0.0000007	0.0000000	0.0000303	0.00004	0.00000	0.04387
39	0.00071	0.00000	0.20183	0.0000006	0.0000000	0.0000285	0.00004	0.00000	0.04297
40	0.00066	0.00000	0.20050	0.0000006	0.0000000	0.0000268	0.00004	0.00000	0.04211
41	0.00062	0.00000	0.19921	0.0000005	0.0000000	0.0000252	0.00003	0.00000	0.04129
42	0.00059	0.00000	0.19796	0.0000005	0.0000000	0.0000238	0.00003	0.00000	0.04050
43	0.00055	0.00000	0.19674	0.0000005	0.0000000	0.0000225	0.00003	0.00000	0.03974
44	0.00052	0.00000	0.19555	0.0000004	0.0000000	0.0000213	0.00003	0.00000	0.03901
45	0.00049	0.00000	0.19440	0.0000004	0.0000000	0.0000201	0.00002	0.00000	0.03831
46	0.00047	0.00000	0.19328	0.0000004	0.0000001	0.0000191	0.00002	0.00000	0.03764
47	0.00044	0.00000	0.19219	0.0000004	0.0000001	0.0000181	0.00002	0.00000	0.03699
48	0.00042	0.00000	0.19113	0.0000003	0.0000000	0.0000172	0.00002	0.00000	0.03636
49	0.00040	0.00000	0.19009	0.0000003	0.0000000	0.0000163	0.00002	0.00000	0.03575
50	0.00038	0.00000	0.18908	0.0000003	0.0000000	0.0000155	0.00002	0.00000	0.03516
55	0.00029	0.00000	0.18436	0.0000002	0.0000000	0.0000123	0.00001	0.00000	0.03251
60	0.00023	0.00000	0.18014	0.0000002	0.0000000	0.0000099	0.00001	0.00000	0.03024
65	0.00019	0.00000	0.17633	0.0000001	0.0000000	0.000008	0.00001	0.00000	0.02827
70	0.00015	0.00000	0.17286	0.0000001	0.0000000	0.0000067	0.00000	0.00000	0.02654
75	0.00013	0.00000	0.16967	0.0000001	0.0000000	0.0000056	0.00000	0.00000	0.02502
80	0.00011	0.00000	0.16673	0.0000001	0.0000001	0.0000047	0.00000	0.00000	0.02367
85	0.00009	0.00000	0.16401	0.0000001	0.0000001	0.000004	0.00000	0.00000	0.02245
90	0.00008	0.00000	0.16148	0.0000000	0.0000000	0.0000035	0.00000	0.00000	0.02136
95	0.00007	0.00000	0.15911	0.0000000	0.0000000	0.000003	0.00000	0.00000	0.02036
100	0.00006	0.00000	0.15689	0.0000000	0.0000000	0.0000026	0.00000	0.00000	0.01946
110	0.00004	0.00000	0.15282	0.0000000	0.0000000	0.000002	0.00000	0.00000	0.01787
120	0.00003	0.00000	0.14918	0.0000000	0.0000000	0.0000016	0.00000	0.00000	0.01652
130	0.00003	0.00000	0.14590	0.0000000	0.0000000	0.0000013	0.00000	0.00000	0.01536
140	0.00002	0.00000	0.14290	0.0000000	0.0000000	0.000001	0.00000	0.00000	0.01434
150	0.00002	0.00000	0.14016	0.0000000	0.0000000	0.0000009	0.00000	0.00000	0.01346
160	0.00001	0.00000	0.13763	0.0000001	0.0000001	0.0000007	0.00000	0.00000	0.01267
170	0.00001	0.00000	0.13529	0.0000001	0.0000001	0.0000006	0.00000	0.00000	0.01197
180	0.00001	0.00000	0.13311	0.0000000	0.0000000	0.0000005	0.00000	0.00000	0.01133
190	0.00001	0.00000	0.13107	0.0000000	0.0000000	0.0000004	0.00000	0.00000	0.01077
200	0.00001	0.00000	0.12916	0.0000000	0.0000000	0.0000004	0.00000	0.00000	0.01025

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	DSw			Ops*			OZf		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
210	0.00001	0.00000	0.12737	0.0000000	0.0000000	0.0000003	0.00000	0.00000	0.00978
220	0.00001	0.00000	0.12567	0.0000000	0.0000000	0.0000003	0.00000	0.00000	0.00935
230	0.00000	0.00000	0.12407	0.0000000	0.0000000	0.0000003	0.00000	0.00000	0.00895
240	0.00000	0.00000	0.12255	0.0000000	0.0000000	0.0000002	0.00000	0.00000	0.00859
250	0.00000	0.00000	0.12111	0.0000000	0.0000000	0.0000002	0.00000	0.00000	0.00825
260	0.00000	0.00000	0.11973	0.0000001	0.0000001	0.0000002	0.00000	0.00000	0.00794
270	0.00000	0.00000	0.11842	0.0000001	0.0000001	0.0000002	0.00000	0.00000	0.00764
280	0.00000	0.00000	0.11717	0.0000000	0.0000000	0.0000001	0.00000	0.00000	0.00737
290	0.00000	0.00000	0.11597	0.0000000	0.0000000	0.0000001	0.00000	0.00000	0.00712
300	0.00000	0.00000	0.11482	0.0000000	0.0000000	0.0000001	0.00000	0.00000	0.00688

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	OZm			OZn			OZnb		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
1	0.39299	0.18635	0.63622	0.50445	0.36570	0.64266	0.20132	0.09010	0.36931
2	0.28816	0.11589	0.53119	0.31779	0.20138	0.45578	0.12168	0.04290	0.26921
3	0.23368	0.08203	0.47528	0.22434	0.12633	0.35520	0.08700	0.02593	0.21925
4	0.19878	0.06210	0.43859	0.16880	0.08553	0.29148	0.06729	0.01758	0.18780
5	0.17401	0.04905	0.41184	0.13241	0.06099	0.24710	0.05453	0.01276	0.16567
6	0.15529	0.03993	0.39107	0.10700	0.04518	0.21425	0.04559	0.00970	0.14902
7	0.14054	0.03324	0.37425	0.08842	0.03446	0.18887	0.03899	0.00763	0.13592
8	0.12856	0.02816	0.36021	0.07437	0.02691	0.16864	0.03392	0.00616	0.12529
9	0.11860	0.02420	0.34821	0.06346	0.02142	0.15212	0.02991	0.00507	0.11643
10	0.11016	0.02104	0.33778	0.05479	0.01732	0.13836	0.02667	0.00424	0.10892
11	0.10291	0.01847	0.32859	0.04778	0.01420	0.12673	0.02399	0.00360	0.10245
12	0.09659	0.01635	0.32039	0.04202	0.01179	0.11676	0.02175	0.00309	0.09681
13	0.09104	0.01458	0.31301	0.03724	0.00988	0.10813	0.01984	0.00268	0.09183
14	0.08611	0.01308	0.30630	0.03321	0.00836	0.10058	0.01821	0.00235	0.08740
15	0.08171	0.01180	0.30018	0.02979	0.00713	0.09392	0.01679	0.00207	0.08343
16	0.07774	0.01070	0.29454	0.02687	0.00613	0.08800	0.01555	0.00183	0.07985
17	0.07415	0.00975	0.28933	0.02434	0.00530	0.08272	0.01446	0.00164	0.07660
18	0.07088	0.00892	0.28449	0.02214	0.00461	0.07797	0.01349	0.00147	0.07362
19	0.06790	0.00819	0.27998	0.02022	0.00403	0.07367	0.01263	0.00132	0.07090
20	0.06515	0.00754	0.27575	0.01853	0.00354	0.06978	0.01185	0.00120	0.06839
21	0.06262	0.00697	0.27178	0.01703	0.00313	0.06622	0.01115	0.00109	0.06607
22	0.06028	0.00646	0.26805	0.01571	0.00277	0.06297	0.01052	0.00100	0.06392
23	0.05811	0.00600	0.26451	0.01452	0.00247	0.05999	0.00995	0.00091	0.06191
24	0.05609	0.00559	0.26117	0.01346	0.00221	0.05724	0.00942	0.00084	0.06004
25	0.05421	0.00522	0.25800	0.01250	0.00198	0.05470	0.00894	0.00077	0.05829
26	0.05244	0.00488	0.25498	0.01164	0.00178	0.05234	0.00850	0.00071	0.05665
27	0.05079	0.00457	0.25210	0.01086	0.00160	0.05016	0.00809	0.00066	0.05510
28	0.04923	0.00429	0.24935	0.01015	0.00145	0.04812	0.00772	0.00061	0.05364
29	0.04777	0.00404	0.24673	0.00951	0.00132	0.04623	0.00737	0.00057	0.05227
30	**0.04639**	**0.00380**	**0.24421**	**0.00892**	**0.00120**	**0.04445**	**0.00705**	**0.00053**	**0.05097**
31	0.04508	0.00359	0.24180	0.00838	0.00109	0.04279	0.00675	0.00050	0.04973
32	0.04385	0.00339	0.23948	0.00789	0.00100	0.04123	0.00647	0.00046	0.04856
33	0.04268	0.00321	0.23726	0.00743	0.00091	0.03976	0.00621	0.00043	0.04745
34	0.04157	0.00304	0.23511	0.00702	0.00084	0.03838	0.00596	0.00041	0.04639
35	0.04051	0.00288	0.23304	0.00663	0.00077	0.03708	0.00573	0.00038	0.04538

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	OZm			OZn			OZnb		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
36	0.03950	0.00274	0.23105	0.00627	0.00071	0.03584	0.00552	0.00036	0.04442
37	0.03855	0.00260	0.22912	0.00594	0.00065	0.03468	0.00532	0.00034	0.04350
38	0.03763	0.00248	0.22726	0.00563	0.00060	0.03358	0.00513	0.00032	0.04262
39	0.03676	0.00236	0.22546	0.00535	0.00056	0.03253	0.00495	0.00030	0.04177
40	0.03592	0.00225	0.22372	0.00508	0.00052	0.03154	0.00478	0.00029	0.04096
41	0.03512	0.00215	0.22202	0.00483	0.00048	0.03060	0.00462	0.00027	0.04019
42	0.03435	0.00205	0.22038	0.00460	0.00045	0.02970	0.00446	0.00026	0.03944
43	0.03362	0.00196	0.21879	0.00439	0.00041	0.02885	0.00432	0.00024	0.03872
44	0.03291	0.00188	0.21725	0.00418	0.00039	0.02803	0.00418	0.00023	0.03803
45	0.03223	0.00180	0.21574	0.00399	0.00036	0.02725	0.00405	0.00022	0.03737
46	0.03158	0.00173	0.21428	0.00382	0.00034	0.02651	0.00393	0.00021	0.03673
47	0.03095	0.00166	0.21286	0.00365	0.00031	0.02580	0.00381	0.00020	0.03611
48	0.03035	0.00159	0.21148	0.00349	0.00029	0.02512	0.00370	0.00019	0.03551
49	0.02977	0.00153	0.21013	0.00334	0.00028	0.02447	0.00359	0.00018	0.03494
50	0.02921	0.00147	0.20881	0.00320	0.00026	0.02385	0.00349	0.00017	0.03438
55	0.02667	0.00121	0.20270	0.00261	0.00019	0.02109	0.00304	0.00014	0.03185
60	0.02453	0.00102	0.19725	0.00216	0.00014	0.01881	0.00268	0.00012	0.02968
65	0.02268	0.00086	0.19234	0.00181	0.00011	0.01691	0.00238	0.00010	0.02780
70	0.02108	0.00074	0.18788	0.00153	0.00009	0.01530	0.00213	0.00008	0.02615
75	0.01967	0.00064	0.18381	0.00131	0.00007	0.01392	0.00192	0.00007	0.02469
80	0.01843	0.00056	0.18006	0.00112	0.00005	0.01273	0.00174	0.00006	0.02338
85	0.01732	0.00049	0.17660	0.00098	0.00004	0.01169	0.00159	0.00005	0.02221
90	0.01633	0.00043	0.17338	0.00085	0.00004	0.01078	0.00145	0.00004	0.02115
95	0.01544	0.00038	0.17039	0.00075	0.00003	0.00998	0.00134	0.00004	0.02019
100	0.01464	0.00034	0.16758	0.00066	0.00002	0.00927	0.00123	0.00003	0.01932
110	0.01323	0.00028	0.16247	0.00052	0.00002	0.00807	0.00106	0.00003	0.01778
120	0.01206	0.00023	0.15791	0.00042	0.00001	0.00709	0.00092	0.00002	0.01647
130	0.01105	0.00019	0.15381	0.00034	0.00001	0.00629	0.00081	0.00002	0.01533
140	0.01019	0.00016	0.15009	0.00028	0.00001	0.00562	0.00072	0.00001	0.01435
150	0.00944	0.00013	0.14669	0.00024	0.00001	0.00505	0.00064	0.00001	0.01348
160	0.00878	0.00011	0.14357	0.00020	0.00000	0.00457	0.00058	0.00001	0.01271
170	0.00820	0.00010	0.14068	0.00017	0.00000	0.00415	0.00052	0.00001	0.01202
180	0.00769	0.00009	0.13800	0.00015	0.00000	0.00380	0.00047	0.00001	0.01140
190	0.00723	0.00008	0.13551	0.00013	0.00000	0.00348	0.00043	0.00001	0.01084
200	0.00681	0.00007	0.13318	0.00011	0.00000	0.00320	0.00039	0.00001	0.01033

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	OZm			OZn			OZnb		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
210	0.00644	0.00006	0.13099	0.00010	0.00000	0.00296	0.00036	0.00000	0.00987
220	0.00610	0.00005	0.12893	0.00008	0.00000	0.00274	0.00033	0.00000	0.00944
230	0.00579	0.00005	0.12698	0.00007	0.00000	0.00255	0.00031	0.00000	0.00905
240	0.00550	0.00004	0.12514	0.00007	0.00000	0.00238	0.00029	0.00000	0.00869
250	0.00524	0.00004	0.12340	0.00006	0.00000	0.00222	0.00027	0.00000	0.00836
260	0.00500	0.00003	0.12174	0.00005	0.00000	0.00208	0.00025	0.00000	0.00805
270	0.00478	0.00003	0.12016	0.00005	0.00000	0.00195	0.00023	0.00000	0.00776
280	0.00457	0.00003	0.11866	0.00004	0.00000	0.00183	0.00022	0.00000	0.00749
290	0.00438	0.00003	0.11722	0.00004	0.00000	0.00173	0.00021	0.00000	0.00724
300	0.00421	0.00002	0.11585	0.00003	0.00000	0.00163	0.00019	0.00000	0.00700

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	Ph			Sacgr			Sagr		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
1	0.47220	0.23247	0.72282	0.69951	0.59142	0.79240	0.57749	0.33202	0.79539
2	0.38398	0.16877	0.64392	0.55401	0.44593	0.65820	0.46876	0.24920	0.69856
3	0.33475	0.13536	0.59782	0.46387	0.35942	0.57089	0.40572	0.20238	0.63909
4	0.30141	0.11388	0.56571	0.40076	0.30036	0.50822	0.36234	0.17092	0.59719
5	0.27663	0.09862	0.54129	0.35345	0.25703	0.46036	0.32983	0.14795	0.56534
6	0.25715	0.08711	0.52173	0.31637	0.22376	0.42223	0.30418	0.13029	0.53991
7	0.24126	0.07806	0.50549	0.28639	0.19737	0.39093	0.28322	0.11624	0.51890
8	0.22794	0.07073	0.49165	0.26155	0.17592	0.36463	0.26564	0.10476	0.50111
9	0.21654	0.06466	0.47963	0.24061	0.15816	0.34213	0.25060	0.09519	0.48574
10	0.20662	0.05954	0.46903	0.22267	0.14321	0.32261	0.23755	0.08710	0.47226
11	0.19789	0.05515	0.45957	0.20712	0.13048	0.30546	0.22606	0.08015	0.46030
12	0.19012	0.05135	0.45104	0.19351	0.11951	0.29025	0.21586	0.07413	0.44956
13	0.18314	0.04803	0.44328	0.18147	0.10997	0.27664	0.20672	0.06885	0.43985
14	0.17682	0.04509	0.43618	0.17076	0.10162	0.26438	0.19846	0.06420	0.43099
15	0.17106	0.04248	0.42963	0.16116	0.09424	0.25325	0.19095	0.06006	0.42286
16	0.16578	0.04013	0.42357	0.15251	0.08768	0.24311	0.18409	0.05637	0.41537
17	0.16092	0.03802	0.41792	0.14466	0.08183	0.23382	0.17778	0.05304	0.40841
18	0.15643	0.03611	0.41265	0.13752	0.07657	0.22526	0.17196	0.05003	0.40194
19	0.15225	0.03437	0.40770	0.13099	0.07183	0.21735	0.16657	0.04730	0.39589
20	0.14836	0.03277	0.40305	0.12499	0.06754	0.21001	0.16156	0.04481	0.39021
21	0.14472	0.03131	0.39866	0.11947	0.06363	0.20319	0.15689	0.04254	0.38487
22	0.14130	0.02996	0.39450	0.11437	0.06007	0.19682	0.15251	0.04045	0.37983
23	0.13809	0.02872	0.39055	0.10964	0.05681	0.19085	0.14841	0.03852	0.37507
24	0.13507	0.02757	0.38680	0.10524	0.05381	0.18526	0.14455	0.03675	0.37054
25	0.13221	0.02649	0.38323	0.10115	0.05106	0.18000	0.14092	0.03510	0.36625
26	0.12950	0.02549	0.37981	0.09733	0.04851	0.17504	0.13748	0.03357	0.36215
27	0.12693	0.02456	0.37655	0.09375	0.04616	0.17036	0.13423	0.03215	0.35825
28	0.12448	0.02369	0.37343	0.09039	0.04397	0.16593	0.13115	0.03082	0.35452
29	0.12216	0.02287	0.37043	0.08724	0.04195	0.16174	0.12822	0.02958	0.35095
30	**0.11994**	**0.02210**	**0.36755**	**0.08428**	**0.04006**	**0.15776**	**0.12543**	**0.02842**	**0.34752**
31	0.11782	0.02137	0.36477	0.08148	0.03829	0.15397	0.12278	0.02734	0.34423
32	0.11580	0.02069	0.36211	0.07884	0.03665	0.15036	0.12025	0.02631	0.34107
33	0.11386	0.02004	0.35953	0.07634	0.03511	0.14693	0.11783	0.02535	0.33803
34	0.11200	0.01943	0.35705	0.07398	0.03366	0.14365	0.11552	0.02445	0.33510
35	0.11021	0.01886	0.35465	0.07174	0.03230	0.14052	0.11330	0.02359	0.33228

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	Ph			Sacgr			Sagr		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
36	0.10850	0.01831	0.35233	0.06961	0.03103	0.13752	0.11118	0.02278	0.32955
37	0.10685	0.01779	0.35008	0.06758	0.02983	0.13465	0.10914	0.02202	0.32691
38	0.10526	0.01729	0.34790	0.06566	0.02869	0.13189	0.10719	0.02129	0.32436
39	0.10373	0.01682	0.34579	0.06383	0.02762	0.12925	0.10530	0.02061	0.32189
40	0.10226	0.01637	0.34374	0.06208	0.02661	0.12672	0.10349	0.01995	0.31950
41	0.10083	0.01594	0.34175	0.06041	0.02566	0.12428	0.10175	0.01933	0.31718
42	0.09946	0.01553	0.33981	0.05881	0.02475	0.12193	0.10007	0.01874	0.31493
43	0.09813	0.01514	0.33793	0.05729	0.02389	0.11967	0.09844	0.01818	0.31274
44	0.09684	0.01476	0.33610	0.05583	0.02308	0.11749	0.09688	0.01765	0.31061
45	0.09559	0.01440	0.33432	0.05443	0.02230	0.11539	0.09536	0.01713	0.30855
46	0.09438	0.01406	0.33258	0.05309	0.02156	0.11337	0.09390	0.01665	0.30654
47	0.09321	0.01373	0.33089	0.05180	0.02086	0.11141	0.09248	0.01618	0.30458
48	0.09208	0.01341	0.32924	0.05056	0.02020	0.10952	0.09111	0.01573	0.30267
49	0.09098	0.01311	0.32762	0.04938	0.01956	0.10769	0.08979	0.01531	0.30081
50	0.08991	0.01281	0.32605	0.04823	0.01895	0.10592	0.08850	0.01490	0.29900
55	0.08498	0.01150	0.31870	0.04313	0.01630	0.09786	0.08261	0.01309	0.29056
60	0.08067	0.01041	0.31210	0.03886	0.01415	0.09092	0.07750	0.01160	0.28303
65	0.07685	0.00948	0.30611	0.03524	0.01240	0.08488	0.07301	0.01035	0.27623
70	0.07343	0.00868	0.30064	0.03215	0.01094	0.07957	0.06904	0.00930	0.27004
75	0.07036	0.00799	0.29562	0.02947	0.00972	0.07486	0.06549	0.00841	0.26438
80	0.06757	0.00739	0.29097	0.02713	0.00869	0.07066	0.06230	0.00764	0.25918
85	0.06504	0.00686	0.28666	0.02508	0.00781	0.06688	0.05942	0.00698	0.25435
90	0.06271	0.00639	0.28263	0.02327	0.00705	0.06347	0.05679	0.00639	0.24987
95	0.06058	0.00597	0.27887	0.02165	0.00639	0.06037	0.05440	0.00588	0.24569
100	0.05860	0.00560	0.27532	0.02021	0.00582	0.05754	0.05220	0.00543	0.24177
110	0.05506	0.00496	0.26883	0.01775	0.00487	0.05257	0.04830	0.00467	0.23462
120	0.05199	0.00443	0.26301	0.01573	0.00413	0.04834	0.04495	0.00406	0.22824
130	0.04928	0.00398	0.25773	0.01405	0.00354	0.04471	0.04203	0.00356	0.22249
140	0.04687	0.00361	0.25292	0.01263	0.00306	0.04154	0.03947	0.00315	0.21726
150	0.04471	0.00329	0.24850	0.01143	0.00266	0.03876	0.03721	0.00280	0.21248
160	0.04277	0.00301	0.24441	0.01039	0.00234	0.03630	0.03518	0.00251	0.20809
170	0.04101	0.00277	0.24062	0.00949	0.00207	0.03411	0.03336	0.00226	0.20402
180	0.03940	0.00256	0.23709	0.00871	0.00183	0.03215	0.03172	0.00204	0.20025
190	0.03793	0.00237	0.23378	0.00802	0.00164	0.03038	0.03023	0.00186	0.19672
200	0.03657	0.00221	0.23068	0.00741	0.00147	0.02878	0.02887	0.00169	0.19343

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	Ph			Sacgr			Sagr		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
210	0.03532	0.00206	0.22775	0.00687	0.00132	0.02732	0.02762	0.00155	0.19033
220	0.03416	0.00192	0.22499	0.00639	0.00120	0.02599	0.02647	0.00143	0.18741
230	0.03308	0.00180	0.22237	0.00596	0.00109	0.02477	0.02541	0.00131	0.18466
240	0.03207	0.00170	0.21989	0.00557	0.00099	0.02365	0.02443	0.00122	0.18205
250	0.03113	0.00160	0.21753	0.00522	0.00090	0.02262	0.02352	0.00113	0.17958
260	0.03024	0.00151	0.21527	0.00490	0.00083	0.02166	0.02268	0.00105	0.17723
270	0.02941	0.00143	0.21312	0.00460	0.00076	0.02077	0.02188	0.00097	0.17499
280	0.02863	0.00135	0.21107	0.00434	0.00070	0.01994	0.02114	0.00091	0.17285
290	0.02789	0.00128	0.20910	0.00410	0.00065	0.01917	0.02045	0.00085	0.17080
300	0.02719	0.00122	0.20721	0.00387	0.00060	0.01845	0.01980	0.00080	0.16885

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	Sb			Sbs			Se		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
1	0.44502	0.26442	0.63806	0.28874	0.12867	0.50739	0.35132	0.14117	0.62230
2	0.27017	0.13088	0.45922	0.09640	0.02179	0.27875	0.09921	0.01598	0.33459
3	0.18684	0.07521	0.36649	0.04108	0.00484	0.18692	0.03476	0.00195	0.22850
4	0.13866	0.04725	0.30833	0.02030	0.00133	0.13758	0.01425	0.00029	0.17273
5	0.10768	0.03156	0.26777	0.01108	0.00043	0.10695	0.00654	0.00005	0.13793
6	0.08634	0.02205	0.23754	0.00651	0.00016	0.08622	0.00327	0.00001	0.11407
7	0.07090	0.01596	0.21397	0.00403	0.00006	0.07136	0.00175	0.00000	0.09668
8	0.05933	0.01188	0.19497	0.00261	0.00003	0.06025	0.00099	0.00000	0.08345
9	0.05040	0.00904	0.17928	0.00175	0.00001	0.05168	0.00058	0.00000	0.07308
10	0.04335	0.00702	0.16607	0.00121	0.00001	0.04490	0.00036	0.00000	0.06473
11	0.03768	0.00554	0.15476	0.00086	0.00000	0.03943	0.00022	0.00000	0.05789
12	0.03305	0.00443	0.14495	0.00062	0.00000	0.03494	0.00015	0.00000	0.05218
13	0.02921	0.00359	0.13636	0.00046	0.00000	0.03120	0.00010	0.00000	0.04735
14	0.02600	0.00294	0.12876	0.00034	0.00000	0.02804	0.00007	0.00000	0.04323
15	0.02328	0.00243	0.12199	0.00026	0.00000	0.02536	0.00005	0.00000	0.03967
16	0.02095	0.00203	0.11590	0.00020	0.00000	0.02305	0.00003	0.00000	0.03656
17	0.01895	0.00171	0.11041	0.00016	0.00000	0.02105	0.00002	0.00000	0.03384
18	0.01721	0.00145	0.10542	0.00012	0.00000	0.01930	0.00002	0.00000	0.03144
19	0.01570	0.00123	0.10086	0.00010	0.00000	0.01777	0.00001	0.00000	0.02930
20	0.01437	0.00106	0.09668	0.00008	0.00000	0.01641	0.00001	0.00000	0.02738
21	0.01319	0.00091	0.09284	0.00006	0.00000	0.01520	0.00001	0.00000	0.02566
22	0.01215	0.00079	0.08929	0.00005	0.00000	0.01413	0.00001	0.00000	0.02411
23	0.01122	0.00069	0.08600	0.00004	0.00000	0.01316	0.00000	0.00000	0.02271
24	0.01039	0.00060	0.08294	0.00004	0.00000	0.01229	0.00000	0.00000	0.02143
25	0.00965	0.00053	0.08009	0.00003	0.00000	0.01150	0.00000	0.00000	0.02026
26	0.00898	0.00047	0.07742	0.00003	0.00000	0.01079	0.00000	0.00000	0.01919
27	0.00837	0.00041	0.07493	0.00002	0.00000	0.01014	0.00000	0.00000	0.01821
28	0.00782	0.00037	0.07258	0.00002	0.00000	0.00955	0.00000	0.00000	0.01730
29	0.00732	0.00033	0.07038	0.00002	0.00000	0.00901	0.00000	0.00000	0.01647
30	**0.00686**	**0.00029**	**0.06830**	**0.00001**	**0.00000**	**0.00851**	**0.00000**	**0.00000**	**0.01570**
31	0.00644	0.00026	0.06634	0.00001	0.00000	0.00805	0.00000	0.00000	0.01498
32	0.00606	0.00023	0.06448	0.00001	0.00000	0.00763	0.00000	0.00000	0.01431
33	0.00571	0.00021	0.06273	0.00001	0.00000	0.00724	0.00000	0.00000	0.01369
34	0.00539	0.00019	0.06106	0.00001	0.00000	0.00687	0.00000	0.00000	0.01311
35	0.00509	0.00017	0.05947	0.00001	0.00000	0.00654	0.00000	0.00000	0.01257

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	Sb			Sbs			Se		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
36	0.00481	0.00016	0.05797	0.00001	0.00000	0.00623	0.00000	0.00000	0.01206
37	0.00456	0.00014	0.05653	0.00001	0.00000	0.00594	0.00000	0.00000	0.01158
38	0.00432	0.00013	0.05516	0.00000	0.00000	0.00566	0.00000	0.00000	0.01113
39	0.00410	0.00012	0.05386	0.00000	0.00000	0.00541	0.00000	0.00000	0.01071
40	0.00389	0.00011	0.05261	0.00000	0.00000	0.00517	0.00000	0.00000	0.01032
41	0.00370	0.00010	0.05141	0.00000	0.00000	0.00495	0.00000	0.00000	0.00994
42	0.00352	0.00009	0.05027	0.00000	0.00000	0.00474	0.00000	0.00000	0.00959
43	0.00336	0.00008	0.04917	0.00000	0.00000	0.00455	0.00000	0.00000	0.00925
44	0.00320	0.00008	0.04812	0.00000	0.00000	0.00436	0.00000	0.00000	0.00893
45	0.00306	0.00007	0.04711	0.00000	0.00000	0.00419	0.00000	0.00000	0.00863
46	0.00292	0.00006	0.04614	0.00000	0.00000	0.00403	0.00000	0.00000	0.00835
47	0.00279	0.00006	0.04520	0.00000	0.00000	0.00387	0.00000	0.00000	0.00808
48	0.00267	0.00006	0.04430	0.00000	0.00000	0.00372	0.00000	0.00000	0.00782
49	0.00256	0.00005	0.04344	0.00000	0.00000	0.00359	0.00000	0.00000	0.00758
50	0.00245	0.00005	0.04260	0.00000	0.00000	0.00346	0.00000	0.00000	0.00734
55	0.00200	0.00003	0.03884	0.00000	0.00000	0.00289	0.00000	0.00000	0.00632
60	0.00165	0.00002	0.03566	0.00000	0.00000	0.00246	0.00000	0.00000	0.00551
65	0.00138	0.00002	0.03292	0.00000	0.00000	0.00211	0.00000	0.00000	0.00484
70	0.00117	0.00001	0.03056	0.00000	0.00000	0.00182	0.00000	0.00000	0.00429
75	0.00100	0.00001	0.02848	0.00000	0.00000	0.00159	0.00000	0.00000	0.00383
80	0.00086	0.00001	0.02665	0.00000	0.00000	0.00140	0.00000	0.00000	0.00344
85	0.00075	0.00001	0.02503	0.00000	0.00000	0.00124	0.00000	0.00000	0.00310
90	0.00065	0.00000	0.02357	0.00000	0.00000	0.00110	0.00000	0.00000	0.00282
95	0.00057	0.00000	0.02226	0.00000	0.00000	0.00099	0.00000	0.00000	0.00257
100	0.00051	0.00000	0.02108	0.00000	0.00000	0.00089	0.00000	0.00000	0.00235
110	0.00040	0.00000	0.01902	0.00000	0.00000	0.00073	0.00000	0.00000	0.00199
120	0.00032	0.00000	0.01730	0.00000	0.00000	0.00061	0.00000	0.00000	0.00171
130	0.00026	0.00000	0.01584	0.00000	0.00000	0.00051	0.00000	0.00000	0.00148
140	0.00022	0.00000	0.01458	0.00000	0.00000	0.00044	0.00000	0.00000	0.00129
150	0.00018	0.00000	0.01349	0.00000	0.00000	0.00037	0.00000	0.00000	0.00114
160	0.00015	0.00000	0.01254	0.00000	0.00000	0.00032	0.00000	0.00000	0.00101
170	0.00013	0.00000	0.01169	0.00000	0.00000	0.00028	0.00000	0.00000	0.00090
180	0.00011	0.00000	0.01095	0.00000	0.00000	0.00025	0.00000	0.00000	0.00081
190	0.00010	0.00000	0.01028	0.00000	0.00000	0.00022	0.00000	0.00000	0.00073
200	0.00008	0.00000	0.00968	0.00000	0.00000	0.00020	0.00000	0.00000	0.00066

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	Sb			Sbs			Se		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
210	0.00007	0.00000	0.00913	0.00000	0.00000	0.00018	0.00000	0.00000	0.00060
220	0.00007	0.00000	0.00864	0.00000	0.00000	0.00016	0.00000	0.00000	0.00055
230	0.00006	0.00000	0.00819	0.00000	0.00000	0.00014	0.00000	0.00000	0.00051
240	0.00005	0.00000	0.00778	0.00000	0.00000	0.00013	0.00000	0.00000	0.00046
250	0.00005	0.00000	0.00741	0.00000	0.00000	0.00012	0.00000	0.00000	0.00043
260	0.00004	0.00000	0.00706	0.00000	0.00000	0.00011	0.00000	0.00000	0.00040
270	0.00004	0.00000	0.00675	0.00000	0.00000	0.00010	0.00000	0.00000	0.00037
280	0.00003	0.00000	0.00645	0.00000	0.00000	0.00009	0.00000	0.00000	0.00034
290	0.00003	0.00000	0.00618	0.00000	0.00000	0.00008	0.00000	0.00000	0.00032
300	0.00003	0.00000	0.00592	0.00000	0.00000	0.00008	0.00000	0.00000	0.00030

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	Sgr			So			SOagr		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
1	0.31386	0.10546	0.61071	0.32432	0.15913	0.53458	0.27049	0.11302	0.49520
2	0.18569	0.03382	0.51582	0.21113	0.08202	0.41552	0.20019	0.06910	0.42098
3	0.12859	0.01344	0.47890	0.15735	0.05103	0.35351	0.16471	0.04947	0.38190
4	0.09632	0.00620	0.45806	0.12521	0.03497	0.31333	0.14218	0.03819	0.35605
5	0.07572	0.00318	0.44411	0.10365	0.02546	0.28437	0.12621	0.03085	0.33704
6	0.06153	0.00176	0.43385	0.08815	0.01934	0.26212	0.11412	0.02570	0.32214
7	0.05124	0.00104	0.42584	0.07645	0.01515	0.24429	0.10457	0.02190	0.30999
8	0.04347	0.00064	0.41932	0.06730	0.01216	0.22956	0.09677	0.01898	0.29977
9	0.03744	0.00041	0.41385	0.05996	0.00995	0.21711	0.09025	0.01667	0.29099
10	0.03264	0.00027	0.40917	0.05393	0.00827	0.20639	0.08470	0.01481	0.28333
11	0.02874	0.00019	0.40509	0.04891	0.00697	0.19703	0.07991	0.01327	0.27653
12	0.02553	0.00013	0.40147	0.04465	0.00594	0.18876	0.07571	0.01199	0.27045
13	0.02285	0.00009	0.39824	0.04100	0.00511	0.18139	0.07200	0.01090	0.26496
14	0.02058	0.00007	0.39532	0.03785	0.00444	0.17475	0.06870	0.00997	0.25995
15	0.01864	0.00005	0.39266	0.03509	0.00388	0.16874	0.06572	0.00916	0.25536
16	0.01698	0.00004	0.39022	0.03266	0.00342	0.16326	0.06303	0.00846	0.25112
17	0.01553	0.00003	0.38797	0.03051	0.00303	0.15823	0.06058	0.00784	0.24720
18	0.01426	0.00002	0.38588	0.02859	0.00269	0.15360	0.05834	0.00729	0.24354
19	0.01314	0.00002	0.38394	0.02686	0.00241	0.14931	0.05629	0.00680	0.24013
20	0.01215	0.00001	0.38212	0.02531	0.00217	0.14533	0.05439	0.00637	0.23692
21	0.01127	0.00001	0.38041	0.02390	0.00196	0.14162	0.05263	0.00597	0.23391
22	0.01048	0.00001	0.37880	0.02262	0.00177	0.13815	0.05099	0.00562	0.23106
23	0.00978	0.00001	0.37728	0.02145	0.00161	0.13489	0.04947	0.00530	0.22837
24	0.00914	0.00001	0.37584	0.02038	0.00147	0.13183	0.04804	0.00500	0.22581
25	0.00856	0.00000	0.37447	0.01940	0.00134	0.12894	0.04671	0.00474	0.22338
26	0.00804	0.00000	0.37317	0.01849	0.00123	0.12622	0.04545	0.00449	0.22107
27	0.00756	0.00000	0.37193	0.01765	0.00113	0.12363	0.04427	0.00427	0.21886
28	0.00713	0.00000	0.37074	0.01687	0.00105	0.12119	0.04316	0.00406	0.21675
29	0.00673	0.00000	0.36960	0.01615	0.00097	0.11886	0.04210	0.00387	0.21473
30	**0.00636**	**0.00000**	**0.36851**	**0.01548**	**0.00089**	**0.11664**	**0.04110**	**0.00369**	**0.21279**
31	0.00602	0.00000	0.36747	0.01485	0.00083	0.11453	0.04015	0.00352	0.21093
32	0.00571	0.00000	0.36646	0.01427	0.00077	0.11252	0.03925	0.00337	0.20914
33	0.00542	0.00000	0.36549	0.01372	0.00072	0.11059	0.03840	0.00323	0.20742
34	0.00515	0.00000	0.36456	0.01320	0.00067	0.10874	0.03758	0.00309	0.20576
35	0.00491	0.00000	0.36366	0.01272	0.00063	0.10698	0.03680	0.00297	0.20415

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	Sgr			So			SOagr		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
36	0.00467	0.00000	0.36278	0.01226	0.00059	0.10528	0.03605	0.00285	0.20261
37	0.00446	0.00000	0.36194	0.01183	0.00055	0.10365	0.03534	0.00274	0.20111
38	0.00426	0.00000	0.36113	0.01143	0.00052	0.10208	0.03466	0.00264	0.19966
39	0.00407	0.00000	0.36034	0.01104	0.00048	0.10057	0.03400	0.00254	0.19826
40	0.00389	0.00000	0.35957	0.01068	0.00046	0.09912	0.03338	0.00245	0.19690
41	0.00373	0.00000	0.35882	0.01034	0.00043	0.09772	0.03277	0.00236	0.19559
42	0.00357	0.00000	0.35810	0.01001	0.00041	0.09637	0.03219	0.00228	0.19431
43	0.00343	0.00000	0.35740	0.00970	0.00038	0.09506	0.03163	0.00220	0.19306
44	0.00329	0.00000	0.35672	0.00941	0.00036	0.09380	0.03110	0.00213	0.19186
45	0.00316	0.00000	0.35605	0.00913	0.00034	0.09257	0.03058	0.00206	0.19068
46	0.00304	0.00000	0.35540	0.00886	0.00032	0.09139	0.03008	0.00199	0.18954
47	0.00292	0.00000	0.35477	0.00860	0.00031	0.09025	0.02960	0.00193	0.18842
48	0.00281	0.00000	0.35415	0.00836	0.00029	0.08914	0.02913	0.00187	0.18734
49	0.00271	0.00000	0.35355	0.00813	0.00028	0.08806	0.02868	0.00181	0.18628
50	0.00261	0.00000	0.35296	0.00791	0.00026	0.08702	0.02824	0.00176	0.18525
55	0.00219	0.00000	0.35022	0.00693	0.00021	0.08222	0.02626	0.00152	0.18044
60	0.00186	0.00000	0.34776	0.00613	0.00017	0.07803	0.02455	0.00133	0.17614
65	0.00160	0.00000	0.34552	0.00547	0.00013	0.07433	0.02307	0.00117	0.17226
70	0.00139	0.00000	0.34347	0.00492	0.00011	0.07102	0.02176	0.00104	0.16872
75	0.00121	0.00000	0.34159	0.00445	0.00009	0.06806	0.02060	0.00093	0.16549
80	0.00107	0.00000	0.33984	0.00404	0.00008	0.06538	0.01956	0.00084	0.16250
85	0.00095	0.00000	0.33822	0.00370	0.00007	0.06294	0.01862	0.00076	0.15974
90	0.00085	0.00000	0.33670	0.00339	0.00006	0.06071	0.01778	0.00069	0.15717
95	0.00076	0.00000	0.33527	0.00313	0.00005	0.05866	0.01701	0.00063	0.15477
100	0.00068	0.00000	0.33393	0.00289	0.00004	0.05676	0.01630	0.00058	0.15252
110	0.00056	0.00000	0.33146	0.00249	0.00003	0.05338	0.01506	0.00050	0.14840
120	0.00047	0.00000	0.32923	0.00218	0.00002	0.05044	0.01400	0.00043	0.14472
130	0.00040	0.00000	0.32720	0.00192	0.00002	0.04785	0.01308	0.00037	0.14141
140	0.00034	0.00000	0.32534	0.00170	0.00002	0.04556	0.01228	0.00033	0.13839
150	0.00029	0.00000	0.32362	0.00152	0.00001	0.04350	0.01157	0.00029	0.13562
160	0.00025	0.00000	0.32202	0.00137	0.00001	0.04165	0.01094	0.00026	0.13308
170	0.00022	0.00000	0.32054	0.00124	0.00001	0.03997	0.01037	0.00023	0.13072
180	0.00019	0.00000	0.31914	0.00113	0.00001	0.03844	0.00986	0.00021	0.12853
190	0.00017	0.00000	0.31784	0.00103	0.00001	0.03704	0.00940	0.00019	0.12649
200	0.00015	0.00000	0.31660	0.00095	0.00001	0.03575	0.00898	0.00017	0.12457

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	Sgr			So			SOagr		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
210	0.00014	0.00000	0.31543	0.00087	0.00000	0.03456	0.00859	0.00016	0.12277
220	0.00012	0.00000	0.31433	0.00080	0.00000	0.03346	0.00824	0.00014	0.12107
230	0.00011	0.00000	0.31327	0.00074	0.00000	0.03243	0.00792	0.00013	0.11947
240	0.00010	0.00000	0.31227	0.00069	0.00000	0.03147	0.00761	0.00012	0.11795
250	0.00009	0.00000	0.31131	0.00064	0.00000	0.03057	0.00734	0.00011	0.11651
260	0.00008	0.00000	0.31039	0.00060	0.00000	0.02973	0.00708	0.00011	0.11513
270	0.00008	0.00000	0.30951	0.00056	0.00000	0.02894	0.00683	0.00010	0.11382
280	0.00007	0.00000	0.30867	0.00053	0.00000	0.02820	0.00661	0.00009	0.11257
290	0.00006	0.00000	0.30786	0.00050	0.00000	0.02749	0.00639	0.00009	0.11138
300	0.00006	0.00000	0.30707	0.00047	0.00000	0.02683	0.00620	0.00008	0.11023

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	SObo			Sp			Spsq*		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
1	0.48976	0.21348	0.77127	0.29427	0.16239	0.46127	0.0595698	0.011175	0.202584
2	0.39909	0.15728	0.68945	0.21950	0.10626	0.38165	0.0294494	0.0043667	0.123926
3	0.34817	0.12548	0.64337	0.18137	0.07987	0.33930	0.0186571	0.0023951	0.089506
4	0.31358	0.10434	0.61246	0.15701	0.06409	0.31122	0.0132263	0.0015282	0.069838
5	0.28781	0.08910	0.58970	0.13966	0.05349	0.29057	0.0100116	0.0010642	0.05704
6	0.26754	0.07753	0.57195	0.12650	0.04583	0.27442	0.0079139	0.0007848	0.048033
7	0.25097	0.06843	0.55754	0.11606	0.04003	0.26127	0.0064526	0.000603	0.041346
8	0.23707	0.06108	0.54550	0.10753	0.03547	0.25024	0.0053853	0.0004777	0.036188
9	0.22517	0.05502	0.53521	0.10038	0.03180	0.24080	0.0045774	0.0003876	0.032091
10	0.21482	0.04994	0.52626	0.09429	0.02877	0.23257	0.0039482	0.0003206	0.02876
11	0.20570	0.04562	0.51838	0.08902	0.02624	0.22530	0.003447	0.0002694	0.026002
12	0.19758	0.04190	0.51134	0.08440	0.02408	0.21881	0.0030402	0.0002293	0.023682
13	0.19028	0.03867	0.50501	0.08032	0.02223	0.21296	0.0027047	0.0001975	0.021705
14	0.18367	0.03584	0.49927	0.07667	0.02062	0.20765	0.0024243	0.0001717	0.020001
15	0.17765	0.03335	0.49401	0.07338	0.01921	0.20279	0.0021871	0.0001506	0.01852
16	0.17213	0.03113	0.48918	0.07041	0.01796	0.19832	0.0019846	0.000133	0.01722
17	0.16705	0.02915	0.48472	0.06771	0.01685	0.19419	0.0018099	0.0001183	0.016071
18	0.16235	0.02737	0.48057	0.06523	0.01586	0.19036	0.0016582	0.0001058	0.015049
19	0.15798	0.02576	0.47670	0.06295	0.01496	0.18678	0.0015255	0.0000951	0.014135
20	0.15391	0.02430	0.47307	0.06085	0.01415	0.18343	0.0014086	0.000086	0.013312
21	0.15010	0.02297	0.46967	0.05890	0.01342	0.18029	0.001305	0.000078	0.012569
22	0.14653	0.02176	0.46646	0.05708	0.01274	0.17733	0.0012128	0.0000711	0.011894
23	0.14317	0.02065	0.46342	0.05539	0.01213	0.17454	0.0011303	0.000065	0.011279
24	0.14000	0.01962	0.46055	0.05381	0.01157	0.17190	0.0010562	0.0000596	0.010716
25	0.13700	0.01868	0.45782	0.05233	0.01104	0.16939	0.0009893	0.0000549	0.0102
26	0.13417	0.01781	0.45523	0.05093	0.01056	0.16701	0.0009287	0.0000506	0.009725
27	0.13148	0.01700	0.45275	0.04962	0.01012	0.16474	0.0008736	0.0000469	0.009286
28	0.12893	0.01625	0.45039	0.04838	0.00970	0.16258	0.0008234	0.0000435	0.008879
29	0.12649	0.01555	0.44812	0.04720	0.00932	0.16051	0.0007775	0.0000404	0.008502
30	**0.12417**	**0.01490**	**0.44596**	**0.04609**	**0.00896**	**0.15853**	**0.0007354**	**0.0000377**	**0.008151**
31	0.12196	0.01429	0.44388	0.04504	0.00862	0.15663	0.0006967	0.0000352	0.007824
32	0.11984	0.01371	0.44188	0.04403	0.00830	0.15481	0.000661	0.0000329	0.007518
33	0.11781	0.01318	0.43995	0.04308	0.00801	0.15307	0.000628	0.0000309	0.007232
34	0.11586	0.01268	0.43810	0.04217	0.00773	0.15138	0.0005975	0.000029	0.006964
35	0.11400	0.01220	0.43631	0.04130	0.00746	0.14976	0.0005692	0.0000272	0.006712

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	SObo			Sp			Spsq*		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
36	0.11221	0.01176	0.43458	0.04047	0.00722	0.14820	0.0005428	0.0000257	0.006475
37	0.11048	0.01133	0.43291	0.03968	0.00698	0.14670	0.0005183	0.0000242	0.006251
38	0.10882	0.01094	0.43130	0.03891	0.00676	0.14524	0.0004954	0.0000229	0.00604
39	0.10722	0.01056	0.42973	0.03818	0.00655	0.14383	0.000474	0.0000216	0.005841
40	0.10568	0.01020	0.42822	0.03748	0.00635	0.14247	0.000454	0.0000205	0.005653
41	0.10419	0.00987	0.42675	0.03681	0.00616	0.14116	0.0004352	0.0000194	0.005474
42	0.10275	0.00955	0.42532	0.03616	0.00598	0.13988	0.0004176	0.0000184	0.005305
43	0.10136	0.00924	0.42393	0.03554	0.00581	0.13864	0.0004011	0.0000175	0.005144
44	0.10001	0.00895	0.42259	0.03494	0.00565	0.13744	0.0003855	0.0000167	0.004991
45	0.09871	0.00867	0.42128	0.03436	0.00549	0.13627	0.0003708	0.0000159	0.004845
46	0.09745	0.00841	0.42000	0.03380	0.00534	0.13514	0.0003569	0.0000151	0.004706
47	0.09623	0.00816	0.41876	0.03326	0.00520	0.13403	0.0003438	0.0000144	0.004574
48	0.09504	0.00792	0.41755	0.03274	0.00507	0.13296	0.0003314	0.0000138	0.004448
49	0.09389	0.00769	0.41637	0.03224	0.00494	0.13192	0.0003197	0.0000132	0.004327
50	0.09277	0.00747	0.41521	0.03175	0.00481	0.13090	0.0003085	0.0000126	0.004212
55	0.08762	0.00651	0.40984	0.02953	0.00426	0.12618	0.0002608	0.0000102	0.003704
60	0.08312	0.00573	0.40503	0.02762	0.00381	0.12199	0.0002233	0.0000084	0.00329
65	0.07913	0.00508	0.40068	0.02596	0.00343	0.11823	0.0001933	0.000007	0.002946
70	0.07556	0.00454	0.39672	0.02449	0.00311	0.11483	0.0001689	0.0000059	0.002657
75	0.07236	0.00408	0.39308	0.02319	0.00283	0.11173	0.0001488	0.000005	0.002412
80	0.06945	0.00369	0.38972	0.02203	0.00260	0.10890	0.0001321	0.0000043	0.002201
85	0.06681	0.00335	0.38660	0.02098	0.00239	0.10628	0.000118	0.0000038	0.002018
90	0.06439	0.00305	0.38369	0.02003	0.00221	0.10386	0.000106	0.0000033	0.001859
95	0.06216	0.00280	0.38096	0.01916	0.00205	0.10161	0.0000957	0.0000029	0.001719
100	0.06010	0.00257	0.37840	0.01837	0.00191	0.09952	0.0000868	0.0000026	0.001595
110	0.05642	0.00219	0.37371	0.01698	0.00167	0.09571	0.0000724	0.000002	0.001386
120	0.05322	0.00189	0.36950	0.01578	0.00147	0.09234	0.0000611	0.0000016	0.001217
130	0.05040	0.00165	0.36568	0.01475	0.00131	0.08932	0.0000523	0.0000014	0.001079
140	0.04790	0.00145	0.36219	0.01384	0.00118	0.08659	0.0000452	0.0000011	0.000965
150	0.04566	0.00128	0.35898	0.01305	0.00106	0.08411	0.0000394	0.000001	0.000868
160	0.04364	0.00114	0.35601	0.01233	0.00097	0.08185	0.0000346	0.0000008	0.000786
170	0.04181	0.00102	0.35325	0.01170	0.00088	0.07976	0.0000307	0.0000007	0.000715
180	0.04015	0.00092	0.35068	0.01112	0.00081	0.07784	0.0000273	0.0000006	0.000654
190	0.03862	0.00083	0.34826	0.01060	0.00075	0.07605	0.0000245	0.0000005	0.0006
200	0.03722	0.00076	0.34599	0.01013	0.00069	0.07439	0.000022	0.0000005	0.000553

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	SObo			Sp			Spsq*		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
210	0.03592	0.00069	0.34384	0.00970	0.00064	0.07283	0.0000199	0.0000004	0.000512
220	0.03472	0.00063	0.34181	0.00930	0.00060	0.07137	0.0000181	0.0000004	0.000475
230	0.03360	0.00058	0.33989	0.00893	0.00056	0.07000	0.0000165	0.0000003	0.000442
240	0.03256	0.00054	0.33806	0.00859	0.00052	0.06871	0.0000151	0.0000003	0.000413
250	0.03159	0.00050	0.33631	0.00828	0.00049	0.06749	0.0000139	0.0000003	0.000386
260	0.03067	0.00046	0.33465	0.00798	0.00046	0.06633	0.0000128	0.0000002	0.000362
270	0.02981	0.00043	0.33305	0.00771	0.00043	0.06523	0.0000118	0.0000002	0.000341
280	0.02901	0.00040	0.33153	0.00745	0.00041	0.06418	0.0000109	0.0000002	0.000321
290	0.02824	0.00037	0.33006	0.00721	0.00038	0.06319	0.0000101	0.0000002	0.000303
300	0.02752	0.00035	0.32865	0.00699	0.00036	0.06224	0.0000094	0.0000002	0.000286

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	Spss			Ssqd			St		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
1	0.10803	0.01801	0.35292	0.33125	0.15099	0.56326	0.26746	0.12567	0.46258
2	0.05713	0.00474	0.28624	0.22783	0.08919	0.44186	0.16133	0.05813	0.34187
3	0.03757	0.00185	0.25586	0.17694	0.06207	0.37577	0.11419	0.03347	0.28195
4	0.02733	0.00088	0.23708	0.14558	0.04675	0.33218	0.08731	0.02158	0.24424
5	0.02109	0.00048	0.22379	0.12400	0.03693	0.30050	0.06996	0.01493	0.21764
6	0.01693	0.00028	0.21367	0.10811	0.03014	0.27607	0.05786	0.01085	0.19756
7	0.01398	0.00018	0.20555	0.09586	0.02519	0.25646	0.04896	0.00817	0.18170
8	0.01179	0.00012	0.19883	0.08611	0.02145	0.24025	0.04218	0.00634	0.16875
9	0.01012	0.00008	0.19313	0.07814	0.01852	0.22656	0.03684	0.00502	0.15793
10	0.00880	0.00006	0.18819	0.07149	0.01619	0.21479	0.03255	0.00406	0.14871
11	0.00774	0.00004	0.18384	0.06586	0.01429	0.20452	0.02903	0.00333	0.14073
12	0.00687	0.00003	0.17998	0.06103	0.01273	0.19547	0.02610	0.00277	0.13374
13	0.00615	0.00002	0.17650	0.05683	0.01141	0.18740	0.02362	0.00233	0.12756
14	0.00554	0.00002	0.17335	0.05315	0.01030	0.18016	0.02151	0.00198	0.12203
15	0.00502	0.00001	0.17047	0.04990	0.00934	0.17360	0.01969	0.00169	0.11705
16	0.00458	0.00001	0.16783	0.04700	0.00852	0.16763	0.01811	0.00146	0.11255
17	0.00419	0.00001	0.16538	0.04440	0.00781	0.16217	0.01672	0.00127	0.10844
18	0.00386	0.00001	0.16311	0.04206	0.00718	0.15714	0.01550	0.00111	0.10468
19	0.00356	0.00001	0.16100	0.03994	0.00662	0.15250	0.01442	0.00098	0.10121
20	0.00330	0.00000	0.15902	0.03800	0.00613	0.14819	0.01345	0.00087	0.09801
21	0.00307	0.00000	0.15716	0.03624	0.00570	0.14418	0.01258	0.00077	0.09504
22	0.00286	0.00000	0.15540	0.03462	0.00530	0.14044	0.01180	0.00069	0.09228
23	0.00267	0.00000	0.15375	0.03312	0.00495	0.13693	0.01109	0.00061	0.08970
24	0.00251	0.00000	0.15218	0.03174	0.00463	0.13364	0.01044	0.00055	0.08728
25	0.00235	0.00000	0.15069	0.03047	0.00434	0.13054	0.00986	0.00050	0.08502
26	0.00221	0.00000	0.14927	0.02928	0.00408	0.12761	0.00932	0.00045	0.08288
27	0.00209	0.00000	0.14792	0.02817	0.00384	0.12485	0.00883	0.00041	0.08087
28	0.00197	0.00000	0.14663	0.02714	0.00362	0.12223	0.00838	0.00037	0.07897
29	0.00187	0.00000	0.14540	0.02617	0.00342	0.11974	0.00796	0.00034	0.07717
30	**0.00177**	**0.00000**	**0.14422**	**0.02527**	**0.00324**	**0.11738**	**0.00758**	**0.00031**	**0.07546**
31	0.00168	0.00000	0.14308	0.02442	0.00307	0.11513	0.00722	0.00029	0.07384
32	0.00160	0.00000	0.14199	0.02362	0.00291	0.11298	0.00689	0.00026	0.07230
33	0.00152	0.00000	0.14094	0.02286	0.00277	0.11093	0.00658	0.00024	0.07083
34	0.00145	0.00000	0.13993	0.02215	0.00263	0.10897	0.00630	0.00022	0.06942
35	0.00138	0.00000	0.13896	0.02147	0.00251	0.10709	0.00603	0.00021	0.06808

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	Spss			Ssqd			St		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
36	0.00132	0.00000	0.13802	0.02083	0.00239	0.10529	0.00578	0.00019	0.06680
37	0.00126	0.00000	0.13711	0.02023	0.00228	0.10357	0.00554	0.00018	0.06557
38	0.00121	0.00000	0.13623	0.01965	0.00218	0.10191	0.00532	0.00017	0.06439
39	0.00116	0.00000	0.13538	0.01911	0.00208	0.10031	0.00511	0.00015	0.06326
40	0.00111	0.00000	0.13456	0.01859	0.00199	0.09878	0.00492	0.00014	0.06218
41	0.00107	0.00000	0.13376	0.01809	0.00191	0.09730	0.00473	0.00013	0.06113
42	0.00103	0.00000	0.13299	0.01762	0.00183	0.09587	0.00456	0.00013	0.06013
43	0.00099	0.00000	0.13223	0.01717	0.00176	0.09450	0.00440	0.00012	0.05916
44	0.00095	0.00000	0.13150	0.01673	0.00169	0.09317	0.00424	0.00011	0.05822
45	0.00091	0.00000	0.13079	0.01632	0.00162	0.09189	0.00409	0.00010	0.05732
46	0.00088	0.00000	0.13010	0.01592	0.00156	0.09064	0.00396	0.00010	0.05645
47	0.00085	0.00000	0.12943	0.01555	0.00150	0.08944	0.00382	0.00009	0.05561
48	0.00082	0.00000	0.12877	0.01518	0.00145	0.08828	0.00370	0.00009	0.05480
49	0.00079	0.00000	0.12813	0.01483	0.00139	0.08715	0.00358	0.00008	0.05401
50	0.00077	0.00000	0.12751	0.01450	0.00134	0.08606	0.00347	0.00008	0.05325
55	0.00065	0.00000	0.12460	0.01300	0.00113	0.08105	0.00297	0.00006	0.04978
60	0.00056	0.00000	0.12200	0.01176	0.00096	0.07668	0.00258	0.00005	0.04677
65	0.00049	0.00000	0.11966	0.01070	0.00083	0.07284	0.00226	0.00004	0.04414
70	0.00043	0.00000	0.11753	0.00980	0.00072	0.06943	0.00199	0.00003	0.04182
75	0.00038	0.00000	0.11557	0.00902	0.00063	0.06637	0.00177	0.00002	0.03975
80	0.00034	0.00000	0.11377	0.00835	0.00055	0.06362	0.00159	0.00002	0.03789
85	0.00030	0.00000	0.11210	0.00775	0.00049	0.06111	0.00143	0.00002	0.03622
90	0.00027	0.00000	0.11055	0.00722	0.00044	0.05883	0.00130	0.00001	0.03469
95	0.00025	0.00000	0.10910	0.00675	0.00039	0.05674	0.00118	0.00001	0.03330
100	0.00022	0.00000	0.10774	0.00633	0.00035	0.05481	0.00108	0.00001	0.03203
110	0.00019	0.00000	0.10525	0.00561	0.00029	0.05137	0.00091	0.00001	0.02977
120	0.00016	0.00000	0.10303	0.00502	0.00024	0.04839	0.00077	0.00001	0.02783
130	0.00014	0.00000	0.10102	0.00452	0.00021	0.04578	0.00067	0.00000	0.02614
140	0.00012	0.00000	0.09919	0.00410	0.00018	0.04348	0.00058	0.00000	0.02465
150	0.00010	0.00000	0.09752	0.00375	0.00015	0.04142	0.00051	0.00000	0.02333
160	0.00009	0.00000	0.09597	0.00344	0.00013	0.03957	0.00045	0.00000	0.02216
170	0.00008	0.00000	0.09454	0.00317	0.00012	0.03789	0.00040	0.00000	0.02110
180	0.00007	0.00000	0.09321	0.00293	0.00010	0.03637	0.00036	0.00000	0.02014
190	0.00007	0.00000	0.09196	0.00272	0.00009	0.03498	0.00033	0.00000	0.01927
200	0.00006	0.00000	0.09080	0.00253	0.00008	0.03370	0.00029	0.00000	0.01847

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	Spss			Ssqd			St		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
210	0.00005	0.00000	0.08970	0.00237	0.00007	0.03253	0.00027	0.00000	0.01774
220	0.00005	0.00000	0.08866	0.00222	0.00006	0.03144	0.00024	0.00000	0.01707
230	0.00004	0.00000	0.08768	0.00209	0.00006	0.03043	0.00022	0.00000	0.01645
240	0.00004	0.00000	0.08675	0.00196	0.00005	0.02948	0.00021	0.00000	0.01587
250	0.00004	0.00000	0.08587	0.00185	0.00005	0.02860	0.00019	0.00000	0.01533
260	0.00003	0.00000	0.08503	0.00175	0.00004	0.02778	0.00017	0.00000	0.01483
270	0.00003	0.00000	0.08422	0.00166	0.00004	0.02701	0.00016	0.00000	0.01436
280	0.00003	0.00000	0.08346	0.00157	0.00004	0.02628	0.00015	0.00000	0.01393
290	0.00003	0.00000	0.08272	0.00150	0.00003	0.02559	0.00014	0.00000	0.01351
300	0.00003	0.00000	0.08202	0.00142	0.00003	0.02495	0.00013	0.00000	0.01313

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	SZtb			Zpg			Zsg		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
1	0.0700933	0.0257274	0.158045	0.49898	0.26915	0.72915	0.92117	0.78082	0.97987
2	0.0383324	0.0105027	0.108813	0.38066	0.18437	0.61461	0.80805	0.63687	0.91795
3	0.026002	0.0058299	0.086296	0.31565	0.14087	0.54642	0.71006	0.53474	0.84611
4	0.0194307	0.0037291	0.072746	0.27262	0.11357	0.49918	0.62873	0.45674	0.77806
5	0.0153589	0.002593	0.063483	0.24138	0.09466	0.46369	0.56117	0.39469	0.71735
6	0.0125982	0.001906	0.05666	0.21738	0.08075	0.43561	0.50451	0.34407	0.66421
7	0.01061	0.0014581	0.051377	0.19820	0.07007	0.41260	0.45649	0.30207	0.61787
8	0.0091146	0.0011495	0.047139	0.18245	0.06163	0.39324	0.41537	0.26677	0.57735
9	0.0079521	0.0009279	0.043648	0.16922	0.05478	0.37663	0.37985	0.23682	0.54174
10	0.0070249	0.0007635	0.040712	0.15792	0.04913	0.36215	0.34890	0.21119	0.51024
11	0.0062697	0.0006382	0.038202	0.14814	0.04439	0.34936	0.32173	0.18912	0.48222
12	0.005644	0.0005406	0.036025	0.13957	0.04037	0.33795	0.29773	0.17000	0.45712
13	0.005118	0.0004631	0.034117	0.13199	0.03691	0.32767	0.27641	0.15334	0.43452
14	0.0046704	0.0004006	0.032428	0.12523	0.03391	0.31835	0.25735	0.13875	0.41406
15	0.0042854	0.0003495	0.030919	0.11916	0.03129	0.30984	0.24025	0.12593	0.39545
16	0.0039512	0.0003072	0.029563	0.11367	0.02899	0.30202	0.22483	0.11461	0.37843
17	0.0036588	0.0002719	0.028336	0.10868	0.02694	0.29480	0.21087	0.10458	0.36282
18	0.003401	0.000242	0.027219	0.10412	0.02512	0.28811	0.19818	0.09566	0.34843
19	0.0031723	0.0002166	0.026197	0.09994	0.02349	0.28188	0.18662	0.08770	0.33513
20	0.0029683	0.0001948	0.025258	0.09608	0.02201	0.27606	0.17604	0.08058	0.32280
21	0.0027852	0.000176	0.024392	0.09252	0.02068	0.27060	0.16634	0.07418	0.31132
22	0.0026202	0.0001597	0.023591	0.08921	0.01948	0.26548	0.15742	0.06843	0.30062
23	0.0024709	0.0001454	0.022846	0.08614	0.01838	0.26064	0.14920	0.06324	0.29061
24	0.0023352	0.0001328	0.022152	0.08327	0.01737	0.25607	0.14160	0.05854	0.28123
25	0.0022114	0.0001217	0.021504	0.08058	0.01645	0.25175	0.13456	0.05428	0.27241
26	0.002098	0.0001119	0.020897	0.07807	0.01560	0.24764	0.12802	0.05041	0.26411
27	0.001994	0.0001032	0.020326	0.07570	0.01482	0.24374	0.12195	0.04689	0.25629
28	0.0018982	0.0000953	0.019789	0.07347	0.01410	0.24002	0.11629	0.04367	0.24890
29	0.0018097	0.0000883	0.019283	0.07137	0.01343	0.23647	0.11100	0.04073	0.24190
30	**0.0017279**	**0.000082**	**0.018805**	**0.06939**	**0.01281**	**0.23308**	**0.10606**	**0.03804**	**0.23527**
31	0.0016519	0.0000763	0.018352	0.06751	0.01223	0.22984	0.10144	0.03557	0.22897
32	0.0015812	0.0000711	0.017922	0.06572	0.01169	0.22673	0.09711	0.03331	0.22299
33	0.0015154	0.0000664	0.017515	0.06403	0.01119	0.22375	0.09304	0.03122	0.21729
34	0.0014539	0.0000621	0.017127	0.06242	0.01072	0.22088	0.08921	0.02929	0.21186
35	0.0013964	0.0000582	0.016757	0.06089	0.01027	0.21813	0.08561	0.02751	0.20668

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	SZtb			Zpg			Zsg		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
36	0.0013426	0.0000547	0.016405	0.05943	0.00986	0.21547	0.08221	0.02587	0.20173
37	0.001292	0.0000514	0.016068	0.05803	0.00947	0.21292	0.07900	0.02435	0.19700
38	0.0012444	0.0000484	0.015746	0.05670	0.00911	0.21045	0.07598	0.02294	0.19247
39	0.0011997	0.0000456	0.015438	0.05543	0.00876	0.20807	0.07311	0.02163	0.18813
40	0.0011574	0.000043	0.015143	0.05421	0.00843	0.20577	0.07040	0.02042	0.18396
41	0.0011176	0.0000407	0.01486	0.05304	0.00813	0.20354	0.06784	0.01929	0.17997
42	0.0010799	0.0000385	0.014589	0.05191	0.00784	0.20139	0.06540	0.01823	0.17613
43	0.0010442	0.0000365	0.014327	0.05084	0.00756	0.19930	0.06309	0.01725	0.17244
44	0.0010104	0.0000346	0.014076	0.04980	0.00730	0.19728	0.06089	0.01634	0.16889
45	0.0009784	0.0000328	0.013834	0.04881	0.00705	0.19531	0.05880	0.01548	0.16547
46	0.0009479	0.0000312	0.013601	0.04785	0.00682	0.19341	0.05681	0.01468	0.16217
47	0.000919	0.0000297	0.013377	0.04692	0.00659	0.19156	0.05492	0.01393	0.15899
48	0.0008914	0.0000283	0.01316	0.04603	0.00638	0.18976	0.05311	0.01323	0.15593
49	0.0008652	0.0000269	0.012951	0.04518	0.00618	0.18801	0.05139	0.01257	0.15296
50	0.0008401	0.0000257	0.012749	0.04435	0.00598	0.18631	0.04974	0.01195	0.15010
55	0.0007308	0.0000205	0.011832	0.04060	0.00514	0.17845	0.04254	0.00937	0.13714
60	0.0006426	0.0000166	0.011046	0.03741	0.00446	0.17149	0.03673	0.00745	0.12606
65	0.0005702	0.0000137	0.010364	0.03466	0.00391	0.16528	0.03197	0.00600	0.11648
70	0.00051	0.0000114	0.009766	0.03226	0.00345	0.15969	0.02803	0.00488	0.10812
75	0.0004593	0.0000097	0.009237	0.03016	0.00307	0.15462	0.02473	0.00400	0.10076
80	0.0004162	0.0000082	0.008766	0.02829	0.00275	0.14999	0.02195	0.00332	0.09423
85	0.0003791	0.0000071	0.008342	0.02663	0.00247	0.14575	0.01958	0.00277	0.08841
90	0.0003469	0.0000061	0.00796	0.02513	0.00223	0.14183	0.01755	0.00233	0.08318
95	0.0003189	0.0000053	0.007613	0.02378	0.00203	0.13820	0.01580	0.00197	0.07846
100	0.0002942	0.0000047	0.007296	0.02256	0.00185	0.13483	0.01428	0.00167	0.07419
110	0.0002531	0.0000037	0.006738	0.02043	0.00155	0.12873	0.01178	0.00123	0.06674
120	0.0002203	0.0000029	0.006262	0.01864	0.00132	0.12336	0.00985	0.00092	0.06048
130	0.0001936	0.0000024	0.005851	0.01711	0.00113	0.11857	0.00831	0.00070	0.05515
140	0.0001717	0.0000019	0.005492	0.01579	0.00098	0.11428	0.00709	0.00055	0.05057
150	0.0001533	0.0000016	0.005176	0.01464	0.00086	0.11040	0.00609	0.00043	0.04659
160	0.0001379	0.0000014	0.004896	0.01363	0.00076	0.10686	0.00528	0.00034	0.04310
170	0.0001247	0.0000012	0.004644	0.01274	0.00067	0.10362	0.00460	0.00027	0.04002
180	0.0001133	0.000001	0.004418	0.01195	0.00060	0.10064	0.00403	0.00022	0.03730
190	0.0001035	0.0000009	0.004214	0.01123	0.00054	0.09788	0.00355	0.00018	0.03486
200	0.0000949	0.0000007	0.004027	0.01059	0.00048	0.09533	0.00315	0.00015	0.03267

Appendix 5. Probability of uranium exceeding a given concentration, by bedrock unit.—Continued

[Probabilities with bold typeface apply to concentrations at the U.S. Environmental Protection Agency drinking-water standard for public supplies. Multiply probability values by 100 to obtain percent probability; *, fewer than five analyses were above the analytical reporting limit and the option to assume a common scale was used in the distribution fitting]

Uranium, in micrograms per liter	Bedrock unit abbreviation								
	SZtb			Zpg			Zsg		
	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound	Probability of concentration being greater than concentration listed in first column	Lower 95-percent confidence bound	Upper 95-percent confidence bound
210	0.0000874	0.0000006	0.003857	0.01001	0.00044	0.09295	0.00280	0.00012	0.03070
220	0.0000807	0.0000006	0.003701	0.00949	0.00040	0.09072	0.00251	0.00010	0.02892
230	0.0000748	0.0000005	0.003557	0.00901	0.00036	0.08863	0.00225	0.00009	0.02730
240	0.0000695	0.0000004	0.003424	0.00857	0.00033	0.08667	0.00202	0.00007	0.02582
250	0.0000648	0.0000004	0.0033	0.00816	0.00030	0.08483	0.00183	0.00006	0.02446
260	0.0000605	0.0000004	0.003186	0.00779	0.00028	0.08308	0.00166	0.00005	0.02322
270	0.0000567	0.0000003	0.003079	0.00745	0.00026	0.08143	0.00151	0.00004	0.02207
280	0.0000532	0.0000003	0.002979	0.00713	0.00024	0.07987	0.00137	0.00004	0.02102
290	0.00005	0.0000003	0.002885	0.00683	0.00022	0.07838	0.00125	0.00003	0.02004
300	0.0000471	0.0000002	0.002797	0.00655	0.00020	0.07697	0.00115	0.00003	0.01913

Appendix 6. Uranium Log-Normal Fit Statistics by Bedrock Unit

Appendix 6. Uranium log-normal fit statistics by bedrock unit.

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
Dcgr					Dfgr				
Censoring information	Count				Censoring information	Count			
Uncensored value	7				Uncensored value	8			
Left censored value	0				Left censored value	0			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	2.31035	0.548184	1.23593	3.38477	Location	0.872357	0.890096	-0.872199	2.61691
Scale	1.35299	0.49093	0.664417	2.75519	Scale	2.33772	0.529608	1.49953	3.64445
Log-likelihood	-29.247				Log-likelihood	-32.057			
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	3.306				Anderson-Darling (adjusted)	2.951			
Correlation coefficien	0.957				Correlation coefficien	0.973			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	25.1698	17.4269	6.47937	97.7751	Mean	36.7756	45.1462	3.31599	407.855
Standard deviation	57.6032	78.2128	4.02436	824.511	Standard deviation	564.077	1.30×10^3	6.16399	5.16×10^4
Median	10.0779	5.52457	3.44157	29.5112	Median	2.39254	2.12959	0.418031	13.6934
First quartile (Q1)	4.04616	2.97585	0.957207	17.1033	First quartile (Q1)	0.494398	0.531543	0.0601067	4.06659
Third quartile (Q3)	25.1016	13.2678	8.90814	70.7318	Third quartile (Q3)	11.5782	9.57458	2.28952	58.5518
Interquartile range (IQR)	21.0554	12.088	6.83416	64.8697	Interquartile range (IQR)	11.0838	9.18399	2.1847	56.2328

Appendix 6. Uranium log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
DI					DSw				
Censoring information	Count				Censoring information	Count			
Uncensored value	9				Uncensored value	8			
Left censored value	0				Left censored value	0			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	-1.42001	0.492276	-2.38486	-0.455172	Location	-0.82093	0.518637	-1.83744	0.19558
Scale	1.4107	0.415304	0.792216	2.51203	Scale	1.40474	0.552648	0.64971	3.0372
Log-likelihood	-4.421				Log-likelihood	-32.057			
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	2.64				Anderson-Darling (adjusted)	2.878			
Correlation coefficien	0.982				Correlation coefficien	0.989			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	0.653782	0.421119	0.184991	2.31055	Mean	1.18024	0.943965	0.246135	5.65936
Standard deviation	1.64306	1.99408	0.152267	17.7297	Standard deviation	2.93744	4.72115	0.12586	68.5566
Median	0.24171	0.118988	0.0921021	0.634339	Median	0.440022	0.228212	0.159225	1.21602
First quartile (Q1)	0.0933392	0.0592101	0.0269216	0.323614	First quartile (Q1)	0.170604	0.122943	0.0415511	0.700477
Third quartile (Q3)	0.625932	0.306129	0.240006	1.63242	Third quartile (Q3)	1.13491	0.618028	0.390328	3.29984
Interquartile range (IQR)	0.532592	0.279416	0.19047	1.48924	Interquartile range (IQR)	0.964306	0.588827	0.291375	3.19138

Appendix 6. Uranium log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
Ops*					OZf				
Censoring information	Count				Censoring information	Count			
Uncensored value	3				Uncensored value	8			
Left censored value	7				Left censored value	0			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	-4.59511	0.651571	-5.87217	-3.31806	Location	-0.861046	0.430412	-1.70464	-0.0174541
Scale	1.70447	0.0790912	1.55629	1.86675	Scale	1.14421	0.3512	0.626965	2.0882
Log-likelihood	-7.89				Log-likelihood	-6.792			
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	1.393				Anderson-Darling (adjusted)	2.89			
Correlation coefficien	0.86				Correlation coefficien	0.986			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	0.0431743	0.0280004	0.0121111	0.15391	Mean	0.813481	0.388955	0.318682	2.07653
Standard deviation	0.179415	0.121157	0.0477589	0.674006	Standard deviation	1.3375	1.20545	0.228632	7.82445
Median	0.0101011	0.0065816	0.0028168	0.0362231	Median	0.42272	0.181944	0.181838	0.982697
First quartile (Q1)	0.0031995	0.002113	0.0008769	0.0116741	First quartile (Q1)	0.195381	0.108958	0.0654924	0.58287
Third quartile (Q3)	0.0318898	0.0206335	0.0089723	0.113345	Third quartile (Q3)	0.914585	0.379014	0.405954	2.0605
Interquartile range (IQR)	0.0286903	0.0185514	0.0080787	0.101889	Interquartile range (IQR)	0.719205	0.330712	0.292041	1.77117

Appendix 6. Uranium log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
OZm					OZn				
Censoring information	Count				Censoring information	Count			
Uncensored value	10				Uncensored value	30			
Left censored value	0				Left censored value	1			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	-0.655272	0.788995	-2.20167	0.89113	Location	0.0159391	0.258203	-0.490129	0.522007
Scale	2.41324	0.682883	1.3859	4.20212	Scale	1.42905	0.185068	1.1087	1.84197
Log-likelihood	-18.878				Log-likelihood	-62.614			
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	2.451				Anderson-Darling (adjusted)	1.108			
Correlation coefficien	0.977				Correlation coefficien	0.973			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	9.55049	15.6289	0.386439	236.032	Mean	2.82083	0.990952	1.41694	5.61568
Standard deviation	175.384	559.999	0.33582	9.16×10^4	Standard deviation	7.30561	4.39151	2.24898	23.7315
Median	0.519301	0.409726	0.110618	2.43788	Median	1.01607	0.262351	0.612547	1.68541
First quartile (Q1)	0.10198	0.102956	0.0140984	0.737666	First quartile (Q1)	0.387538	0.115277	0.21633	0.694244
Third quartile (Q3)	2.64437	2.13213	0.544513	12.8421	Third quartile (Q3)	2.66398	0.734496	1.55182	4.57318
Interquartile range (IQR)	2.54239	2.08213	0.51067	12.6574	Interquartile range (IQR)	2.27644	0.668797	1.27991	4.04884

Appendix 6. Uranium log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
OZnb					Ph				
Censoring information	Count				Censoring information	Count			
Uncensored value	14				Uncensored value	8			
Left censored value	6				Left censored value	1			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	-1.75943	0.483527	-2.70713	-0.811735	Location	-1.75943	0.483527	-2.70713	-0.811735
Scale	2.1023	0.305023	1.58196	2.7938	Scale	2.1023	0.305023	1.58196	2.7938
Log-likelihood	-34.212				Log-likelihood	-25.95			
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	1.676				Anderson-Darling (adjusted)	2.642			
Correlation coefficien	0.857				Correlation coefficien	0.896			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	1.56895	1.24124	0.332813	7.39637	Mean	91.6336	231.335	0.650347	1.29×10^4
Standard deviation	14.2135	19.3858	0.981158	205.902	Standard deviation	1.04×10^4	5.03×10^4	0.801103	1.35×10^8
Median	0.172143	0.0832357	0.0667283	0.444087	Median	0.806891	0.840909	0.104647	6.2216
First quartile (Q1)	0.0416934	0.0221509	0.0147177	0.118112	First quartile (Q1)	0.101305	0.123643	0.0092627	1.10796
Third quartile (Q3)	0.71074	0.369306	0.256697	1.96789	Third quartile (Q3)	6.42687	7.16985	0.721764	57.2274
Interquartile range (IQR)	0.669046	0.354301	0.236969	1.88895	Interquartile range (IQR)	6.32557	7.09744	0.701505	57.0385

Appendix 6. Uranium log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
Sacgr					Sagr				
Censoring information	Count				Censoring information	Count			
Uncensored value	53				Uncensored value	10			
Left censored value	0				Left censored value	1			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	0.936261	0.246092	0.45393	1.41859	Location	0.494757	0.780732	-1.03545	2.02496
Scale	1.79023	0.178323	1.47273	2.17619	Scale	2.5312	0.64904	1.53131	4.18396
Log-likelihood	-157.38				Log-likelihood	-36.858			
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	1.382				Anderson-Darling (adjusted)	2.278			
Correlation coefficien	0.959				Correlation coefficien	0.969			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	12.6636	5.00803	5.83356	27.4903	Mean	40.3759	68.0789	1.48213	1.10×10^3
Standard deviation	61.5898	42.368	15.9942	237.167	Standard deviation	993.15	3.22×10^3	1.7375	5.68×10^4
Median	2.55043	0.62764	1.57449	4.1313	Median	1.6401	1.28048	0.355067	7.57584
First quartile (Q1)	0.762438	0.212005	0.442097	1.3149	First quartile (Q1)	0.29745	0.286112	0.0451501	1.95961
Third quartile (Q3)	8.53142	2.3009	5.02868	14.474	Third quartile (Q3)	9.04329	7.44166	1.80251	45.3706
Interquartile range (IQR)	7.76898	2.17703	4.4858	13.4551	Interquartile range (IQR)	8.74584	7.29465	1.70545	44.8501

Appendix 6. Uranium log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
Sb					Sbs				
Censoring information	Count				Censoring information	Count			
Uncensored value	16				Uncensored value	12			
Left censored value	0				Left censored value	0			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	-0.202141	0.371811	-0.930878	0.526595	Location	-0.518142	0.27691	-1.06087	0.0245912
Scale	1.46215	0.283057	1.00048	2.13686	Scale	0.930099	0.211768	0.595285	1.45323
Log-likelihood	-27.626				Log-likelihood	-11.145			
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	1.715				Anderson-Darling (adjusted)	2.019			
Correlation coefficien	0.97				Correlation coefficien	0.994			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	2.37929	1.19732	0.88736	6.3796	Mean	0.917962	0.27353	0.511902	1.64612
Standard deviation	6.50789	5.81329	1.13003	37.4792	Standard deviation	1.07649	0.582141	0.372989	3.10685
Median	0.816979	0.303762	0.394208	1.69316	Median	0.595626	0.164935	0.346153	1.0249
First quartile (Q1)	0.304725	0.136503	0.126651	0.733174	First quartile (Q1)	0.31807	0.108532	0.162958	0.620827
Third quartile (Q3)	2.19036	0.844705	1.02861	4.66421	Third quartile (Q3)	1.11539	0.31097	0.645817	1.92637
Interquartile range (IQR)	1.88563	0.772188	0.845045	4.20759	Interquartile range (IQR)	0.797316	0.261822	0.418903	1.51757

Appendix 6. Uranium log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
Se					Sgr				
Censoring information	Count				Censoring information	Count			
Uncensored value	8				Uncensored value	7			
Left censored value	0				Left censored value	0			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	-0.292614	0.287496	-0.856096	0.270868	Location	-0.822002	0.675265	-2.1455	0.501493
Scale	0.766477	0.228921	0.426849	1.37633	Scale	1.69502	0.788348	0.681216	4.21761
Log-likelihood		-7.605			Log-likelihood		-8.001		
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)		2.986			Anderson-Darling (adjusted)		3.238		
Correlation coefficien		0.963			Correlation coefficien		0.974		
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	1.00113	0.282716	0.57559	1.74128	Mean	1.84882	2.39012	0.146717	23.2976
Standard deviation	0.895135	0.489043	0.306795	2.61174	Standard deviation	7.55348	19.7808	0.0445706	1.28×10^3
Median	0.74631	0.214561	0.424817	1.3111	Median	0.439551	0.296813	0.11701	1.65118
First quartile (Q1)	0.445038	0.164209	0.215935	0.917215	First quartile (Q1)	0.140117	0.137691	0.0204188	0.961507
Third quartile (Q3)	1.25153	0.346937	0.726907	2.15478	Third quartile (Q3)	1.37888	0.986436	0.339304	5.60359
Interquartile range (IQR)	0.806491	0.286032	0.402448	1.61618	Interquartile range (IQR)	1.23877	0.961806	0.270456	5.6739

Appendix 6. Uranium log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
So					SOagr				
Censoring information	Count				Censoring information	Count			
Uncensored value	12				Uncensored value	10			
Left censored value	2				Left censored value	2			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	-0.910549	0.544193	-1.97715	0.156049	Location	-1.84542	0.919828	-3.64825	-0.0425933
Scale	1.99838	0.413305	1.3324	2.99726	Scale	3.01868	0.795339	1.80115	5.05924
Log-likelihood	-25.899				Log-likelihood	-19.087			
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	1.719				Anderson-Darling (adjusted)	2.108			
Correlation coefficien	0.968				Correlation coefficien	0.969			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	2.96306	2.75646	0.478508	18.3481	Mean	15.0412	35.1856	0.153493	1.47×10^3
Standard deviation	21.6215	36.4911	0.791215	590.851	Standard deviation	1.43×10^3	6.66×10^3	0.157509	1.30×10^7
Median	0.402303	0.218931	0.138464	1.16888	Median	0.157959	0.145295	0.0260366	0.958301
First quartile (Q1)	0.104513	0.0670819	0.029705	0.367718	First quartile (Q1)	0.02062	0.0242945	0.0020484	0.207574
Third quartile (Q3)	1.54858	0.897307	0.497413	4.82117	Third quartile (Q3)	1.21003	1.13483	0.192528	7.60502
Interquartile range (IQR)	1.44407	0.859624	0.449662	4.63757	Interquartile range (IQR)	1.18941	1.12275	0.186997	7.56538

Appendix 6. Uranium log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
SObo					Sp				
Censoring information	Count				Censoring information	Count			
Uncensored value	6				Uncensored value	17			
Left censored value	1				Left censored value	5			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	-0.077395	1.18885	-2.40749	2.2527	Location	-1.60967	0.664053	-2.91119	-0.308154
Scale	3.01338	1.16867	1.40908	6.44427	Scale	2.9756	0.556342	2.06266	4.29262
Log-likelihood		-21.941			Log-likelihood		-41.869		
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)		3.218			Anderson-Darling (adjusted)		1.409		
Correlation coefficien		0.982			Correlation coefficien		0.984		
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	86.7332	297.632	0.104044	7.23×10^4	Mean	16.7339	27.7695	0.647216	432.658
Standard deviation	8.13×10^3	5.57×10^4	0.0119581	5.52×10^9	Standard deviation	1.40×10^3	4.55×10^3	2.40745	8.14×10^5
Median	0.925524	1.10031	0.0900407	9.51342	Median	0.199953	0.132779	0.0544107	0.734802
First quartile (Q1)	0.121251	0.191379	0.0054977	2.67421	First quartile (Q1)	0.0268715	0.0221378	0.0053461	0.135066
Third quartile (Q3)	7.06462	8.87495	0.602233	82.8731	Third quartile (Q3)	1.48786	1.03601	0.380072	5.82452
Interquartile range (IQR)	6.94337	8.80026	0.579067	83.2552	Interquartile range (IQR)	1.46099	1.0246	0.36957	5.77562

Appendix 6. Uranium log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
Spsq*					Spss				
Censoring information	Count				Censoring information	Count			
Uncensored value	4				Uncensored value	7			
Left censored value	5				Left censored value	0			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	-3.26786	0.765784	-4.76876	-1.76695	Location	-2.5205	0.796308	-4.08124	-0.959767
Scale	2.09694	0.118607	1.87689	2.34278	Scale	2.09694	0.118607	1.87689	2.34278
Log-likelihood	-11.6				Log-likelihood	-1.372			
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	1.645				Anderson-Darling (adjusted)	2.819			
Correlation coefficien	0.948				Correlation coefficien	0.998			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	0.343254	0.271361	0.0728944	1.61635	Mean	0.724747	0.587722	0.147883	3.55185
Standard deviation	3.07434	2.73261	0.538474	17.5525	Standard deviation	6.49117	5.83285	1.11544	37.7744
Median	0.038088	0.0291672	0.0084909	0.170854	Median	0.0804192	0.0640385	0.0168866	0.382982
First quartile (Q1)	0.0092585	0.0071735	0.0020278	0.0422721	First quartile (Q1)	0.0195484	0.0157948	0.0040119	0.0952511
Third quartile (Q3)	0.156689	0.119878	0.0349793	0.701883	Third quartile (Q3)	0.330833	0.262209	0.0699794	1.56404
Interquartile range (IQR)	0.14743	0.112868	0.0328802	0.661059	Interquartile range (IQR)	0.311285	0.246747	0.0658315	1.47191

Appendix 6. Uranium log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
Ssqd					St				
Censoring information	Count				Censoring information	Count			
Uncensored value	10				Uncensored value	14			
Left censored value	1				Left censored value	1			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	-0.977338	0.709125	-2.3672	0.412522	Location	-1.16725	0.499365	-2.14599	-0.188511
Scale	2.23919	0.386238	1.59686	3.13989	Scale	1.88108	0.379981	1.26609	2.7948
Log-likelihood	-26.615				Log-likelihood	-20.191			
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	2.275				Anderson-Darling (adjusted)	1.712			
Correlation coefficien	0.975				Correlation coefficien	0.985			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	4.61653	4.38346	0.717942	29.6854	Mean	1.82574	1.42605	0.394987	8.43907
Standard deviation	56.4465	94.6883	2.10744	1.51×10^3	Standard deviation	10.5537	15.1096	0.637893	174.606
Median	0.376312	0.266852	0.093743	1.51062	Median	0.311222	0.155413	0.116953	0.828192
First quartile (Q1)	0.0831052	0.0683251	0.0165887	0.416337	First quartile (Q1)	0.0875086	0.0531504	0.0266105	0.287772
Third quartile (Q3)	1.70399	1.16261	0.447404	6.48982	Third quartile (Q3)	1.10685	0.565689	0.406499	3.01384
Interquartile range (IQR)	1.62088	1.11047	0.423246	6.20742	Interquartile range (IQR)	1.01935	0.535954	0.363726	2.85672

Appendix 6. Uranium log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation									
SZtb					Zpg				
Censoring information	Count				Censoring information	Count			
Uncensored value	21				Uncensored value	10			
Left censored value	12				Left censored value	1			
Distribution	Log normal				Distribution	Log normal			
Parameter estimates					Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI		Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Location	-3.4627	0.477822	-4.39922	-2.52619	Location	-0.005913	0.71992	-1.41693	1.4051
Scale	2.34744	0.380468	1.70857	3.22519	Scale	2.30151	0.483285	1.52501	3.47339
Log-likelihood	-18.676				Log-likelihood	-33.305			
Goodness-of-fit					Goodness-of-fit				
Anderson-Darling (adjusted)	1.832				Anderson-Darling (adjusted)	2.335			
Correlation coefficien	0.966				Correlation coefficien	0.958			
Characteristics of distribution					Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI		Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper				Lower	Upper
Mean	0.492893	0.403814	0.0989431	2.45539	Mean	14.0493	16.4147	1.42277	138.73
Standard deviation	7.73496	12.7591	0.305047	196.133	Standard deviation	198.055	429.793	2.81588	1.39×10^4
Median	0.0313449	0.0149773	0.012287	0.0799632	Median	0.994104	0.715676	0.242457	4.07595
First quartile (Q1)	0.0064348	0.0040499	0.0018742	0.0220932	First quartile (Q1)	0.210502	0.180952	0.0390432	1.13492
Third quartile (Q3)	0.152685	0.0669433	0.064654	0.360577	Third quartile (Q3)	4.6947	3.35313	1.15784	19.0357
Interquartile range (IQR)	0.14625	0.0646419	0.0614992	0.347795	Interquartile range (IQR)	4.4842	3.23448	1.09071	18.4358

Appendix 6. Uranium log-normal fit statistics by bedrock unit.—Continued

[CI, confidence interval; %, percent; *, fewer than five analyses were above the analytical reporting limit and the Minitab option to assume a common scale was used in the distribution fitting]

Bedrock unit abbreviation				
Zsg				
Censoring information	Count			
Uncensored value	23			
Left censored value	0			
Distribution	Log normal			
Parameter estimates				
Parameter	Estimate	Standard error	95% normal CI	
			Lower	Upper
Location	1.80621	0.268843	1.27929	2.33314
Scale	1.2783	0.201315	0.938816	1.74055
Log-likelihood	-81.557			
Goodness-of-fit				
Anderson-Darling (adjusted)	1.276			
Correlation coefficien	0.989			
Characteristics of distribution				
Descriptor	Estimate	Standard error	95% normal CI	
			Lower	Upper
Mean	13.7803	4.78246	6.97989	27.2062
Standard deviation	27.9866	16.9035	8.56714	91.4248
Median	6.08735	1.63654	3.59408	10.3102
First quartile (Q1)	2.57027	0.813775	1.38191	4.78056
Third quartile (Q3)	14.4171	4.10789	8.24788	25.2007
Interquartile range (IQR)	11.8468	3.68061	6.44387	21.7799

Prepared by the Pembroke and the Ft. Lauderdale
Publishing Service Centers

For more information concerning this report, contact:

Director
U.S. Geological Survey
Massachusetts-Rhode Island Water Science Center
10 Bearfoot Road
Northborough, MA 01532
dc_ma@usgs.gov

or visit our Web site at:
http://ma.water.usgs.gov

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APPENDIX K

COPY OF PUBLIC NOTIFICATION LETTERS & LEGAL NOTICE

Environmental & Construction Management Services, Inc.

288 Grove Street, #391
Braintree, Massachusetts 02184

Phone: (617) 338-2121
www.ecmsinc.com

September 17, 2020

Mayor Kassandra Gove
Amesbury City Hall
62 Friend Street
Amesbury, Massachusetts 01913-2884

Re: Release Notification Retraction
Charles C. Cashman Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts 01904
Former MassDEP RTN 3-36397
***ECMS* Project No. 1289.001**

Dear Mayor Gove:

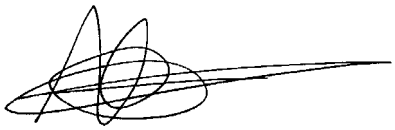
This letter has been prepared by *Environmental & Construction Management Services, Inc. (ECMS)* on behalf of Charles C. Cashman Elementary School pursuant to the requirements of the Massachusetts Contingency Plan (MCP), 310 CMR 40.0000, Section 40.1403 Minimum Public Involvement Activities in Response Actions.

The purpose of this letter is to inform you that Release Notification that was provided to the Commonwealth of Massachusetts Department of Environmental Protection (MassDEP) associated with the detection of arsenic in the soils at the Charles C. Cashman Elementary School has been retracted. The arsenic was determined to be naturally occurring and is therefore outside the scope of the MCP. The MassDEP concurs with the natural origin of the material and requested that a retraction be filed for the site.

Should you have any questions or require additional information or a copy of the entire report documents, please contact the MassDEP, Northeast Regional Office (NERO), Bureau of Waste Site Cleanup in Wilmington, Massachusetts at (978) 694-3220 or obtained if available via MassDEP at http://public.dep.state.ma.us/wsc_viewer.

Sincerely,

*For **Environmental & Construction Management Services, Inc.** by*



Kevin J. Kavanaugh, L.S.P., CHMM
Principal Environmental Engineer

cc: MassDEP Northeast Regional Office – Bureau of Waste Site Cleanup, Wilmington
Chief Kenneth Berkenbush, Interim Health Director Amesbury Board of Health Department
Sharon McDermot, Chair - Amesbury Zoning Board of Appeals

Environmental & Construction Management Services, Inc.

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Braintree, Massachusetts 02184

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www.ecmsinc.com

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Amesbury City Hall
62 Friend Street
Amesbury, Massachusetts 01913-2884

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*For **Environmental & Construction Management Services, Inc.** by*

Kevin J. Kavanaugh, L.S.P., CHMM
Principal Environmental Engineer

cc: MassDEP Northeast Regional Office – Bureau of Waste Site Cleanup, Wilmington
City of Amesbury Mayor Kassandra Gove
Sharon McDermot, Chair - Amesbury Zoning Board of Appeals

Environmental & Construction Management Services, Inc.

288 Grove Street, #391
Braintree, Massachusetts 02184

Phone: (617) 338-2121
www.ecmsinc.com

September 17, 2020

Sharon McDermot, Chair Zoning Board of Appeals
Amesbury City Hall
62 Friend Street
Amesbury, Massachusetts 01913-2884

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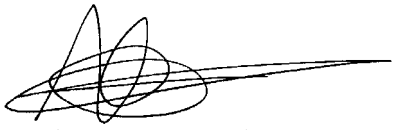
Sincerely,

*For **Environmental & Construction Management Services, Inc.** by*



Kevin J. Kavanaugh, L.S.P., CHMM
Principal Environmental Engineer

cc: MassDEP Northeast Regional Office – Bureau of Waste Site Cleanup, Wilmington
City of Amesbury Mayor Kassandra Gove
Chief Kenneth Berkenbush, Interim Health Director Amesbury Board of Health Department

SECTION 024100

DEMOLITION

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. The Contract Drawings indicate the general extent of the removals and alteration work required to be performed. The Contractor will be held fully responsible for removing all existing materials which would otherwise interfere with the proper installation or function of new work, whether or not such existing materials or conditions have been indicated, such work being performed without additional cost to the Contract, and performing the demolition and removals, work, except where specifically noted to the contrary in the various trade SECTIONS of the Specifications, in which cases the specific trades shall include all costs therefore in their respective bids.

1.02 BACKGROUND INFORMATION AND JOB CONDITIONS

A. The Work detailed in this Section and related Sections involve demolition of the following:

1. Demolition includes disconnection of existing utilities, and removal of all associated materials, equipment and other structures.
2. Existing Little League concession stand, deck, and site amenities.
    a. The existing one-story concession building was constructed in the mid-1990's and consists of concrete slab-on-grade, wood frame walls and roof structure. It is clad in vinyl clapboards and has an asphalt shingle roof and wood deck.
    b. Site amenities to be demolished include, but are not limited to, baseball dugout, backstop and batting cage structures.
3. Selective demolition of the existing retaining wall at the Cashman Elementary School

B. Salvaged items include the storage shed adjacent to the concession building, field lighting, scoreboards and dugout lockers.

C. Asbestos, Lead Paint and PCBs: An environmental report for areas of demolition was prepared (see Attachment A).

1.03 SCOPE OF WORK

A. Perform the following items of work as shown on the Drawings and specified herein:

1. Furnish, install and maintain in safe condition at all times, temporary protection items required to ensure safety for persons and property during the demolition and removal work.

2. Furnish, install, and maintain dust coverings as required to prevent the spread of dust beyond the immediate area where interior demolition and removal work is being performed.

3. Arrange with the appropriate municipal authorities for street cutoffs of services which may be required in conjunction with the demolition and removal work and pay any and all costs incurred therefrom.

4. After all affected services have been disconnected thereto, or otherwise made inactive, remove all abandoned building contents, perform the demolition work and major cutting, remove all demolished and abandoned materials from the site, and legally dispose of same. Haul and dispose of material generated from the demolition including all demolition debris, in accordance with all local, state and Federal regulations.

1.04 QUALITY ASSURANCE

A. Codes, Permits, and Regulations

1. The Contractor shall comply with all applicable laws, rules, ordinances, and the general regulations of the Federal Government, the Commonwealth of Massachusetts, city of Amesbury and Massachusetts Department of Environmental Protection (DEP) for removing and disposing of all demolition materials.

2. The Contractor shall obtain all permits required to conduct the work. The permit fees require by Amesbury will be waived.

B. The Contractor shall protect adjacent structures to remain and leave the same in a safe and satisfactory condition.

C. Approvals given by the Architect shall not relieve the Contractor of the responsibility for performing the work in accordance with the Contract Documents.

D. Any change from requirements of these documents or from procedures outlined in Contractor's demolition plan shall be requested in writing. No changes will be allowed unless approved by the Architect.

1.05 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Removal of certain items, drilling, coring and specified cutting and surface preparation: As specified in various SECTIONS.
2. Administrative and procedural requirements for recycling and disposing demolition waste: SECTION 017419-CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
3. Removal of shrubs, trees, clearing and grubbing. Removal of pavement and other items of site demolition: SECTION 311000-SITE PREPARATION.
4. Excavation, backfill, filling, and establishing new subgrades where applicable: SECTION 312000-EARTHWORK.

1.06 SUBMITTALS

A. Submit the following information and other requirements of SECTION 013300 – SUBMITTALS.

1. A demolition plan describing the proposed sequence, methods, schedule and equipment for all demolition work shall be submitted a minimum of 3 days prior to beginning work at the next site. Include a narrative description of the following:
   a. Procedures and sequence of operations for cleaning and dismantling structures including equipment inside the building.
   b. Locations for disposal of demolition materials.
2. Copies of all related permits and notices authorizing demolition.
3. Certificates of utility severances.
4. Permits for transport and disposal of demolition debris and other waste materials generated.
5. Certification that all demolition debris has been rendered non-hazardous prior to removal from the site.

1.07 HAZARDOUS MATERIALS REGULATIONS

A. The Contractor shall remove all hazardous materials in full compliance with all applicable Federal, State, and local regulations as they apply to potentially hazardous materials for the protection of workers and the environment.

PART 2 PRODUCTS (not used)

PART 3 EXECUTION

3.01 GENERAL

A. The Demolition Subcontractor shall be responsible for any materials analysis required, such as containerized liquids or other materials, required to adequately characterize the material for disposal.

B. All hazardous waste removal shall be performed by a qualified, hazardous waste Contractor licensed to handle, transport and dispose of each type of hazardous material.

C. Conduct operations with a minimum of interference to public or private accesses and facilities. Maintain access and egress at all times and clean and sweep any roadways daily or as required by the governing authority. At such times as deemed necessary by the Owner, dust control shall be provided with sprinkling systems or equipment provided by the Contractor.

D. Promptly notify the Architect when any unexpected items are encountered during demolition.

E. The Contractor shall ensure that demolition debris is treated in a controlled manner such that the potential of cross-contamination between material that exhibits visual or olfactory evidence of contamination and clean material is eliminated.

3.02 DESCRIPTION OF WORK

A. Obtain and pay for all permits and licenses required to perform demolition work, prior to commencing the work of this SECTION.

B. Conditions, as they are known to bid date, have been indicated on the Drawings; however, all existing dimensions shall be verified on site before commencing work.

C. The Site Utilities, Plumbing, Heating, Ventilating, Air Conditioning and Electrical Subcontractors respectively, shall perform the disconnecting and capping where necessary, of existing mechanical and electrical items which are to be removed and/or relocated.

D. The Demolition Subcontractor shall perform the cutting and removal of all items so designated on the Drawings except as otherwise specified hereunder. Where items are designated to be relocated, the Demolition Subcontractor shall perform the relocation of all items, which are not normally installed by a Sub-Trade. Where such equipment is to be installed by a Sub-Trade, the applicable Subcontractor shall be responsible for disconnecting and moving such items to the room or area where these items are to be relocated. The respective subcontractor shall be responsible for storing such items if the areas for relocation are under the Owner's Use and Occupancy at the time of disconnect.

E. Installation of all relocated equipment of the Sub-Trades, including required alterations thereto, shall be performed by the respective Subcontractors under whose jurisdiction this work is normally performed.

F. Prior to commencing cutting work in existing floors and walls, the Contractor shall take all precautionary measures to assure that mechanical and electrical services to the particular area of work are turned off, as far as practicable.

G. Use no explosives or fire in the performance of the demolition and removals work.

H. Perform all cutting in existing surfaces in manner which will ensure a minimal difference between the cut area and new material when patched.

I. If, in the process of cutting work, existing utility lines or fixtures are encountered which have not been indicated on the Drawings, and whether or not such items are damaged, report such items to the Architect immediately, requesting disposition of same. Do not proceed with the work in such areas until such disposition has been obtained. Should the Contractor be directed, in writing by the Architect, to repair, remove, and/or relocate such items, the work shall be performed with the Contract Price adjusted accordingly.

3.03 DEMOLITION

A. Perform demolition using equipment of a type and size acceptable to the Engineer. Wrecking balls, whip hammers or similar devices will not be acceptable.

B. Do not bring explosives to the site and do not use any explosives in performance of the work.

C. Conduct demolition to preclude damage and minimize interference with other existing structures and utilities to remain at the project site.

D. Perform demolition in accordance with the submitted and accepted demolition plan.

E. Dismantle and remove for off-site disposal the existing building equipment, piping, transformers, and other ancillary structures. Utilize appropriate equipment in sufficient quantity and sizes to expeditiously perform the demolition.

3.04 DUST AND POLLUTION CONTROL

A. Use water sprinkling, temporary enclosures and other suitable methods to limit to the lowest practical level the amount of dust and dirt rising into the air.

B. Comply with applicable regulations pertains to environmental protection and pollution.

C. Clean existing structures of dust, dirt and debris caused by demolition operations as directed. Return adjacent areas to condition existing prior to the start of the work.

3.05 CONTAMINATION AND HAZARDOUS WASTE

A. The Demolition Subcontractor is responsible for removal and disposal of all materials encountered during conduct of work.

B. Collect and containerize rinseate generated for cleaning of machinery, equipment and demolition debris and dispose of in a legal manner.

C. Provide copies of manifests for disposal of all drummed wastes to the Architect.

3.06 DISPOSITION OF REMOVED MATERIALS

A. Except for items specifically designated to be relocated and/or re-used, or salvaged by Owner, or removed and disposed of under another Section, all existing removed building materials and items and abandoned building contents shall become the property of the Demolition Subcontractor and shall be completely removed from the site and legally disposed of beyond town limits.

1. All materials including, but not limited to, equipment, machinery and maintenance supplies removed from the building shall be transported to a salvage facility immediately. No stockpiling will be allowed.

2. Contractor shall clean, disassemble, remove, transport, and dispose of all materials including, but not limited to, indicated equipment, machinery and maintenance supplies. Contractor shall remove free liquids from the interior of each piece of equipment and handle them in accordance with the requirements of this SECTION.

B. Owner Salvage: Items to be delivered by the Contractor to the Owner's storage site after removal under the Contract shall include:

1. Storage shed adjacent to Concession Building

2. From Concession Building: Kitchen Equipment: Grill, hood, stainless steel sinks (including faucets) and wall mounted safe.

3. Site Amenities:

   a. Sport lighting including poles

   b. Scoreboards (not including steel supports and concrete footings)

   c. Dugout lockers

C. Items to be removed by the Owner prior to the Demolition Subcontractor's on-site operations:

1. From Concession Building:

   a. Refrigerator and freezers

   b. Picnic tables

   c. Sports equipment

2. From Shed:

   a. Infield grooming tractor and supplies

   b. Line marking equipment and supplies

   c. Sports equipment

3.07 SCHEDULING OF DEMOLITION WORK

A. The existing Cashman Elementary School adjacent to the site will be operational. Demolition work may not proceed until all site fencing and signage are in place to ensure the safety of Cashman School occupants and visitors.

B. Work at the Cashman Elementary School shall be coordinated with school operations.

END OF SECTION

Division 3
Concrete

SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

C. Coordinate work with that of all other trades affecting or affected by work of this Section. Coordinate with such trades to assure the steady progress of all work under the Contract.

1.02 SCOPE OF WORK

A. The work of this Section consists of all plain and reinforced concrete work as shown on the Drawings and as specified herein, and includes, but is not limited to the following:

1. Furnishing, placing, curing, and finishing of all plain and reinforced concrete work for the building and site.
2. Furnishing, erection and removal of formwork and shoring.
3. Furnishing and placing of reinforcing steel and related accessories.
4. Furnishing and installation of vapor retarder.
5. Furnishing and installation of underslab insulation.
6. Furnishing and installation of bentonite strip waterstops.
7. Furnishing and installation of mastic coating on embedded structural steel.
8. Furnishing and installation of joint fillers.
9. Setting of anchor rods and grouting of leveling plates and bearing plates.
10. Coordination with all other trades for location of all pipe sleeves, roof drains, floor drains, duct openings, keys, chases, electrical boxes and conduits, anchors, inserts, fastenings, and other devices required by other trades.
11. Grouting anchor rod oversize holes at column base plates.
12. Hardening and sealing of exposed concrete floors.
13. Coordination of floor slab finish requirements with flooring manufacturers and contractors.

14. As-built surveys of concrete floor slab elevations.

15. Furnishing and installation of leveling of concrete slabs with a self-leveling concrete underlayment if required to meet the specified tolerances.

B. Items to be installed only: Install the following items furnished by the designated Sections:

1. Section 051200 - STRUCTURAL STEEL FRAMING: Anchor bolts, embedded plates with bolts or anchors, as indicated by the Drawings.

C. LEED v4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEED v4-S Certification. LEED v4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEED v4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. For all adhesives and sealants field applied on site and inside the weatherproofing, meet the LEED v4-S requirements for IEQ Credit 2, Low Emitting Materials as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

3. For all adhesives and sealants field applied on site and inside the weatherproofing, submit industry-wide (generic) EPDs or product specific Type III EPDs.

4. For all paints and coatings, meet the LEED requirements for IEQ Credit 4.2 and as defined in Subparagraph 2.04 of Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

5. For all paints and coatings, submit industry-wide (generic) EPDs or product specific Type III EPDs

6. For all concrete, meet the LEED requirements for MR Credit 4: Recycled Content.

7. For all concrete, meet the LEED requirements for MR Credit 5: Regional Materials.

8. For all concrete, submit industry-wide (generic) EPDs or product specific Type III EPDs.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The related work shall be performed under the following Sections:

1. Section 040001 MASONRY.

2. Section 050001 MISCELLANEOUS AND ORNAMENTAL IRON.

3. Section 051200 STRUCTURAL STEEL FRAMING.

4. Section 051226 SHEAR CONNECTORS

5. Section 053100 STEEL DECKING
6. Section 055000 MISCELLANEOUS METALS.
7. Section 070001 WATERPROOFING, DAMPROOFING AND CAULKING.
8. Section 072100 INSULATION.
9. Section 312000 EARTHWORK.
10. Section 321313 SITE CONCRETE.

1.04 REFERENCES (LATEST EDITIONS)

A. ASTM listed standards by the American Society for Testing and Materials.

B. ACI listed standards by the American Concrete Institute.

C. CRSI listed standards by the Concrete Reinforcing Steel Institute.

D. In case of conflict between the References and the Project Specification, the Project Specification shall govern. In the case of conflict between References, the more stringent shall govern.

E. When compliance with any such References is specified herein for materials or a manufactured or fabricated product, the Contractor, if requested, shall furnish an affidavit from the manufacturer or fabricator certifying that the materials or product delivered to the job meets the requirements specified. However, such certification shall not relieve the Contractor from the responsibility of complying with any added requirements specified herein.

1.05 SUBMITTALS

A. Submit Complete Shop Drawings and Data, in accordance with the provisions of SECTION 013300 - SUBMITTALS.

1. Shop Drawings:

a. Construction joint layout: Submit drawings showing proposed construction joint locations for all walls and slabs. Drawings shall be submitted prior to preparation of reinforcement drawings.

b. Reinforcement Drawings: Prepare in accordance with ACI 315, "Manual of Standard Practice for Detailing Reinforced Concrete Structure" and show the following: elevations; dimensions of concrete work with specified reinforcement clearances; ledges, brackets, openings, sleeves or other items furnished by other Sections, where interference with reinforcement may occur; bending diagrams; assembly diagrams; splices and laps of reinforcement; temperature and shrinkage reinforcement; construction joint locations and reinforcement; shapes, dimensions, grade designations and details of reinforcement and

accessories. Show dowels with concrete work to be placed first. Indicate suitable marks for placing bars.

c. Formwork Drawings: Schedules of placement; beam and haunch detailing, expansion joint details, construction joints and contraction or control joints with methods of forming; general arrangement, sizes and grades of lumber, panel and tie layouts and alignment. Formwork drawings will be reviewed for general compliance with the Contract Documents only. Dimensions, strength of formwork, shoring, bracing, and all related work are the sole responsibility of the Contractor. At Architecturally Exposed Concrete areas, show layout of joint patterns and exposed cone recesses at wall ties.

d. Except as otherwise noted, approval of Shop Drawings will be for size and arrangement of components. Errors in dimensions shown on Shop Drawings shall be responsibility of the Contractor.

e. Check and coordinate cast-in-place concrete work with work of other trades before submitting Shop Drawings.

f. Submit plans for all levels with M.E.P. penetration sizes and locations for approval prior to submitting reinforcing shop drawings.

g. Reproduction of structural plans, sections and details, and any like information by reprographic or electronic methods for use as Shop and Coordination Drawings is subject to the following conditions:

1) The entity producing the Shop and Coordination Drawings (The “User”) agrees to accept the reproduced information from Foley Buhl Roberts & Associates, Inc. without any warranties, guarantees and/or representations of any nature whatsoever regarding the correctness, dimensional and/or quantitative accuracy and/or completeness of any such information contained therein.

2) The User further agrees that such information shall be used as reference material only for the production of Shop and Coordination Drawings for the referenced project to which this Specification applies and only for that project.

3) The User further agrees to release, indemnify, hold harmless and defend Foley Buhl Roberts & Associates, Inc. with respect to any claims, costs (including the cost of litigation), losses, damages and/or liabilities which arise from (or related to) the use, misuse, modification, interpretation, misinterpretation and/or misrepresentation of the reproduced information.

2. Concrete Constituents: Submit a detailed list of concrete materials and corresponding sources, proposed for use in concrete for this project. If conveying concrete by pump is requested by the Contractor, related data regarding concrete materials, pumping devices and methods shall be submitted to Architect for approval three weeks before such method is proposed for use. Provide concrete mix data as specified in Paragraph 2.02B.

3. Methods of Construction: Prior to starting work, submit summary of methods, sequence of construction, and type of equipment proposed for use for performing cast-in-place concrete work. This submission shall not relieve the Contractor of his responsibility for providing proper methods, equipment, workmanship and safety precautions.

4. Samples: Submit samples and/or descriptive literature of materials, products, and methods as noted herein, and as otherwise requested by the Architect: concrete constituents including admixtures; form ties and spreaders; accessories for reinforcement; reglets; non-shrink cement grout; inserts; form release agents and waterstops.

5. Mill Test Certification: Prior to delivery of steel or concrete to job site, submit certified mill test reports of reinforcing steel and cement, (including names and locations of mills and shops and analyses of chemical and physical properties) properly correlated to concrete to be used in this project. Test reports for reinforcing to be welded shall show that the steel meets AWS weldability requirements.

6. Concrete Curing and Protection: Submit summary of methods proposed for curing and protection of concrete. When applicable, submittal shall include methods of cold weather protection following the requirements of ACI 306 – Cold Weather Concreting and/or hot weather protection following the requirements of ACI 305 – Hot Weather Concreting.

7. Corrective Work: Submit drawings showing details of any proposed corrective work.

8. Affidavit: Submit, upon request by Architect, manufacturer's and/or supplier's and/or installer's affidavit stating that material or product provided complies with the Contract Documents.

B. Provide concrete Mix Data as specified in Paragraph 2.02B.

C. Provide manufacturer's data for other products.

D. Fabrication of any material or performing of any work prior to the final approval of the Submittals will be entirely at the risk of the Contractor.

E. The Contractor is responsible for furnishing and installing materials called for in the Contract Documents, even though these materials may have been omitted from approved Submittals.

F. LEED v4-S SUBMITTAL REQUIREMENTS:

1. Submit relevant supporting documentation as required by LEED for schools v4 and as detailed in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.
2. Submit a completed LEED MATERIAL REPORTING FORM, per SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.
3. Product substitution requests are subject to additional LEEDv4-S submittal requirements, see SECTION 012500 - SUBSTITUTION PROCEDURES.

1.06 QUALITY ASSURANCE

A. All materials, measuring, mixing, transportation, placing and curing shall be subject to inspection by the Architect or by the Testing Agency. However, such inspection, wherever conducted, shall not relieve the Contractor of his responsibility to furnish materials and workmanship in accordance with the Contract requirements, nor shall inspector's acceptance of material or workmanship prevent later rejection of same by the Owner or Architect if defects are discovered.

B. A qualified Testing Agency for testing and inspection will be selected by the Owner and will be paid directly by the Owner.

C. The Contractor shall retain the services of a qualified testing agency, approved by the Architect, to test aggregate and to prepare or review mix designs for each strength of concrete specified, and shall submit mix designs and test results to the Architect for approval. The costs of all such preliminary services shall be borne by the Contractor.

D. Advise the Testing Agency of intent to place concrete by notification at least 24 hours prior to the time of placement.

E. Concrete will be sampled and tested for quality control as follows:

1. ASTM C 172: Sampling fresh concrete.
2. ASTM C 31: Compression test specimens.
3. ASTM C 143: Slump.
4. ASTM C 231: Air content.
5. ASTM C 39: Compressive strength.
6. ASTM C 618: Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.

7. ASTM C 311: Standard Methods of Sampling and Testing Fly Ash and Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete.

F. Concrete floor slabs shall be prepared in accordance with ASTM F 710: Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

G. All reinforcing will be inspected by the Testing Agency for grade, size, spacing, position, cleanliness, cover, and support.

H. Cooperate with the Testing Agency's work and provide help as required for taking and storing samples. Provide storage facilities for concrete cylinders at the site. Facilities must protect cylinders from affects of low or high temperatures in cold or hot weather, respectively.

I. Compression tests shall consist of four - six inch diameter by twelve inch long cylinders (or six - four inch diameter by eight inch long cylinders) for each test made, cured and tested by the laboratory during the progress of the job. At least one test shall be made for each strength of concrete up to 50 cubic yards pour, and at least one test per strength for each 50 cubic yards thereafter, unless otherwise directed by the Architect. For each test made, one cylinder shall be tested at seven-days test sample age and two - six inch diameter cylinders (three - four inch diameter cylinders) shall be tested at 28-day test sample age. One six inch diameter cylinder (or two – four inch diameter cylinders) for each test shall be kept in the event that a 56-day sample age test is required due to low 28-day results. Concrete for each set of cylinders shall be from one sample representative of the entire batch.

J. In addition to the above, the Architect or the Contractor may direct additional control cylinders to be made, cured and tested to verify strengths for removal of forms, shoring or adequacy for curing or cold weather protection. In such instances, the cylinders shall be cured in the same environment as the area which the cylinders represent. All such additional work requested by the Contractor shall be at his own expense.

K. Evaluation of Compression Tests:

1. Architect has authority to order, for any strength of concrete, increase in cement content and mix redesign for remaining work of either:

   a. Average seven-day strength of any two consecutive tests representing a particular design strength of a class of concrete is less than 55 percent of specified strength; OR

   b. Average 28-day strength of any two consecutive tests representing particular design strength of a class of concrete is less than 90 percent of specified strength.

2. The strength level of a class of concrete shall be considered satisfactory, if the following requirements are met:

a. Averages of any three consecutive 28-day strength tests representing each class of concrete equal or exceed the specified strength (f'c).

b. Not more than 10 percent of 28-day strength tests have values less than the specified strength (f'c).

c. No individual 28-day test shows an average strength less than 90 percent of specified strength (f'c).

3. When tests of control specimens fall below the strength level requirements, the Architect may require core specimens taken from concrete in question and tested in accordance with ASTM C 42. If these specimens do not meet the strength requirements, the Architect will have the right to require additional curing, load tests, strengthening or removal and replacement of those parts of the structure which are unacceptable, and in addition, removal of such sound portions of structure as necessary to ensure safety, appearance and durability of the structure. Additional testing, load tests, strengthening or removal and replacement of parts of the structure and any costs associated with redesign or delay of the project shall be at the Contractor's expense.

L. Upon completion of concrete testing for the project the Testing Agency will compile all results and perform a statistical strength analysis for each class of concrete in accordance with ACI 214.

M. Accept as final, results of tests made by the qualified professional testing organization engaged by the Owner.

N. Testing required because of changes requested by the Contractor in materials, sources of materials or mix proportions, and extra testing of concrete or materials because of failure to meet the Specification requirements is to be paid by the Contractor.

O. A final report will be issued by the Testing Agency following the completion of work in this Section stating that all deficiencies have been corrected.

P. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1.

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following: (1) Architect, (2) General Contractor, (3) Concrete Subcontractor, (4) Independent testing agency, (5) Ready-mix concrete manufacturer, (6) Under slab vapor barrier, waterproofing and damproofing subcontractor and manufacturer’s representative.

2. Review items such as: special inspection, testing and inspection agency procedures for field quality control, concrete finishes and finishing, cold- and hot- weather concreting procedures, curing procedures, construction, contraction and isolation joints, joint filler strips, semi-rigid joint fillers, forms and form removal limitations, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

3. Before concrete slabs on grade are placed, and after approval of all resilient flooring materials, a pre-flooring conference shall be held at the job site. In attendance shall be (1) Architect, (2) General Contractor, (3) Concrete Subcontractor, (4) Resilient Flooring Subcontractor, and (5) Flooring manufacturer's technical representative. The parties shall review drawings, specifications and approved materials and coordinate surface, methods of curing, protection, moisture and PH requirements of the concrete in preparation for the application of the finish flooring materials.

1.07 NOTIFICATION OF RELATED TRADES

A. Notify all other trades responsible for installing chases, inserts, sleeves, anchors, louvers and similar items when ready for such installation, and for final checking immediately before concrete is placed. Cooperate with such trades to obtain proper installation.

B. Leave openings in walls for pipes, ducts, and similar openings for mechanical/electrical/plumbing work, as shown on Drawings or required by layout of mechanical/electrical/plumbing systems.

1.08 SUBSTITUTIONS

A. Refer to Section 012500 - SUBSTITUTION PROCEDURES

PART 2 PRODUCTS

2.01 LEED v4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEED-v4S materials Credits, and a completed LEED v4 Materials Reporting Form shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
3. Furnish any adhesives, sealants, paints and coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

2.02 MATERIALS

A. Cement:

1. Portland Cement - ASTM C 150, Type I or II.
2. Fly Ash - ASTM C 618 Class F.
3. Ground Granulated Blast-Furnace Slag - ASTM C 989 - Grade 100 or 120.

B. Natural Aggregate:

1. Coarse Aggregate: Shall be hard, durable, uncoated crushed stone or gravel conforming to ASTM C 33. Typical coarse aggregate shall pass through a 3/4" sieve and meet the grading requirements of ASTM C 33 size number 67. Coarse aggregate for toppings less than three inch thick or areas with congested, closely spaced rebar shall pass through a 3/8" sieve and meet the grading requirements of ASTM C 33 size number 8. Coarse aggregate shall meet the following additional requirements:

Fineness Modulus:	(+/- 0.20) 6.70 and 5.5 respectively
Organic:	Plate 1 maximum.
Silt:	1.0 % maximum
Soundness:	5%-8% maximum loss, magnesium sulfate, five cycles.

2. Fine Aggregate: Shall be sand, clean, hard, durable, uncoated grains, free from silt, loam and clay, to meet ASTM C 33. Fine aggregate shall meet the following additional requirements:

Sieve	Retained Percent
#4	0-5
#16	25-40
#50	70-87
#100	93-97

Fineness Modulus:	2.8 (+/- 0.20)
Organic:	Plate 2 maximum
Silt:	2.0% maximum
Soundness:	5%-10% max. loss, magnesium sulfate, five cycles.

C. Water:

1. Water shall be from the local municipal supply.

D. Admixtures:

1. Water-reducing Agent shall conform to ASTM C 494, Type A. Water-reducing agent shall be compatible with air-entraining agent.
2. Superplasticizer shall conform to ASTM C494, Type F or Type G. Superplastizer shall be compatible with the other admixtures.
3. Air-entraining Agent shall conform to ASTM C 260.
4. Calcium Chloride or admixtures containing more than 0.1% Chloride ions are not permitted.

E. Concrete Reinforcement:

1. Reinforcing steel shall conform to ASTM A 615 deformed bars, Grade 60. Reinforcing to be welded shall conform to ASTM A 706 deformed bars, Grade 60
2. Welded wire fabric shall conform to ASTM A 1065 in flat sheets.
3. Reinforcing supports, metal accessories and other devices necessary for proper assembly of concrete reinforcing shall be of standardized factory-made wire bar supports. Reinforcing that bears on vapor barriers shall have integral bearing plates. Wire for tying shall be ASTM A 82, 18 gauge black annealed wire. All accessories shall conform to Product Standard PS7-766, National Bureau of Standards, Department of Commerce, Class C.
4. Steel reinforcing shall be manufactured using minimum 95% recycled materials.

5. Accessories touching formed surfaces exposed to view shall have not less than 1/4 inch of high density polyethylene between metal and concrete surface. Plastic tips shall extend not less than 1/2 inch up on metal legs.

F. Formwork:

1. Forms for concrete surfaces not exposed to view in finished work shall be made of wood, metal, or other material subject to approval of Architect.

2. Form release agent shall be of a non-staining type, specifically manufactured for concrete forms.

3. Form Ties shall be factory-fabricated, removable or snap back of approved design. Wire shall be at least one and one half inch back from exterior surfaces and one inch from interior surfaces. Furnish with removable wooden or plastic cones of approved sizes where called for, with waterproofed stop at exposed concrete surfaces.

4. Chamfer strips shall be one half inch, 45 degree wood strips, or as detailed, nailed six inches on center, and installed at inside corners of all forms, unless otherwise directed by the Architect.

5. Reglets shall be formed from 24 gauge galvanized steel and shall be of type shown on Drawings or appropriate for use intended. Metal reglets shall be used merely as form to obtain desired profile. After concrete has set, remove reglets.

6. Forms for concrete surfaces exposed to view in the finished work (Architecturally Exposed Concrete), shall be new Class 1 B-B High Density Overlay plyform, exterior grade not less than 5 ply nor less than 5/8" thick, conforming to U.S. Product Standard P-1-66.

G. Bonding Agent:

1. Bonding agent for bonding new concrete to existing concrete at construction joints shall be Sikadur 32, Hi-Mod by Sika Corporation; Duracrete by Euclid Chemical Co.; Deck-O-Weld by W.R. Meadows or equal approved by the Architect.

H. Self-Leveling Concrete Underlayment:

1. <u>For areas to be covered by a finish or flooring:</u>
Concrete underlayment used for floor leveling shall be "Sika Level-315" by Sika Corporation, "Ardex K-15" by Ardex, Inc., "ProSpec Level Set 300" by Bonsal American Inc. or equal approved by the Architect.

2. <u>For areas to remain exposed:</u>
Concrete underlayment used for floor leveling shall be "Sika Level-315" by Sika Corporation, "Ardex SD-T" by Ardex, Inc., "ProSpec Level Set Wear Topping" by Bonsal American Inc. or equal approved by the Architect.

3. Aggregate shall be well-graded, washed fine gravel (1/8 inch to 1/4 inch or larger) for use when underlayment is installed to a thickness where aggregate is recommended by the manufacturer.

4. Gypsum based underlayment products are not allowed.

I. Surface Conditioners:

1. Floor hardener for exposed concrete floors shall be “UltraSil LI+ by Euclid Chemical Company, Inc., “L&M Lion Hard” by Laticrete International, Inc., “Liqui-Hard Ultra” by W.R. Meadows, or equal approved by the Architect.

2. Unless otherwise specified, floor hardener is required at all exposed concrete floors.

J. Other Materials:

1. Joint filler where used with caulking or sealants, shall be cork type, non-extruding, self-expanding filler strips conforming to ASTM D 1752, Type III with removable top snap-caps to allow room for sealants or caulking. Where no sealant or caulking is required, strips shall be closed cell flexible polyethylene type conforming to ASTM D 4819, Type II. Joint fillers for exterior paving shall be non-extruding bituminous type in accordance with ASTM D1751 with removable top snap-caps to allow room for sealants. Joint filler manufacturers include W.R. Meadows, or an approved equal.

2. Underslab Vapor Retarder: 15-mil thick polyethylene vapor retarder meeting or exceeding the performance requirements for ASTM E 1745, Class A. Acceptable products include: Stego Industries, LLC, Stego Wrap 15-mil Class A; W.R. Meadows, Perinator 15-mil Underslab Vapor Mat and Reef Industries, Griffolyn 15-mil Green.

3. Curing cover sheets shall be “Hydracure” by PNA Construction Technologies, “Transguard 4000” by Reed Industries, “UltraCure DOT” by McTech Group, or an equal approved by the Architect.

4. Waterstops shall be bentonite strip type Waterstop – RX, manufactured by Cetco; Swellstop by Sika Corporation; Rockmax Swelling 101 by Rockmax Co. Ltd., or an equal as approved by the Architect.

5. Non-Shrink Grout: Grout at column and beam bearing shall be “Masterflow 100” by BASF, “Sonogrout 10K” by Sonneborn ChemRx, “Five Star Grout” by Five Star Products, Inc. or equal approved by the Architect.

6. Anchor Rod Hole Grout: Grout in oversize anchor rod holes at brace column steel base plates shall be “MasterFlow 816” by Master Builders, “Five Star Fluid Grout PT” by Five Star Products, Inc., “Quickcrete Cable Duct Grout” by Quickcrete, or equal approved by the Architect.

7. Flexible epoxy joint sealant shall be “SIKADUR 51 SL” by Sika Corporation, “Rezi-Weld Flex” by W.R. Meadows, “Dural 340” by Euclid Chemical Company, “Joint Tite 750” by L&M Construction Chemicals or equal approved by the Architect.

8. Underslab insulation shall be extruded tongue and groove polystyrene foam as manufactured by Dow, Johns Manville, Certain Teed, GAF or equal (molded bead polystyrene is not permitted). Underslab rigid insulation built up voids shall be EPS19 (40 PSI) Geofoam blocks as manufactured by Universal Foam Products, ACH Foam Technologies, Atlas EPS, or approved equal.

9. Mastic coating of structural steel below the top of slab on grade elevation shall be a high-build coal tar epoxy mastic as manufactured by Carboline, Inc., Sumter Coatings, Inc., Rust-Oleum, Inc., Krylon Industrial Coatings, Inc. or approved equal.

10. Threaded Inserts: Richmond Screw Anchor Co., or equal structural concrete inserts of type shown on Drawings. Galvanized all components in accordance with ASTM A 153.

2.03 CONCRETE MIXES

A. Strength, cement and water requirements:

Design Compressive Strength, f'c	Min. Cement Factor* Sacks/yd3	lbs/yd3	Max. Water Cement Ratio Gal/sack	Gal by wt.
3000	5.5	517	6.5	0.57
4000	6.5	611	5.5	0.44
5000	7.0	658	5.0	0.40

*Fly ash or slag may be used in all concrete except for interior slabs on metal deck, interior slabs on grade, exterior slabs or site walls. Amount shall be a maximum of 20% fly ash or 25% slag of the total cement content. Do not use slag during winter-concrete conditions.

B. All concrete shall be proportioned in accordance with ACI Standard 211.1, "Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete" and comply with the requirements of ACI 301 "Specifications for Structural Concrete" Section 4, Method 1 (trial mixtures) or 2 (field test data).

C. All concrete with strengths 4000 psi and higher shall have a minimum coarse aggregate content of 1600 lbs./cu. yd.

D. Air-entraining and water-reducing agents shall be used in all concrete, in strict accordance with the manufacturer's printed instructions. All exterior concrete subjected to freezing and thawing shall have a total air content of 5% plus or minus 1%. All interior concrete slabs shall have a maximum air content of 3% and all other interior concrete shall have a total air content of 4% plus or minus 1%. Use a high range water-reducing agent (superplasticizer) in concrete for slabs on grade and slabs on steel deck.

E. Water-Cement Ratio - All concrete subjected to freezing and thawing shall have a maximum water-cement ratio of 0.44 (f'c = 4000 psi minimum). All concrete required to be watertight and/or subjected to de-icers shall have a maximum water-cement ratio of 0.40 (f'c = 5000 psi minimum). The maximum water-cement ratio for slabs on grade and slabs on steel deck is limited to 0.44. This is the total water in mix at time of placement, including free water of aggregates and liquid admixtures.

F. Slump of concrete shall be four inches (+/- one inch). If a superplasticizer is used, the slump shall be three inches (+/- one inch) prior to adding the superplasticizer and eight inches (+/- one inch) after adding the superplasticizer. Concrete for slabs on grade and slabs on steel deck shall include a superplasticizer.

G. Premix admixtures in solution form and dispense as recommended by the manufacturer. Include the water in the solution in the design water content of the mixtures.

PART 3 EXECUTION

3.01 STORAGE

A. All materials shall be stored to prevent damage from the elements and other causes.

B. Cement and aggregates shall be stored in such a manner as to prevent deterioration or intrusion of foreign matter. Any materials which have deteriorated, or which have been damaged, shall not be used for concrete.

C. Store reinforcing steel on wood skids to protect it from earth and damage from trucking or other construction operations. Reinforcement shall be free from loose mill scale, rust, release agent, concrete splatter and other extraneous coatings at the time it is embedded in the concrete.

D. All forms shall be stored in a neat manner and orderly fashion, protected from the weather and abuse.

E. Materials which are judged not acceptable for this project shall not be stored on the site, but shall be immediately removed from the site.

3.02 FORMING

A. Formwork construction shall be as specified in ACI 347 “Guide to Formwork for Concrete”.

1. Provide Class A tolerances for all visually exposed concrete surfaces.
2. Provide Class C tolerances for other concrete surfaces.

B. Acceptable tolerances shall be as specified in ACI 117 "Standard Specifications for Tolerances for Concrete Construction and Materials".

C. Forms shall be constructed to conform to shapes, lines, and dimensions shown, plumb and straight, and shall be maintained sufficiently rigid to prevent deformation under load. Forms shall be sufficiently tight to prevent the leakage of grout. Securely brace and shore forms to prevent displacement and to safely support the construction loads.

D. Treat forms with a form release agent applied according to the manufacturer's instructions, by roller, brush or spray to produce a uniform thin film without bubbles or streaks. Apply the release agent in two coats for the first use of the form and in one coat for each additional use.

3.03 MIXING PROCESS

A. Ready-mixed concrete shall be mixed and transported in accordance with "Specification for Ready-Mixed Concrete" ASTM C 94, Alt. #3 and ACI 304, “Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".

3.04 VAPOR RETARDER INSTALLATION

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer’s written instructions.

1. Lap joints six inches and seal with manufacturer’s recommended tape.

3.05 UNDERSLAB INSULATION

A. Insulation beneath slabs-on-grade – rigid insulation thickness per the Drawings.

1. Place insulation boards beneath slabs-on-grade at occupied areas only. Additionally, extend insulation downward at conditions indicated on the Drawings.

2. Butt edges and ends tight to adjacent boards. Bevel insulation to allow snug fit at cants.

3.06 REINFORCING

A. Reinforcing shall be securely tied and supported to maintain proper spacing and cover during placing operations. Take particular care to bend tie wire ends away from faces of walls. In no case shall ends of tie wires project towards or touch formwork. All reinforcing and accessories shall be placed in accordance with CRSI Standards 63 and 68. Reinforcing shall be free of excessive rust, scale or other coatings that will reduce bond.

3.07 EMBEDDED ITEMS

A. Coordinate the installation of all embedded items required by other trades. Such items normally are to be in place prior to the placing of reinforcing steel.

B. Place all anchor bolts, sleeves, inserts, and other embedded items and secure properly.

C. Conduits and Pipes by M.E.P. Contractors: Embed no pipes other than electrical conduit in structural concrete. Provide steel pipe sleeves for pipes passing through. Embed conduit in concrete only under the following conditions:

1. No conduit coating, except galvanizing or equivalent shall be used. Do not embed aluminum conduit in concrete.

2. Do not cut or displace any reinforcement.

3. Place conduit within the middle half of any member. Do not place conduit between concrete surfaces and reinforcement.

4. Place nearly parallel conduit apart at least three times O.D.

5. Do not place conduit in concrete toppings on metal deck.

3.08 JOINTS

A. Provide construction joints as shown on the Drawings, but in any case limit the maximum dimensions for placement of concrete in any one placement as follows:

1.	Walls:	80 feet
2.	Slabs-on-grade:	100 feet
3.	Slabs on metal deck:	100 feet

The time period between adjacent concrete pours on either side of the construction joint shall not be less than three days to allow for drying shrinkage in the initial pour.

B. Construction joints shall be formed with keyed bulkheads. At joint locations labeled on the drawings as roughened joints, the entire contact surface shall be mechanically roughened with a roughness of at least ¼ inch amplitude and an approved bonding agent shall be used in accordance with the manufacturer's recommendations. All construction joints shall be free of debris. Reinforcement shall continue through the joint, and additional reinforcement shall be placed as indicated on the Drawings.

C. Provide control joints as shown on the Drawings, but in any case limit the maximum dimensions between joints as follows:

1. Provide control joints at slabs on grade at each column line in each direction and at 15 feet maximum spacing in between.

D. Control joints shall be saw cut, as early as practical, the day after placement and finishing of concrete. Discontinue 50% of reinforcing at the joint. Do not place control joints in slabs on metal deck.

E. Provide isolation joints between slabs on grade and steel columns/gusset plates, and where shown on the Drawings. Isolation joint fillers shall be installed with removable top snap-caps so that the joint filler material to remain is ½ inch below the top surface of the slab to allow for joint sealants.

3.09 PLACING

A. Notify Architect at least 72 hours prior to each placement.

B. Do not place concrete until soil bearing material, reinforcing steel, inserts, sleeves and other work to be built into the concrete have been inspected and approved by the Architect and all trades concerned.

C. In hot weather, all concreting shall be done in accordance with ACI 305, "Recommended Practice for Hot Weather Concreting".

1. When temperature rises above 80 degrees F, all surfaces of concrete shall be protected against rapid drying.
2. Concrete delivered to the forms shall have a temperature of not over 90 degrees F.
3. The temperature of the forms shall not be over 90 degrees F.

D. In cold weather, all concreting shall be done in accordance with ACI 306, "Recommended Practice for Cold Weather Concreting".

1. When the average daily temperature falls below 40 degrees F, all surfaces of concrete shall be maintained at a temperature of at least 50 degrees F and not over 90 degrees F for seven days.
2. Concrete delivered to the forms shall have a temperature of at least 60 degrees F and not over 90 degrees F.
3. The temperature of the forms including gravel base, shall be at least 40 degrees F.
4. The Contractor shall maintain a record of temperature of the concrete at the most exposed surfaces of each placement at the beginning and at the end of each day of the curing period, which shall be available to the Architect.

E. Conveying - Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent separation or loss of ingredients and in a manner which will assure that the required quality of the concrete is retained.

F. Depositing - Delivery and placement of concrete shall be programmed so that the time lapse between batching and placement shall not exceed one and one half hours. Concrete shall not be allowed a free fall of over four feet. Concrete shall be deposited as nearly as practicable in its final position, to avoid segregation due to rehandling or flowing.

G. Concrete shall be deposited continuously, in horizontal layers of such thickness (not deeper than 18 inches) that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. Placing shall be carried out at such a rate that the concrete which is being integrated with fresh concrete is still plastic. Concrete which has partially hardened or has been contaminated by foreign materials shall not be deposited.

H. Concrete shall be consolidated with the aid of mechanical vibrators in conformance with ACI "Recommended Practice for Consolidation of Concrete" to produce a dense, homogeneous mass without voids or pockets. Vibrators should be placed in concrete rapidly so as to penetrate the entire previous lift, to blend the two layers. Vibrating techniques must assure that when the coarse aggregate reaches the form, it stops and the matrix fills the voids.

I. Horizontal construction joints including those for toppings shall be mechanically roughened and cleaned thoroughly of all foreign materials and laitance, roughen with suitable tools such as chipping hammers or wire brushes, reclean by stream of water or compressed air and an approved bonding agent shall be used in accordance with the manufacturer's recommendations. New concrete shall be deposited before the bonding agent dries out.

3.10 FINISHING OF CONCRETE SURFACES

A. The intent of this Specification is to secure for the job, materials and workmanship of such quality that only nominal finishing will be required to produce concrete surfaces equal to the best obtainable with the concrete and forming materials specified. Surfaces which reveal, upon removal of forms, imperfections of such magnitude as to seriously impair the appearance of the structure, in the opinion of the Architect, shall be deemed cause for rejection, and concrete members containing such imperfections shall be entirely removed and replaced without damage to adjacent materials or extra expense to the Owner. Lesser imperfections of concrete surfaces shall be patched and finished in accordance with the following procedures.

B. Patching - Areas to be patched shall not exceed 1.5 square feet for each 1000 square feet of surface area. Patches shall match in every respect, the color and texture of the surrounding surfaces. Mix formulation shall be determined by trial to obtain a color match when both the patch and the surrounding concrete are cured and dry. After initial set, surfaces of patches shall be textured manually to obtain a match with the surrounding surfaces. All patches are subject to Architect's final acceptance as to appearance and quality.

C. Exposed Vertical Surfaces - Immediately after removal of forms, chip off all fins, and other projections, and patch all voids, honeycombs, and air pockets exceeding ¾ inch in any dimension. In areas where concentrations of small voids occur, patch a sufficient number of voids to produce a uniform appearance across the entire panel. Smooth out projections and fins with wet carborundum stones or power grinders to extent directed by Architect. Pull tie rods and pack voids formed by tie-rod cones to a point 3/4" from finish surface. Patch exposed irregular lines at edges of slab soffits to produce neat, uniform appearance.

D. Surfaces to Receive Sandblast Finish: Upon completion of operations under the preceding paragraph, sandblast all exterior vertical surfaces and all other surfaces indicated as receiving sandblast finish. No interior surfaces shall be sandblasted. Use a #400 gradation abrasive that will not adversely affect the color of the finished surface, such as “Black Beauty” supplied by M. B. Reed and Company, Inc., Hammond, Indiana, “Garnet Sand” supplied by Davidson MacDonald, Boston, Massachusetts, or approved equal. Abrasive blasting shall be carried out to the same depth and produce the same texture as the accepted sample panel throughout. Sandblasting shall be done after all concrete to be blasted has attained a strength of 3,000 psi as determined by field control cylinders, or after a minimum of seven days, whichever is first. The Contractor shall be responsible for safety of the workmen and for any damage or claims resulting from this operation and shall equip each person with an air-fed helmet. Provide suitable enclosures for collecting grit and dust from the blasting operation. During abrasive blasting, surfaces intended to be left smooth, such as rustications, chamfers and tie cone holes, shall be protected from blasting by masking with wood, metal, rubber or tape. Avoid rounding edges. All inserts shall be masked and protected from blasting. Sandblasting shall comply with all local and state anti-pollution laws.

E. Finishing Concrete Vertical Surfaces Exposed to View and not scheduled to be sandblasted: Provide a smooth-formed surface obtained with selected form-facing material arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.

Smooth-Rubbed Finish: Provide smooth-rubbed finish on exposed concrete vertical surfaces that have received smooth-formed finish treatment not later than one day after form removal. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process. Thoroughly clean surfaces to remove stains, laitance, dust, form oil, and all other surface residue by use of water, stiff brushes, sandpaper or other means approved by the Architect.

F. Finishing of Concealed Concrete Surfaces - At surfaces to receive waterproofing membranes, chip off fins and other projections and trowel patch all voids, honeycombs and air pockets exceeding one half inch in any dimension. Pull tie-rods and patch voids formed by tie-rod cones flush with adjacent surfaces. At outside faces of foundation walls, except for surfaces to receive waterproofing membranes, trowel patch all voids, honeycombs and air pockets exceeding ¾ inch in depth. At other concealed surfaces, patching, if any, shall be as directed by the Architect and shall, in general, be only such as is required to assure or protect the structural integrity of concrete or reinforcing.

3.11 FLOOR AND OTHER FLATWORK FINISHES

A. Concrete for finish floor slabs shall be poured as dry as practicable within allowable slump range. Except when otherwise indicated or specified, concrete floor slabs shall be monolithically finished at required elevation by screeding, floating, and troweling (if required) to provide a smooth, even, non-porous finish, free of finishing marks. Do not begin finish troweling until concrete has hardened sufficiently to prevent excess fines from working to the surface. Finish requirements for concrete slabs on deck and concrete slabs on grade are as follows (but must be coordinated with the requirements of the selected flooring manufacturers and contractors):

Float Finish: Slabs to receive unbonded toppings, steel trowel finish, mortar setting beds, equipment pads, and other similar surfaces shall be floated to a smooth, dense, uniform, sandy textured finish. During floating, while surface is still soft, check surface flatness using a 10 foot highway straight edge. Correct high spots by cutting down and correct low spots by filling with material of the same composition as floor finish.

Light Steel Trowel Finish: At areas to receive resilient floor covering, carpeting, or other floor covering, perform a light steel troweling immediately after floating. These areas shall be prepared in accordance with ASTM F 710: Standard Practice of Preparing Concrete Floors to Receive Resilient Flooring.

Steel Trowel Finish: At floors to remain exposed to view, steel trowel immediately after floating. After initial troweling is complete and slabs have set sufficiently to ring the trowel, the surfaces shall be given a second steel troweling to a burnished finish.

Scratch Finish: At areas to receive a bonded, applied cementitious application, finish base slab as indicated above, except bull floats or darbys may be used. Thoroughly coarse wire broom within two hours after placing to roughen slab surface to ensure a permanent bond between base slab and applied cementitious materials.

Broom Finish: Provide edged and jointed broom finish for exposed concrete pavements, ramps, stairs, and other similar surfaces. Slab surfaces shall be float finished following the procedures listed below. Following the float finish, use a moistened, stiff bristled natural fiber broom with a long handle to obtain a heavy brush texture finish. Install brush marks perpendicular to the flow of traffic. Repeat edging and jointing operations as required to obtain a distinct edge. Match texture approved by Architect from sample panel.

B. Concrete for floor slabs on metal deck shall be poured to the proper elevations by adding concrete to compensate for deck and structural member deflections. Composite steel beams are designed to be unshored. Slab thickness indicated on drawings is a minimum. Assume one and one quarter inch additional thickness concrete at mid-bay required.

C. Concrete floor slabs shall conform to the following flatness and levelness tolerances per ASTM E1155 for Specified Overall Values (SOV) and Minimum Local Values (MLV):

Carpeted areas:

Floor Flatness Number FF:	Specified Overall Value (SOV) = 25 Minimum Local Value (MLV) = 17
Floor Levelness Number FL:	Specified Overall Value (SOV) = 20 Minimum Local Value (MLV) = 15

Exposed areas or areas to receive wood flooring, resilient flooring, or thin set tile:

Floor Flatness Number FF:	Specified Overall Value (SOV) = 35 Minimum Local Value (MLV) = 25
Floor Levelness Number F_L:	Specified Overall Value (SOV) = 20 Minimum Local Value (MLV) = 15

Measurements shall be taken by the Testing Agency in accordance with ASTM E1155. Measurements shall be taken within 72 hours of concrete placement to verify compliance with FF and FL requirements. Leveling of the slab by the Contractor to the required tolerances, if not achieved by initial finishing, shall be by machine grinding or by special leveling compound, or both, as approved by the Architect.

Note: Only F_F numbers are applicable to elevated reinforced concrete slabs and slabs on metal deck. Both F_F and $F_{L.}$ numbers are applicable to slabs on grade.

D. Elevation Tolerance: The top surface elevation of slabs on metal deck and slabs on grade must not vary from the specified design elevation by more than +/- 3/8 inch (3/4 inch envelope), as measured at 80% of all points.

E. Concrete slab surfaces to be sloped shall be sloped uniformly to drains.

F. Concrete slabs to receive Portland cement setting beds or concrete or fills shall be given a rough wood float or broom finish.

G. Provide edged and jointed broom finish for exposed concrete pavements. Immediately following floating of surfaces to have broom finish, steel trowel the surface. Use a stiff bristled natural fiber broom with a long handle to obtain a heavy brush texture finish. Install brush marks perpendicular to the flow of traffic. Repeat edging and jointing operations as required to obtain a distinct edge.

H. No dry cement or mixture of sand and cement shall be applied to surface of any concrete slab to absorb moisture.

I. Protect floors from damage until completion of job.

3.12 SURVEY

A. The Contractor shall engage the services of a licensed Engineer or Surveyor to provide as-built elevation surveys of concrete slabs at all levels.

B. Surveys shall be taken prior to removal of shoring, as applicable.

C. Slab elevation readings shall be taken at each column, mid-way between columns on each column in each direction, and at mid-bay.

D. Submit a summary of results at each level for review by the Architect. Additional readings may be requested, at the direction of the Architect. Floor leveling, if required, shall be as specified in Paragraphs 2.01 H and Section 3.15.

3.13 CURING AND PROTECTION

A. Protect newly placed concrete against low and high temperature effects and against rapid loss of moisture. Cure all concrete for at least seven days at a temperature of at least 50 degrees F by curing methods approved by the Architect.

B. Vertical or near vertical surfaces may be cured by maintaining wood forms continuously wet during curing period, by wrapping with continuous .006 inch polyethylene with taped joints or as approved by the Architect.

C. Floor surfaces, after hardening sufficiently to prevent damage, and normally within several hours after final troweling, shall be treated with the approved curing cover sheets with taped, lapped seams.

3.14 FORM REMOVAL

A. Forms shall be removed without damage to concrete. The Contractor shall be responsible for the safety of the construction during and after form removal. No act of the Architect shall relieve him of this responsibility.

B. Protect corners from damage after form removal by boxing, corner boards or other means approved by the Architect.

C. Formwork for pilasters, walls, and other parts not supporting the weight of concrete may be removed as soon as the concrete has reached 30% of its specified 28-day strength, but not before 2 days, provided it is properly cured and protected.

D. Foundation walls to retain earth shall not be backfilled until the connecting slabs at the top and bottom of the wall have achieved their 28-day strength. Alternatively, the contractor may provide an engineered wall bracing system to withstand wall earth pressures during construction prior to slab bracing.

3.15 FLOOR LEVELING

A. Place self-leveling concrete underlayment for floor leveling in accordance with manufacturer's recommendations:

1. Remove all dirt, grease, and sealers from existing slab by sandblasting or power washing.

2. Prime and seal entire surface to receive topping. Use bonding agent, applied in strict conformance with manufacturer's instructions.

3. Pour or pump, mixed rough course of underlayment material onto primed area in accordance with manufacturer's instructions, filling areas to within ¾ inch of finish elevation at mid-bay. This rough course shall consist of the underlayment material, mixed with fine gravel aggregate (3/8 inch maximum size), as applicable and as required by manufacturer.

4. After allowing rough course to set, prime with bonding agent and place finished course of underlayment material to within ¼ inch of finish elevation at mid-bay. Protect newly applied underlayment from premature surface drying and moisture loss.

3.16 WATERSTOP

A. Install continuous Bentonite strip waterstop at vertical and horizontal below grade wall construction joints. Installation shall be in accordance with manufacturer's recommendations.

3.17 MASTIC COATING OF EMBEDDED STRUCTURAL STEEL

A. Install mastic coating continuously over steel embedded in concrete or soil in accordance with the manufacturer's recommendations.

3.18 CUTTING OF HOLES

A. Holes required by other trades in any cast-in-place concrete which did not receive sleeves shall be cut by the respective trades. Use a core drilling process or sawing process which produces clean sharp edges and the minimum hole size which accommodates the piping, conduit, or equipment requiring the opening. Field locate all reinforcing bars prior to coring and do not cut bars.

B. Obtain approval of Architect before cutting any holes for any trades.

3.19 FLOOR HARDENING

A. Unless otherwise specified, all interior concrete floors remaining exposed in the finished work shall be treated with a chemical hardener in a three-coat application, not sooner than 28 days after pouring of slab, in accordance with manufacturer's specifications.

3.20 NON-SHRINK GROUT

A. Grout solid all column leveling plates and beam bearing plates in accordance with manufacturer's recommendations.

3.21 ANCHOR ROD BASE PLATE HOLE GROUT

A. Grout solid all oversize brace column steel base plate holes around anchor rods in accordance with manufacturer's recommendations.

END OF SECTION

Division 4
Masonry

SECTION 040001

MASONRY

*(Filed Sub-Bid Required)

PART 1 GENERAL

1.00 TIME, MANNER AND REQUIREMENTS FOR SUBMITTING SUB-BIDS

A. Sub-bids shall be submitted in accordance with provisions of the General Laws (Ter. Ed.), Chapter 149, Section 44A to 44L, inclusive, as amended. The time and place for submission to Sub-Bids shall be set forth under INSTRUCTIONS TO BIDDERS.

B. Each Sub-Bid filed with the Awarding Authority must be accompanied by BID BOND, or CERTIFIED CHECK, or TREASURER'S CHECK, or CASHIER'S CHECK issued by a responsible bank or trust company, payable to the **City of Amesbury**, in the amount stipulated in the INSTRUCTIONS TO BIDDERS. A Sub-Bid accompanied by any other form of bid deposit than those specified will be rejected.

C. Each Sub-Bid submitted for the work, under this SECTION, shall be on a form furnished by the Awarding Authority and required by SECTION 44F of Chapter 149 of the General Laws, as amended.

D. Work to be performed under this SECTION is shown on Contract Drawings numbered:

G.0.01, G.0.02, G.0.04-G.0.08, inclusive; 1.1.01-1.1.14, inclusive; 1.5.01-1.5.06, inclusive; 2.1.00-2.8.03, inclusive; 3.4.01-3.9.15, inclusive; 4.1.01-5.4.11, inclusive; 6.1.00-6.2.01, inclusive; 7.4.01-7.4.03, inclusive; 8.4.01-8.5.03, inclusive; 9.4.01-9.8.07, inclusive; and 10.0.01-10.3.13, inclusive.

Remaining Contract Drawings are included for reference and coordination.

E. LEEDv4-S Requirements:

1. The work of this Section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. For all adhesives and sealants, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a sub-bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following items required to complete the work of this SECTION, as shown on the Contract Drawings and specified herein:

1. Face brick.
2. Ground face (GF-CMU) concrete masonry units.
3. Concrete masonry units, including bullnose corners, cap blocks (2 and 3 sided), bullnose bases (2 and 3 sides), and concrete brick.
4. Colored precast concrete bases, caps, and lintels.
5. Natural stone veneer at site wall.
   Note: Adjustment to the percentage mix of light and medium stones may be required to achieve design intent of medium warm greys.
6. Bluestone cap at site wall.
7. Colored mortar at brick and GF-CMU and regular mortar at CMU.
8. Pointing mortar at precast elements.
9. Grout fill for concrete masonry units and pressed metal frames (in masonry walls), and where required for anchorage of the work of other trades.
10. Drainage fill in exterior cavity of masonry veneer walls, wherever through-wall flashing occurs therein.
11. Membrane through-wall flashing installed in soft mortar joints of masonry exterior cavity walls, including metal drip edge.
12. Reinforcement and anchorage items for masonry work, including horizontal and vertical reinforcing, lintel beam reinforcing, and all grouting except vertical reinforcing imbedded in concrete and/or welded to structural steel. (Refer to Structural Drawings.)
13. Compressible filler for major expansion joints in masonry, in joints between tops of interior masonry partitions and under side of metal decking, and in other locations in masonry as indicated on the Drawings.

B. Furnish the following for installation under the designated SECTIONS:

1. Prefabricated metal anchor slots: SECTION 051200-STRUCTURAL STEEL.
2. Dovetail anchor slots for receipt of dovetail anchors wherever masonry abuts, or is backed by, concrete walls: SECTION 033000-CAST-IN-PLACE CONCRETE.

C. Install the following items as furnished by the designated SECTIONS:

1. Loose Steel Lintels: SECTION 055000-MISCELLANEOUS METALS.

2. Anchor bolts, access panels and other items furnished by other trades requiring same.

3. Anchors for louvers in masonry: SECTION 2300010-HVAC.

4. Sleeves for piping and conduit, as furnished by the Fire Protection, Plumbing, Mechanical and Electrical SECTIONS, unless otherwise specified.

5. Preformed and prefinished sill flashing and base wall flashing to be incorporated into masonry walls at termination of PVC roofing: SECTION 074213-PREFORMED CLADDING.

6. Rigid cavity wall insulation at masonry veneer walls: SECTION 072100-INSULATION.

D. This Subcontractor shall furnish, install and maintain in safe adequate condition all lifts, hoisting, staging and scaffolding that are necessary for the proper execution of the work in this Section.

E. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Construction of mock-up: SECTION 014339-EXTERIOR MOCK-UPS.

2. Temporary protection and temporary heating: SECTION 015000-TEMPORARY FACILITIES AND CONTROLS.

3. Masonry, in conjunction with site utilities: SECTION 334000-STORM DRAINAGE.

4. Roof flashings, fascias and roof pads: SECTION 070002-ROOFING AND FLASHING.

5. Sills of fenestration and wall panels: SECTION 074213-PREFORMED CLADDING and SECTION 080001-METAL WINDOWS.

6. Caulking and sealant materials (including joint bead back-up), and dampproofing: SECTION 070001-WATERPROOFING, DAMPPROOFING, AND CAULKING.

7. Continuous Air Barrier: SECTION 071326-AIR AND VAPOR BARRIERS.

8. Ceramic tile walls and floors in toilets: SECTION 090002-TILE.

9. Drywall back-up system for masonry veneer: SECTION 092116-GYPSUM WALLBOARD.

10. Insulation at top of masonry walls at decking and structural steel penetrations at masonry: SECTION 06100-ROUGH CARPENTRY.

11. Steel seismic clip angles at top of masonry walls: SECTION 050001-MISCELLANEOUS AND ORNAMENTAL IRON.

12. Installation of exterior rigid and semi-rigid insulation behind metal wall panels and rainscreen systems: SECTION 074213-PREFORMED METAL CLADDING, SECTION 074247-FIBER REINFORCED CONCRETE PANEL RAINSCREEN SYSTEM and SECTION 074233-PHENOLIC RAINSCREEN SYSTEM, respectively.

13. Firestopping and smoke stopping (except at top of masonry walls and underside of metal deck): By Trade requiring penetrations thorough walls.

14. Aluminum louvers for mechanical equipment: SECTION 230001-HVAC.

15. Intercom, file alarm, door operator actuators and other electric devices mounted in masonry: SECTION 260001-ELECTRICAL and DIVISIONS 27 and 28.

1.04 SUBMITTALS

A. Submit the following samples in accordance with the requirements of SECTION 013300-SUBMITTALS.

1. Face brick: One full strap in each specified color and size.

2. Ground face CMU: One full unit, for each specified color and size.

3. Concrete masonry unit: One full unit, 7 and 5/8 inches thick of specified size.

4. Precast Concrete: Color samples in full range of manufacturer's colors and one custom color match if subsequently requested.

5. Natural stone: One strap, full color range.

6. Through-wall flashing and drip edge: 12-inch x 12 inch in 12 inch length, respectively, of specified type.

7. Reinforcement, anchors, and ties: One piece of each type specified.

8. Mortar color samples of full range of available colors. Up to 10 real mortar samples mixed with specified mortar in correct proportions of colors chosen from full kit.

9. Bluestone wall cap: (2) samples with specified finish and full color range of the material illustrated.

B. Submit with masonry unit samples complete data and tests for each type of masonry. The Architect reserves the right to request and obtain additional data if required and to reject the proposed materials if not in accordance with the Specifications.

C. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for School v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. Product substitution requests are subject to additional LEEDv4-S submittal requirements. Refer to SECTION 012500-SUBSTITUTION PROCEDURES.

D. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:

1. For structural masonry, include data and calculations establishing average net-area compressive strength of units.
2. Cementitious materials, including brand, type, and name of manufacturer.
3. Pre-blended, dry mortar mixes. Include description of type and proportions of ingredients.
4. Grout mixes complying with compressive strength requirements of ASTM C476. Include description of type and proportions of ingredients.
5. Reinforcing steel bars.
6. Joint reinforcement.
7. Anchors, ties, and metal accessories.

E. Shop Drawings: Show fabrication and installation details for the following:

1. Precast Concrete Trim Units: Show sizes, profiles, anchorage and location of each trim unit required.
2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, “Details and Detailing of Concrete Reinforcement.” Show elevations of reinforced walls.
3. Job specific through wall flashing details.

F. Hot and Cold Weather Masonry Procedures as described in this SECTION.

1.05 MOCK-UP PANEL STRUCTURE

A. After receipt of Architect's approval of above materials, build mock-up panels of typical exterior wall comprised of full range of selected and approved brick veneer, masonry, precast cap, insulation, with specified bond, joints and reinforcing. Refer to SECTION 014339-EXTERIOR MOCK-UPS for panel size and configuration.

B. Provide and install masonry work to exterior wall mock-up panels as shown on the Drawings. Mock-up panel shall include brick, CMU, precast concrete, mortar and all insulation, ties, for a complete masonry installation as shown on the mock-up panel drawings. The final mock-up structure shall be left on site to serve as the reference standard for appearance and workmanship as the work progresses. This subcontractor shall, at no additional cost to the Owner, rebuild the portions of the mock-up furnished and installed under this SECTION using the final approved materials, colors and construction to complete the final mock-up.

C. Refer to SECTION 014339-EXTERIOR MOCK-UPS for sizes, configuration and other requirements for the mock-up panel structure.

D. Approval of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless Architect specifically approves such deviations in writing.

E. Mock-up panel structure will not remain as part of the Work.

F. **Do Not** proceed with masonry work until sample panels have been approved by the Architect. Leave panel on site for comparison with the project workmanship and remove when directed. The Architect reserves the right to require up to three panels to be erected until sample and workmanship is satisfactory to the Architect.

1.06 REFERENCE STANDARDS (LATEST EDITIONS)

A. Comply with the following codes for all materials, methods, and workmanship, not otherwise specified:

1. The National Concrete Masonry Association Standard "Specifications for the Design and Construction of Load Bearing Concrete Masonry."
2. "Recommended Practices for Cold Weather Masonry Construction" by the International Masonry Industry All-Weather Council."
3. Recommendations of the "Brick Institute of America."
4. ASTM C 652 - Standard Specification for Hollow Brick.

B. The above referenced standards are in addition to ASTM and other standards specified herein constitute minimum requirements. In case of conflict between referenced standards and/or with specified requirements, the more stringent requirements shall govern.

1.07 PRODUCT, DELIVERY, STORAGE AND HANDLING

A. Handle and store all materials so as to prevent damage or intrusion of foreign matter.

B. Stack masonry units on platforms. Store masonry under a waterproof cover that permit circulation of air and prevents excessive moisture absorption. Store cement and lime in weather-tight sheds with elevated floors. Locate storage piles to avoid being disturbed or damaged by construction activities.

C. Store metal accessories indoors and protect against rust and other damage.

D. Materials in broken containers or in packages showing watermarks or other evidence of damage, shall not be incorporated in to the work and shall be removed from the site.

E. Do not deliver cement, lime, and similar perishable materials to the site until suitable storage is available. Store such materials in weatherproof structures and ensure that materials are in perfectly fresh condition when brought out for use.

1.08 JOB CONDITIONS

A. Do not erect any masonry when temperature of surrounding area is below 40 degrees F., or below 45 degrees F. and falling, or forecast by public news media to fall, to or below 35 degrees F. within 24 hours except where weather protection materials have been furnished in accordance with SECTION 015000-TEMPORARY FACILITIES AND CONTROLS. Do not use masonry materials which are observed to contain frost or are covered with ice or snow and heat all masonry materials to 40 degrees F immediately before installation. Do not mix anti-freezing or accelerating ingredients with any mortar. Mortar shall not be permitted to freeze, or be damaged from frost, and take down any completed work found to be affected by frost and rebuild without change in the Contract Price.

B. Protect fresh and uncompleted masonry against the elements when not being worked on by the use of non-staining weather proof coverings, properly held in place.

C. Calcium chloride or admixtures containing calcium chloride will not be permitted in the performance of the work of this SECTION.

D. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials.

1. When ambient temperature exceeds 100 degrees F, or 90 degrees F, with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S Materials Reporting Form shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
3. Furnish any adhesives and sealants applied on site and inside the weatherproofing such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 MASONRY MATERIALS

A. Face Brick (New Elementary School):

1. To establish a standard of quality and level of color design, the basis of design brick shall be manufactured by Endicott as follows:
   a. Brick Type 1 (Field) – Ruby Red Blend Velour Norman
   b. Brick Type 2 (Accent – Canopies and as otherwise shown on the drawings) – Medium Ironspot Velour #46 Modular
2. Nominal Dimensions:
   a. Norman Brick: 12 in. long x 2-2/3 in. high x 4 in. deep
   b. Modular Brick: 8 in. long x 2-2/3 in. high x 4 in. deep
3. Units by Endicott, Belden, Carolina Ceramics, Interstate, Sioux City or other manufacturers matching the specified units in color, appearance, physical and performance criteria will be considered for approval as an equal by the Architect upon receipt of adequate supporting data and samples.
4. Face brick shall be hard burned brick with water absorption of not more than 7.87 percent for an average of five bricks when tested by the five-hour boiling test in accordance with American Society of Testing Materials Designation C67 and which shall conform to the requirements of ASTM C216, Grade SW, Type FBA. Test reports to be submitted with samples as follows:
   a. Test reports for each type to be submitted to the Architect.

b. Test reports are to be prepared by an independent testing laboratory.

c. Tests shall include:

1) Compressive strength

2) 24-hour cold water absorption

3) 5-hour absorption

4) Saturation coefficient

5) Initial amounts of absorption (suction)

6) Efflorescence (none allowed)

5. Provide special molded shapes where indicated and for application requiring brick of form, size and finish on exposed surfaces which cannot be produced from standard brick sizes by sawing.

6. For applications resulting in exposure of brick surfaces which otherwise would be concealed from view, provide uncored or unfrogged units with all exposed surfaces finished.

B. Face Brick (Cashman School)

1. To establish a standard of quality and level of color, texture, flash and finish, the basis of design brick shall be manufactured by Morin as follows:

a. Brick Type 3 (Cashman retaining wall) – 50/50 mix: Blackstone / Brownstone water struck modular.

2. Nominal Dimensions:

a. Modular Brick: 8 in. long x 2-2/3 in. high by 4 in. deep.

3. Units by Glen Gery, Ragland or other manufacturers matching the specified units in color, appearance, physical and performance criteria will be considered for approval as an equal by the Architect upon receipt of adequate supporting data and samples.

C. Concrete Masonry Units (CMU) and Concrete Lintel Units

1. CMU shall be purchased from a single manufacturer.

2. Masonry units shall be of standard height, sound, and true to plane and line. Where faces of units remain exposed, extreme care shall be used in handling of such units. Chipped or discolored units will be rejected by the Architect, and such units shall be immediately removed and replaced with undamaged units.

3. Blocks shall be free of all materials which may cause pop-outs and staining.

4. Where a required fire rating is indicated on the drawings, provide units meeting that rating in accordance with the equivalent thickness method of the American Insurance Association.

5. Provide bullnose units (caps and bases) at all outside corners and top of low walls.

6. All CMU shall be Normal weight Concrete Masonry Units (CMU) with the following properties:

   a. Hollow units shall comply with all provisions of ASTM C90-16

   b. Solid units shall comply with all provisions of ASTM C90-16. Refer to Drawings for locations of solid units.

7. LEEDv4-S Requirements: CMU units shall qualify as Regional Materials.

D. Ground Face (GF-CMU) Concrete Masonry Units: To establish a standard of quality, design and color range, specifications and drawings have been based on GF-CMU, ground face finish as manufactured by Jandris and Sons. Similar units by Trenwyth Industries, D'Agostino Building Blocks, and other manufacturers matching the specified physical and performance criteria, colors and appearance will be considered for approval as an equal by the Architect, upon receipt of adequate supporting data and samples.

1. Ground face concrete masonry units (GF-CMU) shall be architectural facing units conforming to ASTM C90-16 and the following requirements:

   a. Solid GF-CMU shall be used where indicated on the Drawings and in any locations where cores would be exposed. All other GF-CMU shall be hollow load bearing.

   b. Refer to the Drawings for ground face lintel blocks and for shapes and dimensions of GFCMU. Provide shapes and sizes shown on the drawings. Custom block shapes shall be either cut or cast to the dimensions shown, with all exposed to view surfaces ground to specified finish.

   c. All exposed faces including ends and outside corners of GF-CMU shall be ground for uniform appearance. Refer to the drawings for locations where both sides of GF-CMU units are exposed and unpainted.

   d. Physical Properties

Hollow GF-CMU	Solid GF-CMU	
2000psi	2000psi	Min. average compressive strength on gross area
0.065	0.065	Max. average drying shrinkage percent
0.75	0.75	Max. saturation coefficient

   Maximum Water Absorption allowed lb. /cu. ft. for oven dry density Normal Weight is 13, Medium Weight is 15, Light Weight is 18 for an average of three units.

   e. Size: GF-CMU units shall be nominally 4 in. x 16 in. x 4 in. and 8 in. x 16 in. x 4 in.

f. Color surface texture and aggregate exposure shall be uniform within the normal range represented by the approved sample wall panel erected at the job site. Colors to be as follows:

1) Exterior: 9300 Series: 9303

2) Interior: Plymouth Series: P-107

g. All GF-CMU shall be sound and free of cracks or other defects.

h. The supplier shall submit a notarized certificate stating that the units supplied will conform to the Specifications set forth herein.

E. Natural Stone Veneer: To establish a standard of quality, design and color range, specifications and drawings are based Fond du Lax "Manor" natural thin veneer stone by Natural Stone Veneers International, Fond du Lac, WI. Similar units matching colors and appearance by Glen-Gery; Adirondack Square Fieldstone", McGregor "Architectural Stone" or other manufacturers will be considered for approval as an equal by the Architect upon receipt of adequate supporting data and samples.

1. Pattern: "Fond du Lac Manor".

a. Height: 4 inches to 12 inches (102 mm to 305 mm).

b. Length: 8 inches to 20 inches (203 mm to 508 mm).

c. Corner Trim Units: To simulate full-bed installation, shall be in a variety of lengths and equal numbers of "long-leg right" and "long-leg left" fabrications.

d. Nominal Thickness: 3/4 inch to 1-1/2 inches (19 mm to 38 mm).

e. Color: Shades of light and warm medium grays in range and proportion of approved samples.

f. Material: Limestone, rated as Type III High Density when tested in accordance with ASTM C 568.

2. Mortar:

a. Cement: ASTM C 270.

b. Lime: ASTM C 207.

c. Sand: ASTM C 144, natural or manufactured.

d. Color Pigments: ASTM C 979, mineral oxide.

e. Water: Potable.

f. Pre-Packaged Latex-Portland Cement Mortar: ANSI A118.4 or ANSI A118.15.

3. Bonding Agent: Acrylic additive.

4. Mortar Mixes:

a. Grouted Joints:

1) Mortar Mix: ASTM C 270, Type S.

2) Add color pigments to mortar in accordance with pigment manufacturer's instructions.

b. Jointless Dry-Stack Installation:

1) Mortar Mix: ANSI A118.4 or ANSI A118.15.
2) Add color pigments to mortar in accordance with pigment manufacturer's instructions.

F. Bluestone Materials for Site Wall Cap

1. General:

a. Bluestone: Full blue: "New York Blue-Blue", free of cracks, seams or starts which may impair its structural integrity or function.

b. Inherent variations characteristics of the quarry from which it is obtained will be acceptable.

c. Color, texture and finish shall be within the range of samples submitted and approved. Submit blue-blue green stone samples.

d. Provide matched blocks from a single quarry or other source for each type, variety, color and quality of stone required. Extract blocks from a single bed of quarry stratum, especially reserved for project, unless stones from randomly selected blocks are acceptable to Landscape Architect for aesthetic effect.

2. Bluestone Wall Cap: Sawn bluestone with 1/8-inch pencil eased top and corner edges, thermal finish all exposed faces.

a. Cap Dimensions: As shown on the Drawings.

3. Latex Grout and Mortar Admixture: "Laticrete 8510" by Laticrete International, Inc. (800) 243-4788.

Physical Properties:

Compressive Strength – 3,500 psi minimum
Bond Strength at 24 hours – 500 psi minimum
Water Absorption – 6 percent maximum

4. Moisture Resistant Mortar Additive: Ammonium stearate, aluminum tri-stearate or calcium stearate.

5. Water: Fresh, clean and non-alkaline water as available from the Contractor. Transport as required.

2.02 MEMBRANE FLASHING MATERIALS

A. Membrane Flashing – Blueskin TWF as manufacturer by Henry Co., W.R. Meadows Air Shield, Williams Products Everlastic MF-40 or an approved equal, a self-adhered membrane specifically designed for use as thru-wall flashing and consisting of an SBS rubberized asphalt compound integrally laminated to a yellow cross-laminated HDPE film, total thickness 40 mils.

5. Include any associated primers, termination sealants and other products required for a complete system.

B. Drip Edge – Installed beneath membrane flashing as it exits the cavity where shown on the drawings, formed stainless steel drip edge as manufactured by Sandell Manufacturing Co., Wire-Bond, RKL Building Specialties or an approved equal. Setting bed sealant shall be Dow Corning 790, Tremco Spectrem 1, Pecora 890, GE Silpruf SCS-9000 NB silicone building sealant or an approved equal.

2.03 MORTAR AND JOINT MATERIALS

A. Mortar shall conform to ASTM C270 "Mortar for Unit Masonry." Refer to paragraph 3.02 for mortar mixes and types.

B. Cement – An approved brand of domestic Portland cement, conforming to ASTM C150, Type I as approved by the Architect. Portland Cement shall be supplied by a single manufacturer throughout the work of this section to assure consistency of results.

C. Sand – Clean, washed, uniformly well graded, conforming to ASTM C144. Sand shall be light in color and obtained from a single source.

D. Lime – Approved brand of plastic hydrated, such as New England 4X, conforming to ASTM Specification C207, Type S.

E. Mortar colorant for all exterior mortar – Horn Staybright, Master Builders Colomix, Flamingo-BRIXENT, based on Solomon Colors A Series or approved equal. Colors shall be:

1. Dark Brown 35H at brick types 1 and 2
2. Portland Cement at ground face CMU.
3. Colors to match existing mortar at brick type 3.

F. Integral waterproofing for all exterior mortar – Omicron Mortar-proofing by the Master Builders Co., "Hydrocide" by C.G. Pardee Co., Inc., Dry-Block by WR Grace or an approved equal.

G. Compressible joint filler – Glass fiber board, six pounds per cubic foot density, 25 percent greater in thickness than width of joint.

H. Mortar Net – High density polyethylene strands woven into a 90% open mesh, 2 in. thick x 10 in. high x 5 feet long, “Mortar Net” by Mortar Net Solutions, No. 84 Weep-thru Mortar Deflector by Heckman, Mortar Trap Weep Vents by Hohmann and Barnard, Inc., or an approved equal.

I. Weep-holes – Rectangular plastic weep holes, 3/8 in. x 1-1/2 in. high x 3 ½ in. long, Hohmann & Bernard “QV-Quadro-Vent”, Heckman “No. 85 Cell Vent”, Sandell Cell Vents, or an approved equal.

J. Latex bonding agent – Shall be non-re-emulsifiable in the presence of moisture and shall have no less than 50% internally plastered solids.

K. Pointing mortar for precast concrete – Pliable sealant with sand finish as follows:

1. Sealant shall be Dow Corning, 790, Tremco Spectrum 1, Pecora 890, GE Silpruf SCS-9000 NB silicone building sealant or approved equal in color(s) chosen by the Architect to match mortar, meeting the following minimum requirements:
   a. TT-S-001543A (COM-NBS) Class A.
   b. TT-S-00230C (COM-NBS) Class A.
   c. ASTM C-290 Type S, Grade NS, Class 50, Use T, NT, M, G, A, O.
   d. SCAQMD, Rule 1168, for low-VOC sealants.
2. Sand – Clean washed sand, color and texture closely matching adjacent mortar.

2.04 GROUT AND DRAINAGE FILL

A. Grout shall conform to ASTM C476 "Grout for Reinforced and Non-Reinforced Masonry," Type Fine.

B. Aggregate for grout shall conform to ASTM C-404.

C. Drainage Fill – 3/8 inch minus washed peastone.

2.05 REINFORCEMENT, ANCHORS AND TIES

A. Reinforcements

1. Reinforcing Steel bars for vertical cell and bond beam reinforcement at CMU shall conform to ASTM 615, Grade 60, in sizes, quantities and frequencies shown on the Drawings.
2. LEEDv4-S Requirement: Steel reinforcing shall be manufactured using minimum 95% recycled content
3. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning concrete masonry unit cells with loops for holding reinforcing bars in center of cells. Positioners shall be formed from 0.142 - inch (3.6 mm) steel wire, hot-dip galvanized after fabrication. Bar positioners shall be: Hohmann & Barnard: #RB or #RB-Twin Rebar Positioner; Heckmann: No. 376 Rebar Positioner; Wire-Bond: O-Ring or Double O-Ring Rebar Positioner or approved equal. Provide units with either two or four loops as needed for number of bars indicated on the Drawings.
4. Continuous horizontal reinforcement of all exterior and interior CMU shall be 9-gauge hot-dip galvanized wire with prefabricated corner and prefabricated tee units provided at all intersections. Width of horizontal reinforcements shall be 1-5/8 inches less than overall wall thickness. Horizontal reinforcement shall be Hohmann & Barnard No. 220 ladder design at vertically reinforced walls and partitions; Hohmann & Barnard No. 120 truss type at all others; or similar products by Heckman, Wire Bond, Tru-mesh, or approved equal.

B. Anchors

1. Rigid Partition Anchor ("Bar ties") at intersecting CMU partitions: ¼ in. x 1-1/2 in. x 2'-0 in. hot dip galvanized steel ties with ends bent two inches and placed 32 inches on center vertically, Hohmann & Barnard: No. 344, Heckman: No. 140, or approved equal.

2. Slotted Anchors at structural steel: hot dip galvanized steel slotted channels (12-gauge by 7-1/2 inches by 3/8 inches) welded to structural steel and compatible hot dip galvanized steel anchors (1/8 inch by 1-1/4 inch in lengths sufficient to turn into masonry web). Hohmann and Barnard: Gripstay Channel System, or similar anchors by Heckman or approved equal. Furnish slotted channels to SECTION 051200-STRUCTURAL STEEL for installation.

3. Anchors welded to structural steel: adjustable hot-dip galvanized steel anchors welded to structural steel and 3/16" hot-dip galvanized diameter box ties with moisture drips. Hohmann & Barnard, No. 359; Heckman Building Products, No. 317, or approved equal. Furnish anchors to SECTION 051200-STRUCTURAL STEEL for installation.

4. Anchors at CMU perpendicular concrete walls: 1/8 in. x 1 in. x 3-1/2 inches, stainless steel or hot dip galvanized, with one end dovetailed and opposite end turned down approximately two inches into block cavity: Hohmann and Barnard: No. 304 or similar anchors by Heckman or an approved equal. Slots for anchors: hot dip galvanized steel, min. 22 gauge of approved design. Hohmann and Barnard: No. 305 galvanized slots or equal. Furnish slots to Section 033000-CAST IN PLACE CONCRETE for embedment into the concrete.

C. Veneer Ties

1. Ties for exterior masonry veneer backed by sheathed LGMF walls shall be thermally broken, two-part screw system. Anchor shall consist a self-drilling threaded screw and barrel shaft with seals to cover holes at the vapor barrier and at the face of the insulation. Length of barrel shaft shall be sized to suit depth of materials penetrated, Pintle type ties shall attach to reinforced plastic wingnut/thermal clip. Ties shall penetrate at least 50 percent of the masonry wythe thickness. Minimum 4 inch size ties, 5 inch where required for specified penetration. Ties shall be Hohmann & Barnard: Thermal 2 Seal Wingnut anchor/2x hook; Heckman: No. 75TC Pos-I-Tie with thermal clip/No. 282 wire ties or approved equal.

2. Ties for exterior masonry veneer backed by CMU & concrete walls where walls are insulated shall be thermally broken, two part screw system . Anchor shall consist a threaded concrete screw and barrel shaft with seals to cover holes at the vapor barrier and at the face of the insulation. Length of barrel shaft shall be sized to suit depth of materials penetrated, Pintle type ties shall attach to reinforced plastic wingnut/thermal clip and shall penetrate at least 50 percent of the masonry wythe thickness. Ties shall be Hohmann & Barnard: Thermal Concrete 2 Seal Wingnut anchor/2x hook; Heckman No. 75TC Pos-I-Tie with thermal clip/ No. 282 wire ties or approved equal

3. Ties of exterior masonry veneer backed by uninsulated concrete walls: (Cashman retaining wall):shall be hot dip galvanized flexible dovetail brick ties: Hohmann & Barnard No. 315 Vee-Byna, or similar anchors by Heckman or approved equal. Slots for dovetail masonry ties shall be hot dip galvanized steel, min. 22 gauge: Hohmann and Barnard No. 305 galvanized slots or equal. Furnish anchor slots to Section 033000-CAST IN PLACE CONCRETE for embedment into the concrete.

4. Ties for interior masonry veneer backed by LGMF gypsum wallboard construction shall be mill galvanized corrugated buck anchor, 14-gauge x 1-½ inches wide, in length as needed for veneer conditions. Hohmann and Barnard No. 345 or similar ties by Heckman or approved equal.

2.06 PRECAST CONCRETE LINTELS, CAPS AND BASES

A. Precast to indicate profiles, from 5000 PSI 5% air entrained concrete, with steel reinforcing and stainless steel dowels and anchorage's. Unless otherwise shown on the Drawings, provide in single lengths. For long continuous sills, provide minimum 8 ft. long segments unless shown otherwise on drawing. Precast concrete shall have second finish. Color shall be equal to MGA Cast Stone: Dove Gray.

B. Reinforcement and stainless steel anchorage, dowels and ties shall be furnished and installed as shown on the drawings and the approved shop drawings, and by job conditions to properly anchor the precast sections.

C. Coordinate fabrication of precast building trim with items by other trades, such as electric clock, ground mounted flagpole lights, flagpole, and fire alarm beacon back box.

PART 3 EXECUTION

3.01 MASONRY WORK IN GENERAL

A. Perform all masonry work with skilled workmen under adequate supervision to assure that the requirements of Chapter 4 of the referenced NCMA specifications are met. Erect all masonry true to lines and levels with joints of uniform thicknesses, all surfaces true, and corners straight and plumb. Lay exposed-to-view masonry block units with an individual unit-to-unit level tolerance not exceeding 1/8 inch and an overall tolerance from true level not exceeding 1/4 inch in 10 feet in any direction. Do not lay any unit having chipped edges or face in exposed-to-view locations. Remove any such unit, if installed, and replace with a new undamaged unit.

B. Perform all cutting of masonry, using power saw with carbide-tipped blade.

C. Examine all Drawings as requirements for the accommodation of work of other trades and Contractors in new masonry, and provide all required recessed, chases, slots, cut-outs and built-in items, for the accommodation of bearing plates and set loose lintels, place anchors, bolts, sleeves, and other items occurring in the masonry work. Every precaution should be taken to minimize future cutting and patching.

D. Protect all masonry from rain prior to, and during, the installation thereof. If the temperature is in excess of 80 degrees F. at time of installation, lightly moisten contact surfaces of masonry units by brushing with water.

E. Lay all masonry in full mortar beds, and completely butter vertical edges with mortar.

F. All masonry shall have a low rate of suction at the time they are placed in the work; to secure this low rate of suction, the masonry shall be thoroughly wetted and not allowed to dry out. The suction of the masonry shall be so reduced that specimen of masonry taken from the scaffold shall not gain more than 0.7 of an ounce (20 grams) in weight when placed in 1/8 to 1/4 inch of water for one minute.

G. Fit masonry into bucks and frames so as not to distort alignment of such items, and fill backs of such items with mortar. Carefully point around all metal frames with mortar, except where joints are specified to receive caulking and sealant, in which case rake joints to a uniform depth of 3/4 inch for proper installation of caulking and sealant materials.

H. All masonry to be used as permanent forms for grout or cast-in-place concrete shall be adequately supported to resist gravity loads and lateral pressures imposed on it during grout or concrete placement and curing.

I. Build in all lintels, sleeves, and anchors as the work progresses.

3.02 MORTAR MIXES

A. General - In proportioning volumetric mixtures, one 94-pound sack of Portland cement and one 50-pound sack of hydrated lime each shall be assumed to constitute a nominal one cubic foot. Do not measure by shovel. Use known measurements. Mix materials in a clean mechanical batch mixer.

1. After the Architect has approved the mortar mix color, mix together a sufficient quantity of materials for the entire project without the use of water. Mix entire quantity of dry materials and combine with water only in quantities that shall be used before hardening.

B. Colored Mortar: Produce mortar of color required by use of selected ingredients. Do not adjust proportions without Architect's approval.

1. Color Pigmented Mortar: Where colored mortar pigments are required do not exceed pigment-to-cement ration of 1-to-10, by weight.

C. Do not use admixtures of any kind in mortar, unless otherwise indicated.

D. Mixes:

1. Mix for masonry exterior veneer (Type N-750 PSI) - One part Portland Cement, one part lime, six (6) parts sand, by volume.
2. Mix for exterior masonry veneer back up and bearing walls (Type S-1800 PSI) - One part Portland Cement, one-half part lime, four parts sand, by volume.
3. For reinforced masonry use Type S mortar, minimum 1800 psi at 28 days. Mortar proportions by volume shall be one part Portland Cement; over ¼ to ½ part hydrated lime; and not less than 2-1/4 and not more than 3 times the sum of the volumes of cement and lime shall be aggregate.

E. Mortar Preparation

1. Mixing the lime, cement and sand shall be carefully measured and well mixed together dry. The minimum amount of water necessary to produce a workable mix shall be used.

F. No pre-bagged mixes are allowed.

3.03 REINFORCEMENT AND ANCHORAGE

A. Install horizontal and vertical reinforcing for the following conditions:

1. All exterior concrete masonry walls.
2. All interior concrete masonry walls which enclose stairwells and elevator shafts.
3. All other concrete masonry walls as shown on the drawings.
4. Refer to structural drawings for other requirements.

B. Install specified continuous reinforcement in all masonry walls and partitions, spacing the reinforcing not more than 16 inches on center (8 inches where indicated on the drawings), vertical dimension, commencing one course above supporting concrete slabs or walls as applicable. Install additional reinforcement over all exterior and interior openings in first joint above opening unless otherwise shown on the Drawings and extending 24 inches minimum beyond each side of opening. Lap all reinforcement 8 inches minimum. Install preformed reinforcement ladder units at intersections of all masonry walls and partitions and wherever walls and partitions change directions.

C. Install specified anchors, for ends of masonry to concrete, masonry backed by concrete, and masonry to column surfaces, spacing the anchors not more than 16 inches on center, vertically. Provide written instructions for proper spacing of anchors on steel columns and beams to structural steel fabricator when furnishing the anchors for shop-welding to the columns. Coordinate placement of dovetail anchor slots ensuring that such slots are properly located and securely installed in the forms under the work of SECTION 033000-CAST-IN-PLACE CONCRETE, before the concrete is poured.

D. Install veneer ties for exterior and interior face brick and CMU veneer at metal stud back up at 16 inches on center vertically and 16 inches on center horizontally. Secure anchors through rigid insulation and gypsum sheathing into metal studs according to manufacturer's recommendations. Dab mastic or caulk on heads of screws.

3.04 GROUT

A. Fill solid only the voids of concrete masonry units which are to receive vertical reinforcing unless noted otherwise on the Drawings. Grout shall have a minimum compressive strength of 3000 psi after 28 days.

B. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C-143.

C. Refer to structural drawings for other requirements.

3.05 BONDS AND JOINT TREATMENTS

A. Bonds (unless otherwise shown on the drawings):

1. Exterior brick veneer – Running bond (Refer to Drawings).
2. Concrete masonry units – Running bond.
3 GL-CMU – Running bond (Refer to Drawings).

B. Joints:

1. Mortar joints for face brick and masonry shall be concave joints.

2. Control joints, and other vertical joints indicated on the Drawings to have compressible filler – Terminate all reinforcing at each side of joint.

   Install compressible filler against one side of joint, securing in place with spots of specified insulation adhesive, and maintaining outer edge of filler back 3/4 inch to receive sealant and bead back-up. Erect masonry of abutting wall with compression against filler to achieve a uniform joint width for full height of wall. Unless otherwise shown on the Drawings, spacing of control joints in exterior masonry veneer shall not exceed thirty (30) feet on center.

3. Joints at tops of interior masonry partitions – Install compressible filler between top of partition and underside of deck or structural member above, keeping edges of filler back 1/2 inch from each face of partition.

4. Joints of all exposed-to-view CMU – Not designated to have compressible filler inserted therein - Fill with mortar, strike off flush, and tool to smooth and dense surface, using a concave joint tool.

5. Concealed-from-view joints of masonry – Fill with mortar and strike off flush and tool to smooth and dense surface using concave joint.

6. All head joints and bed joints in both face CMU and back-up work shall be completely filled with mortar. No slushing shall be allowed.

C. Precast concrete joints:

1. All precast concrete units shall be set by experienced masons, accurately and in accordance with the shop and setting drawings. Unless otherwise noted, every unit shall be set in a full bed of mortar with all vertical joints flushed full. All anchors and dowels shall be firmly placed and all anchor holes and dowel holes and similar holes filled completely with mortar.

2. When setting with mortar, all units not thoroughly wet shall be drenched with clear water prior to setting.

3. After each unit has been set, all joints shall be raked to a depth of 3/4" from the face for pointing. The face of each unit shall then be sponged off to remove any splashed mortar or mortar smears.

4. Only the ends of lugged sills shall be embedded in mortar. The balance of joint shall be left open until pointing of precast work, then tuck pointed in face only to a depth of ¾ inches.

5. Apply sealant and caulking material in joint using a hand caulking gun or power gun with a gun nozzle of proper size and sufficient pressure to completely fill joints. The depth of sealant and caulking materials shall be in accordance with the recommendations of the materials manufacturer for the specific joint function but in no case shall exceed 5/8 inch depth, not be less than 1/4 inch wide, regardless of the width of the joints. Tool with a dry tool only. Do not use detergents or soapy water for tooling operations. Joints shall be given a slight concave surface. Remove masking tape immediately after tooling and/or before sealant and caulking material has taken initial set.

   a. Do not apply materials when temperatures are below 40 ^{o}F without prior approval of the Architect.

b. Primer, if used, shall be maintained within the joint area and not allowed to over-lap on adjacent surfaces.

c. Before sealant has cured, finish surface with sand mixture to match mortar appearance. Sand shall be worked into surface of uncured sealant.

3.06 WALL AND PARTITION CONSTRUCTION

A. General:

1. Build the walls and partitions in the various combinations and thicknesses as indicated on the Drawings and as herein specified.

2. Build in continuous reinforcement, vertical reinforcing rods, anchorage items, and loose lintels, as the work progresses.

3. Fill cells of masonry units with mortar wherever anchors, grout and reinforcing rods are to be installed therein. Fill pressed metal frames, occurring in masonry, with mortar, as the masonry is erected. Fill cores of masonry units in other locations where so indicated on the Drawings.

4. Refer to the Drawings for locations and partitions and walls where surfaces of masonry units will be exposed to view. Take special care in laying up such partitions and walls to assure that specified face tolerances are met.

5. Lightly stone all concrete masonry units, after erection, to remove all projections and loose mortar, and follow up with dry brushing.

B. Exterior Walls:

1. Insulation shall be installed in strict accordance with manufacturer's recommendations. Joint tape and adhesive shall be compatible with the air and vapor barrier.

2. Provide weep holes in mortar joints of exterior masonry veneer spaced 32 inches on centers, wherever through-wall flashing occurs. Install mortar netting, membrane and metal drip in accordance with manufacture recommendations.

3. Membrane Flashing, Installation:

a. All surfaces receiving through-wall flashing shall be thoroughly dry, free from loose material and reasonably smooth. There shall be no slopes that form pockets or prevent free drainage of water to the exterior.

b. Install self-adhering membrane flashing in strict conformance with the manufacturer's instructions.

c. Flashing shall be carried through or up the walls, as indicated on the Drawings. Flashing shall extend up the wall construction, behind the cavity insulation, a minimum of 8 inches and beyond each side of openings and turned up at the sides a minimum of 8 inches, forming a pan. Extend outer edges of flashing 1/4 inch beyond the face of walls and turn down exposed flashing. Seal the upper edge to the air and moisture barrier furnished and installed by SECTION 071326-AIR AND VAPOR BARRIER.

d. Where membrane through-wall flashing is in combination with solid metal flashing, membrane flashing shall be placed over the metal flashing.

4. In general, erect the lowest course of face masonry up to top of foundation walls before commencing installation of back-up units.

5. Lay first course of back-up masonry units on a smooth bed of mortar, after supporting slab has been cleaned. Fill cells of first course with mortar to full height of the masonry unit.

6. Erect two courses of back-up units, installing continuous reinforcing therein, before commencing installation of insulation and face masonry. Strike off all excess mortar from faces as the work progresses.

7. At cavity walls, keep the space between wythes clear of all mortar drippings by catching them on metal or wood strips. Place wood strips temporarily on the continuous reinforcing, or anchors, as applicable, and then pull up and clear off the accumulated drippings before placing the next layer of reinforcing or row of anchors, as applicable.

8. Repeat procedures specified in subparagraphs 4, 5, 6, and 7 for full height of exterior walls, except where differing condition is indicated on the Drawings.

C. Interior Partitions:

1. Refer to the Drawings for the various partition conditions.

2. Erect partitions in accordance with the requirements specified under Article 3.03, installing continuous reinforcement 16 inches on center, vertical dimensions, and using the bond and joint treatments specified herein before. Install all specified types of anchors at a spacing not to exceed 16 inches on centers, vertical dimension, and 24 inches on center, horizontal dimension.

3.07 STONE VENEER INSTALLATION

A. Prepare for Installation Over Concrete Masonry Units: Ensure concrete masonry unit wall assembly is sound, without defects, and properly cured to accept adhered masonry veneer setting material.

1. Examine and remove contaminants including dirt, dust, stains, paint, organic matter, form-release agents, and other substances that may inhibit mortar bond.

2. Mortar: ANSI A118.4 or ANSI A118.15 to adhere stone to concrete masonry unit wall assembly

B. Install natural thin veneer stone and mortar in accordance with manufacturer's instructions and ACI 530.1/ASCE 6/TMS 602.

C. Sort and install irregularly shaped stones to form a tight web of interlocking pieces with a maximum grout joint width of 3/8 inch. Corners shall be installed to form the appearance of a solid stone wall, alternating between small and large stones on front and side faces of the wall.

D. Cleaning:

1. Keep face of stone free of mortar as work progresses.
2. If residual mortar is on face of stone, allow to dry partially and brush mortar off surface and sponge off residue.
3. When work is completed and mortar has set for two to three days, clean surface from top to bottom using mild masonry detergent acceptable to stone manufacturer. Do not use harsh cleaning chemicals or methods that could damage stone. Do not use metal brushes or acids for cleaning.

E. Protect installed natural stone veneer to ensure that except for natural weathering, stone will be without damage or deterioration at time of Substantial Completion.

3.08 CLEANING AND POINTING OF MASONRY

A. During the progress of the work, keep the exposed surfaces of masonry clean at all times and protected against damage. Upon completion of masonry and adjoining work likely to damage the masonry, and when directed by the Architect, clean the exposed surfaces thoroughly using bristle brushes and sufficient amounts of fresh and clean water. Wire brushes shall not be used. Cleaning compounds, soaps, detergents, and acids may be used only when specifically approved and as directed by the Architect. All cleaning operations shall proceed from the top down.

1. Face Brick – Perform final cleaning with special detergents and water, and if they fail to completely remove grouting or mortar stains, use a solutions and stiff bristle brushes to remove residual stains. Brick shall be thoroughly saturated prior to applying the acid solution, and the brushes washed and solution changed frequently to avoid transferring the stains to other locations. Work shall proceed from top downward and thoroughly rinsed off with clean water as each section is cleaned. The masonry subcontractor shall be responsible for any damages to this or other work caused by the cleaning process.
2. Concrete Masonry Units – Perform final cleaning by scrubbing with a stiff bristle fiber brush and mild detergent with water. Rinse all surfaces thoroughly with clean water.

B. As the cleaning progresses, examine all face joints in exposed masonry to locate cracks, holes, or other defects and point up all such defects and fill with mortar. Where necessary, in the opinion of the Architect, cut out defective joints and masonry units and replace with new materials, exercising extreme care to match original work.

C. Foregoing shall be in addition to, and not in lieu of, any specific requirements for cleaning of masonry as specified hereinafter under different paragraphs.

3.09 FIELD QUALITY CONTROL

A. Owner will engage a qualified independent testing agency to perform field quality control testing indicated below.

1. Owner will make payment for these services.
2. Retesting of materials failing to meet specified requirements shall be performed at Sub-Contractor's expense.

B. Testing Frequency: Tests and evaluations listed in this Article will be performed during construction for each 5,000 sq. ft. of wall area or portion thereof.

C. Mortar properties shall be tested per ASTM C780.

D. Grout will be sampled and tested for compressive strength per ASTM C1019.

E. Concrete Block Tests: For each type of concrete masonry unit indicated, units will be tested according to ASTM C140.

END OF SECTION

Division 5
Metals

SECTION 050001

MISCELLANEOUS AND ORNAMENTAL IRON

*(Filed Sub-Bid Required)

PART 1 GENERAL

1.00 TIME, MANNER AND REQUIREMENTS FOR SUBMITTING SUB-BIDS

A. Sub-bids shall be submitted in accordance with provisions of the General Laws (Ter. Ed.), Chapter 149, Section 44A to 44L, inclusive, as amended. The time and place for submission to Sub-Bids shall be set forth under INSTRUCTIONS TO BIDDERS.

B. Each Sub-Bid filed with the Awarding Authority must be accompanied by BID BOND, or CERTIFIED CHECK, or a TREASURER'S CHECK or CASHIER'S CHECK issued by a responsible bank or trust company, payable to the **City of Amesbury** in the amount stipulated in the INSTRUCTIONS TO BIDDERS. A Sub-Bid accompanied by any other form of bid deposit than those specified will be rejected.

C. Each Sub-Bid submitted for the work, under this SECTION, shall be on a form furnished by the Awarding Authority, and required by SECTION 44F of Chapter 149 of the General Laws, as amended.

D. Work to be performed under this SECTION is shown on Contract Drawings numbered:

G.0.01, G.0.02, G.0.04-G.0.08, inclusive; 1.1.01-1.1.14, inclusive; 1.5.01-1.5.06, inclusive; 2.1.00-2.8.03, inclusive; 3.4.01-3.9.15, inclusive; 4.1.01-5.2.07, inclusive; 5.4.01-5.4.11, inclusive; 5.6.01-5.6.13, inclusive; and 6.1.00-6.1.03, inclusive.

Remaining Contract Drawings are included for reference and coordination.

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a sub-bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following, as shown on the Drawings and specified herein:

1. Interior steel stairs, intermediate landings and landing support structure. Fabricated steel posts in conjunction with “low height” metal stud partitions and millwork and lockers at project areas and Pre-K and Kindergarten and other classrooms as shown on the Drawings.

   a. Stainless steel stair railing/guardrail system, including but not limited to stainless steel flat stock, stainless steel infill wire panels with perimeter stainless steel and mounting brackets, stainless steel wall railings with stainless steel mounting supports and prefabricated rail supports. Stringers at Stairs A, B and C: primed HSS steel tubes.

   b. Stainless steel ramp and wall railings at cafeteria platform.

   c. Galvanized roof access stair including but not limited to: channels, bar grate, checker plate nosing, pipe and flat stock bar.

2. Interior steel ladder at elevator pit and bar grate cover for elevator sump.

3. ~~Stainless~~ Steel seismic clip angles at top of masonry partitions.

4. Galvanized steel access ladder and railings, roof access pipe rail and roof railing.

5. Steel pipe support system for swing at ceiling in PT and Rise Motor Room.

6. Steel bench brackets and legs at underside of Stair A.

7. Galvanized steel stair tread nosings.

8. Exterior galvanized and stainless steel railings and guardrails throughout the site.

~~9. Skateboard deterrents~~

9. All other items designated “SECTION 050001” “MISCELLANEOUS AND ORNAMENTAL IRON” or “MISCELLANEOUS IRON” on the Drawings.

B. The work of SECTION 055000-MISCELLANEOUS METALS shall be included in the sub bid for this SECTION.

C. Perform all shop painting and touch up after erection, as specified hereunder.

D. Furnish the following, for installation under the designated SECTIONS.

1. Anchor bolts, inserts and sleeves, required to attach miscellaneous iron items to concrete and masonry: SECTION 033000-CAST-IN-PLACE CONCRETE and SECTION 040001-MASONRY.

E. Unless otherwise noted on the Drawings or specified herein, all exposed steel that is not painted or protected by cladding, shall be hot dip galvanized, including all fasteners.

F. This subcontractor shall furnish, install and maintain in a safe, adequate condition all lifts, hoisting, staging and scaffolding that are necessary for the proper execution of the work of this SECTION.

G. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. For all paints and coatings, meet the LEED-S requirements for IEQ Credit 2, Low-Emitting Materials and as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Exterior metal fencing: SECTION 323100-FENCING.
2. Break metal angles and other fasteners at interior millwork: SECTION 062000-FINISH CARPENTRY.
3. Steel angles, clips and plates at windows, storefronts and curtainwalls: SECTION 080001-METAL WINDOWS.
4. Free-standing exterior signs: SECTION 101453-TRAFFIC SIGNAGE.
5. Vehicle gates: SECTION 323100-FENCING
6. Decorative site bollards: SECTION 323000-MISCELLANEOUS SITE IMPROVEMENTS.

1.04 STRUCTURAL REQUIREMENTS (MASS BUILDING CODE)

A. Metal stair assembly shall carry a minimum uniform live load of 100 pounds per square foot of projected plan area, or a minimum concentrated load of 300 pounds on an area of 4 square inches applied at the center of any tread span, whichever produces the greater stresses. Limit deflection of treads, platform, and framing members to L/360.

B. Handrails, guards, railings and barriers around stairways, stairwells, balconies, and other floor openings, both exterior and interior, including frameless glass railing systems, shall be designed to resist a concentrated load of at least two hundred (200) pounds applied in any direction at any point of the top rail, and they shall also be designed for a uniformly distributed load of fifty (50) pounds per linear foot applied in any direction at any point at the top rail. These loads need not be assumed to act concurrently.

C. Intermediate rails (all rails except hand rail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot including openings and space between rails. Reactions due to this load are not required to be superimposed with those indicated above.

1.05 SUBMITTALS

A. Submit the complete shop drawings in accordance with the requirements of SECTION 013300 – SUBMITTALS.

B. Include large-scale plans, elevations and details of items specified herein, showing proposed methods of anchorage to surrounding structure.

C. Include with shop drawings all engineering calculations for all items specified herein and their connections furnished under this Section, **prepared and stamped by a Structural Engineer registered in the Commonwealth of Massachusetts**.

D. Each field piece shall be marked plainly with suitable erection marks, which shall also be shown on the shop drawings.

E. Submit notarized certificate of compliance from the galvanizer, stating requirements for galvanizing specified herein have been met.

F. Certification - Prior to commencing installation of materials required hereunder, furnish the Architect with certification that requirements pertaining to shop painting have been performed in the manner specified.

G. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

H. Structural Performance of Ladders: Provide ladders capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3

I. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

J. LEED for Schools submittal requirements:

1. Relevant supporting documentation by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

1.06 JOB CONDITIONS

A. Be responsible for location and levels of all work of this SECTION, except such parts as may be delivered to others and set by them. In such cases assist them in properly locating said parts.

B. Furnish anchorage items and other items required to be built into the concrete or masonry to the job at the proper time and include instructions and/or templates for their installation.

1.07 QUALITY ASSURANCE

A. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

1. The engineer shall make two visits to the site (once during installation and once after completion of the work) to inspect their respective components for conformance with the shop drawings.

B. Engineer Qualifications: A structural engineer who is registered in the Commonwealth of Massachusetts and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of metal fabrications that are similar to those indicated for this Project in material, design, and extent.

C. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated. 1. Preassembled Stairs: Commercial class. 2. Ornamental Stairs: Architectural class.

D. NAAMM Railing Standard: Reference NAAMM AMP-521, "Pipe Railing Systems Manual" for design of railings.

E. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.6, "Structural Welding Code--Stainless Steel."

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S Materials Reporting Form shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) Steel shall be produced using an average minimum 65% recycled materials.
2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) Steel shall be fabricated within 500 miles of the project site.
3. IEQ Credit 2, Low-Emitting Materials: meet the requirements for IEQ Credit 2 and as defined in of SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 METALS AND METAL TREATMENTS

A. General

1. Standard products meeting the detailed requirements of the miscellaneous and ornamental iron items required hereunder will be considered for approval by the Architect.
2. Provide all supplemental parts necessary to complete each miscellaneous metal item whether or not such parts are shown and specified. Provide all anchorage for securing the work required hereunder.
3. Provide only new metals, free from defects impairing strength, durability, and of the commercial quality specified.
4. Curved work shall be true to radii, with smooth finished surfaces unless otherwise specified.
5. Provide fastenings of the same material, color and finish, as the metal to which applied unless otherwise noted.

B. Steel shapes, plates, and bars - Conforming to the requirements of Standard Specifications for Steel for Bridges and Buildings, ASTM Designation A 36.

1. Minimum 3/8 inches thick full depth fitted stiffener plates shall be provide in the webs of all channel stringers to align with railing posts above.

C. Steel pipe – ASTM A53 schedule 40 or stronger, seamless steel, of the sizes indicated on the Drawings, galvanized when used on exterior, of sufficient strength to meet the structural requirements of this SECTION.

1. Stainless steel pipe and fittings shall be Schedule 40 (Schedule 80 at PT swing), type 304, ornamental grade with a No. 4 satin finish.

2. Stainless steel wire cable shall be minimum 9 gauge.

D. Pipe sleeves - Hot-dipped galvanized steel, having inside dimension of 1/4 inch greater than outside diameter of post to be inserted therein.

E. Hydraulic cement, for installing bolts and fastenings into masonry and concrete - Quick setting, non-staining type.

F. Bolts, nuts, and washers for field or shop connections - Galvanized, to comply with ASTM B 633, Class Fe/Zn 5, nuts re-tapped to fit, for all galvanized structural steel elements.

G. Guard infill mesh panels – "Aura 8155 Designer Mesh", by McNichols. Similar products made of stainless steel wire by Balco, Inc.; P&P Artec or others will be considered for approval by the Architect upon receipt of adequate product data and samples.

1. Material: Stainless steel type 316,

2. Weave type: Rigid cable style weave, 62% open

3. Component wire: .120 in. (8 ga) warp wire at .283 in. on center and .092 in. (11ga) weft wire at 2.87 in. on center.

H. Bar Grating – To establish a standard of quality, design and function, bar grating shall be as manufactured by McNichols, Tampa, FL. Similar products by FS Industries, Nucor Grating or others will be considered for approval by the Architect upon receipt of adequate product data and samples.

1. Material: Galvanized steel, smooth surface, 11W4 welded bar grating with 3/16 inch rectangular bearing bars spaced 11/16 inch between centers with cross bar at 4 inches and ½ inch clear openings. Bars shall be 1 inch in height.

2. Grating shall comply with IBC 1011.7.1 Stairway Walking Surface, Exception 1.

3. Openings shall be placed so that the long dimension is perpendicular to the path of travel.

4. Accessories:

   a. Checker plate nosing

   b. 3-inch toe kick welded to tread / landing

I. Prefabricated Handrail Bar Brackets: To establish a standard of quality, design and function, bar brackets shall be as manufactured by Wagner Industries, Milwaukee, WI. Similar product by others will be considered for approval by the Architect upon receipt of adequate product data and samples.

1. Handrail bar brackets shall consist of bracket saddle, bracket arm and 3-inch bracket base.
2. Brackets shall be fabricated of the same material as the supported handrail.
3. Brackets shall be equal to Wagner RB1503.4 stainless steel at all locations except Stair D, where they shall be Wagner RB14030 with galvanized finish.
4. No snap-on cover shall be provided at any location.

J. Galvanizing - All metal fabrications indicated to be galvanized on the Drawings or specified hereunder to be galvanized, shall conform to the requirements of the latest edition of the following ASTM Reference Standards: A123, A153, A143, A384, A385 and A780. Fabricated steel shall be galvanized by the hot-dip process conforming to the requirements of ASTM A123, latest edition with the addition of .05 to .09 percent nickel and other earthly materials to the galvanizing kettle forming an alloy, DELTAGALV by Duncan Galvanizing or an approved equal meeting all requirements of this specification. Provide thickness of galvanizing specified in referenced standards. To prevent flux inclusions and entrapment, the steel shall be immersed in a bath of zinc ammonium chloride prior to galvanizing. The use of the wet kettle process shall be prohibited.

Wherever possible, perform galvanizing after assembly of items. Only where items are too large for galvanizing tanks will galvanizing before assembly be acceptable. Each galvanized piece shall bear the stamp of the galvanizing processing firm indicating the ASTM Specification Number and the weight of the nickel zinc coating per square foot.

K. Shop priming paint for non-galvanized steel (Grey) - Tnemec 37 H-78 high solids, Benjamin Moore SuperSpec HP (P06) Alkyd Metal Primer, PPG Pit Tech Plus, or an approved equal.

L. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

M. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails unless otherwise indicated.

N. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

O. Expansion bolts shall be Hilti Kwik Bolt TZ Expansion Anchors; Strong Bolt by Simpson Strong Tie; or Wedge Bolt by Powers Fastening Systems or an equal approved by the Architect.

P. Epoxy injection anchor bolts shall be Hilti HIT Adhesive Anchors, ET with Set XP Epoxy Adhesive Anchors by Simpson Strong Tie, PE 1000 Epoxy Adhesive Anchor System by Powers Fastening Systems or an equal approved by the Architect. Use renovation screens when bolting to hollow substrate.

PART 3 EXECUTION

3.01 WORKMANSHIP AND FABRICATION

A. Shop-fabricate items wherever practicable, accurately fitting all parts and making all joints fit tight.

B. Grind all edges of bar and plates completely free from nicks and machine marks, prior to galvanizing and/or shop priming.

C. Make all welds in a continuous manner, using equipment and methods which are recognized to be the best in modern practice. Grind all welds completely smooth and to the surface plane of the base metals. Perform welding work prior to galvanizing in all cases, except where field welding is necessary, in which case completely coat all such welds in a cold liquid galvanizing, Z.R.C., Galvicon, Zirp, or approved equal, after performing grinding operations.

1. Welds in stainless steel handrails, guards and PT swing support system shall be ground and polished to match adjoining material. The satin texture of the final polishing operation shall be uniform and smooth without discoloration.

D. Draw up all threaded connections tightly, after butting same with pipe-joint compound, to exclude water.

E. Use only screws and bolts of sufficient size to assure against loosening from normal usage of miscellaneous metal items furnished hereunder.

F. Wherever the underside of steel pan stair construction is exposed to view, seams shall be either continuously welded or a seam sealer applied before the concrete fill is placed, to eliminate ongoing leaks and streaking on the exposed underside.

3.02 RAILINGS IN PIPE SLEEVES

A. Insert vertical pipe rail members into sleeves, shim with lead wedges, and fill the sleeve with hydraulic cement, level with the surrounding surface. Set sleeves to a depth of six inches, minimum.

B. Handrails – To withstand loads specified in Article 1.04.

3.03 SHOP PAINTING AND TOUCH-UP OF NON-GALVANIZED STEEL

A. Surface preparation of steel – Thoroughly clean all steel of all mill scale pits and blemishes by power wire brushing or sand-blasting. Remove all rust, dirt, weld flux, weld splatter, and other foreign matter by wire brushing or scraping (power wire brushing, if necessary). Grind smooth all projections. Remove oil and grease deposits with solvent.

B. Shop Painting – All non-galvanized steel members shall be painted before shipping. All surfaces shall be painted except surfaces which are to be welded, and surfaces to be encased in masonry. Paint shall be applied thoroughly and evenly on the surfaces and worked in to the joints and other open areas on the surfaces. Primer shall be applied in accordance with coating manufacturer's recommendations to provide a minimum dry film thickness per coat of prime paint 3.0–3.5 mils.

C. Touch-up – After erection, repeat surface preparation of steel at all areas affected by erection. Remove scale, blemishes, dirt, weld flux and weld splatter and other foreign material by wire brushing or scraping. Touch-up all abrasions, scarred areas and field welds with compatible primer meeting requirements of IEQ 4.2.

END OF SECTION

SECTION 051200

STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. The work of this Section consists of furnishing and erecting all structural steel and Exposed to View Structural Steel (EVSS) as shown on the Drawings and as specified herein and includes, but is not limited to, the following:

1. Leveling plates and anchor rods.
2. Columns with base plates and connections.
3. Beams with connections.
4. Moment Connections
5. Channels, angles, plates, frames, anchors, and other similar pieces.
6. Steel bracing with connections.
7. Shop paint and field touch-up paint after erection.
8. Galvanizing.
9. As-Built column and base plate surveys.
10. Relieving angles and connections.
11. Thermal isolation pads, bushings, and washers.

All structural steel that is exposed in the finish work shall be Exposed to View Structural Steel (EVSS) as noted on the drawings. Coordinate locations of EVSS with Architectural Drawings.

B. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEED v4-S Certification. LEED v4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEED v4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. For all paints and coatings, meet the LEED requirements for IEQ Credit 4.2 and as defined in Subparagraph 2.04 of Section 018113 – SUSTAINABLE DESIGN REQUIREMENTS.

3. For all paints and coatings, submit industry-wide (generic) EPDs or product specific Type III EPDs.

C. Items to Be Furnished Only: Furnish the following items for installation by the designated Sections:

1. Section 033000 - CAST-IN-PLACE CONCRETE: Anchor rods, embedded plates with bolts or anchors, as indicated on the Drawings.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Related work shall be performed under the following Sections:

1. Section 033000 CAST-IN-PLACE CONCRETE.
2. Section 040001 MASONRY.
3. Section 050001 MISCELLANEOUS AND ORNAMENTAL IRON.
4. Section 051226 SHEAR CONNECTORS.
5. Section 052100 STEEL JOIST FRAMING.
6. Section 053100 STEEL DECKING.
7. Section 055000 MISCELLANEOUS METALS.
8. Section 090007 PAINTING.
9. Section 071820-SPRAY APPLIED FIREPROOFING

1.04 REFERENCES (LATEST EDITIONS)

A. "Code of Standard Practice for Steel Buildings and Bridges – 2010" and "Specifications for the Design, Fabrication and Erector of Structural Steel Buildings - 2010" by the American Institute of Steel Construction.

B. The "Seismic Provisions for Structural Steel Buildings - 2010" by the American Institute of Steel Construction, Inc.

C. The "Steel Construction Manual" by the American Institute of Steel Construction, Inc.

D. The "Structural Welding Code – Steel - 2010" by the American Welding Society.

E. The "Specifications for Structural Joints Using High Strength Bolts - 2009" by the Research Council on Structural Connections (RCSC).

F. ASTM listed standards by the American Society for Testing and Materials.

G. SSPC listed standards by the Steel Structures Painting Council.

H. In case of conflict between the References and the Project Specification, the Project Specification shall govern. In the case of conflict between References, the more stringent shall govern.

I. When compliance with any such References is specified herein for materials or a manufactured or fabricated product, the Contractor, if requested, shall furnish an affidavit from the manufacturer or fabricator certifying that the materials or product delivered to the job meets the requirements specified. However, such certification shall not relieve the Contractor from the responsibility of complying with any added requirements specified herein.

1.05 SUBMITTALS

A. Submit complete Shop Drawings in accordance with the provisions of SECTION 013300 - SUBMITTALS. One set of printed shop drawings shall be delivered to the Structural Engineer within 24 hours of submitting the electronic version of those shop drawings.

B. Before starting the work of the Shop and Erection Drawings, the steel fabricator shall have their representatives contact the Architect and Structural Engineer to discuss connection details, schedules, shop procedures, materials, and other concerns related to structural steel work.

C. Prior to preparation of Shop Drawings, the fabricator shall submit typical details and calculations of all structural steel and Exposed to View Structural Steel connection types including, but not limited to, moment connections, beam to column and beam to girder connections, truss connections, column splices, beam splices, bracing connections, hanger connections, and other similar details, for approval by the Architect and Structural Engineer. Design of all connections is to be provided by the fabricator, under the supervision of a registered, professional structural engineer, registered in the state of Massachusetts.

D. Prior to submission of Shop Drawings, Contractor shall verify all dimensions, site conditions, and other similar pertinent information relating to existing conditions. Any discrepancies which affect the structural design or details shall be brought to the attention of the Architect and Structural Engineer.

E. No variance from design sizes and details will be permitted on submitted Shop Drawings, but requests for modifications of connection type or details to better suit their shop practice, or for any other reason, will be considered by the Architect and Structural Engineer.

F. Shop Drawings shall include all information required for fabrication of the component parts of the structure. Erection drawings shall clearly indicate all EVSS members. They shall indicate size and weight of members, surface preparation, type and location of shop and field connections, the type, size and extent of all welds. Identify grinding, finish and profile of welds. The welding symbols used on the Shop Drawings shall be as adopted by the American Welding Society. Identify type, size, finish and length of bolts, distinguishing between shop and field bolts. Indicate direction of bolt head orientation at connections for all EVSS members.

G. Approval of Shop Drawings will be for size and arrangement of principal and auxiliary members and for strength of connections. Any errors in dimensions shown on the Shop Drawings shall be the responsibility of the Contractor.

H. Fabrication of any material or performing of any work prior to the final approval of the Shop Drawings shall be entirely at the risk of the Contractor.

I. Certification - Prior to commencing installation of materials required hereunder, furnish the Architect with certification that requirements pertaining to shop painting have been performed in the manner specified.

J. Reproduction of structural plans, sections and details, and any like information by reprographic or electronic methods for use as Shop and Coordination Drawings is subject to the following conditions:

1. The entity producing the Shop and Coordination Drawings (The “User”) agrees to accept the reproduced information from Foley Buhl Roberts & Associates Inc. without any warranties, guarantees and/or representations of any nature whatsoever regarding the correctness, dimensional and/or quantitative accuracy and/or completeness of any such information contained therein.
2. The User further agrees that such information shall be used as reference material only for the production of Shop and Coordination Drawings for the referenced project to which this Specification applies and only for that project.
3. The User further agrees to release, indemnify, hold harmless and defend Foley Buhl Roberts & Associates Inc. with respect to any claims, costs (including the cost of litigation), losses, damages and/or liabilities which arise from (or relate to) the use, misuse, modification, interpretation, misinterpretation and/or misrepresentation of the reproduced information.

K. Provide manufacturer's data for structural steel primers to be used.

L. Submit certified copies of mill test reports for all structural steel furnished.

M. LEED v4-S SUBMITTAL REQUIREMENTS.

1. Submit relevant supporting documentation as required by LEED for schools v4 and as detailed in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.
2. Submit a completed LEED MATERIAL REPORTING FORM, per SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.
3. Product substitution requests are subject to additional LEEDv4-S submittal requirements, see SECTION 012500 - SUBSTITUTION PROCEDURES.

1.06 QUALITY ASSURANCE

A. Qualifications: The steel fabricator and erector conducting the work of this Section shall be AISC certified and experienced in fabricating steel similar to that required for this project.

B. All materials and workmanship under this Section shall be subject to inspection in the mill, shop or field by the Architect, or by qualified inspectors selected by the Architect and paid directly by the Owner.

C. A qualified Testing Agency for testing and inspection will be selected by the Owner and will be paid directly by the Owner.

D. However, such inspection, wherever conducted, shall not relieve the Contractor of his responsibility to furnish materials and workmanship in accordance with the Contract requirements, nor shall the inspector's acceptance of materials or workmanship prevent later rejection of same by the Owner or Architect if defects are discovered.

E. Inspection of welding work other than moment connections will consist of non-destructive spot testing done by visual, magnetic particle, radiographic or ultrasonic methods, whichever is most effective for joint to be tested.

F. Inspection of welding for work for moment connections will be tested 100 percent either by ultrasonic or by radiography in accordance with the latest edition of the AWS Structural Welding Code. However, if, for an individual welder, the reject rate is demonstrated to be five percent or less, the non-destructive testing rate may be reduced to 25 percent for the individual welder. The evaluation of the welding will be based on a sampling of at least 40 completed welds.

G. Inspection of bolting work will be in accordance with "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" by the American Institute of Steel Construction, latest edition. All bearing (Type N) bolts shall be fully tightened. Slip critical (Type SC) bolts shall be fully tensioned. All bolting will be visually inspected, as directed by the Architect and Structural Engineer.

H. The Contractor shall give proper notice to the Testing Agency and shall allow access and full facilities as required for this inspection.

I. A final report will be issued by the Testing Agency following the completion of work in this Section stating that all deficiencies have been corrected.

1.07 SUBSTITUTIONS

A. Refer to Section 012500 - SUBSTITUTION PROCEDURES.

PART 2 PRODUCTS

2.01 LEED v4-S PRODUCT REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEED v4-S materials Credits, and a completed LEED v4 Materials Reporting Form shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
3. Furnish any adhesives, sealants, paints and coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

2.02 MATERIALS

A. Structural steel W and WT shapes shall comply with the requirements of ASTM A 992 or A 572 (50 ksi minimum yield) for Structural Steel. Structural steel plates and shapes other than W and WT shapes shall comply with ASTM A 36 (36 ksi minimum yield). Square and rectangular steel tubing shall comply with ASTM A 500 - Grade C (50 ksi minimum yield). Round steel tubing shall comply with ASTM A 500 - Grade B (42 ksi minimum yield).

B. Bolts, nuts, and washers shall comply with the requirements of ASTM A 325. Bolts shall be A 325N with washer, except A 325, Type SC at slip critical connections indicated on the Drawings. All field bolts shall be tension control (TC) type, with twist-off lugs.

C. Anchor rods shall comply with the requirements of ASTM F 1554 - Grade 36, except F 1554 – Grade 105 as indicated on the Drawings. All anchor rods shall be headed type, with washer.

D. Expansion anchors shall be Hilti Kwik Bolt TZ Expansion Anchors; Strong Bolt by Simpson Strong Tie; or Wedge Bolt by Powers Fastening Systems or an approved equal.

E. Adhesive injection anchor bolts shall be Hilti HIT Adhesive Anchors, ET with Set XP Epoxy Adhesive Anchors by Simpson Strong Tie, PE 1000 Epoxy Adhesive Anchor System by Powers Fastening Systems or an approved equal. Use renovation screens when bolting to hollow substrate.

F. Metallic Filler: Composition of 90% ground metal and 10% epoxy binder such as "Plastic Steel" manufactured by ITW Devon Corporation, "Scotch-Weld Adhesive 1751" by the 3M Corporation, or an approval equal.

G. Thermal isolating sheets shall be fiber-reinforced structural thermal breaks such as Fabreeka-TIM by Fabreeka, Armatherm FR by Armadillo, Farrat TBK by Farrat, or equal approved by the Architect. Provide manufacturer's standard thermal isolating washers and bushings at all thermally isolated connections.

2.03 FABRICATION

A. All structural steel shall be fabricated in accordance with References, approved Shop Drawings, and as hereinafter specified.

B. All structural steel to remain exposed to view in the completed project shall be classified as Exposed to View Structural Steel (EVSS). Provide continuously welded joints at EVSS members. The welds shall be ground smooth, contoured and filled with metallic filler or otherwise treated as required to blend with adjacent parent metal. In addition, fabricate as follows:

1. Fabricate EVSS with exposed surfaces smooth, square and of surface quality with the approved mockups. Use special care in handling and shipping EVSS before and after shop painting.
2. Fabricator shall grind welds of EVSS smooth. For groove welds, the welds shall be made flush to the surfaces each side and be within +1/16" and –0" of plate thickness.
3. Remove spatter and grind where necessary for blending. Contour surfaces to match those surfaces that are adjacent. Form fillets to the smallest radii possible and still comply with the structural requirements. Provide additional metallic filler to form smooth continuous surfaces that will appear as one piece construction when primed. Grind and polish as required, to match profile on approved mockup.
4. All exposed welds shall be continuous, unless otherwise noted on the Drawings. Provide uniform weld size and profile.
5. All weld show-through shall be minimized by grinding and filling the far side with metallic filler as required to provide a smooth unblemished surface.
6. Joint gaps between abutting members shall be uniform and minimized to 1/8".
7. Fabricate EVSS members such that piece marks are fully hidden in the final structure or use media to permit full removal.
8. Members specified to be rolled to a final curved shape shall be fully shaped in the shop and tied during shipping to prevent stress relieving. Distortion of the web or stem and of outstanding flanges of open sections shall be visibly acceptable to the Architect from a distance of 20 feet under any lighting condition.

9. Seal weld open ends of rectangular hollow structural sections with 3/8” minimum closure plates with continuous ground smooth welds.

C. The design of members and connections for any portions of the structure not indicated on the Drawings shall be completed by the fabricator. Unless otherwise noted on the drawings, connections shall be capable of supporting the maximum uniform load of the member for the span shown and the material specified. Consideration must be given to the additional load carrying capacity of composite steel members. In general, and unless otherwise indicated, connections for composite beams shall be designed for at least 1.75 times the end reaction derived from the AISC uniform load beam tables for the particular beam and span. Connections for girders which support other beams shall be designed for at least 1.5 times the AISC uniform load reaction. All connection design shall be subject to approval by the Architect and Structural Engineer.

D. Welding, as indicated on the Drawings, shall be in accordance with References and shall be done only by experienced welders who have been qualified by tests as prescribed in AWS "Standard Qualifications Procedure" for the type of work required.

E. All shop connections shall be welded or bolted.

F. Weld and joint details shall comply with requirements of the "Structural Welding Code - Steel" by the American Welding Society.

G. Bolting shall comply with the requirements of AISC "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts".

H. All field connections shall be bolted, except where welding is indicated on the Drawings. All field bolts shall be tension control (TC) type, with twist off lugs.

I. Diameter of holes in bolted parts shall be 1/16 inch greater than the nominal diameter of the bolt. No unfair holes will be accepted, and enlargement of holes shall not be accomplished by burning. Burrs resulting from drilling or punching shall be ground to the surface of the material. Shearing and punching shall be done cleanly so as not to deform or mar adjacent surfaces.

J. Provide holes and connections as required for site assembly of steel work. Holes shall be plasma cut, drilled, or punched and reamed in the shop. Show sizes and locations of all such holes on the Shop Drawings.

K. Provide angles, bars, and/or other steel as necessary for deck support at columns where members do not frame in from all four sides and where connections interfere with the support of metal decking.

L. Provide angles, channels, and/or other steel as necessary around all openings in roof deck at drains, fans, and other similar penetrations as shown in drawings. Coordinate size, number, and location with Architectural, Mechanical, Electrical, and Plumbing trades.

M. In general, beam to beam, and beam to column connections shall be double angle type connections, unless otherwise shown on the Drawings.

N. Vent holes for HSS members to be galvanized shall be located at lower elevations/sides of members and at areas not exposed to view. Vent holes shall be plugged following galvanizing with zinc plugs to match the appearance of the surrounding galvanizing. Vent hole plugs shall prevent moisture entering the HSS members.

2.04 SURFACE PREPARATION AND PROTECTIVE COATINGS

A. All structural steel shall be cleaned of all scale, rust, grease and other foreign matter.

B. Surface preparation for interior structural steel not exposed to view or structural steel exposed to view and primed designated as (EP), shall be in accordance with “Steel Structures Painting Council Surface Preparation No. 3, Power Tool Cleaning” and shall be left unprimed.

C. Surface preparation for interior structural steel that will remain exposed to view and designated (EVSS), steel to be hot-dip galvanized, and all exterior structural steel shall be in accordance with “Steel Structures Painting Council Surface Preparation No. 6, Commercial Blast Cleaning”.

D. Primer for interior structural steel that will remain exposed to view (EVSS) and is not scheduled to be fireproofed shall be Tnemec 10-09 Modified Alkyd Primer (white or grey color), Sherwin Williams High Solids Alkyd Metal Primer (white or light gray), Benjamin Moore Super Spec HP Metal Primer KP14 (white or light gray), or approved equivalent.

E. Primer for structural steel that will remain exposed to view and is scheduled to be fireproofed with intumescent paint shall be Albi 490W by the Albi Manufacturing Company, or approved equivalent.

F. Where primer is required on steel members, omit the primer at the following locations:

1. Surfaces embedded in concrete.
2. Surfaces to be field welded.
3. Surfaces at slip-critical connections.
4. The tops of steel beams where deck is to be welded.
5. Surfaces to be spray fireproofed.

G. Primer shall be applied in accordance with manufacturer’s instruction to provide a minimum dry film thickness of 3.0 to 3.5 mils. Use priming methods that result in full coverage of joints, corners, edges and exposed surfaces.

H. Shop and field touch-up paint shall be compatible with intumescent paint or paint to be used for finish painting in the field as required under Section 090007 - PAINTING.

I. Primer paint shall be applied in accordance with manufacturer's directions to ensure no running or sagging.

J. After erection, all scarred areas shall be touched up with the same paint as the shop coat.

2.05 GALVANIZING

A. All steel items noted on the Drawings to be galvanized shall be galvanized by the hot dip process conforming to ASTM A 123 with the addition of nickel to zinc bath. All galvanizing shall be done after fabrication. All galvanized material to be painted shall be primed by the galvanizer within 12 hours after galvanizing and shall be force cured in a facility capable of maintaining 150 degrees F. All hot dip galvanized steel shall be safeguarded against embrittlement according to ASTM A 143. Primer shall be compatible with finish paint as specified under Section 090007 - PAINTING.

B. The galvanizer shall inspect all members for compliance with this Specification, and shall mark each member with a stamp indicating the ASTM number and the weight of the zinc coating in ounces per square foot.

PART 3 EXECUTION

3.01 STORAGE AND HANDLING

A. Care and protection shall be given to all structural steel during handling and storage. If items are to be stored prior to installation, they shall not be placed in contact with the ground. Care shall be taken to avoid abrasions and damage.

3.02 ERECTION

A. All structural steel shall be anchored and erected in accordance with References, approved Shop Drawings, and as hereinafter specified.

B. All work shall be accurately set to established lines and elevations and rigidly fastened in place with suitable attachments to the construction of the building.

C. Temporary bracing, guying, and support shall be provided to keep the structure safe and aligned at all times during construction, and to prevent danger to persons and property. Check all temporary loads and stay within safe capacity of all building components.

D. Except as otherwise indicated on the Drawings, all field connections shall be bolted in accordance with AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts". All bearing (Type N) bolts shall be fully tightened. Slip critical (Type SC) bolts shall be fully tensioned. All twist-off lugs shall be removed. Bolts that are hand tightened shall be clearly marked upon completion. Use not less than one washer placed under the turning part of the assembly. Do not enlarge unfair holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts. Replace connection plates that are misaligned where holes cannot be aligned with acceptable final appearance.

E. The initial installations of expansion anchors and adhesive injection anchors shall be witnessed by the manufacturer’s representative and load tests shall be performed to test their adequacy.

F. Do not cut or alter any member in the field without Architect's written approval for each specific condition.

G. Welding, as indicated on the Drawings, shall be in accordance with References and shall be done only by experienced welders who have been qualified by tests as prescribed in AWS "Standard Qualifications Procedure" for the type of work required.

H. After erection, all structural steel members and connections shall be touched up with the appropriate primer.

I. Prior to field welding of any galvanized steel element, galvanizing in the general area to be welded shall be removed by grinding.

J. All galvanized steel elements shall be touched up with a zinc-rich paint at areas scarred by welding or bolting.

K. Install fiber-reinforced structural thermal breaks at all exterior steel to interior steel connections and below base plates, as shown on the Drawings.

3.03 SURVEY

A. Engage the services of a licensed Engineer or Surveyor to survey elevations and locations of all column bases, prior to start of erection of structural steel. Any discrepancies shall be brought to the attention of the Architect. Erection shall not proceed until any required remedial measures have been completed.

B. Upon completion of the building frame provide a survey of perimeter building columns **at all levels** that indicates the plan deviation (as applicable) from the column grid in each direction.

3.04 TOLERANCES

A. Individual structural steel members shall be plumbed, leveled, and aligned in accordance with the requirements of Chapter 7 of the "Code of Standard Practice for Steel Buildings and Bridges", except as follows:

1. All tolerances (rolling, fabrication, and erection) combined shall result in a framing in the complete structure being located within ¾ inches of its theoretical location, except that members at connections to columns shall be within 1/8 inch vertically of their theoretical elevations.
2. Tolerances for Exposed to View Structural Steel (EVSS) shall not exceed one-half those permitted for structural steel.

END OF SECTION

SECTION 051226

SHEAR CONNECTORS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. The work of this Section consists of furnishing and installing all shear connector work as shown on the Drawings and as specified herein and includes, but is not limited to the following:

1. Headed shear connectors.

B. LEED v4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEED v4-S Certification. LEED v4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEED v4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Related work shall be performed under the following Sections:

1. Section 033000 CAST-IN-PLACE CONCRETE.
2. Section 051200 STRUCTURAL STEEL FRAMING.
3. Section 053100 STEEL DECKING.

1.04 REFERENCES (LATEST EDITIONS)

A. "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings" by the American Institute of Steel Construction.

B. "Structural Welding Code - Steel" by the American Welding Society.

C. ASTM listed standards by the American Society for Testing and Materials.

D. In case of conflict between the References and the Project Specification, the Project Specification shall govern. In the case of conflict between References, the more stringent shall govern.

E. When compliance with such References is specified for materials or a manufactured or fabricated product, the Contractor, if requested, shall furnish an affidavit from the manufacturer or fabricator, certifying that the materials or product delivered to the job meets the requirements specified. However, such certification shall not relieve the Contractor from the responsibility of complying with any added requirements specified herein.

1.05 SUBMITTALS

A. Submit complete Shop Drawings in accordance with the provisions of SECTION 013300 - SUBMITTALS.

B. Shop Drawings shall indicate size and position of all shear connectors. Shop Drawings shall indicate fastening methods for shear connectors.

C. Approval of Shop Drawings will be for size and arrangement of shear connectors. Errors in dimensions shown on the Shop Drawings shall be the responsibility of the Contractor.

D. Purchasing of any materials or performing any work prior to the final approval of Shop Drawings will be entirely at the risk of the Contractor.

E. Reproduction of structural plans, sections and details, and any like information by reprographic or electronic methods for use as Shop and Coordination Drawings is subject to the following conditions:

1. The entity producing the Shop and Coordination Drawings (The "User") agrees to accept the reproduced information from Foley Buhl Roberts & Associates Inc. without any warranties, guarantees and/or representations of any nature whatsoever regarding the correctness, dimensional and/or quantitative accuracy and/or completeness of any such information contained therein.
2. The User further agrees that such information shall be used as reference material only for the production of Shop and Coordination Drawings for the referenced project to which this Specification applies and only for that project.
3. The User further agrees to release, indemnify, hold harmless and defend Foley Buhl Roberts & Associates Inc. with respect to any claims, costs (including the cost of litigation), losses, damages and/or liabilities which arise from (or relate to) the use, misuse, modification, interpretation, misinterpretation and/or misrepresentation of the reproduced information.

F. LEED v4-S SUBMITTAL REQUIREMENTS:

1. Submit relevant supporting documentation as required by LEED for schools v4 and as detailed in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.
2. Submit a completed LEED MATERIAL REPORTING FORM, per SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.
3. Product substitution requests are subject to additional LEEDv4-S submittal requirements, see SECTION 012500 - SUBSTITUTION PROCEDURES.

1.06 QUALITY ASSURANCE

A. All materials and workmanship under this Section shall be subject to inspection in the mill, shop or field by the Architect, or by qualified inspectors selected by the Architect and paid directly by the Owner.

B. However, such inspection, wherever conducted, shall not relieve the Contractor of his responsibility to furnish materials and workmanship in accordance with Contract requirements, nor shall inspector's acceptance of materials or workmanship prevent later rejection of same by the Owner or Architect, if defects are discovered.

C. A minimum of two shear connector studs shall be welded at the start of each production period to determine proper settings for the generator, control unit, and stud welder. These studs shall be capable of being bent 45 degrees from vertical without weld failure. If, after welding, visual inspection reveals that a sound, full 360 degree weld has not been achieved for any particular stud, that stud shall be struck with a hammer and bent approximately 15 degrees from vertical towards the nearest end of the beam, or bent away from the opening in the fillet weld. Studs meeting this test shall be considered acceptable and shall be left in this position. Studs failing under this test shall be replaced.

D. The Contractor shall give proper notice to inspection agencies designated by the Architect and shall allow access and full facilities as required for this inspection.

E. A final report will be issued by the Testing Agency following the completion of the work of this Section.

PART 2 PRODUCTS

2.01 LEED v4-S PRODUCT REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEED v4S materials Credits, and a completed LEED 4 Materials Reporting Form shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
3. Furnish any adhesives, sealants, paints and coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.02 MATERIALS

A. All shear connectors shall be made from cold drawn bar stock conforming to the requirements of ASTM A108, Grades 1015 through 1020, either semi- or fully- killed. See drawings for lengths and diameter.

B. Tensile requirements of shear connectors, as determined by tests (ASTM A 370) of bar stock after drawing, or of full diameter finished shear connectors, at the manufacturer's option, shall conform to the following:

1.	Tensile strength, (psi) minimum:	60,000
2.	Elongation in two inches, (%) minimum:	20
3.	Reduction in area, (%) minimum:	50

C. Shear connectors shall be of uniform diameter; heads shall be concentric and normal to shaft; and the weld shall be chamfered and solid fluxed. Shear connectors shall not be painted or galvanized.

PART 3 EXECUTION

3.01 STORAGE

A. Care and protection shall be given to all shear connector studs during handling and storage. If connectors are to be stored prior to installation, they shall not be placed in contact with the ground and shall be protected from the elements and kept dry.

3.02 INSTALLATION

A. Shear connector studs shall be installed by an automatic welding system, in the number and spacing shown on approved Shop Drawings and as herein specified.

B. Steel in the area to which the shear connector is to be directly welded shall be free of loose mill scale, heavy rust, dirt and paint. In addition, where studs are to be welded through metal deck, verify that no water has become entrapped between the beam and the deck, prior to welding studs.

C. Studs shall not be welded when the temperature falls below 10 degrees Fahrenheit, or when the surface is wet with rain or snow.

D. All welding shall be in accordance with the "Structural Welding Code - Steel".

E. After welding, break off ceramic arc shields and dispose of them properly.

END OF SECTION

SECTION 052100

STEEL JOIST FRAMING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. The work of this Section consists of furnishing and installing all steel joist work as shown on the Drawings and as specified herein and includes, but is not limited to, the following:

1. Steel joists - Longspan LH Series.
2. Bridging, anchors, extended ends, ceiling extensions, and special seats.
3. Shop paint and field touch-up paint after erection.

B. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEED V4-S Certification. LEED v4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEED v4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. For all paints and coatings, meet the LEED requirements for IEQ Credit 4.2 and as defined in Subparagraph 2.04 of Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS.
3. For all paints and coatings, submit industry-wide (generic) EPDs or product specific Type III EPDs.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The related work shall be performed under the following Sections:

1. Section 051200 STRUCTURAL STEEL FRAMING.
2. Section 053100 STEEL DECKING.
3. Section 055000 METAL FABRICATIONS.
4. Section 090007 PAINTING.

1.04 REFERENCES (LATEST EDITIONS)

A. "Standard Specifications, Load Tables and Weight Tables for Longspan Steel Joists – LH Series" by the Steel Joist Institute.

B. "Structural Welding Code - Steel" by the American Welding Society.

C. ASTM listed standards by the American Society for Testing and Materials.

D. SSPC listed standards by the Steel Structures Painting Council.

E. In case of conflict between the References and the Project Specification, the Project Specification shall govern. In the case of conflict between References, the more stringent shall govern.

F. When compliance with any Reference is specified for materials or a manufactured or fabricated product, the Contractor, if requested, shall furnish an affidavit from the manufacturer or fabricator certifying that the materials or product delivered to the job meets the requirements specified. However, such certification shall not relieve the Contractor from the responsibility of complying with any added requirements specified herein.

1.05 SUBMITTALS

A. Submit complete Shop Drawings in accordance with the provisions of SECTION 013300 – SUBMITTALS.

B. Shop Drawings shall indicate type, number, sizes, details, and spacing of all members. Shop Drawings shall indicate fastening methods for joists, bridging, anchors and all other details for installation.

C. Approval of Shop Drawings will be for size and arrangement of items and for strength of field connections. Errors in dimensions shown on the Shop Drawings shall be the responsibility of the Contractor.

D. Fabrication of any material or performing of any work prior to the final approval of the Shop Drawings shall be entirely at the risk of the Contractor.

E. Reproduction of structural plans, sections and details, and any like information by reprographic or electronic methods for use as Shop and Coordination Drawings is subject to the following conditions:

1. The entity producing the Shop and Coordination Drawings (The "User") agrees to accept the reproduced information from Foley Buhl Roberts & Associates, Inc. without any warranties, guarantees and/or representations of any nature whatsoever regarding the correctness, dimensional and/or quantitative accuracy and/or completeness of any such information contained therein.

2. The User further agrees that such information shall be used as reference material only for the production of Shop and Coordination Drawings for the referenced project to which this Specification applies and only for that project.

3. The User further agrees to release, indemnify, hold harmless and defend Foley Buhl Roberts & Associates, Inc. with respect to any claims, costs (including the cost of litigation), losses, damages and/or liabilities which arise from (or relate to) the use, misuse, modification, interpretation, misinterpretation and/or misrepresentation of the reproduced information.

F. Submit certified copies of mill test reports for all structural steel furnished.

G. LEED v4-S Submittals (Refer to SECTION 018113 – SUSTAINABLE DESIGN REQUIREMENTS):

1. Submit relevant supporting documentation as required by LEEF for schools v4 and as detailed in SECTION 018113 – SUSTAINABLE DESIGN REQUIREMENTS.

2. Submit a completed LEED MATERIAL REPORTING FORM, per SECTION 018113 – SUSTAINABLE DESIGN REQUIREMENTS.

3. Product substitution requests are subject to additional LEEDv4-S submittal requirements, see SECTION 012500 – SUBSTITUTION PROCEDURES.

1.06 QUALITY ASSURANCE

A. All materials and workmanship under this Section shall be subject to inspection in the mill, shop or field by the Architect, or by the Testing Agency selected by the Architect and paid directly by the Owner.

B. However, such inspection, wherever conducted, shall not relieve the Contractor of his responsibility to furnish materials and workmanship in accordance with Contract requirements, nor shall Testing Agency's acceptance of materials or workmanship prevent later rejection of same by the Owner or Architect if defects are discovered.

C. The Contractor shall give proper notice to the Testing Agency designated by the Architect and shall allow access and full facilities for this inspection and testing.

PART 2 PRODUCTS

2.01 LEED v4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEED v4 Materials Reporting Form shall be submitted for all materials in the SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
3. Furnish any adhesives, sealants, paints, and coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113 – SUSTAINABLE DESIGN REQUIREMENTS.

2.02 MATERIALS

A. All steel joists and accessories shall be formed of material in accordance with the Reference Specification. See drawings for type, depth and size.

2.03 FABRICATION

A. All steel joists and accessories shall be fabricated in accordance with Reference Specifications, approved Shop Drawings, and as hereinafter specified.

B. All steel joists and accessories shall be fabricated by a member of the Steel Joist Institute.

C. All steel joists shall be fabricated with a standard camber unless noted otherwise.

2.04 PROTECTIVE COATING

A. All items shall be cleaned of all scale, rust, weld slag and weld spatter and other foreign matter and be given one shop coat of gray rust inhibiting paint, one mil dry film thickness.

B. Shop and field touch-up paint shall be compatible with paint to be used for finish painting in the field under another Section as indicated on the Shop Drawings.

C. After erection, all scarred areas shall be touched up with the same paint as the shop coat.

PART 3 EXECUTION

3.01 STORAGE AND HANDLING

A. Care and protection shall be given to all items during handling and storage. If items are to be stored prior to installation, they shall not be placed in contact with the ground.

3.02 FABRICATION

A. All steel joists shall be fabricated in accordance with Reference Standards, approved Shop Drawings, and as hereinafter specified.

B. The design of members and connections for any portions of the structure not indicated on the Drawings shall be completed by the fabricator. Connections shall be capable of supporting the maximum uniform load of the member for the span shown and the material specified. All connection design shall be subject to approval by the Architect and Structural Engineer.

C. Welding, as indicated on the Drawings, shall be in accordance with Reference Standards and shall be done only by experienced welders who have been qualified by tests as prescribed in AWS “Standard Qualifications Procedure” for the type of work required.

3.03 ERECTION

A. All steel joists and accessories shall be installed in accordance with References, approved Shop Drawings, and as hereinafter specified.

B. Steel joists shall be welded to steel supports with two ¼ inch welds, each at least three inches long.

C. Bridging shall be installed in accordance with Reference Specifications or as shown on the Drawings.

D. Joists shall be permanently fastened to supports and all bridging and anchors completely installed before any construction loads (other than workers) are placed on the joists.

E. All field welding shall be in accordance with References and shall be done only by experienced welders who have previously been qualified by tests as prescribed in AWS "Standard Qualification Procedure" to perform the type of work required.

END OF SECTION

SECTION 053100

STEEL DECKING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of the SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of the SECTION.

1.02 SCOPE OF WORK

A. The work of this Section consists of furnishing and erecting all metal deck work as shown on the Drawings and as specified herein and includes, but is not limited to, the following:

1. Metal roof deck.
2. Acoustic metal roof deck.
3. Metal floor deck.
4. Roof deck accessories: finish strips, butt strips, valley plates, splice plates, sump pans and rubber closures.
5. Floor deck accessories: finish strips, butt strips, closures and pour stops.
6. Shop coating and field touch-up painting after erection.

B. LEED v4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEED v4-S Certification. LEED v4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEED v4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Related work shall be performed under the following Sections:

1. Section 033000 CAST-IN-PLACE CONCRETE.
2. Section 051200 STRUCTURAL STEEL FRAMING.
3. Section 052100 STEEL JOIST FRAMING.
4. Section 051226 SHEAR CONNECTORS.
5. Section 072100 INSULATION.
6. Section 090007 PAINTING.

7. Section 092116 GYPSUM WALLBOARD.

1.04 REFERENCES (LATEST EDITIONS)

A. "Basic Design Specifications for Steel Deck Construction" by the Steel Deck Institute.

B. "Specifications for the Design of Light Gauge Cold Formed Structural Members" by the American Iron and Steel Institute.

C. ASTM listed standards by the American Society for Testing and Materials.

D. "Structural Welding Code - Steel" by the American Welding Society.

E. In case of conflict between the References and the Project Specification, the Project Specification shall govern. In the case of conflict between References, the more stringent shall govern.

F. When compliance with such References is specified for materials or a manufactured or fabricated product, the Contractor, if requested, shall furnish an affidavit from the manufacturer or fabricator, certifying that the materials or product delivered to the job meets the requirements specified. However, such certification shall not relieve the Contractor from the responsibility of complying with any added requirements specified herein.

1.05 SUBMITTALS

A. Submit complete Shop Drawings in accordance the provisions of SECTION 013300 - SUBMITTALS.

B. Shop Drawings shall indicate size and location of framing supports and the location, lengths, types, gauges, and markings of deck units. Shop Drawings shall indicate fastening methods for deck units, and the type of connections, welds or screws, and other items as hereinafter called for.

C. Shop Drawings shall also show all accessories and methods of attachment to the building frame.

D. Approval of Shop Drawings will be for size and arrangement of units and for strength of connections. Errors in dimensions shown on the Shop Drawings shall be the responsibility of the Contractor.

E. Fabrication of any material or performing any work prior to the final approval of the Shop Drawings will be entirely at the risk of the Contractor.

F. Reproduction of structural plans, sections and details, and any like information by reprographic or electronic methods for use as Shop and Coordination Drawings is subject to the following conditions:

1. The entity producing the Shop and Coordination Drawings (The "User") agrees to accept the reproduced information from Foley Buhl Roberts & Associates Inc. without any warranties, guarantees and/or representations of any nature whatsoever regarding the correctness, dimensional and/or quantitative accuracy and/or completeness of any such information contained therein.

2. The User further agrees that such information shall be used as reference material only for the production of Shop and Coordination Drawings for the referenced project to which this Specification applies and only for that project.

3. The User further agrees to release, indemnify, hold harmless and defend Foley Buhl Roberts & Associates Inc. with respect to any claims, costs (including the cost of litigation), losses, damages and/or liabilities which arise from (or relate to) the use, misuse, modification, interpretation, misinterpretation and/or misrepresentation of the reproduced information.

G. LEED v4-S SUBMITTAL REQUIREMENTS.

1. Submit relevant supporting documentation as required by LEED for schools v4 and as detailed in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

2. Submit a completed LEED MATERIAL REPORTING FORM, per SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

3. Product substitution requests are subject to additional LEEDv4-S submittal requirements, see SECTION 012500 - SUBSTITUTION PROCEDURES.

1.06 QUALITY ASSURANCE

A. All materials and workmanship under this Section shall be subject to inspection in the mill, shop or field by the Architect or by Testing Agency selected by the Architect and paid directly by the Owner. All deck fastening will be visually inspected.

B. However, such inspection, wherever conducted, shall not relieve the Contractor of his responsibility to furnish materials and workmanship in accordance with Contract requirements, nor shall the inspector's acceptance of materials or workmanship prevent later rejection of same by the Owner or Architect if defects are discovered.

C. A qualified Testing Agency for testing and inspection will be selected by the Owner and will be paid directly by the Owner.

D. The Contractor shall give proper notice to the Testing Agency designated by the Architect and shall allow access and full facilities as required for this inspection and testing.

E. A final report will be issued by the Testing Agency following the completion of the work in this Section.

PART 2 PRODUCTS

2.01 LEED v4-S PRODUCT REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEED-v4S materials Credits, and a completed LEEDv4 Materials Reporting Form shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.

2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.

3. Furnish any adhesives, sealants, paints and coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

2.02 METAL ROOF DECK

A. Typical metal roof deck shall be formed of steel sheets conforming to ASTM A 653 Grade 33, with a minimum yield strength of 33,000 psi with nestable side lap. All metal roof deck shall have a maximum nominal top-side gap between flutes of 2¾". Galvanized coating shall conform to ASTM A 653 G 60. See Drawings for deck type, gauge and depth.

B. Acoustic metal roof deck shall be cellular type and formed of steel sheets conforming to ASTM A 653 Grade 33 with a minimum yield strength of 33,000 psi with interlocking side lap and perforated bottom plate. All metal roof deck shall have a maximum nominal top-side gap between flutes of 2¾". Galvanized coating shall conform to ASTM A 653 G 60. Sound absorbing batts shall be inert non-organic mineral fiber and shall be placed in each cell prior to delivery to the job site. To facilitate field painting of perforated surfaces, the sound absorbing elements shall be supported above the surface by spacers. The minimum Noise Reduction Coefficient (NRC) shall be 0.85. The minimum Sound Absorption Coefficients for various frequencies shall be as follows (frequency (Hz)/coefficient): 125/0.40, 250/0.50, 500/0.85, 1000/0.90, 2000/0.75, and 4000/0.60. Refer to the Drawings for deck type, gauge and depth.

C. Typical metal roof deck units shall be cut to required lengths so that end joints will occur over supporting members and be lapped a minimum of two inches. Typical lengths shall extend over three or more spans, where possible.

D. Acoustic metal roof deck units shall be cut to required lengths so that end joints will butt over supporting members. Typical lengths shall extend over three or more spans, where possible.

E. Accessory metal sections shall be of the same material, gauge and finish as the metal deck units, unless otherwise indicated.

F. Sump pans shall be recessed and not lighter than 14 gauge galvanized sheets. Size of the hole to be field cut to match the roof drain.

G. Closures shall be rubber to seal flutes.

H. All exposed surfaces shall be shop primed and ready for job site finish painting.

2.03 COMPOSITE METAL FLOOR DECK

A. Typical metal floor deck shall be formed of steel sheets conforming to ASTM Standard A 653 minimum Grade 40 and shall be composite type with six inch wide (nominal) flutes top and bottom sides at 12 inch on center and with a minimum yield strength of 40,000 psi with interlocking side laps. Galvanized coating shall conform to ASTM A 653 G 60. Refer to the Drawings for gauge and depth. Units shall have vented bottom flutes, except as noted on the drawings. Vent openings shall account for 0.5% of the surface area covered by the decking.

B. Metal floor deck units shall be cut so that end joints butt over supporting members. Typical lengths shall extend over three or more spans where possible.

C. The deck manufacturer shall be selected to meet strength requirements during concrete placement and provide temporary shoring as required.

D. Accessory metal sections shall be of the same material, gauge and finish as the metal deck units, unless otherwise indicated.

E. Pour stops shall be not lighter than 18 gauge and be of the same material and finish as the metal deck units. Use heavier gauge where indicated on the Drawings.

F. All exposed surfaces shall be shop primed and ready for job site finish painting.

2.04 PROTECTIVE COATINGS

A. Metal deck units shall be cleaned of scale, rust, grease, oil or other foreign matter and be given a phosphate conversion coating. Metal deck surfaces to remain exposed to view, shall then be shop coated with an approved primer and oven baked. The primer shall be verified by the field painting contractor for compatibility with approved field top coat paints under the Section 090007 - PAINTING.

B. Shop and field touch-up paint shall be compatible with paint to be used for finish painting in the field under the Section 090007 - PAINTING.

PART 3 EXECUTION

3.01 STORAGE

A. Care and protection shall be given to all metal decking material during handling and storage. During unloading and hoisting, extra care shall be given to prevent damage to the ends, sides and distortion of the individual items. If items are to be stored prior to installation, they shall not be placed in contact with the ground. Cellular acoustic decking must be kept dry at all times.

3.02 INSTALLATION

A. Deck shall be erected and fastened in accordance with manufacturer's specifications, approved Shop Drawings, and as hereinafter specified.

B. Place metal deck units on supporting framework and adjust to final position with proper bearings, end and side laps before permanently securing work.

C. Welds to steel supports shall be fusion type. Puddle welds shall be at least 5/8 inch diameter or an elongated weld having an equal perimeter. When metal deck units are 22 gage or lighter, use welding washers to connect all metal deck material to supporting steel.

D. Typical metal roof deck units shall be fastened to the supporting structure (minimum requirements) as follows:

1. Panel ends and end laps: Welded at each rib.
2. Intermediate supports: Welded at each rib.
3. Longitudinal edges at marginal supports: Welded at maximum spacing of 12 inches.
4. Side laps of adjacent units: Screw fastened between supports at intervals not exceeding 24 inches.

E. Acoustic metal roof deck units shall be fastened to the supporting structure (minimum requirements) as follows:

1. Panel ends and end laps: Welded at each rib.
2. Intermediate supports: Welded at each rib.
3. Longitudinal edges at marginal supports: Welded at maximum spacing of 12 inches.
4. Side laps of adjacent units: 1½ inch long seam welds between supports at intervals not exceeding 24 inches.

F. Typical composite metal floor deck units shall be fastened to the supporting structure (minimum requirements) as follows:

1. Panel ends and end laps: Welded at each rib.
2. Intermediate supports: Welded at each rib.

3. Longitudinal edges at marginal supports: Welded, maximum spacing of 12 inches.

4. Side laps of adjacent units: Button punched between supports at intervals not exceeding 30 inches.

G. Fasten accessories to deck by welding.

H. Fasteners for overlying roofing material shall be concealed within the depth of the roof deck ribs.

I. Holes and openings which are indicated on the Structural Drawings shall be cut by the deck erector. Coordinate locations with respective trades. Holes not so indicated, but which are required for work by other trades, shall be located and cut by the respective trades. No architectural, mechanical, electrical, plumbing, fire protection or other components shall be hung from metal roof deck.

J. All welding shall be in accordance with the References and shall be done only by experienced welders who have previously been qualified to perform the type of work required.

K. After erection, all scarred areas of decking, including cuts, drill holes, rust spots, welds and weld scars, shall be touched up with a zinc-rich paint.

L. Install rubber closures in all roof deck flutes over exterior walls.

M. Provide field fabricated sheet closures at all perimeter and interior columns, breaks at perimeter pour stops, and at all similar locations as required for a complete job.

N. Omit acoustic batt at exterior applications or portions of decking with exterior exposure.

END OF SECTION

SECTION 055000

MISCELLANEOUS METALS

(THIS SECTION TO BE INCLUDED IN SUB BID FOR SECTION 050001-MISCELLANEOUS AND ORNAMENTAL IRON)

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following, as shown on the Drawings and specified herein:

1. Steel tube bracing at project area millwork and cubbies.
2. ~~Metal bollards~~
2. All items designated "miscellaneous metals" or "SECTION 055000" on the Drawings.
3. Continuous 3 in. x 6 in. x .375 in. aluminum angles, primed, to support LED tape light fixture at head of proscenium opening at the stage.

B. Perform all shop painting, and touch-up after erection, as specified hereunder.

C. Furnish the following, for installation under the designated SECTIONS:

1. Steel lintels (loose), not attached to structural steel, galvanized when used on exterior openings, as per lintel schedule on Structural Drawings, and over all new openings in new masonry or concrete walls and partitions, including openings for ducts, doors, and other openings in these surfaces: SECTION 040001-MASONRY.
2. Anchor bolts, inserts, and sleeves required to attached miscellaneous metal items to concrete and to masonry: SECTION 033000-CAST-IN-PLACE CONCRETE and SECTION 040001-MASONRY.
3. Metal bollards: SECTION 323000-MISCELLANEOUS SITE IMPROVEMENTS.

D. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. For all paints and coatings, meet the LEED requirements for IEQ Credit 2 Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. For all adhesives and sealants, meet the LEED-S requirements for IEQ Credit 2 Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

4. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Construction of mock-up: SECTION 014339-EXTERIOR MOCK-UPS.

2. Metal items requiring custom fabrication: SECTION 050001-MISCELLANEOUS AND ORNAMENTAL IRON.

3. Steel seismic clip angles at tops of all masonry walls: SECTION 050001-MISCELLANEOUS AND ORNAMENTAL IRON.

4. Structural steel items, including all attached lintels, relieving angles, leveling plates and related anchors bolts, and other steel shapes shown on the Drawings, not specified hereunder: SECTION 051200 - STRUCTURAL STEEL.

5. Manufactured metal items in conjunction with millwork: SECTION 062000 - FINISH CARPENTRY.

6. Finish painting of miscellaneous metal items except factory finished items: SECTION 090007 - PAINTING.

7. Control joints and picture rail reglets in gypsum wallboard surfaces: SECTION 092116 - GYPSUM WALLBOARD.

8. Thresholds not specified herein: SECTION 087100 - HARDWARE AND SPECIALTIES.

9. Access panels furnished under mechanical and electrical Sections: SECTION 220001 - PLUMBING, SECTION 210001 - FIRE PROTECTION, SECTION 230001 - HVAC and SECTION 260001 - ELECTRICAL.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with the requirements of SECTION 013300-SUBMITTALS.

B. Include large-scale details of items of miscellaneous metals, specified herein, showing proposed methods of anchorage to surrounding structure, complete schedules showing locations and sizes to be furnished hereunder.

C. Each field piece shall be marked plainly with suitable erection marks, which shall also be shown on the shop drawings.

D. Submit color samples for prefinished items.

E. Mock-Up Panel Structure: Provide miscellaneous metal elements including, but not limited to, loose lintels as shown on the Drawings.

F. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

1.05 JOB CONDITIONS

A. Be responsible for location and levels of all work of this SECTION, except such parts as may be delivered to other and set by them. In such cases assist them in properly locating said parts.

B. Furnish anchorage items and other items required to be built into the concrete or masonry to the job at the proper time and include instructions and/or templates for their installation.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S Materials Reporting Form shall be submitted for all materials in this SECTION:

1. IEQ Credit 2, Low Emitting Materials: Meet the LEED requirements for IEQ Credit 2 as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements). Steel framing shall be produced using an average minimum 65% recycled content.
3. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) This Subcontractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.

2.01 METALS AND METAL TREATMENTS

A. General

1. Standard products meeting the detailed requirements of the miscellaneous metal items required hereunder will be considered for approval by the Architect.
2. Provide all supplemental parts necessary to complete each miscellaneous metal items whether or not such parts are shown and specified. Provide all anchorage for securing the work required hereunder.
3. Provide only new metals, free from defects impairing strength, durability, and of the commercial quality specified.
4. Curved work shall be true to radii, with smooth finished surfaces unless otherwise specified.
5. Provide fastenings of the same material, color and finish, as the metal to which applied unless otherwise noted.

B. Steel shapes, plates, and bars - Conforming to the requirements of Standard Specifications for Steel for Bridges and Buildings, ASTM Designation A 36.

C. Hydraulic cement, for installing bolts and fastenings into masonry and concrete - Quick setting, non-staining type.

D. Bolts, nuts, and washers for field or stop connections - Galvanized, nuts re-tapped to fit, for all galvanized structural steel elements.

E. Galvanizing – All metal fabrications indicated to be galvanized on the Drawings or specified hereunder to be galvanized, shall conform to the requirements of the latest edition of the following ASTM Reference Standards: A123, A153, A143, A384, A385 and A780. Fabricated steel shall be galvanized by the hot-dip process conforming to the requirements of ASTM A123, latest edition with the addition of .05 to .09 percent nickel and other earthly materials to the galvanizing kettle forming an alloy, DELTAGALV by Duncan Galvanizing or an approved equal meeting all requirements of this specification. Provide thickness of galvanizing specified in referenced standards. To prevent flux inclusions and entrapment, the steel shall be immersed in a bath of zinc ammonium chloride prior to galvanizing. The use of the wet kettle process shall be prohibited.

Wherever possible, perform galvanizing after assembly of items. Only where items are too large for galvanizing tanks will galvanizing before assembly be acceptable. Each galvanized piece shall bear the stamp of the galvanizing processing firm indicating the ASTM Specification Number and the weight of the nickel zinc coating per square foot.

F. Shop priming paint for non-galvanized steel – (Gray) Tnemec 37, H-78 high solids, Benjamin Moore Super Spec HP (P06) alkyd metal primer, PPG Pitt-Tech Plus or an approved equal.

1. Paint shall meet the requirements of LEEDv4-S IEQ Credit 2.

G. Aluminum shapes: 6063-T52, shop primed in the manner specified above for non-galvanized steel.

1. At Platform proscenium head angles: provide all required fasteners to attach through GWB to blocking in LGMF wall. Cope short leg of angles around oval ductwork. Coordinate length of angles (± 45 linear ft.) and holes drilled in long leg as required for mounting LED tape fixture with SECTION 260001-ELECTRICAL.

PART 3 EXECUTION

3.01 WORKMANSHIP, FABRICATION AND INSTALLATION

A. Grind all edges of bars and plates completely free from nicks and machine marks, prior to galvanizing and/or shop priming.

B. Where field welding is necessary, completely coat all such welds with a cold liquid galvanizing, Z.R.C., Galvicon, Zirp or an approved equal, after performing grinding operations.

C. Countersink all screw heads and bolt heads as far as practicable. Use not less than two screws, bolts or other anchorage items, at each connection point.

D. Use only screws and bolts of sufficient size to assure against loosening form normal usage of miscellaneous metal items furnished hereunder.

E. Install expansion joints and other miscellaneous metal items in strict accordance with the details, the approved shop drawings, and manufacturer's recommendations.

F. Adequately isolate all miscellaneous metal items from adjacent dissimilar materials and fastenings to minimize corrosion.

3.02 SHOP PAINTING AND TOUCH-UP OF NON-GALVANIZED STEEL

A. Surface preparation of steel - Thoroughly clean all steel of all loose mill scale by power wire brushing or sand-blasting. Remove all rust, dirt, weld flux, weld splatter, and other foreign matter by wire brushing or scraping (power wire brushing, if necessary). Grind smooth any sharp projections. Remove oil and grease deposits with solvent.

B. Shop painting - All non-galvanized steel members shall be painted before shipping. All surfaces shall be painted except surfaces, which are to be welded, and surfaces to be encased in masonry. Paint shall be applied thoroughly and evenly on the surfaces and worked in to the joints and other open areas on the surfaces. Dry mil thickness per coat of prime paint shall not be less than 2.4 mils.

C. Touch-up - After erection, touch-up all abrasions and field welds with paint meeting the requirements of LEEDv4-S IEQ Credit 2.

END OF SECTION

Division 6
Wood and Plastic

SECTION 061000

ROUGH CARPENTRY

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following, as shown on the Drawings and specified herein:

1. Temporary enclosures for openings in the building, and other temporary items normally performed by the carpentry trade and required under SECTION 015000-TEMPORARY FACILITIES AND CONTROLS and SECTION 024100-DEMOLITION.
2. All interior wood blocking, nailers, furring, strapping, and other rough lumber for the various conditions as indicated on the Drawings, except as other wise specified herein.
3. Rough hardware, such as nails, bolts, screws, clips required to install rough carpentry work.
4. Miscellaneous framing and sheathing as indicated on the Drawings, except as otherwise specified herein.
5. Wood blocking (minimum 1-1/2 inches thick) for attachment of all wall and ceiling mounted equipment, toilet accessories, toilet partitions, railings, miscellaneous specialties, markerboards, tackboards, large wall mounted signage, plaques, wall mounted gymnasium equipment and other wall and ceiling mounted items indicated on the Drawings.
6. Plywood sheathing back up at drywall and ceramic tile/backer board walls in all student toilet rooms.
7. Plywood substrate at interior phenolic panels, tongue and groove wood panels and wood veneer panels.
8. MDO plywood wall sheathing at mechanical, electrical, data panels, electrical closets, main electrical room, and data IDF/MDF rooms.
9. Wood blocking (minimum 1-1/2 inches thick) at wall mounted hardware, including but not limited to door stops, magnetic hold open devices and door closers.
10. Fire retardant treated plywood roof and wall sheathing at mechanical doghouses and at vertical walls at level transitions on roof.
11. Exterior pressure treated wood blocking in conjunction with roofing including, but not limited to, cant strips, wood curbs, nailers, roof blocking and other rough lumber in conjunction with roofing and flashing.

12. Plywood on galvanized z-girt system including z-shaped girts, hat channels and other LGMF shapes, and all required fasteners at PVC roof terminations at base of vertical walls, where indicated on the drawings.

B. Install the following as shown on the Drawings and specified under the designated SECTIONS:

1. Glass fiber batt insulation at top of masonry walls at corrugated roof deck and where structural members penetrate masonry interior walls: SECTION 072100-INSULATION.

2. Rigid and semi-rigid (Mineral Wool) insulation for installation behind plywood at PVC roof terminations at base of vertical walls and where indicated on the drawings: SECTION 072100-INSULATION.

C. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. For all adhesives, sealants, paints and coatings, meet the requirements for IEQ Credit 2, Low-Emitting Materials and as defined SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. For all composite wood and agrifiber products, meet the LEED-S requirements for IEQ Credit 2, Low-Emitting Materials and as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

4. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Mock-up construction: SECTION 014339-EXTERIOR MOCK-UPS.

1. New roof decks: SECTION 053100-METAL DECKING.

2. Wood cabinetry and millwork, plastic laminate, wood finish, solid wood, wood veneer and trim, and MDO window sills and jambs not specified herein, and other items of finish carpentry and millwork: SECTION 062000-FINISH CARPENTRY.

3. Installation of doors and frames, application of finish hardware, and installation of toilet accessories: SECTION 062000-FINISH CARPENTRY.

4. ~~Wood framing and sheathing in conjunction with base wall roofing flashing as shown on the drawings, including specified preservative treatment there of: SECTION 070002-ROOFING AND FLASHING.~~

5. Metal fascias, metal flashings, resilient flashing, roof insulation, membrane roofing system: SECTION 070002-ROOFING AND FLASHING and SECTION 074213-PREFORMED CLADDING.

6. Field painting of MDO plywood panels at mechanical, electrical and data rooms: SECTION 090007-PAINTING.

7. Acoustic panels: SECTION 098400-ACOUSTIC WALL TREATMENT.

8. Wood finish flooring at stage and gymnasium: SECTION 096466-WOOD AND ATHLETIC FLOORING.

9. Solid tongue and groove paneling and wood veneer paneling: SECTION 062000-FINISH CARPENTRY.

10. Interior phenolic panels and z-clip support systems: SECTION 074233-PHENOLIC RAINSCREEN SYSTEM.

11. Wall mounted markerboards, prefabricated sliding markerboard units and tackboards: SECTION 101100-MARKERBOARDS AND TACKBOARDS.

12. Air and vapor barrier: SECTION 071326-AIR AND VAPOR BARRIERS.

13. Wood, plastic or metal shims for plumbing/leveling finish product or finish material: By Trade requiring same.

1.04 SUBMITTALS

A. Submit the following in accordance with the provisions of SECTION 013300-SUBMITTALS.

1. Pressure treatment of lumber - The treatment plant shall furnish a notarized certificate stating compliance with all pertinent details of this Specification.

2. Fire retardant treated lumber - The treatment plant shall furnish a notarized certificate stating compliance with all pertinent details of this Specification.

B. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation by LEED for Schools v4 as detailed in Section 018113-Sustainable Design Requirements.

2. A completed LEED MATERIALS REPORTING FORM, per Section018113-Sustainable Design Requirements.

1.05 GRADING STANDARDS AND QUALITY

A. All lumber shall:

1. Be new, dressed 4 sides (S4S), clear, and free from warping and other defects. Lumber at specified concealed ares shall be pressure treated with Wolman Salts at concealed areas.

2. Conform to U.S. Department of Commerce Simplified Practice Recommendation R-16 for sizes and use classifications.

3. Have a moisture content not exceeding 19 percent when delivered to the project, except blocking adjacent to the millwork which shall not exceed 5 percent moisture content. The Owner reserves the right to have test performed for moisture content and will pay for such test, except where the specified content is exceeded, in which case the costs of all tests made until materials conform, shall be paid for by the Contractor.

4. Be in accordance with the grading rules of the lumber manufacturer's associated under whose jurisdiction the species of lumber is produced.

B. Plywood-Conformance to American Plywood Association (APA) DFPA grade trademark and Product Standards PS-1.

C. Lumber and plywood shall be identified by the official grade mark, except where grade mark will interfere with the natural finish. In such cases, the material shall be accompanied by a certificate of inspection issued by the lumbar grading and inspection agency.

1.06 STORAGE OF MATERIALS

A. Store all materials in an elevated dry location, protected by waterproof coverings. Do not store within the building until masonry, concrete, and other such wet work has been completed and allowed to dry.

1.07 TEMPORARY BRACING

A. Provide and maintain, until such time as permanently built into the structure, all temporary bracing for door frames, sills, and other work requiring bracing and which is not specified as being provided under other SECTIONS of the Specifications.

1.08 PROTECTION AND TEMPORARY ENCLOSURES

A. Do such work as in necessary to cover and protect all finishes and other work from damage during construction. Provide and maintain temporary substantial wood handrails around all openings through floors such as stairways.

B. Refer to SECTION 015000-TEMPORARY FACILITIES AND CONTROLS for specific requirements of temporary enclosures and protection and other temporary items and perform all such work under this SECTION.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEED v4 Materials Reporting Form shall be submitted for all materials in this SECTION.

1. Furnish any composite wood and agrifiber products installed inside the air and vapor barrier such that they meet the formaldehyde emissions requirements for CARB ATCM for ultra-low-emitting formaldehyde (ULEF) or no-added-formaldehyde (NAF) resins. Laminating adhesives used to fabricate on site and shop applied composite wood and agrifiber assemblies must also meet these requirements. Refer to requirements for IEQ Credit 2 as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) The Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
3. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) The Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
4. Certified Wood (FSC). (See Section 018113 Sustainable Design Requirements for overall project FSC-Certified wood content requirements.) For the sum of all wood products in this section, a minimum of 50% FSC wood is required.
5. Furnish any paints and coatings such that they meet the requirements for IEQ Credit 2 as defined in Section 018113-SUSTAINABLE DESIGN REQUIREMENTS.
6. For all adhesives and sealants, meet the requirements for IEQ Credit 2 as defined in Section 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 INTENT AND WORKMANSHIP

A. It is not the intent of this Specification to hereinafter define the types, sizes or installation methods for each item of work. Methods of installation, joinery, sizes, spacing of nailers and furring strips, and other information pertaining to the lumber, plywood and other items or required work shall be installed in accordance with the details on the Drawings for the specific areas involved.

B. Work that is to be finished or painted shall be free from defects or blemishes on surfaces exposed to view that will show after the finish coat of paint is applied. Any materials which is in any way defective and not up to Specifications for quality and grade for its intended use, or otherwise not in proper condition shall be rejected. Rough lumber shall be dressed four sides, air-dried, well-seasoned, sound and free from splits, cracks, shakes and wanes, loose or unsound knots, and decay.

2.02 LUMBER AND PLYWOOD TREATMENTS

A. Preservative Treatment: All concealed-from-view nailers in conjunction with roofs and curbs and all other wood members noted on the drawings to be "pressure treated" shall be pressure-preservative treated. All other wood nailers, furring, and other concealed lumber in direct contact with masonry or concrete shall be treated by brush-coating. Brush coat all cut ends of treated lumber with two heavy coats of Penta, Woodlife, Cuprinol, or equal.

1. Pressure Treatment – Lumber and plywood specified to be "pressure treated" shall be impregnated under pressure with a paintable wood preservative of water borne type, chromated zinc chloride, chemonite, Celcure, Erdalith, Wolman Salt or equal. Minimum retention shall be .30 pounds of preservative per cubic foot of wood. Preservative shall meet APWA P-5 and Federal Standard TT-W-550. Pressure treatment process and results shall meet Federal Specification TT-W-571 and AWPA Conformity Standards.
2. Brush Treatment – Penta, Cuprinol, Woodlife, or approved equal, applied in two heavy coats, prior to installation of lumber on all surfaces.

B. Fire Retardant Treatment: All lumber and plywood for framing and blocking and as otherwise designated on the Drawings to be fire retardant treated, shall be pressure impregnated with FLAME PROOF LHC by Osmose Wood Preserving, Inc. or approved equal to comply with the requirement for a flame spread of 25 or less with no evidence of significant progressive combustion when tested for thirty minutes duration under the Standard Test Method for surface burning characteristics of building materials (ASTM E-84, NFPA 225, UL 723 and AWPA C-20 and C-27). Each piece of wood shall bear the mark of an accredited testing agency such as the Underwriters Laboratories label, indicating compliance with the flame spread classification.

C. After treatment, all lumber shall be kiln dried to an average moisture content of 19 % or less, and all plywood shall be dried to an average moisture content of 15 % or less.

D. Exterior fire-retardant pressure treated plywood shall be formulated to both meet flame spread of 25 or less (ASTM-E-84) and provide protection for applications exposed to the weather: “Exterior Fire-X”, by Hoover Treated Wood Products or equal.

2.03 ROUGH CARPENTRY MATERIALS

A. Wood framing, blocking, and other lumber of actual 1-1/2 inches (2 in. nominal) or greater dimension – Southern Pine No. 2 or better in sizes as indicated on drawings.

1. **Wood blocking for attachment of all wall and ceiling mounted items shall be a full 1 ½ inches (2 in. nominal) thickness.**

B. Furring, nailers, and other lumber of less than 1-1/2 inches (2" nominal) in dimension – No. 2 spruce or pine.

C. Interior Plywood – C-C EXT-APA, unsanded of thickness indicated on the Drawings except where exposed to view where grade A-C EXT-APA shall be used.

D. Fire retardant interior plywood where plywood substrate is called for on the Drawings at circulation spaces: ramp, passage, corridor, lobby and vestibules.

E. Exterior Plywood – C-C EXT-APA, unsanded, of thickness indicated on the Drawings.

F. Medium Density Overlay (MDO) plywood for surface mounting of electrical panelboards, data/communications and other MEPFP wall mounted equipment for painted finish.

G. Bolts and fastenings:

1. Non-specified nailers and blocking in excess of 7/8 inches thick, 3/8-inch diameter, unless otherwise indicated on the Drawings, galvanized steel anchor bolts or expansion bolts, as applicable, of sufficient length to penetrate masonry or concrete a minimum of six inches. Space bolts not more than 12 inches on center and stagger the lines of bolts as far as practicable.
2. Bolts for lumber and furring 7/8 inches actual thickness and less - Galvanized steel bolts at least 1/4 inch in diameter, of the most appropriate types and lengths for the particular application and provided with all required galvanized washers and nuts.
3. All flush framed connections shall have beam or joist hangers.

H. Exterior wall and roof sheathing (veneered plywood).

1. Pressure treated sheathing as noted on the drawings.
2. Fasteners – Refer to structural drawings for fastening requirements.

I. Adhesives: Where used, all adhesives shall comply with LEEDv4-S IEQ Credit 2 for VOC content. Refer to SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.04 MISCELLANEOUS MATERIALS

A. Install rigid and semi-rigid thermal insulation provided by SECTION 072100-INSULATION behind 1/2 inch PT plywood at the base of vertical walls at PVC roofing terminations, as shown on the drawings. Insulation shall match the insulation provided in the cavity of masonry veneer, metal panel, phenolic panel and cement fiber panel walls.

B. Miscellaneous Framing Component, General: Cold-formed metallic coated steel sheet, ASTM C 645, Grade 50, with ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating.

1. Z-girts: 0.053 inch / 16 ga. (1.34 mm) minimum.
2. Hat Channels: 0.053 inch/16 ga. (1.34 mm) minimum.
3. Sill Channels: 0.053 inch/16 ga. (1.34 mm) minimum.
4. Other Required Shapes: 0.053 inch/16 ga. (1.34 mm) minimum.

PART 3 EXECUTION

3.01 GENERAL

A. Framing, nailers, blocking and furring - Refer to the Drawings for the various conditions. Install items with specified fastenings, shimming as the work progresses, to assure smooth and level surfaces for proper receipt of materials to be attached thereto. Countersink all heads of fasteners in all locations where another finish material will be directly applied to furring, nailers and blocking. Furnish and install all beam and joist hangers and similar accessories, as shown on the Drawings and required for a complete installation.

B. All construction, including framing and fire stopping shall be performed in accordance with the requirements of the Commonwealth of Massachusetts State Building Code, except where the work indicated on the Drawings exceeds the requirements of the Code. Where the Drawings indicate work in excess of minimum Code requirements, the work shall be done according to the Drawings.

C. Brush treat all field cuts of treated wood with preservative.

D. Be thoroughly familiar with all sections specifying wall and ceiling mounted items. Install wood blocking within wall and ceiling construction for attachment of all wall and ceiling mounted items.

END OF SECTION

SECTION 062000

FINISH CARPENTRY

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following, as shown on the Drawings and specified herein:

1. Prefinished custom fabricated millwork and standard cabinetry as shown on the Drawings, including but not limited to: base, upper and tall cabinets, classroom storage wall millwork, administration reception desk, media center circulation desk, mailbox units, project area locker enclosures, project area seat, tack and dry erase surface low height dividers, benches, display, tack and seating cabinetry, countertops with side and back splashes, and all necessary hardware.
2. Shelving, fixed and adjustable, with metal standards, brackets, and hardware.
3. Prefinished veneer panels, veneer core plywood, with solid edge-banding, for all new plywood surfaces and millwork construction noted on the drawings to be "hardwood veneer plywood" or "hardwood plywood" for natural finish.
4. Prefinished solid hardwood for all new millwork, sills, trim, tongue and groove paneling, backsplashes at engineered stone counters and other items noted on the drawings as "hardwood" or “prefinished hardwood.”
5. Solid poplar wood trim and MDO plywood where designated on the Drawings to be field painted.
6. Lockable display cases, including shelf supports, glass doors, glass shelves, tack surfaces, and all required hardware.
7. Wood risers, treads and apron at cafeteria platform (stage).
8. Wood benches at Cafeteria, Main Lobby and Media Center.
9. Perimeter shelving and storage cabinets at Media Center.
10. Recycled glass engineered stone countertops with solid hardwood splashes at main administration counters, library circulation counter and other surfaces and locations as shown on the Drawings.
11. Plastic laminate surfacing for counters, backsplashes and millwork where noted.
12. Epoxy countertop and splash in Art Room.

13. Butcher block countertop in Custodian Workshop.

14. Linoleum resilient tack surface and backer panel when called for on the Drawings at display cases and other wall surfaces.

15. Magnetic dry erase porcelain white board surface, particle board backing and vapor barrier where integrated into the millwork as noted.

16. Shims for plumbing and leveling items furnished and/or installed herein.

17. Custom fabricated, prefinished sliding “barn” doors including installation of all associated sliding tracks, guides and recessed hand pulls.

18. Sealant and caulking at backsplashes and between millwork (standing and running trim, fillers, panels and cases) and other dissimilar materials.

19. All of the work of SECTION 062000-FINISH CARPENTRY in all egress, and egress access (circulation) spaces; corridors, project areas, lobbies, vestibules, stairs and the spaces that are contiguous to them (not separated by doors) shall be CLASS B rated.

20. Fire treated wood blocking, grounds, cleats and shims as shown on the Drawings in this Section and fire treated plywood core for veneered surfaces in corridors, project areas, lobby and stairs.

21. Colored putty for filling nail holes.

22. Expansion anchors for free standing millwork at concrete slabs not otherwise attached to walls and/or overhead soffits and where noted on the Drawings.

23. All other items designated “millwork” and “casework” or “BY SECTION 062000-FINISH CARPENTRY” on the Drawings.

24. Miscellaneous hardware including but not limited to flag brackets designated “BY SECTION 062000-FINISH CARPENTRY” on the Drawings.

B. Install all new wood doors, metal doors and frames, and finish hardware, as furnished under SECTION 081113-HOLLOW METALWORK, SECTION 081416-WOOD AND PLASTIC DOORS, and SECTION 087100-FINISH HARDWARE, respectively, except as otherwise specified hereunder.

C. Install toilet accessories so specified and furnished under SECTION 102813-TOILET AND BATH ACCESSORIES.

D. Install designated toilet accessories as furnished by the Owner.

E. Secure tall bookcases, as provided under separate contract by the Owner to walls in Literacy Library.

F. Install linear aluminum grilles for venting millwork benches and sills as furnished under SECTION 230001-HVAC.

G. LEEDv4-S Requirements:

1. The work of this SECTION includes material and submittal requirements for fulfillment of project LEEDv4-s certification. LEEDv4-s certification at "Silver" level is an Owner requirement that is critical to secure funding from the Massachusetts School Building Authority. LEEDv4-s requirements for the work of this SECTION are detailed herein, and additionally in Division 1 of the Project Manual.
2. For all adhesives and sealants, meet the requirements for IEQ Credit 2 as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.
3. For all composite wood and agrifiber products, meet the requirements for IEQ Credit 2 and as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.
4. For all paints and coatings, meet the requirements for IEQ Credit 2 as defined in SECTION 018113 – SUBSTAINABLE DESIGN REQUIREMENTS.
5. For ceiling and wall systems, including gypsum board products, insulation products, acoustical ceiling systems and wall coverings installed in the building interior (e.g., tackable surfaces), meet the requirements for IEQ Credit 2 as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.
6. Materials Credit Certified Wood: For all new wood, provide itemized invoices showing wood that is FSC certified and wood that is not. Invoices that include FSC certified wood shall show the vendor's Chain of Custody Certificate number on them. Submit Millwork shop FSC certifications associated with each invoice, to provide complete chain of custody for FSC wood.
7. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following work is to be performed under the designated SECTIONS:

1. Rough blocking, furring, nailers, plywood sheathing, and other items of rough carpentry: SECTION 061000-ROUGH CARPENTRY.
2. Woodgrain phenolic panels: SECTION 074233-PHENOLIC RAINSCREEN SYSTEM.
3. Aluminum sliding doors at administration desk and bulletproof transaction window: SECTION 080001-METAL WINDOWS.
4. Furnishing and installation of glass at interior wood and hollow metal doors and lites: SECTION 080002-GLASS AND GLAZING.

5. Engineered quartz stone thresholds, jambs and heads adjacent to ceramic tile: SECTION 090002-TILE.

6. Field painting of designated solid Poplar and MDO veneered plywood: SECTION 090007-PAINTING.

7. Wood finish flooring: SECTION 096466-WOOD AND ATHLETIC FLOORING.

8. Prefabricated markerboards, tackboards and prefabricated sliding markerboard units including maprails with flag holders: SECTION 101100-MARKERBOARDS AND TACKBOARDS.

9. Metal lockers in project areas: SECTION 105113-LOCKERS.

10. Outlets at cabinetry and light fixtures mounted on or below wall cabinets, on top of project area lockers, and in display cases: SECTION 260001-ELECTRICAL.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with the requirements of SECTION 013300-SUBMITTALS.

B. Include large-scale fabrication details and joinery of finish carpentry items furnished hereunder, elevations showing the direction of grain and all fabricated joints and a schedule and cuts of hardware therefore.

C. Make actual field measurements of all condition receiving millwork and shelving and include such dimensions on shop drawings. Dimensions indicated on the Contract Drawings, therefore, will be subject to minor corrections.

D. Submit the following samples in accordance with the requirements of SECTION 013300-SUBMITTALS.

1. Provide an affidavit confirming that all samples submitted comply with the specified AWI Architectural Woodwork Standards for Premium Grade as classified and characterized by Architectural Woodwork Standards, Section 4 – Sheet Products and factory finished veneer panels comply with Section 5 – Finishes, Prefinished Work.

2. Solid Wood and Plywood – 4 x 12 x ¾ inch of solid wood and 24 x 24 x ¾ inch of plywood core veneer in each species proposed for use, with designation of locations to be used. Samples shall be representative of the full range (extremes of light and dark) of the material proposed to be used.

3. MDF Plywood for Exposed Shelving – 24 x 24 x 1 inch of MDF veneer core with ¼ inch solid wood edge banding (all four edges) at adjustable shelves in each species proposed for use, with designation of locations to be used. Samples shall be representative of the full range (extremes of light and dark) of the material proposed to be used.

4. MDF Plywood for Concealed Shelving in Base and Wall Cabinets – 24 x 24 x ¾ inch of MDF veneer core with ¼ inch solid wood edge banding (all four edges) at adjustable shelves in each species proposed for use, with designation of locations to be used. Samples shall be representative of the full range (extremes of light and dark) of the material proposed to be used.
5. MDO (medium density overlay panel): 12 in. x 12 in. x ¾ in.
6. Hardware: One sample each of the following:
    a. Wire pull
    b. Lock
    c. Shelf support
    d. Coat hook
    e. Grommet
    f. Nametag holder
    g. 3 ft. length of shelf standard and one bracket
    h. Flag bracket
7. Plastic Laminate – Manufacturer's standard sample chains including complete line of solid colors, patterns and wood grains.
8. Engineered Recycled Glass and Quartz Stone – Manufacturer's samples of complete line of available colors.
9. Stain Finish – Provide min. 4 in. x 4 in. stained samples of tongue and groove quarter sawn red oak solid wood in five approximations of chosen phenolic panel color.
10. Roll Tack Surface – Manufacturer's samples of complete line of available colors, not smaller than 1 in. x 2 in. Upon request, provide larger samples of 12 in. x 12 in. of up to (2) colors.
11. Caulking manufacturer's card with full line of standard colors.
12. Dry Erase Surface, Backing and Moisture Barrier – Manufacturer's sample not less than 12 in. x 12 in. demonstrating a full example of steel spline butt joint.
13. Mock-ups:
    a. Tongue and Groove Panel System – After approval of submitted samples and choice of stain, provide minimum 2 ft. x 2 ft. x 2 ft. mock-up of tongue and groove panel system including 4" recessed VCB base and mitered 90° corner. Mock-up shall be constructed and finished per the requirements of this Section and, once approved, be retained and used as the standard of quality for the project.
    b. Sample Classroom – Provide all millwork in sample classroom. Revise if modifications are required. Once approved, millwork in mock-up classroom may become part of the work.

E. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation by LEED for Schools v4 and as detailed in Section 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per Section 018113-Sustainable Design Requirements.
3. Product substitution requests are subject to additional LEEDv4-S submittal requirements, see SECTION 012500-SUBSTITUTION PROCEDURES.

1.05 WORKMANSHIP AND QUALITY STANDARDS

A. General – Refer to the Drawings for details of new finish, trim, and millwork items.

1. Shelving, millwork, finish and trim shall conform to design and detail as shown. Where practicable, work shall be finished and assembled at the mill.
2. All millwork and trim shall be furnished smooth and free from all machine and tool marks that may show through the finish. Nails used to fasten finish work shall be set to receive putty or wood filler.
3. All joints shall be tight and formed to conceal shrinkage. Miters 4 inches or more from heel to point shall be glued.
4. Finish shall be made in as long lengths as possible and jointed only where solid fastenings can be made.

B. Quality Standards – The quality standards of the Architectural Woodwork Institute (AWI) Architectural Woodwork Standards, latest edition for PREMIUM GRADE are hereby made a part of this SECTION 062000.

1. All materials and workmanship shall conform to the requirements for premium grade set forth herein.

2. Conform to the stricter requirements specified herein and shown on the Drawings, which include but are not limited to:

a. Prohibition of glue up for width at certain feature elements where finish width exceeds AWI standards.

~~b.~~

C. Material References – The references to the various wood panel products used herein shall be as classified and characterized by Architectural Woodwork Institute Architectural Woodwork Standards, latest edition, Section 3 – Lumber, Section 4 - Sheet Products and Section 5 – Finishes and other Sections as applicable.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4 Materials Reporting Form shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
3. Rapidly Renewable Content. (See Section 018113 Sustainable Design Requirements for overall project rapidly renewable content requirements.) Contractor shall examine each product or material specification below for a stated minimum rapidly renewable content requirement, and if none is stated, the requirements under 018113 shall govern.
4. Certified Wood (FSC). (See Section 018113 Sustainable Design Requirements for overall project FSC-Certified wood content requirements.) For the sum of all wood products in this section, a minimum of 50% FSC wood is required.
5. Furnish any composite wood and agrifiber products such that they meet the formaldehyde emissions requirement for CARB ATCM for ultra-low-emitting formaldehyde (ULEF) or no-added formaldehyde (NAF) resins. Laminating adhesives used to fabricate on-site and shop applied composite wood and agrifiber assemblies must also meet this requirement. Refer to the requirements for IEQ Credit 2 as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
6. Furnish any adhesives and sealants such that they meet the requirements for IEQ Credit 2 as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
7. Furnish any paints and coatings such that they meet the requirements for IEQ Credit 2 as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
8. Furnish ceiling and wall systems, including gypsum board products, insulation products, acoustical ceiling systems and wall coverings installed in the building interior (e.g., tackable surfaces), such that they meet the requirements for IEQ Credit 2 as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 FINISH, TRIM AND MILLWORK MATERIALS

A. General – Materials required for items of new cabinets, finish trim, shelving, and millwork shall be as follows. (Note: Materials to receive natural finish and stain finish shall be **pre-finished**):

1. Solid Hardwood (except 4 in. tongue and groove panels): Quarter Sawn **Red Oak**, AWI grade I, with matte clear coat finish.
2. Solid Hardwood for 4 in. Tongue and Groove Panels: Quarter sawn **Red Oak** AWI grade 1 with stain and clear matte finish.
3. Hardwood Veneer Plywood: Rift Cut **Red Oak** veneer plywood, book matched AWI Grade AA with matte clear coat finish. Core shall be medium density fiberboard (MDF) as specified for the particular application. Plywood shall conform to all standards for Premium Grade.
4. Poplar: Yellow poplar, AWI grade II, to be field painted, except as noted "factory finish" on the Drawings.
5. Medium Density Overlay (MDO) plywood with resin-impregnated with Grade B face and backer veneers for field paint finish.
6. Solid Hardwood for Platform Treads & Risers: Select White Maple, plain sawn, AWI grade I, for natural finish. Glue-up is permitted per AWI standards to achieve required widths. All component boards shall be well matched for color and grain.

B. Panel products for the construction of cabinets, counters and other finish carpentry items shall be as follows:

1. Cabinet Doors and Drawer Fronts:
   a. For doors and drawer fronts with stain and clear matte finish: Medium Density Fiberboard (MDF) with hardwood "AA" **Red Oak** face veneer on exposed side and "B" **Red Oak** back veneer on concealed side with solid **Red Oak** hardwood 1/8 inch edge banding on all exposed edges. Wood grain shall run in direction shown on the Drawings.
   b. For doors and drawers with plastic laminate finish: MDF with same grade plastic laminate on all six surfaces.
2. Base, Overhead and Tall Cabinet Carcass:
   a. Clear Matte Finish Cabinets:
      1) Panels exposed to view on the outside of cabinet: MDF with hardwood **Red Oak** veneer on exposed surface and plain sawn on concealed side, and solid **Red Oak** hardwood 1/8 inch edge banding on all exposed edges.
      2) Face frames and any exposed door stops or trim: Solid **Red Oak** hardwood, Quarter Sawn.

3) Panels not exposed to view: Particle board with melamine, color as selected by Architect unless shown on Drawings to be natural finish.

b. Plastic Laminate Finish Cabinets

1) All panels except backs and bottoms: Medium Density Fiberboard (MDF) with melamine finish inside cabinet and plastic laminate on all surfaces visible from outside the cabinet. Backs and bottoms MDF or Medium Density Particleboard (MDP) with melamine finish. Melamine color as selected by Architect.

3. Shelving inside (concealed) enclosed base and overhead wall cabinets:

a. Clear Coat Cabinets: MDF with **Red Oak** veneer and solid **Red Oak** 1/8 inch edge banding.

b. Fixed Shelving: Fixed shelving for all uses other than inside enclosed cabinets shall be one-inch thick Medium Density Fiberboard (MDF) veneer core with 1/8 inch edge banding at exposed edge.

c. Adjustable Shelving: Adjustable shelving shall be one-inch thick Medium Density Fiberboard (MDF) core with Red Oak veneer with 1/8 inch edge banding at **all** four edges.

d. Plastic Laminate Shelving: Shelving with plastic laminate shall be plastic laminate on all six exposed surfaces.

4. Plastic Laminate Cabinets shall be MDF with plastic laminate on all six (6) surfaces.

5. Countertops:

a. Countertops with sinks: Phenolic resin particleboard. Counters installed over base cabinets shall be one layer of ¾ inch material with laminate balancing sheet under counter.

b. Counters and work surfaces without sinks: Medium Density Particleboard. Counters over base cabinets shall be one layer of ¾ inch material with laminate balancing sheet.

c. All countertops not installed over base cabinets shall be a minimum of two layers of ¾ inch material.

d. Epoxy Countertops at Art Rooms: Tops shall be one inch thick molded from a modified epoxy resin, color black, by Kemresin, Prime, Durcon or equal.

e. Butcher Block Benchtops: Tops shall be kiln dried, 2-1/4 inch thick Maple, electronically glued, cured and sanded with an eased edge. Tops shall be finished with a penetrating mineral oil product.

6. Engineered Recycled Glass and Stone Countertops: To establish a level of color, quality and design, countertops shall be engineered stone incorporating recycled glass as manufactured by Curava, Merrimack, NH. Other products of comparable quality and color by EOS, Polycor, Inc. or an approved equal may be considered for approval by the Architect upon receipt of adequate data and sample. Countertops to be 1 ¼ in. thick unless otherwise noted. Backsplashes shall be ¾ in. thick unless otherwise noted.

   a. Basis of Design: Curava, Arctic Blue Polished finish.

7. Plastic Laminate: General Purpose (HGS) for horizontal surfaces: 0.044-0.048 inch thick, and Vertical Surface (VGP) for vertical surfaces: 0.028 inch thick at cabinet walls, doors & drawers shall be high-pressure laminates, meeting or exceeding the performance standards of NEMA, Class I, in a low, non-directive texture in solid colors, patterns and wood grains as indicated: "plastic laminate" on the drawings. Laminates shall be chosen by Architect from Wilsonart, Nevamar, Pionite or Formica lines. Provide balancing sheet of the same thickness of plastic laminate for all plastic laminate surfaces. Interior surfaces of cabinets with doors shall receive low-pressure (melamine) surfacing material.

8. Cement – For application of laminated plastic: 3M Brand Fastbond 10 or approved equal that is LEEDv4-S compliant adhesive.

9. Glue: For lamination and fabrication of wood and plywood items - Exterior Grade, phenolic resin glue that is LEEDv4-S compliant adhesive.

10. Nails: For finish and trim items - 6D or 8D coated or galvanized finish nails.

11. Screws: Flathead galvanized or stainless steel wood screws, of the appropriate size.

12. Panel Adhesive: as recommended by manufacturer that is LEEDv4-S compliant adhesive.

13. Tack Surface: Linoleum resilient tackable surface material, "Bulletin Board" as manufactured by FORBO Linoleum, Inc. Hazeton, PA, Industrial Acoustics Co., Polyvision, Inc. or an approved equal as determined by the Architect. Tack surface material shall be of natural materials consisting of linseed oil, granulated cork, resin binders and dry pigments mixed and calendared onto a natural burlap backing. Color shall extend throughout the ¼-inch thickness of material. Full range of colors for Architect's selection.

   a. Where shown on the drawings, tack surface to be laminated to molded, recycled post-consumer paper cellulose fiber structural panel. Panels used in egress corridors (project areas) shall be class A fire rated.

14. Magnetic Dry Erase Surface: Porcelain enameled steel on 7/16 MDF with adhered moisture barrier as manufactured by Claridge (frameless). Panels shall be supplied in maximum available sizes, up to 5 ft. x 16 ft. Where required, joints shall be steel spine butt joints.

   a. Face Sheet: Vitreous porcelain enamel nonporous, stain resistant writing surface on 24 gauge LCS markerboard. Surface shall be "low gloss".

b. Core Material: 7/16 medium density fiberboard.

c. Panel Backing: .005 inch aluminum foil for panels.

15. Adjustable Metal Non-Slip Shelf Supports: 5 mm steel spoon supports with angles on seat to receive kerf in shelf, nickel plated, Model 282.04.711 as manufactured by Hafele. Similar anti-slip spoon shelf supports by US Futaba, Inc. Model 7211152024, ROK Model ROK5P5NSTOP or an approved equal as determined by the Architect.

C. 4 in. Nominal Tongue and Groove System:

1. Quarter sawn red oak tongue and groove panels, fabricated as shown on the Drawings.

2. Tongue and groove panels shall be milled to provide 3 5/8 in. high outer face and leave 3/8 in. high x ¼ in. deep reveal such that assembled board remain on 4 in. module.

3. Starter (as base) and cap (top) boards shall be fabricated without tongue and groove as shown on the Drawings.

4. Tongue and groove panels shall be blind nailed except at starter and cap boards, mitered corners and above and below projecting millwork installations. All finish face nails shall be set and puttied.

5. Tongue and groove planks shall be in prefinished stain finish.

6. Seams between the component boards of glued-up tongue and groove panels, when required, shall be located in the area of the tongue / reveal such that the 3-5/8 in. exposed outer face is comprised of one board.

D. Solid hardwood frames of “cube” elements shall be quarter sawn red oak with a clear factory applied finish. Cube elements include display cabinets, seats, transaction counter surround and lobby interactive feature wall.

1. Provide 6 in. wide boards in maximum practical lengths with no board less than 4 ft.-0 in. long. Where multiple boards are required for lengths over 8 ft., boards shall be well matched for color and grain. All such joints shall be as indicated on the approved shop drawings.

2. No glue-up for width shall be permitted for “cube” frames.

3. Detail cube elements with best practices to prevent cupping and bowing including but not limited to: relief cuts and backing out of wide boards.

E. Miscellaneous Materials:

1. Grommets: Plastic grommets at all countertops shall be 2 ¾ inches in diameter with inserts and top covers. Color to be selected by the Architect. Locations shall be coordinated in the field with the Architect. Assume four (4) grommets per 10 linear feet of countertops.

2. Latex Based Caulking: Pecora Acrylic Latex Caulk AC 20, Tremco Tremflex 834, Bostik Findley Chem-Caulk 600 or an approved equal, in colors as selected by the Architect.

3. Putty: Wood putty in colors compatible to the light and dark grains for each wood species.

4. Expansion Anchors: ½ in. min. diameter x 5 in. min. length (or as required for the application).

2.02 HARDWARE FOR MILLWORK, SHELVING, AND PARTITION WORK AND MISCELLANEOUS HARDWARE

A. General – Refer to the Drawings for various new millwork, shelving, and partition, and provide all hardware therefore. Unless otherwise noted, finish of all exposed-to-view hardware shall be US26D. All hardware shall be as specified on the Drawings, or approved equal.

1. All doors and drawers shall have keyed locks that are keyed alike, keying schedule to be provided by the Architect.

B. Hardware and Accessories – To establish a level of quality, design and function, Drawings are based on products by manufacturers listed in the schedule shown on the Drawings. Hardware by other manufacturers will be considered for approval as an equal by the Architect upon receipt of adequate supporting data and samples.

C. Miscellaneous Hardware:

1. Flag Holders: To establish a level of quality, design and function, flag holders are based on Annin & Co. Item # 642600: 45° cast aluminum in natural finish flag mounting bracket for ¼ in. to ½ in. dowels. Flagpole holders by other manufacturers will be considered for approval as an equal by the Architect upon receipt of adequate supporting data and samples.

a. Provide flag holders at a rate of one per room at all "teaching spaces" including Kindergarten, Pre-K, Rise, Rise Jr., Classrooms, CUBS, ISN, Music, NAS, Literacy Library, Language Based Program, STE/ Engineering.

b. Flags and rods N.I.C.

2.03 PREFINISH WORK

A. Factory finished millwork shall be in accordance with AWI Division 1500-S-4-Finish System Standards for 'Premium Grade'. Factory finish shall be ultraviolet (UV) cured polyurethane to comply with EPA Title 5 guidelines for Volatile Organic Compound (VOC) emissions limitations. Finish shall meet or exceed performance standards of TR-6 catalyzed polyurethane. Millwork shall be furnished with a clear matte finish at all areas except the 4 in. tongue and groove panels. 4 in. tongue and groove panels shall be furnished with a stained finish and matte clear top coats. Paste filler shall be applied per AWI standards between washcoat and sealer.

B. Stain shall be Minwax Gel Stain or equal. Stain shall be custom mixture of one or more manufacturers' full line of available colors to achieve color and tone of phenolic panels.

C. Touch-up all field cuts and imperfections with stain and polyurethane to match pre-finished surfaces.

2.04 GLASS DOORS AND SHELVES FOR DISPLAY CASE

A. Clear Tempered Safety Glass – Minimum 3/8 inch, heat tempered, annealed, polished clear float glass, PPG Herculite, LOF Tuf-Flex, ASG TRU-TEMP, or approved equal. Edges shall be "pencil" ground where glass panel and door edges are frameless.

B. Glass Door Hardware – Labora Series sliding glass door fittings as manufactured by Hafele, or approved equal. Furnish and install all glass retainers, track runners, pulls and locks required for a complete installation. Locks shall be integrated in the bottom hardware track and rail. No glass mounted ratchet type locks are permitted.

2.05 CUSTOM BARN DOORS

A. General: Custom barn doors shall comply with all requirements for lumber core, wood flush doors in SECTION 081416-WOOD AND PLASTIC DOORS.

B. Door leaves shall be 1 ¾-inch thick in size shown on the Drawings.

C. Provide rift cut red oak veneers conforming to the veneer requirements of paragraph 2.01.A.3 of this Section. Veneers shall be applied in the direction shown on the Drawings to both sides of each panel.

D. Provide solid quarter sawn oak conforming to paragraph 2.01.A.1 of this Section for both side stiles of each panel. Provide minimum 1 1/8-inch top and bottom stiles in compatible hardwood.

E. Door leaves shall be prefinished per Article 2.03 of this Section.

F. Provide 1/8-inch wide x 1/16-inch deep reveals as shown on the Drawings. Reveals shall have shop-applied matte black paint finish.

2.05 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this Article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified.

1. Do not use treated materials that do not comply with requirements of referenced woodworking standard or that are warped, discolored, or otherwise defective.

2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.

3. Identify fire-retardant-treated materials with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Comply with performance requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Use the following treatment type:

1. Mill lumber before treatment and implement special procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of treated woodwork.
2. Kiln-dry materials before and after treatment to levels required for untreated materials.

C. Mill lumber before treatment and implement special procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of treated woodwork.

1. Kiln-dry materials before and after treatment to levels required for untreated materials.

D. Fire-Retardant Particleboard: Panels complying with the following requirements, made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 25 or less per ASTM E 84.

2.06 LATEX BASE CAULKING MATERIALS

A. Materials

1. Caulking Material and Siliconized Acrylic Latex Caulk/Sealant – Pecora Acrylic Latex Caulk AC-20+, Tremco Tremflex 834 Caulk, Bostik Findley Bosti-Flex Plus, or equal, in colors as selected by the Architect, from manufacturer's full line of colors.
2. Primer – Of a type as recommended by the manufacturer of caulking material and shall be non-staining.

PART 3 EXECUTION

3.01 FABRICATION AND INSTALLATION OF NEW MILLWORK AND SHELVING

A. Except as otherwise specified hereunder, fabricate and install all work in strict accordance with the workmanship standards set forth in the A.W.I. Quality Standards Premium Grade, Section 200, 400, 500, and 600 and the approved shop drawings.

3.02 FABRICATION AND INSTALLATION OF WOOD TRIM

A. Fabricate and install all standing and running trim in accordance with the workmanship standards set forth in the A.W.I. Quality Standards Section 300 for Premium Grade, and the approved shop drawings.

3.03 INSTALLATION OF PRESSED STEEL FRAMES

A. Erect all pressed steel frames, furnished under SECTION 081113, in accordance with the approved shop drawings and frame schedule. Anchor clips for frames in metal stud partitions shall be secured to studs by the drywall construction erector.

B. Provide rigid temporary bracing for frames to ensure maintenance of positioning, and remove only after frames have been permanently anchored.

3.04 HANGING AND FITTING OF DOORS AND METAL SIDELIGHT PANELS

A. Receive, store and be responsible for hardware as furnished under SECTION 087100-FINISH HARDWARE.

B. Fit all hinged doors to their respective openings. Install metal sidelight panels as indicated on the Drawings.

C. Install fire rated and non-rated doors in accordance with NFPA 80, manufacturer's instructions, and UL and Massachusetts Building Code requirements. Warped, bowed and cup in wood doors shall not exceed 1/4 inch over a 36 inch x 84 inch surface.

D. Fit all hardware accurately, from templates supplied with hardware apply securely, and adjust carefully.

E. Should pre-finished wood doors require cutting or re-machining, seal exposed surfaces with two brush coats of oil base polyurethane or varnish before hanging.

F. Prior to Substantial Completion of the Contract, and before building is occupied, inspect entire building with Architect, to ensure that each piece of finish hardware is undamaged and in perfect order and that the proper key for each lock is identified.

3.05 INSTALLATION OF ADJUSTABLE SHELVING IN MILLWORK

A. Adjustable shelving ends at shelf supports shall be kerf cut to receive angles anti-slip fin of metal shelf supports.

3.06 FABRICATION AND INSTALLATION OF ALL MILLWORK, CABINETS AND PANELING

A. The fabrication and installation of all wood and plastic laminate paneling shall be "premium grade" as defined by AWI Eighth Edition: "Architectural Woodwork Quality Standards."

3.07 INSTALLATION OF TOILET ACCESSORIES

A. Perform installation of accessories furnished under SECTION 102813-TOILET AND BATH ACCESSORIES including scheduled Owner-furnished items, in accordance with the templates and instructions furnished by the accessory manufacturer. Refer to the Drawings for various locations.

B. Perform installation of Owner provided toilet accessories including toilet paper, soap and paper towel dispensers in accordance with templates and instructions, furnished by the vendor. Refer to the Drawings for locations.

3.08 INSTALLATION OF SOAP AND PAPER TOWEL DISPENSERS

A. Perform installation of Owner provided soap and paper towel dispensers at sinks in classrooms and elsewhere where noted at sinks outside of toilet rooms in accordance with templates and instructions furnished by the vendor.

3.09 SECURING OF N.I.C. TALL BOOKCASES IN LITERACY LIBRARY 147

A. Secure tall bookcases as shown on sheet 5.9.02 to in-wall blocking (provided by SECTION 061000-ROUGH CARPENTRY). Bookcases procured and placed fully assembled in room with all necessary mounting clips / straps under separate contract (N.I.C.). Each of up to 12 bookcases will be secured requiring a maximum of four screws. Screws of appropriate length and appropriate to in-wall blocking shall be provided under this Section.

3.10 INSTALLATION LATEX CAULKING MATERIALS

A. Thoroughly clean all joints, removing all grease, dust and other foreign materials which will prevent proper adhesion. Apply masking tape to each exposed surface of joints.

B. After cleaning, and if so recommended by the materials manufacturer, apply primer to all joint surfaces, taking care not to stain adjacent surfaces.

C. Apply caulking material in joint using a hand caulking gun or power gun with a gun nozzle of proper size and sufficient pressure to completely fill joints. The depth of sealant and caulking materials shall be in accordance with the recommendations of the materials manufacturer for the specific joint function but in no case shall exceed 5/8 inch depth, nor be less than 1/8 inch. Tool with a dry or water-wet tool only. Do not use detergents or soapy water for tooling operations. Joints shall be given a slight concave surface. Remove masking tape immediately after tooling and/or before caulking material has taken initial set.

3.11 FINAL INSPECTION

A. Just prior to completion of all work under this SECTION 062000, the General Contractor, with the Architect, shall inspect all portions of the work and shall make any required adjustments or corrections to the work.

END OF SECTION

Division 7
Thermal and Moisture Protection

SECTION 070001

WATERPROOFING, DAMPPROOFING AND CAULKING

*(Filed Sub-Bid Required)

PART 1 GENERAL

1.00 TIME, MANNER AND REQUIREMENTS FOR SUBMITTING SUB-BIDS

A. Sub-bids shall be submitted in accordance with provisions of the General Laws (Ter. Ed.), Chapter 149, Section 44A to 44L, inclusive, as amended. The time and place for submission to Sub-Bids shall be set forth under INSTRUCTIONS TO BIDDERS.

B. Each Sub-Bid filed with the Awarding Authority must be accompanied by BID BOND, or CERTIFIED CHECK, or a TREASURER'S CHECK or CASHIER'S CHECK issued by a responsible bank or trust company, payable to the **City of Amesbury** in the amount stipulated in the INSTRUCTIONS TO BIDDERS. A Sub-Bid accompanied by any other form of bid deposit than those specified will be rejected.

C. Each Sub-Bid submitted for the work, under this SECTION, shall be on a form furnished by the Awarding Authority and required by SECTION 44F of Chapter 149 of the General Laws, as amended.

D. Work to be performed under this SECTION is shown on Contract Drawings numbered:

G.0.01, G.0.02, G.0.04-G.0.08, inclusive; 2.1.00-2.8.03, inclusive; 3.4.01-3.9.15, inclusive; 4.1.01-5.4.11, inclusive; 5.6.01-5.6.13, inclusive; 6.1.00-6.2.01, inclusive; 7.4.01-7.4.03, inclusive; 8.4.01-8.5.03, inclusive; 9.4.01-9.7.07, inclusive; and 10.0.01-10.3.13, inclusive.

Remaining Contract Drawings are included for reference and coordination.

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a sub-bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following, as shown on the Drawings and/or specified herein.

1. Ultra-low modulus silicone rubber sealant, including joint bead back-up, installed in the following joints:
    a. Perimeter joints between hollow metal exterior door frames and masonry, and other dissimilar materials.
    b. Control and expansion joints in exterior masonry.

c. Other exterior joints of the structure, designated on the Drawings to receive "sealant", except as otherwise specified hereunder.

2. Urethane-base sealant including joint bead back-up, for upper 1/2 inch of joints in interior pavements, between interior concrete pavements and walls of the building and other horizontal joints noted to receive "sealant" on the Drawings.

3. Two-part polytremdyne sealant (or optional two-part polysulfide sealant), including joint bead back-up, installed in the following joints.

   a. Interior expansion and control joints and where else shown on the Drawings.

4. Latex-base caulking material, including joint bead back-up, installed in the following joints:

   a. Interior perimeter joints of all openings in new exterior walls.

   b. Other interior joints designated on the Drawings to receive "caulking," except as otherwise specified hereunder.

5. Below-grade dampproofing, with insulating protective board, applied to:

   a. The exterior face of all perimeter concrete foundation walls except where sheet membrane waterproofing is called for.

6. Cement-based crystalline waterproofing inside walls and floor of elevator pits.

7. Sheet membrane waterproofing, drainage mat and rigid insulation at below-grade retaining walls at occupied areas of ground floor as shown on the Drawings.

~~C. Install the following as furnished under the following SECTION.~~

~~1. Install clamps for mechanical room floor drains as furnished under SECTION 220001-PLUMBING.~~

C. This subcontractor shall furnish, install and maintain in safe, adequate condition all lifts, hoisting, staging and scaffolding that are necessary for the proper execution of the work of this section.

D. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. For all adhesives and sealants field applied on site and inside the weatherproofing, meet the LEEDv4-S requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

E. Exterior Envelope Commissioning - Refer to SECTION 019113-BUILDING COMMISSIONING REQUIREMENTS.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Construction of mock-up: SECTION 014339-EXTERIOR MOCK-UPS.
2. Compressible joint fillers in masonry, and membrane flashing in masonry walls: SECTION 040001-MASONRY.
3. Compressible joint fillers in cast-in-place concrete, and underslab moisture barrier and insulation and sealing of saw cuts in slabs-on-grade: SECTION 033000-CAST-IN-PLACE CONCRETE.
4. Metal flashings and sealants in conjunction therewith, roofing, roofing flashings and internal sealants for preformed soffits, fascias and flashings: SECTION 070002-ROOFING AND FLASHING, SECTION 074213-PREFORMED CLADDING and SECTION 074251-PORCELAIN TILE WALL SYSTEM.
5. Internal sealants and perimeter sealants and caulking (exterior and interior) in conjunction with metal window, curtainwall and storefront systems: SECTION 080001-METAL WINDOWS.
6. Sealants, in conjunction with interior glazing: SECTION 080002-GLASS AND GLAZING.
7. Caulking and liquid membrane waterproofing, in conjunction with ceramic tile: SECTION 090002-TILE.
8. Perimeter exterior joints at window and curtainwall systems: SECTION 080001-METAL WINDOWS.
9. Sealants, in conjunction with gypsum drywall surfaces and accessories: SECTION 092116-GYPSUM WALLBOARD.
10. Air and vapor barriers: SECTION 071326-AIR AND VAPOR BARRIERS.
11. Joint sealants and backer rod at expansion and construction joints in exterior concrete pavement: SECTION 321313-SITE CONCRETE.
12. Caulking between plumbing fixtures and walls and floors: SECTION 220001-PLUMBING.
13. Sealant and caulking at counters, backsplashes and other finish carpentry items except as otherwise detailed in the contract drawings: SECTION 062000-FINISH CARPENTRY and SECTION 123533-CLASSROOM CASEWORK.

14. Caulking and sealants at backsplashes, side panels and scribes at wall construction at classroom casework: SECTION 123533-CLASSROOM CASEWORK.

1.04 SUBMITTALS

A. Submit the following samples in accordance with the provisions of SECTION 013300-SUBMITTALS.

1. Joint bead material – 12-inch length.

2. Sealants and caulking materials, 3-inch strips of each specified type, in all available colors for selection by the Architect, applied to pieces of cardboard.

B. Include, with samples submission, complete manufacturer's specifications, installation instructions and application data, and duplicate copies of certifications of compliance to the designated Standards and Specifications set forth herein for all material, together with supporting test data and chemical composition of each material. Written approval of the Architect must be obtained for all samples and data before delivering any material to the project.

C. Manufacturer's data - Submit to the Architect copies of manufacturer's specifications and installation and application instructions for all herein specified, and other data as may be required.

D. General Contractor’s Review - Accompanying approval request, submit to the Architect written statement signed by the Subcontractor, stating that the Architect’s drawings and specifications for materials herein specified have been reviewed with an agent or the manufacturer of the primary materials and that he is in agreement that the selected systems and all other materials herein specified are proper, compatible and adequate for the application shown, and the conditions and details are not in conflict with the respective warranties. Show by copy of transmittal from that copy of statement that has been transmitted to respective manufacturers.

E. Mockups of sealant materials installation: Perform sealant samples on mock-ups in conjunction with exterior wall system mockup panel construction to integrate the sealant installation into the exterior wall for approval by the Architect. Provide several mockups if necessary to include the various conditions. Rebuild mockups that are not approved at no additional cost to the Owner.

1. Final Mock-Up: Following the Architect’s review and approval of the mock-up panel, including those portions of the panel furnished and installed under other SECTIONS, a final mock-up panel shall incorporate all approved materials, colors and methods of installation. This final mock-up all be left on site to serve as the reference standard for appearance and workmanship as the work progresses. This Subcontractor shall, at no additional cost to the Owner, rebuild the portions of the mock-up furnished and installed under this SECTION using the final approved materials, colors and construction to complete the final mock-up.

2. Refer to SECTION 014339-EXTERIOR MOCKUPS for additional requirements.

F. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in Section 018113 - Sustainable Design Requirements.

2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. Product substitution requests are subject to additional LLEDv4-S submittal requirements, see SECTION 012500-SUBSTITUTION PROCEDURES.

1.05 PRE-WATERPROOFING CONFERENCE

A. After approval of all materials and prior to installation, a pre-waterproofing conference shall be held at the job site. In attendance shall be (1) Architect, (2) General Contractor (3) Owner's Project Manager and (4) Waterproofing Subcontractor, and (4) Manufacturer's representative.

B. The parties shall review Drawings, specifications and approved materials. Correct conflicts, if any, between approvals and specification requirements. Examine job site conditions, including inspection of substrate, material labels and methods of storing materials. Review installation procedures, scheduling and temperature requirements, and establish protection methods for finished waterproofing from other trades.

1.06 GUARANTEE AND BONDS

A. Silicone Sealant Systems

1. Manufacturer for the work of this SECTION shall review the Contract Documents, Shop Drawings and inspect the installation, and upon approval issue a standard 20-year warranty.

1.07 QUALITY ASSURANCE

A. The Subcontractor shall, for all materials and systems specified herein, submit a letter from each respective manufacturer certifying this Subcontractor is an authorized applicator.

1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Each container must bear an unbroken seal, test number, and label of the manufacturer upon delivery to the site. Failure to comply with these requirements shall be sufficient cause for rejection of the material in question by the Architect and his requiring its removal from the site. New materials conforming to said requirements, shall be promptly furnished at no additional cost.

1.09 JOB CONDITIONS

A. Weather conditions must be dry and of the proper temperature during application operations. Surfaces receiving work of this SECTION must be absolutely dry and dust free. All joints receiving sealants and caulking materials shall be subject to the approval of the materials manufacturer for proper use of the specified materials.

B. Adjacent surfaces must be protected from damaged work performed under this SECTION.

1.10 FIELD ADHESION TESTS

A. Perform adhesion tests on samples of sealant applied to prepared substrates at the site to assure that the proposed materials and installation procedures achieve adequate adhesion and that the optimum primers are selected. The General Contractor shall schedule the testing and report the results at no additional cost to the Owner. The Subcontractor may request the sealant manufacturer's technical representative visit the site to assist with adhesion testing.

B. Perform jobsite sealant adhesion tests in accordance with the following:

1. Apply three sealant test strips to each jobsite substrate. Prepare three samples for each type of sealant proposed on each substrate.
2. Sealant test strips shall be a minimum of 4 in. long at each location. Apply a 1 in. wide strip of bond breaker tape across the edge of each test specimen to produce a tab for gripping the specimen during testing.
3. Prepare additional test samples for each primer or substrate preparation technique recommended by the sealant manufacturer. For substrates where adhesion may benefit from the use of a primer, prepare test strips with and without primer to evaluate the effect on adhesion.
4. Locate sealant test strips in areas approved by the Owner in advance. Remove all traces of sealant test residue on substrates to remain.
5. Install sealant sufficiently in advance of general sealant application to allow time for curing and testing, and in no case less than three weeks in advance.
6. After curing for at least three weeks, forcibly remove sealant test strips to check on the sealant adhesion. Failure must be by tearing within the sealant itself (cohesive failure). Sealant test samples that fail adhesively (that is, by pulling cleanly away from the substrate leaving little or no sealant residue) are unacceptable.
7. If sealant fails adhesively, modify sealant application procedures as recommended by the sealant manufacturer and repeat testing until satisfactory adhesion is achieved.
8. Notify Architect at least 48 hrs. prior to the installation of test samples and 48 hours in advance of performing pull-tests so that he can be present to observe the installation.
9. Provide a written report to the Architect describing the testing, the results, and the recommendations of the sealant manufacturer.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEED v4 MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) The Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) The Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
3. Furnish any adhesives and sealants applied on site inside and outside the air and vapor barrier such that they meet the requirements for IEQ Credit 2 as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 MATERIALS REQUIREMENTS

A. Deliver each material in manufacturer's unopened container or bundles, fully identified with brand, type, grade, class, and all other qualifying information.

B. Storage of Materials - Store all materials in properly protected and dry storage facilities until ready for use. Installation of wet or damp materials will not be accepted. Do not use materials which have been damaged in any manner.

C. Protect work from damage during construction period so that it shall be without indication of abuse or damage at time of acceptance.

D. Protect the building from damage resulting from spillage, dripping, and dropping of materials. Repair and restore other work damaged during roofing operations.

E. Prevent waterproofing materials from running into the drains, clogging rain water conductors.

F. Take all necessary precautions against fire and other hazards, during delivery, storage, and installation of inflammable adhesives, solvents, and other materials specified herein. Comply with local ordinances and fire regulations in the installation of hazardous materials specified or required under this SECTION.

2.02 ULTRA-LOW MODULUS SILICONE SEALANT

A. Materials

1. Sealants shall be Dow Corning 790, Tremco Spectrum I, Pecora 890, GE Silpruf SCS-9000 NB silicone building sealant or an approved equal, meeting the following minimum requirements:
   a. TT-S-001543A (COM-NBS) Class A.
   b. TT-S-00230C (COM-NBS) Class A.
   c. ASTM C-920 Type S, Grade NS, Class 50, USE T, NT, M, G, A, O.
2. Primer shall be of a type as recommended by the manufacturer of the sealant. Primers shall be non-staining.
3. Joint beads shall be closed-cell polyethylene foam rod or closed-cell polyurethane foam rod, 1/3 greater in diameter than joint width. Beads shall be Tremco Backing, Toch-Tok-Rod "E", BASF closed cell backer rod or an approved equal as recommended by the sealant manufacturer.

2.03 POLYURETHANE-BASE SEALANT MATERIALS

A. Materials

1. Sealant shall be a two-part gun-grade polyurethane-base sealant, in color as selected by the Architect. Sealant shall be Pecora Urexpan NR-200, Williams Products, Inc. Dynaseal, Tremco Vulkem or an approved equal meeting the following minimum requirements:
   a. Adhesion to concrete – 25, as per ASTM C794
   b. Harness, Shore A, after heat aging – 25-35, as per ASTM C661
   c. Elongation (%) – 600, as per ASTM D412
   d. Tensile strength (psi) – 150, as per ASTM D412
   e. Maximum Movement Compatibility – as per ASTM C719

      Extension (%) – 25
      Compression (%) – 25
2. Primers shall be as recommended by the sealant manufacturer.
3. Joint beads – As specified herein for sealant materials.

2.04 TWO PART POLYTREMDYNE SEALANT

A. Materials

1. Sealant – Two-part polymer base sealant, in color as selected by the Architect, or (optional) approved equal two-part polysulfide-base sealant, meeting the following minimum requirements:
   a. Staining – None, as per Fed. Spec. Test TT-S-00227c.
   b. Hardness – Shore "A" average 35.
   c. Elongation – 300% @ 35 degrees F., 500% @ 75 degrees F.

d. Dynamic movement – no adhesive or cohesive failure.

e. Sagging – None, as per Fed. Spec. Test TT-S-00227c.

f. Adhesion in peel – No adhesion failure after 8,000 hours WX; peel strength 20 to 30 pounds.

2. Primer – Of a type recommended by the manufacturer of the sealant. Primers shall be non-staining.

3. Joint beads – As specified herein for sealant materials.

2.05 LATEX BASE CAULKING MATERIALS

A. Materials

1. Caulking material – Pecora Acrylic Latex Caulk AC-20, Tremco Tremflex 834, Bostik Findley Chem-Calk 600, or an approved equal, in color as selected by the Architect.

2. Primer – Of a type as recommended by the manufacturer of caulking material and shall be non-staining.

3. Joint beads – As specified herein for sealant materials.

2.06 BELOW-GRADE DAMPPROOFING MATERIALS

A. Dampproofing system has been based upon Non-Fibered Foundation and Roof Coating manufactured by Gardner-Gibson. Similar systems by W. R. Meadows, Carlisle Coatings and Waterproofing or other manufacturers meeting the VOC requirements of SCAQMD Rule 1168 will be considered as an equal upon submission of adequate supporting data.

B. Materials shall be as follows, or approved equal:

1. Apply to surface using a roller at a rate of 70SF per gallon.

2. Protective board – Let dry 24 hrs. before backfilling. Place as protection board rigid plastic foam insulation, 2 inches thick, DOW Stryofoam “Square Edge”, Atlas Thermal Star X-Grade, Owens Corning Foamular or approved equal compatible with the materials.

2.07 CEMENT-BASED CRYSTALLINE WATERPROOFING

A. Cement-based crystalline waterproofing shall be a complete system for horizontal and vertical waterproofing of concrete and masonry surfaces equal to “Hey’Di K – 11” by Euclid Chemical Co., “Xypex Admix C-2000/C-2000NF Concrete Waterproofing” by Xypex Chemical Co., “Krystol T1” by Kryton International, Inc. or an approved equal.

2.08 SHEET MEMBRANE WATERPROOFING

A. Sheet membrane waterproofing shall be a complete system for horizontal and vertical waterproofing of concrete and masonry surfaces. To establish a level of quality, design and function specifications and drawings are based on “CCW Mira DRI 860/861” by Carlisle Coatings and Waterproofing. Similar systems by GCP Products “Bituthene”, Henry “WP200” or others will be considered for approval by the Architect upon receipt of adequate supporting data and samples. System shall include drainage mat, insulation and all accessories including, but not limited to, primers, sealants, termination bars and clamps for a complete waterproofing system. All accessory products shall be Carlisle unless otherwise noted.

B. Membrane: Self-adhering waterproofing membrane shall consist of a 56 mill rubberized asphalt membrane laminated to a 4 mill cross laminated polyethylene film, and shall meet or exceed the following requirements:

1. Tensile Strength: 325 psi minimum, ASTM D 412
2. Ultimate Elongation: 350% minimum, ASTM D 412
3. Puncture Resistance: 60 lbs. minimum, ASTM E 154
4. Permeance: 0.05 Perm maximum, ASTM E 96 (B)
5. Low Temperature Flexibility: Unaffected at -45°F, ASTM D 1970, 1" mandrel
6. Tensile to Film: 5000 psi, ASTM D 882
7. Thickness: 60 mils, ASTM D 3767
8. Hydrostatic Head: 230 ft., ASTM D 751
9. Water Absorption: 0.1% by wt., ASTM D 570

C. ACCESSORY PRODUCTS

1. Surface Primer: Shall be CCW-702 Solvent-based Primer, CCW AWP Water-Based Primer, or CCW-714 Water-Based Primer.
2. Mastic: Shall be CCW-704 Mastic.
3. Sealants: Shall be CCW-703 Vertical Grade Liquiseal Membrane, PT-304 one component, CCW-201 two component Polyurethane Sealant or CCW LM-800XL
4. Backing Rod: Shall be closed-cell polyethylene foam rod.
5. Rigid Insulation / Protection Board: 2-inch thick rigid plastic foam insulation: Dow Styrofoam “Square Edge”, Atlas “ThermalStar X-Grade”, Owen Corning “Foamular” or approved equal compatible with membrane system.
6. Drainage Mat: Carlisle MiraDrain 6200 0.4” or equal, minimum flow rate: 110 gpm /ft.^{2}, minimum compressive strength: 15,000 psi.

PART 3 EXECUTION

3.01 APPLICATION CONDITIONS – WATERPROOFING, SEALANTS AND CAULKING

A. Weather conditions must be dry and of the proper temperature during application operations. Surfaces receiving work of this SECTION must be absolutely dry and dust free. All joints receiving sealants and caulking materials shall be subject to the approval of the materials manufacturer for proper use of the specified materials.

B. Protect all adjacent work from damage by work performed under this SECTION.

3.02 INSTALLATION OF SILICONE SEALANT AND LATEX CAULKING MATERIALS

A. Thoroughly clean all joints, removing all loose mortar, oil, grease, dust, frost, and other foreign materials which shall prevent proper adhesion. Apply masking tape to each exposed surface of joints. Rake out joints to properly receive new sealant.

B. After cleaning, and if so recommended by the materials manufacturer, apply primer to all joint surfaces, taking care not to stain adjacent surfaces.

C. Install joint bead back-up in all joints in excess of 5/8 inch depth (from face of wall to edge of compressible joint filler), and joints which have no back-up therein, placing the joint bead in the joint in a manner which shall assure a constant depth 1/8 inch greater than the sealant and caulking material depth tolerances specified hereunder. Set beads into joints continuously, by slightly stretching during placement, to permit compression against sides of joint, without surface wrinkles or buckles.

D. Apply sealant and caulking material in joint using a hand caulking gun or power gun with a gun nozzle of proper size and sufficient pressure to completely fill joints. The depth of sealant and caulking materials shall be in accordance with the recommendations of the materials manufacturer for the specific joint function but in no case shall exceed 5/8 inches depth, not be less than 1/4 inch, regardless of the width of the joints; and outer edge of sealant and caulking material shall be kept back 1/8 inch from face of wall. Tool with a dry or water-wet tool only. Do not use detergents or soapy water for tooling operations. Joints shall be given a slight concave surface. Remove masking tape immediately after tooling and/or before sealant and caulking material has taken initial set.

E. Do not apply materials when temperatures are below 40 degrees F. without prior approval of the Architect.

F. Primer, if used, shall be maintained within the joint area and not allowed to over-lap any adjacent surface.

3.03 INSTALLATION OF URETHANE-BASE SEALANT

A. Apply sealant directly into joint by gun, completely filling upper 1/2 inch of joints.

B. Tool surface of sealant with square-edge tool, slightly below surface.

3.04 BELOW-GRADE DAMPPROOFING APPLICATION

A. First coat – Brush or spray on at a rate of 125 - 150 square feet per gallon, filling all voids in concrete surfaces completely.

B. Second coat – Towel-apply at a rate of 20 - 25 square feet per gallon.

C. Protective board – Embed specified board in second coat, over entire dampproofed area, tightly butting all edges.

3.05 CEMENT-BASED CRYSTALLINE WATERPROOFING

A. Surfaces to receive waterproofing shall be thoroughly dry and free of moisture. Concrete shall have cured a minimum of 28 days before application of waterproofing. Surfaces shall not contain any grease, oil, or any other contaminants which could affect the complete bonding of the waterproofing membrane to the concrete surface.

B. Install and complete the system to ensure that no water leakage occurs through waterproofing system. Install the system in accordance with the manufacturers written instructions.

C. Allow waterproofing to cure properly. During this period, block off traffic and protect waterproofing from physical damage.

3.06 SHEET MEMBRANE WATERPROOFING

A. INSPECTION

1. Before any waterproofing work is started the waterproofing applicator shall thoroughly examine all surfaces for any deficiencies. Should any deficiencies exist, the architect, owner, or general contractor shall be notified in writing and corrections made.

2. Condition of Concrete Surfaces (Surfaces prepared by SECTION 033000-CAST IN PLACE CONCRETE):

a. The concrete surfaces shall be of sound structural grade and shall have a smooth finish, free of fins, ridges, protrusions, rough spalled areas, loose aggregate, exposed coarse aggregate, voids or entrained air holes. Rough surfaces shall receive a well-adhered parge coat.

b. Concrete shall be cured by water curing method. Any curing compounds must be of the pure sodium silicate type and be approved by the membrane manufacturer representative.

c. Concrete shall be cured at least 7 days and shall be sloped for proper drainage.

d. Voids, rock pockets and excessively rough surfaces shall be repaired with approved non-shrink grout or ground to match the unrepaired areas.

e. Surfaces at cold joints shall be on the same plane.

B. SURFACE PREPARATION

1. The concrete surface must be thoroughly clean, dry and free from any surface contaminates or cleaning residue that may harmfully affect the adhesion of the membrane.

2. Install a ¾ inch face, 45-degree cant of CCW-201 Polyurethane Sealant or CCW LM-800XL at all angle changes and inside corners including, but not limited to, penetrations through the deck, walls and curbs.

3. All cracks over 1/16 inch in width and all moving cracks under 1/16 inch in width shall be routed out to ¼ inch minimum in width and depth and filled flush with PT-304 or CCW-201 polyurethane sealant.

4. All expansion joints less than 1 inch wide shall be cleaned, primed, fitted with a backing rod and caulked with CCW-201 Polyurethane Sealant. For larger joints, contact manufacturer's representative.

5. Allow all sealant to cure at least overnight.

6. Stir Primer. Apply a thin film of primer 10 inches wide, centered over sealed cracks and joints, hairline cracks, and cold joints. Apply primer 8 inches on each side of all corners. Prime concrete around drain flanges. Allow primer to dry per manufacturer=s recommendations.

7. Install an 8 inch wide strip of CCW MiraDRI 860/861centered over joints and cracks. Install a 12 inch wide strip of CCW MiraDRI 860/861centered over the axis of all corners.

C. APPLICATION

1. Priming: Clean surfaces to remove residual dust before priming. Stir primer. Apply by spray or roller at a rate recommended by manufacturer. Allow to dry per manufacturer's recommendation.

2. Horizontal surfaces: Install sheet membrane from low to high point, so that laps will shed water. Overlap edge seams 2 1/2 inches, end laps 5 inches. Stagger end seams. Roll in place with an 18 to 24 inches wide, 100 lb. (min.) resilient roller. Ensure that all laps are firmly adhered and that there are no gaps or fishmouths.

3. Vertical Surfaces: Apply in lengths of 8 feet or less. Overlap edge seams 2 1/2 inches. On walls over 8 feet high, apply in 8 foot sections, starting at the lowest point with the higher section overlapping the lower section 5 inches. Roll in place using firm pressure with a hand roller.

4. Terminations: Consult Carlisle 860-9 Details for proper terminations. Roll terminating edges firmly. Apply CCW-704 mastic to all terminations and "T" joints. Apply CCW-704 Mastic or CCW-703-V Liquiseal to laps at angle changes, extending 9 inches in each direction.

5. Protection Board: Install insulation on horizontal and vertical surfaces of foundation wall construction.

6. Drainage Mat: Apply over insulation / protection board.

3.07 CLEANING

A. Clean all surfaces of adjacent surfaces which have been marked or soiled by the work of this SECTION, removing all excess mastics, sealants, and caulking materials therefrom. Use only cleaning materials and solvents which shall not damage the surfaces in any way.

END OF SECTION

SECTION 070002

ROOFING AND FLASHING

*(Filed Sub-Bid Required)

PART 1 GENERAL

1.00 TIME, MANNER AND REQUIREMENTS FOR SUBMITTING SUB-BIDS

A. Sub-bids shall be submitted in accordance with provision of the General Laws (Ter. Ed.), Chapter 149, Section 44A to 44L, inclusive, as amended. The time and place for submission to Sub-bids shall be set forth under INSTRUCTIONS TO BIDDERS.

B. Each sub-bid filed with the Awarding Authority must be accompanied by BID BOND, or CERTIFIED CHECK, or TREASURER'S CHECK or CASHIER'S CHECK issued by a responsible bank or trust company, payable to the **City of Amesbury** in the amount stipulated in the INSTRUCTION TO BIDDERS. A sub-bid accompanied by any other form of bid deposit then those specified will be rejected.

C. Each Sub-bid submitted for the work, under this SECTION, shall be on a form furnished by the Awarding Authority, and required by SECTION 44F of Chapter 149 of the General Laws, as amended.

D. Work to be performed under this SECTION is shown on Contract Drawings numbered:

G.0.01, G.0.02, G.0.04-G.0.08, inclusive; 2.1.00-2.8.03, inclusive; 3.4.01-3.9.15, inclusive; 4.1.01-4.2.03, inclusive; 6.1.00-6.2.01, inclusive; 7.4.01-7.4.03, inclusive; 8.4.01-8.5.03, inclusive; 9.4.01-9.7.07, inclusive; and 10.0.01-10.3.13, inclusive.

Remaining Contract Drawings are included for reference and coordination.

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Roofing System

1. PVC roofing system comprised of the following:

a. Substrate Board – Over metal decks only, ½ inch thick with a glass mat/primed surface loose laid to metal deck.

~~1) Fire Rated Roof Sheathing – 5/8 in. thick, installed over metal roof decks in locations shown on the Drawings.~~

b. Continuous vapor retarder:

1) Loose laid vapor retarder barrier installed over substrate board layer over metal deck.

2) Self-sealing, peel and stick vapor retarder at concrete decks.

c. Insulation – Rigid polyisocyanurate foam insulation with black mat faces, “Sarnatherm” or approved equal, obtaining a compressive strength of not less than 25 psi and having an aged R value of 5.7 per inch. Where roof decks are pitched to drain, insulation shall be 7 inches thick, except at crickets and transitions. Where tapered insulation is shown on the Drawings, polyisocyanurate insulation having the above specified properties shall be tapered ¼ inch per foot, with a minimum thickness of (4 ½) inches. Minimum thickness at roof drains shall be 2 ½ inches. Refer to Drawings for minimum thickness at canopies.

d. Cover Board – Over insulation, ½ inch thick with a glass mat/primed surface adhered to roof insulation.

e. Adhered PVC membrane.

f. Snap-on fascias and PVC clad fascias and trims.

g. All flashings and sealants required for a complete installation.

h. Walkway protection membrane.

~~i. Precast concrete splash blocks at downspouts.~~

i. River stone “visual” ballast and associated filter fabric and metal retainer edges.

j. Galvanized z-girt system including z-shaped girts, hat channels and other LGMF shapes, and all required fasteners.

2. All sealants required in conjunction with copper and metal flashing work specified hereunder.

3. Install .060 inch thick PVC membrane, z-girts, insulation, air and vapor barrier on sides and tops of doghouses, including flashing exposed ductwork to doghouses.

~~4. Fasteners for canopy mounted sign.~~

4. Coordinate with SECTION 071326-AIR AND VAPOR BARRIERS for sealing roof membrane to wall system air and vapor barriers.

5. Provide membrane compatible sealant to affix the lightning protection system. Coordinate installation with SECTION 260001-ELECTRICAL.

B. Furnish and install asphalt resistance flashing membrane at joint between doghouses and ductwork penetrations.

C. Install the following as furnished under the following SECTIONS:

1. Prefinished aluminum flashings in conjunction with membrane roofing system: SECTION 074213-PREFORMED CLADDING.

2. Prefinished aluminum ~~overflow scuppers and~~ parapet caps / copings: SECTION 074213-PREFORMED CLADDING.

3. Install clamps for roof drain flashing and sump as furnished under SECTION 220001-PLUMBING.

4. Install rigid insulation at doghouse walls as furnished under SECTION 072100-INSULATION.

D. This subcontractor shall furnish, install and maintain in safe and adequate condition all lifts, hoisting, staging and scaffolding that are necessary for the proper execution of the work of this section.

E. LEEDv4-S REQUIREMENTS:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. Roof membrane shall meet the specified reflectivity.

3. For all adhesives and sealants field applied, meet the LEEDv4-S requirements for IEQ Credit 2, Low-Emitting Materials as defined in Subparagraph 2.04 of SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

4. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

F. Exterior Envelope Commissioning – Refer to SECTION 019113-BUILDING COMMISSIONING for requirements.

1. Non-destructive infra-red (IR) scan of completed roofing assemblies will be performed. This subcontractor shall be responsible for replacing all wet areas down to deck as determined by the infra-redscan.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Construction of mock-up: SECTION 014339-EXTERIOR MOCK-UPS.

2. Continuous wood nailers, blocking, curbs, walls and cant strips: SECTION 061000-ROUGH CARPENTRY.

3. Concrete roof decks: SECTION 033000-CAST-IN-PLACE CONCRETE.

4. Peel and stick air and vapor barrier at walls and soffits: SECTION 071326-AIR AND VAPOR BARRIERS

5. Steel roof decks and equipment screen structural framing: SECTION 053100-METAL DECKING and 051200-STRUCTURAL STEEL.

6. Constructing metal stud duct penetration penthouses: SECTION 072116-GYPSUM WALLBOARD and SECTION 061000-ROUGH CARPENTRY.

7. Mounting of free-standing signage onto entry canopy roof: SECTION 101400-IDENTIFYING DEVICES.

8. Lightning Protection System: SECTION 260001-ELECTRICAL.

9. Furnishing and installing roof drains, furnishing clamps for same and downspout boots: SECTION 220001-PLUMBING.

10. Furnishing and installing downspouts: SECTION 074213-PREFORMED CLADDING.

11. Penetrations through roofing, including but not limited to roof mounted food service equipment, plumbing vents, exhaust fans: by trades requiring same.

12. Furnishing and installing roof curbs for mechanical equipment and waterproofing exposed ductwork with roofing membrane: SECTION 230001-HVAC.

13. Furnishing and installing PVC membrane weather protection wrap at exposed rooftop ductwork: SECTION 230001-HVAC.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with the provisions of SECTION 013300-SUBMITTALS.

B. Shop drawings shall include:

1. Large scale details showing all project specific conditions in context with surrounding materials.

2. Dimensional layouts of insulation, tapered insulation, crickets, and of underlayment including fasteners. Such fasteners to comply with applicable requirements of Underwriters Laboratory and Factory Mutual, and following the membrane manufacturer's recommendations, but at least one fastener for every two square feet.

3. Exterior elevations showing the proposed locations of all seams in snap-on fascias.

C. Submit the following Letters of Certification for each specified roof membrane system:

1. Letter from the roof membrane manufacturer stating that the insulation submitted for the project is compatible with the roofing membrane submitted.

2. Letter from the insulation manufacturer stating that the insulation submitted for the project is compatible with the roofing membrane submitted.

3. Certification of Underwriters Laboratory and Factory Mutual approval of insulating attachment fasteners.

D. Submit the following samples in accordance with the provisions of the SECTION 01330-SUBMITTALS.

1. Roof insulation – 12 x 12 inches of specified types and thickness.
2. PVC roofing sheets and flashings – 12 x 12 inches, of specified types and thickness, and flashing in 12 inch lengths in manufacturer's standard colors.
3. Fasteners for insulation and underlayment – Two of each type proposed.
4. Vapor retarder – 12 x 12 inches, of specified types.
5. Cover Board – 12 x 12 inches of specified type.
6. Color samples for custom color prefinished snap on roof edge fascia trim.
7. Fasteners for free-standing roof mounted sign.
8. Asphalt resistant flashing membrane.
9. Riverstone – Min. ½ gallon (0.07 cu. ft.) showing full range of sizes.

E. Manufacturer's Literature – Submit to the Architect for approval manufacturer's CSI "Spec-Data" sheet or equivalent printed literature indicating product information correlated to specified requirements.

F. Manufacturer's Data – Submit to the Architect copies of manufacturer's specifications and installation instructions for the roofing system, and other data as may be required.

G. Contractor's Review – Accompanying approval request, submit to the Architect written statement signed by the General Contractor and the Roofing and Flashing Subcontractor, stating that the Architect's drawings and specifications for roofing and flashing have been reviewed with an agent or the manufacturer of the primary roofing materials and that he is in agreement that the selected systems for roofing and flashing are proper, compatible and adequate for the application shown, and the conditions and details are not in conflict with the roofing and flashing warranties. Show by copy of transmittal form that copy of statement has been transmitted to respective manufacturers and involve certification of U.L. approval of the materials.

H. Statement of Application – At the time of Substantial Completion, as defined in the GENERAL CONDITIONS, submit a statement to the Architect, signed by the General Contractor, and Roofing and Flashing Subcontractor and Roofing Manufacturer, stating that the roofing, flashing, and insulation, comply with these specifications, and that the installation methods complied with the manufacturer's printed instructive materials, workmanship or arrangement of the various parts shall be made good to the satisfaction of the Owner at the Membrane Roofing Subcontractor's expense.

I. **No roofing work shall commence without the Architect's approval of all Letters of Certification in addition to all other requirements of this SECTION.**

J. Mock-Up Panel Structure:

1. Provide and install roofing systems as shown on the Drawings. Mock-up structure shall include entire membrane system: insulation, vapor barriers, recovery board, PVC membrane, ballast and fascias including transitions to adjacent construction as shown on the mock-up drawings. The final mock-up structure shall be left on site to serve as the reference standard for appearance and workmanship as the work progresses. This subcontractor shall, at no additional cost to the Owner, rebuild the portions of the mock-up furnished and installed under this SECTION using the final approved materials, colors and construction to complete the final mock-up.
2. Refer to SECTION 014339-EXTERIOR MOCK-UPS for sizes, configuration and other requirements for the mock-up panel structure.
3. Approval of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless Architect specifically approves such deviations in writing.
4. Mock-up panel structure will not remain as part of the Work.

K. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. Product substitution requests are subject to additional LEEDv4-S submittal requirements, see SECTION 012500-SUBSTITUTION PROCEDURES.

1.05 COORDINATION OF ALUMINUM FINISH

A. Snap-on roof fascias and flashing to be furnished and installed under this Section shall match in color and finish items furnished under the following Sections:

1. SECTION 074213-PREFORMED CLADDING: Preformed aluminum ACM and single skin cladding panels, copings, flashing and trim.
2. SECTION 080001-METAL WINDOWS: Aluminum windows, curtainwalls, storefronts, doors and trim.

B. It shall be the responsibility of both the roofing subcontractor and the General Contractor to jointly coordinate the finish operation with the other listed trades to achieve a uniform finish.

1.06 PRE-ROOFING CONFERENCE

A. After approval of all materials and prior to installation, a pre-roofing conference shall be held at the job site. In attendance shall be (1) Architect, (2) General Contractor, (3) Roofing Subcontractor, (4) Manufacturer's representative, and (5) Owner’s Project Manager.

B. The parties shall review Drawings, specifications and approved materials, correct conflicts, if any, between approvals and specification requirements. Examine job site conditions, including inspection of deck, material labels and methods of storing materials. Confirm that all nailers, curbs and edges are provided and correctly installed. Review installation procedures, scheduling and temperature requirements, and establish protection methods for finished roof from other trades.

1.07 GUARANTEE AND BONDS

A. The Roofing Subcontractor, as a condition precedent to final payment, shall execute his own written guarantee direct to the Owner, warranting all roofing, systems, insulation, and sheet metal work weather and watertight and perfect for a period of **three years** after date of Substantial Completion of the building. Any imperfections as a whole or in part, by reason of defective materials, workmanship or arrangement of the various parts shall be made good to the satisfaction of the Owner at the Membrane Roofing Subcontractor's expense.

B. The Roofing Membrane Manufacturer shall inspect the installation of the roof systems and upon approval shall issue their standard non-prorated twenty (20) year warranty for the entire (full system) roofing installation. The roofing manufacturer shall also issue their standard twenty (20) year warranty for membrane only.

C. Wind Speed: The wind speed coverage for the specified roof system shall be in accordance with manufacturer’s requirements with a minimum of 55 mph.

1.08 RESPONSIBILITY

A. Furnish, install and maintain in a watertight condition at all times, substantial temporary coverings and other protection items required to prevent the entry of water into the existing building from the roofs or flashing areas, commencing at the time work of this SECTION is started, and continued until the work is entirely completed.

B. Bear full responsibility for any and all damage caused by failure to comply with the requirements of this paragraph, and pay all costs resulting from such damage.

1.09 QUALITY ASSURANCE

A. The Roofing Contractor shall have a minimum of five (5) years of experience in the installation of the specified roofing systems and shall submit a letter from the manufacturer(s) certifying that this Roofing Contractor is an authorized installer.

B. All membrane roofing and flashing materials furnished and installed under this Section shall be the product of a single manufacturer or shall be specifically approved for use with his materials by the manufacturer whose roofing specification is used. Materials shall be high grade, first quality of domestic USA manufacturer with an application history of 10 years in the United States. Furnish a written affidavit stating that these requirements have been complied with.

C. The entire roofing system, including but not limited to, the membrane, vapor barrier, adhesives, insulation, cover board and flashing shall be applied in strict accordance with the roofing manufacturer's written requirements and specifications applicable to roof conditions. The entire roofing system shall be accepted and approved by the proposed roofing membrane manufacturer. There shall be no deviations made from this specification or the approved shop drawings without prior written approval by the manufacturer.

1. The roofing manufacture's published requirements are considered minimum standards. Requirements specified herein may exceed those of the manufacturer. In the event of such a discrepancy the most stringent requirements shall govern.

2. Where additional work or materials, or greater quantities of materials than required by roofing manufacturer are specified herein, these Project Specifications shall govern.

3. The above referenced provisions shall be adhered to at no additional cost to the Owner.

D. During and upon completion of the installation, inspections shall be made by a representative of the roofing manufacturer to ascertain that the roofing system has been installed according to the applicable manufacturer's specifications and details. Copies of the manufacturer's inspection reports shall be submitted to the Architect.

1.10 U.L. LISTING

A. Materials used under this contract shall be labeled, tested and listed by (U.L.) for the application indicated on the Drawings with the following ratings for roof slopes shown:

U.L. Class A, with main wind force resistance of 110 MPH.

1.11 FIELD TESTING

A. Fasteners – Field testing of fasteners shall be required. Four random fasteners for each separate roof area for securing vapor retarder and/or insulation shall be tested for pull-out resistance as listed below. A report of the findings shall be forwarded to the Architect. Testing shall be performed by the fastener manufacturer.

1. New steel and concrete decks.

B. Refer to SECTION 019113- BUILDING COMMISSIONING REQUIREMENTS for additional field testing requirements.

1.12 INTENT

A. It is not the intent herein to describe all of the details for roofing and flashing. The Roofing Contractor shall assure himself that all items and details not otherwise specified herein but shown on the Drawings, or as otherwise required by the membrane manufacturer to achieve a complete watertight installation, shall be provided under this contract at no additional cost to the Owner.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4 MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. HEAT ISLAND REDUCTION: Documentation that roofing system has a Solar Reflexive Index (SR) not less than 78% when calculated per ASTM E-1980.
2. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
3. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
4. Furnish any adhesives and sealants such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in Subparagraph 2.04 of SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 MATERIALS REQUIREMENTS

A. Deliver materials in manufacturer's unopened container or bundles, fully identified with brand, type, grade, class, and all other qualifying information, including UL and other specified insurance company's labels for specified roof construction.

B. Storage of Materials – Store all materials in properly protected and dry storage facilities until ready for use. Installation of wet or damp materials will not be accepted. Do not use materials which have been damaged in any manner.

C. Protect work from damage during construction period so that it shall be without indication of abuse or damage at time of acceptance.

D. Protect the building from damage resulting from spillage, dripping, and dropping of materials. Repair and restore other work damaged during roofing operations.

E. Prevent roofing materials from running into and clogging rain water conductors and roof drains.

F. Take all necessary precautions against fire and other hazards, during delivery, storage, and installation of inflammable adhesives, solvents, and other materials specified herein. Comply with local ordinances and fire regulations in the installation of hazardous materials specified or required under this SECTION.

2.02 ADHERED PVC ROOFING SYSTEM AND MATERIALS

A. Manufacture and Type – To establish a standard quality, design and function, specifications and drawings have been based on a PVC adhered system as manufactured by Sarnafil. Similar systems by Duro-Last "Single Ply PVC Roof Membrane System", Johns Manville "PVC Single Ply Roofing System", or others will be considered for approval as an equal by the Architect, upon receipt of adequate supporting data and samples, including UL approval for the specified roof system.

1. The roof system manufacturer shall have a minimum of five years of experience in manufacturing own membrane.

B. Membrane Sarnafil G 410 Bareback, 60 mils (.060 inch) thickness, nonwoven fiberglass reinforced membrane with an acrylic coating to repel dirt. Membrane shall conform to ASTM D 4434 (latest edition) Standard for polyvinyl chloride sheet roofing. Classification: Type II, Grade 1. The manufacturer to guarantee that the membrane thickness meets or exceeds the specified thickness when tested according to ASTM D-751. Polymer thickness to be evenly distributed above and below the membrane scrim.

1. Membrane color shall be Sarnafil Energy Smart in colors, white, with selected low roofs reflective gray as shown on the roof plans.

2. White shall have initial SRI = 0.83, and 3-year SRI = 0.73. Reflective gray shall have initial SRI = 0.73, 3-year = 0.66.

C. As manufactured, membrane shall conform to the physical properties noted I the following table:

Product Characteristics of G 410

PARAMETERS	ASTM TEST METHOD	MINIMUM ASTM REQUIREMENTS	TYPICAL PHYSICAL PROPERTIES
overall thickness mm (inches)	D 638	1.14 (0.045)	1.50(0.060)
tensile strength, psi	D 638	1,500 psi	1,550 psi
elongation at break, %	D 638	250% MD 220% CMD	250% MD 220% CMD
seam strength, % of tensile strength*		75%	85%
retention of properties after heat aging	D 3045	---	---
tensile strength, % of original	D 638	80%	93%
elongation, % of original	D 638	80%	93%
tear resistance (lbf)	D 1004	10	14
low temperature (-40°F)	D 2136	pass	pass
accelerated weathering test (Xenon)	D 2565	5,000 hours	10,000 hours
cracking (7x magnification)	D 1204	none	none
discoloration (by observation)		negligible	negligible
crazing (7X magnification)	D 2565	none	none
linear dimensional change, %	D 1204	0.1% max.	0.02%
weight change after immersion in water, max. %	D 570	±3.0% max.	1.9%

* Failure occurs through membrane rupture not seam failure.

D. Flashing Membrane

Flashing membrane shall be as supplied by Sarnafil. Flashing membrane is the same material as the roofing membrane (except when indicated otherwise).

1. Vertical wall flashing having more than 8 inches of exposure and visible from the ground shall be metal wall flashing furnished by SECTION 074213-PREFORMED CLADDING and installed under this Section.

E. Sarnafil membrane adhesive

The adhesive for bonding the Sarnafil G 410 membrane to the insulation shall be as follows:

1. Sarnafil adhesive, SCAQMD VOC compliant for the various substrate conditions.
   a. Use adhesive for bonding Sarnafil membranes to the insulation.
   b. Application rates for bonding Sarnafil membranes to various substrates:

SUBSTRATE	RATE
fiberboard	24 gal./sq.
smooth plywood	12 gal./sq.
smooth cellular concrete	2 gal./sq.

Notes:

1) Rates include the 2 gal./sq. applied to the underside of the Sarnafil membrane
2) When outdoor temperature during installation is below 40°F, add 2 gal/sq. to application rate.
3) Rates shall vary with finish of substrate.
4) Application techniques and coverage rates are different when using felt backed membranes.

F. Insulation – Rigid polyisocyanurate foam insulation with black mat faces, “Sarnatherm CG-25” or approved equal, seven inches thick at sloped decks, obtaining a compressive strength of not less than 25 psi and having an aged R value of 5.7 per inch. Where tapered insulation is shown on the Drawings, polyisocyanurate insulation having the above specified properties shall be tapered ¼ inch per foot.

1. Minimum aged R value at sloped decks shall be R-39.9.
2. Minimum aged R value at flat roof decks shall be R-34.2.

G. Substrade Board Over Metal Roof Deck **and** Cover Board Over Insulation: Sarnatherm Roof Board-A-III glass mat board, ½ inch thick with glass mat / primed surface.

H. Miscellaneous fasteners and anchors

All fasteners shall be the same type as the metal being secured. In general, all fasteners, anchors, nails, and straps, shall be of zinc or cadmium plated steel galvanized, or stainless steel. All fasteners and anchors shall have a minimum embedment of 1-1/4 inches and shall be approved for such use by the fastener manufacturer. Fasteners for attachment of metal to wood blocking shall be annular ring nails. Fasteners for attachment of metal to masonry shall be expansion type fasteners. All fasteners shall meet Factory Mutual Standard 4470 for corrosion resistance.

1. **Fasteners at exposed cellular acoustic roof deck in gym shall penetrate the top flute ONLY. No fasteners shall be exposed to view at the underside of the cellular deck.**
2. Fasteners for mounting signage on membrane shall be “PowerGrip” roof mounting system Fasteners by OMG Roofing, “U-Anchor” by Anchor Products, “EcoFasten” by EcoFasten Solar, or an approved equal.

I. Flashing membrane adhesive

The adhesive for bonding Sarnafil flashing membrane to vertical flashings shall be SCAQMD VOC compliant as recommended by Sarnafil. Substrate must be compatible, clean, dry and solvent resistant.

J. Sarnafil G 459

Fiberglass-reinforced PVC membrane .060-inch thick asphalt resistant flashing shall be used where membrane is in contact with asphalt surfaces and where grease resistant protective membrane is indicated on the Drawings.

K. Sarnamatic welder

Automatic hot-air welding apparatus for seaming of sheets.

L. Edge Flashing, as shown on the drawings.

1. Aluminum snap-on Edge Grip fascia, consisting of a rigid, continuous 20-gauge galvanized steel base retainer and a snap on decorative, three coat Kynar 500 painted, consisting of prime coat, color coat and clear top coat-.050 aluminum cap, custom color as selected by Architect. Retainer to fasten to edge blocking without penetrating the horizontal roof membrane.
    a. Finish: Fluoropolymer three-coat metallic system, consisting of 0.2 mil primer with a 0.80 mil PVCF fluoropolymer color coat containing metal flakes and a 0.50 mil PVDF fluoropolymer clear coat.
    b. Color: One custom metallic color to match Fluropon Classic Pewter – Centira Sundance Metallic – Clearcoat: 430A307.
    c. The Architect reserves the right to select the custom color match from the manufacturer’s full line of metallic finishes.

2. Fascias shall be constructed in the longest practical lengths. In no circumstances shall there be a seam within runs of less than 12 ft.-0 in. Where seams are required, no individual length shall be less than 6 ft.-0 in. Note seams shall be as shown on the approved shop drawings.

3. PVC clad, heat weldable 24 gauge G90 galvanized steel. Color will be chosen by the Architect from the full range of manufacturer's standard colors.

M. Prefabricated details

Inside/outside corners or vent stacks. (2-inch, 3-inch, 4-inch 5-inch diameters.)

N. Sarnafastener

Self-tapping, corrosion-resistant fasteners, for use in steel and wood decks, and nail-in type for concrete decks. Anchors shall also be provided for concrete decks. Corrosion-resistant plates are also required for securement of insulation.

O. Sarnastop

1-inch wide alloy extruded aluminum bar pre-punched every 12 inches on center used for additional uplift resistance at the base of parapets, walls, curbs, peaks, valleys and transitions.

P. Sarnasolv

A solvent cleaner for removal of Sarnacol adhesives form lap areas and for removal of contaminants from the Sarnafil membrane.

Q. Sealants and pitch pocket fillers

The following caulking/sealants are accepted based on chemical compatibility with Sarnafil membranes:

1. Vulkem 116 by Mameco International (VOC 72 g/l)

2. Sonneborn NP-1 by Chemrex (VOC 43 g/l)

3. Sikaflex 1A (VOC 40 g/l)

R. The following pitch pocket filler accepted based on chemical compatibility with Sarnafil membranes:

1. Chem Link Pro Pak two part urethane sealant (0 VOC)

2. Sarnafiller: A two-component urethane adhesive used for pitch pocket fillers (VOC 1.99 g/l).

S. River stone visual ballast – where called for on the drawings, provide river stone visual ballast stones and related system materials.

1. #4 Ballast – Nominal 1 ½ inch smooth river bottom stone of ballast gradation size #4, #3, #2 or #1 as chosen by the Architect as specified in ASTM D448 or ASTM D7655/D7655M spread at a minimum rate of 1,000 lbs./100 ft.^{2} (48.80 kg/m^2).

2. Miscellaneous Materials:

a. 11 oz/sf needle punched polypropylene filter fabric as protection for roof membrane.

b. Edge metal shall be .063 in. perforated aluminum. Edge metal for ballast stone retainage shall be slotted for water drainage. Splice plates as manufactured by same source or approved equal.

T. Walkway Protection – A polyester reinforced, 0.096 inch (96 mil/2.4 mm) weldable membrane with surface embossment, used as a protection layer from roof top traffic.

U. Precast Concrete Splash Blocks – Formed from precast concrete with casted drainage slope.

V. Sarnacol 2163 Board Adhesive – elastomeric, one step SCAQMD VOC compliant foamable adhesive.

~~W. Exterior Glass Faced Fire Rated Gypsum Sheathing (ASTM C 1177) – Georgia-Pacific "DensGlass" Exterior Sheathing, National Gypsum Co. eXP Sheathing, U.S. Gypsum Co. "SecurRock", or an approved equal, square edge panels, 5/8-inch thick fire rated where designated on the Drawings.~~

2.03 VAPOR RETARDER / BARRIER

A. At Metal Decks Only – Loose laid vapor retarder over metal decks shall be 10 mils thick, minimum, Sarnavap-10 by Sika Sarnafil or an approved equal. Vapor retarder shall be approved by the roofing manufacturer for inclusion into the system warranty and must meet the 0.1 permeability rating required by the energy code. Vapor barrier to be installed in accordance manufacturer recommendations. Vapor retarder to include mastic tape at seams, and self-adhesive tape at penetrations.

B. At Concrete Roof Decks – Vapor retarder shall be self-sealing peel-and-stick type, having a water vapor permeance of .03 - .05 perm, minimum .032-gauge rubberized asphalt with laminated polyethylene top sheet. Vapor retarder shall be approved by the roofing manufacturer for inclusion into the systems warranty.

C. Transition Materials – Provide transition air barrier materials for use between the loose laid and self-sealing AVB within the roofing scope, and as required to provide continuous roofing AVB at penetrations, gaps, and other transitions. Provide transition materials consisting of extruded low-modulus silicone sheet and silicone sealant designed to adhere to the membrane and adjacent material. Products shall meet the VOC requirements of SCAQMD, Rule 1168. Provide at locations as shown on the drawings.

1. Cleaning Agent

2. Silicone Sheet: SIL-SPAN Preformed Silicone Profiles by Pecora or ULTRASPAN Weatherstripping by General Electric. Provide preformed corners.

3. Silicone Sealant: Low modulus component silicone sealant compatible with adjacent materials.

Note: Window, curtainwall and storefront systems (SECTION 080001-METAL WINDOWS) shall seal to wall and roof AVB systems. Wall AVB systems (SECTION 071326-AIR AND VAPOR BARRIERS) shall seal to the roof AVB systems.

2.04 SHEET METAL AND FLASHING MATERIALS

A. Galvanized Steel Cleats – where shown on the drawings to be galvanized steel cleats shall be continuous (in lengths not exceeding 12 feet) and formed of 20 GA. minimum G90 steel.

B. Sealant in Conjunction with Sheet Metal and Flashings – low-modulus silicone sealant in color closely matching the base metal to which it will be in contact. Sealant to be compatible with roofing material.

C. Asphalt Resistant Membrane Flashing – Flexible rubberized asphalt backed, self-adhering, 20 mil membrane as manufactured by OSI, Tite-Seal, Vyco or an approved equal.

2.05 CANTS AND CRICKETS

A. Rigid fiberboard or plastic foam as recommended by manufacturer of roofing materials, and compatible with all adjacent roofing components. Furnish and install cants and crickets wherever required to achieve pitch to drains.

2.06 PRECAST CONCRETE SPLASH BLOCKS

A. At all downspout locations, furnish and install precast light weight concrete splash blocks, fanned shaped to shed water.

2.07 MISCELLANEOUS FASTENERS AND ANCHORS

A. All fasteners, anchors, nails, bars, and other similar items shall be post-galvanized steel, aluminum, or stainless steel. Mixing metal types and methods of contact shall be assembled in such a manner as to avoid galvanic corrosion. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins. All concrete fasteners and anchors shall have a minimum embedment of 1¼ inches and shall be approved for such use by the fastener manufacturer. All miscellaneous wood fasteners and anchors used for flashing shall have a minimum embedment of 1 inch and shall be approved for such use by the fastener manufacturer.

2.08 INSULATION AT DOGHOUSE WALLS

A. Install rigid thermal insulation provided by SECTION 072100-INSULATION, which shall match the insulation provided in the cavity of masonry veneer, metal panel and cement fiber panel walls.

B. Miscellaneous Framing Components, General: Cold-formed metallic coated steel sheet, ASTM C 645, Grade 50, with ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating.

1. Z-girts: 0.053 inch / 16 ga. (1.34 mm) minimum

2. Hat Channels: 0.053 inch/16 ga. (1.34 mm) minimum.

3. Sill Channels: 0.053 inch/16 ga. (1.34 mm) minimum.

4. Other Required Shapes: 0.053 inch/16 ga. (1.34 mm) minimum.

~~2.09 SELF-ADHERING AIR AND VAPOR BARRIER MEMBRANES~~

~~A. Self-Adhering Air and Vapor Barrier Membrane: Self-adhering, self-sealing membrane of inherent fire-resistant 40 mil composite consisting of foil-faced glass laminated with a fire-resistant, factory applied pressure sensitive adhesive.~~

~~1. To establish a standard of quality, design and function required, specifications are based on Carlisle 705FRA self-adhering barrier in widths to comply with job conditions.~~

~~2. Similar LEED-S compliant membranes by Grace Construction Products, York Manufacturing, or other manufacturer will be considered by the Architect as an equal upon receipt of adequate supporting data.~~

~~B. Transition Materials: To provide an air barrier between the membrane and adjacent materials (except window, curtainwall and storefront systems), provide transition materials consisting of extruded low-modulus silicone sheet and silicone sealant designed to adhere to polyethylene side of membrane and adjacent material. Provide the following materials as acceptable to the manufacturer of the air barrier membrane and meeting the VOC requirements of SCAQMD, Rule 1168.~~

~~1. Cleaning Agent.~~

~~2. Silicone Sheet: SIL-SPAN Preformed Silicone Profiles by Pecora or ULTRASPAN Weatherstripping by General Electric. Provide preformed corners.~~

~~3. Silicone Sealant: Low modulus component silicone sealant compatible with adjacent materials.~~

PART 3 EXECUTION

3.01 INSTALLATION CONDITIONS

A. Notify the Contractor of any defects or other characteristics in the receiving surfaces which may be detrimental to the installation and performance of the items to be furnished and installed hereunder. Request correction of such surfaces and do not commence work until defects have been corrected. Commencement of roofing and flashing work shall constitute acceptance of surface conditions and the Roofing and Flashing Subcontractor shall be responsible for leakage in roofs and flashed surfaces and any other defects in these surfaces.

B. Properly prepare, under the work of this SECTION 070002, all roof surfaces which are to receive new materials furnished and installed hereunder. Remove all existing foreign material which would interfere with the proper installation and performance of new items to be furnished and installed hereunder.

C. Ensure that all openings through the roof decks for fans, vents and other items have been either temporarily or permanently covered, to prevent the entry of water into the building, prior to commencing the work of this SECTION 070002. Notify the Contractor of any uncovered openings, and request that such openings be covered.

D. Have sufficient materials on the Project to complete each day's work. The complete roofing system for any one section of the roof must be finished by the end of the day.

3.02 INSTALLATION OF VAPOR RETARDER

A. At Metal Decks – Install loose laid vapor retarder over cover board at new metal decks. Vapor retarder to be in lengths as long as possible so as to minimize seams. Lap seams are minimum 4 inches and use seam tape as recommended by manufacturer. Vapor retarder must be continuously sealed to membrane air barrier. Vapor retarder must be installed in accordance with Factory Mutual Class 1A-90 design criteria. Install mastic tape at seams and self-adhesive tape at penetrations.

B. At Concrete Decks – Prime concrete decks with manufacturers primer. Install self-stick vapor retarder at concrete decks in accordance with manufacturer’s requirements.

3.03 INSTALLATION OF INSULATION

A. All insulation shall be installed in multiple layers with joints staggered. Mechanically attach insulation up to four inches in thickness to the various decks using screw type fasteners as detailed and necessary to comply with paragraph 1.09 criteria. Remaining layers of insulation, cover board and crickets shall be adhered.

1. Insulation shall be mechanically fastened to the deck with approved fasteners and plates at a rate according to the insulation manufacturer's FM's and Sika Sarnafil's recommendations for fastening rates and patterns. The quantity and locations of the fasteners and plates shall also cause the insulation boards to rest evenly on the roof desk/substrate so that there are no significant and avoidable air spaces between the boards and the substrate. Each insulation board shall be installed tightly against the adjacent boards on all sides.
2. Fasteners are to be installed consistently in accordance with fastener manufacturer's recommendations. Fasteners are to have minimum penetration into structural deck recommended by the fastener manufacturer and Sika Sarafil.
3. Use fastener tools with a depth locator and torque-limiting attachment at recommended or supplied by fastener manufacturer to ensure proper installation.

B. Subsequent layers of tapered or flat insulation, cover board and crickets shall be adhered in compliance with insulation and membrane roofing manufacturers requirement to comply with U.L. listing and warranty, but in no case less than adhesive using two-part urethane insulation adhesive in ¾ inch ribbons spaced 12 inches on center at the field of the roof, 6 inches on center at the perimeter areas and 4 inches on center at the corners.

C. Application and foam adhesive and insulation shall be in strict accordance with the manufacturer's written requirements.

D. **At exposed to view cellular acoustic deck, fasteners shall penetrate the top flute ONLY, no fasteners shall be exposed to view from the underside.**

E. At concrete decks, the first 3 ½ inch thick insulation board shall be mechanically fastened, with all subsequent layers of insulation and cover board adhered per paragraph B above.

3.04 INSTALLATION OF COVER BOARD (AND FIRE RATED SHEATHING WHERE DESIGNATED)

A. General Criteria:

1. Boards shall be installed according to manufacturer's instructions.
2. Boards shall be neatly cut to fit around penetrations and projections.
3. Do not install more boards than can be covered with membrane by end of day or onset of inclement weather.
4. Boards shall be installed tightly against adjacent boards on all sides.
5. Boards shall lay evenly on roof deck/substrate so that there are no significant and avoidable air spaces between boards and substrate.
6. Install tapered insulation boards in accordance with insulation manufacturer's approved shop drawings.
7. Install tapered insulation boards around drains creating a drain sump.

8. Stagger joints at least 12 inches (0.3 m) between layers.

9. Board shall be adhered to insulation with insulation adhesive.

3.05 INSTALLATION OF PVC MEMBRANE

A. The surface of the insulation or substrate shall be inspected prior to installation of the Sarnafil roof membrane. The substrate shall be clean, dry, and smooth with no excessive surface roughness, contaminated surfaces, or unsound surfaces such as broken or delaminated insulation boards.

B. Adhesive

1. Over the properly installed and prepared substrate surface, Sarnacol 2170 VC adhesive shall be applied using approved solvent-resistant ¾--inch nap paint rollers. The adhesive shall be applied in a smooth, even coating with no holidays, globs, puddles, or similar irregularities. Only an area that can be covered completely in the same day's operations shall be coated with adhesive. The adhesive shall be allowed to dry completely prior to installing the membrane.

   a. Drying time increases with cooler temperatures and high humidity conditions. The Subcontractor shall check with a Sarnafil representative prior to roof operations on such days.

   b. The Subcontractor shall count the amount of adhesive used per square and shall count the number of buckets of adhesive used per area per day to verify that he is conforming to the specified adhesive rate.

2. When the adhesive on the substrate is dry, the roof membrane is unrolled. Adjacent sheets shall be overlapped a minimum of 3 inches. Once in place, one-half of the sheet's length shall be turned back and the underside shall be coated with adhesive at a rate of 2 gallons per 100 square feet while adhesive is active (produces strings when touched with a dry finger) the coated membrane shall be rolled carefully onto the previously coated substrate to avoid wrinkles. Do not allow adhesive on the underside of the membrane to dry completely. The amount of membrane that can be coated with adhesive before rolling into substrate shall be determined by ambient temperature, humidity, and manpower. Typically, two men can coat 8-12 feet at a time. The bonded sheet shall be pressed firmly into place with a weighted foam-covered lawn roller. The remaining unbonded half of the sheet shall be folded back and the bonding procedure repeated.

3. No bonding adhesive shall be applied in lap areas. All sheets shall be applied in the same manner, lapping all sheets by welding techniques.

C. Hot Air Welding of PVC Lap Areas

1. General

a. Adjacent sheets shall be welded in accordance with manufacturer's written instructions. All side and end lap joints shall be hot-air welded. Lap area shall be a minimum of 3 inches wide when machine welding, and a minimum of 4 inches wide when hand welding.

b. Welding equipment shall be provided by or approved by membrane manufacturer. All mechanics intending to use the equipment shall have successfully completed a course of instruction provided by a manufacturer's representative prior to welding.

c. All surfaces to be welded shall be clean according to manufacturer's instructions, and dry. No adhesive shall be present within the lap areas.

2. Hand Welding

Hand welded seams shall be completed in three stages. Equipment shall be allowed to warm up for at least one minute prior to start of welding.

a. The lap shall be tack welded every 3 feet to hold the material in place.

b. The back edge of the lap shall be welded with a thin, continuous weld to prevent loss of hot air during the final welding.

c. The hot-air nozzle shall be inserted into the lap, keeping the welding equipment at a 45-degree angle to the side lap. Once the proper welding temperature has been reached and the material starts to flow, the hand roller shall be applied at a right angle to the welding gun and pressed lightly. For straight laps, the 12-inch wide nozzle shall be used. For corners and compound connections, a ¾-inch wide nozzle shall be used.

3. Machine Welding

a. Machine sealed seams may be achieved by the use of manufacturer's various automatic welding equipment. When using this equipment, the manufacturer's instruction shall be followed and local codes for electric supply, grounding, and overcurrent protection observed. The automatic welding machines require 218 to 230 volts at 30 amps. The use of a portable generator is recommended.

b. When welding sheets adhered with Sarnacol 2121 adhesive, 15-inch wide metal tracks must be used over the deck sheet and under the machine welder to prevent wrinkles.

4. Quality control of welded seams

All completed welded seams shall be checked after cooling for continuity using a rounded screwdriver or other suitable blunt object by the roofing Subcontractor. Visible evidence that welding is proceeding acceptably is smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of black material from the edge of completed joints. On-site evaluation of welded seams shall be made daily by the Subcontractor at locations as directed by the Owner's representative or membrane manufacturer's representative. Two-inch wide cross-sectional samples shall be taken three times a day minimum through completed seams. Correct welds display failure from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the Subcontractor at no extra charge to the owner.

D. PVC Membrane Flashings

1. All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior approval of the architect and the membrane manufacturer. Approval shall only be for specific location on specific dates. If any water is allowed to enter under the new roofing due to incomplete flashings, the affected area shall be removed and replaced at the Subcontractor's expense. Flashings shall be adhered to compatible, dry smooth, and solvent-resistant surfaces.

2. Contact adhesive for flashings

   a. Over the properly installed and prepared substrate surface, contact adhesive shall be applied using approved solvent-resistant paint rollers. The adhesive shall be applied at a rate of approximately 2 gallons per 100 square feet of surface depending upon substrate. The adhesive shall be applied in smooth, even coatings with no holidays, globs, puddles, or similar irregularities. Only an area that can be covered completely in the same day's operations shall be coated with adhesive. The surface with adhesive coating shall be allowed to dry completely prior to installing the membrane.

      1) Drying time increase with cooler temperatures and high humidity conditions. The Subcontractor shall check with the Sarnafil technical representative prior to roof operations on such days.

      2) The Subcontractor shall count the amount of adhesive used per square, and shall count the number of buckets of adhesive used per area per day to verify that he is conforming to the specified adhesive rate.

b. When the surface is dry, the flashing membrane is cut to a workable length and the underside shall be coated evenly with adhesive at a rate of 2 gallon per 100 square feet. While the coated membrane shall be rolled carefully onto the previously coated substrate to avoid wrinkle. Do not allow adhesive on the underside of the membrane to dry completely. The amount of membrane that can be coated with adhesive before applying to substrate shall be determined by ambient temperature, humidity, and manpower. Adjacent sheets shall be overlapped a minimum of 4 inches. Flashings shall extend 5 inches onto the roofing membrane. The bonded sheet shall be pressed firmly into place with a hand roller.

c. No bonding adhesive shall be applied in lap areas that are to be welded to flashings or adjacent sheets. All sheets shall be applied in the same manner, lapping all sheets required by welding techniques.

3. Install Sarnastop fastened 12 inches on center with acceptable fasteners into the structural deck at the base of parapets, walls and curbs. Sarnastops shall also be installed at the base of fiberboard tapered edge strips and at transitions, peaks, and valleys according to Sarnafil's recommended details.

4. Manufacturer's requirements and recommendations and the specifications shall be followed. All material submittals shall have been accepted by membrane manufacturer prior to installation.

5. All flashings shall extend a minimum of 8 inches above roofing level unless previously accepted by the owner's representative and membrane manufacturer.

6. All flashing membranes shall be fully adhered to solvent-resistant substrates. All interior and exterior corners and miters shall be cut and hot-air welded into place. No bituminous elements shall be in contact with the membrane unless G459 membrane is used.

7. All flashings shall be hot-air welded at their joints and at their connections with the roof membrane.

8. All flashing membranes shall be mechanically attached along the top edge a metal termination bars predrilled at 8 inches on center. Expansion pins with nylon sheaths set in predrilled holes shall be used to secure flashings to masonry and concrete surfaces.

9. Flashings shall be terminated according to membrane manufacturer's recommended details.

E. Metal Flashings

1. Refer to drawings for locations of metal flashings.

2. Metal shall be installed to provide adequate resistance to bending and to allow for normal thermal expansion and contraction.

3. Metal joints shall be watertight.

4. Metal flashings shall have a 4-inch minimum nailing flange and shall be fastened into solid wood blocking with fasteners of the same type with two rows of annular ring nails, 4 inches on center, staggered. Fasteners shall penetrate the wood nailer a minimum of 1 5/8 inches.

5. Continuous metal hook strips are required if metal fascia exceeds 5 inches in width. Hook strip is to be fastened 12 inches on center into wood nailer or masonry wall.

6. Adjacent sheets of PVC clad metal shall be spaced ¼ inch apart. The end joints of the metal shall be fastened 6 inches on center. The joints shall be covered with 1 inch wide masking tape. A 4-inch wide strip of membrane flashing strip shall be hot-air welded over the joint.

7. PVC clad metal and other edge metal shall be installed according to Factory Mutual's Loss Prevention Data Sheet 1-49.

F. Installation of river rock ballast:

1. Install metal edging per article 3.06.

2. Install filter fabric per manufacturer's instructions.

3. Spread stones at rate of 1,000 lbs./100 sf. Spread to edges in a uniform layer.

4. Remove debris for neat finish appearance of raked stones.

3.06 INSTALLATION OF SHEET METAL AND FLASHINGS

A. Refer to the Drawings for locations of plain sheet metal and flashings.

B. General - All roof shall be flashed and made watertight at all edges and intersections of roofs with vertical surfaces of any nature, using metal flashing except as otherwise shown on the Drawings or specified hereunder.

1. Comply with SMACNA requirements unless otherwise indicated on the Drawings. In case of conflict the most stringent shall govern.

2. Generally, flashing and sheet metal work shall be in lengths not exceeding 8 feet and free from longitudinal joints. All flashing in contact with dissimilar metal shall be coated with asphalt paint. All joints in copper flashing shall be pre-tinned, locked and soldered. Expansion joints in running flashing work shall be formed by joining end of sheets together with a 3-inch loose lock, filled with sealant compatible with the roofing membrane. Expansion joints shall be installed every 24 feet in straight runs.

3. All new metal flashings in direct conjunction with membrane roofing system shall be installed over the roofing membrane. Flashing flanges, and edges extending onto roof shall extend a minimum of 4 inches onto the roof surfaces and be secured to wood nailers with specified nails spaced not more than 4 inches apart. Membrane flashing of the flanges must extend a minimum of 3 inches from the edge of the flange and from the nail line and shall be installed in strict accordance with the membrane manufacturer's requirements and the approved shop drawings. The edges of the flashing membrane shall be continuously caulked. Except where otherwise specified, no fasteners shall be exposed in the finished work.

4. Check all surfaces for nailing; verify wood backing.

5. Provide felt insulation between any ductwork and copper at contacts.

6. Clean all copper, using caustic soda hot water solution where metal is exposed. Tool solder work reasonably smooth.

C. Flashings shall be formed as indicated on the Drawings.

D. Continuous cleats – Install minimum 20-gauge galvanized steel cleat to profile indicated on the Drawings, spacing nails 12 inches on center.

E. Install asphalt resistant flashing at doghouse duct penetration with seam located at underside of ducts.

F. Other non-specified flashings - Fabricate flashings to profiles indicated, using as large sheets as practical.

3.07 PVC CLAD FLASHINGS

A. Refer to drawings for locations of PVC clad material.

B. Metal shall be installed to provide adequate resistance to bending and to allow for normal thermal expansion and contraction.

C. Metal joints shall be watertight.

D. Metal flashings shall have a 4-inch minimum nailing flange and shall be fastened into solid wood blocking with fasteners of the same type with two rows of annular ring nails, 4 inches on center, staggered. Fasteners shall penetrate the wood nailer a minimum of 14 inches.

E. Continuous metal hook strips are required if metal fascia exceeds 5 inches in width. Hook strip is to be fastened 12 inches on center into wood nailer or masonry wall.

F. Adjacent sheets of PVC clad metal shall be spaced ¼ inch apart. The end joints of the metal shall be fastened 6 inches on center. The joints shall be covered with 1-inch wide duct tape. A 4-inch wide strip of membrane flashing strip shall be hot-air welded over the joint.

G. PVC clad metal and other edge metal shall be installed according to Factory Mutual - Loss Prevention Data Sheet 1-49.

3.08 WALKWAY PAD INSTALLATION

A. Sarnatred V Installation

1. Roofing membrane to receive Sarntred Walkway shall be clean and dry. Place chalk lines on desk sheet to indicate location of Walkway. Apply a continuous coat of Sarnacol 2170 VC adhesive to the deck sheet and the back of the Walkway in accordance with Sika Sarnafil's technical requirements and press Walkway into place with a water filled, foam covered lawn roller. Clean the deck membrane in areas to be welded. Hot air weld the entire perimeter of the Walkway to the Sarnafil deck sheet. Check all welds with a rounded screwdriver. Re-weld any inconsistencies. Check existing deck membrane seams that are to be covered by Walkway with rounded screwdriver and re-weld any inconsistencies before Walkway installation. Do not run Walkway over Sarnabars.

3.09 TEMPORARY CUTOFFS

A. All flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the wok progresses. When a break in the day's work occurs in the central area of a roof, a temporary waterstop shall be constructed to provide a 100% watertight seal. When work on the new system is suspended, the stagger of the insulation joints shall be maintained by installing partial fillers. The new membrane shall be carried into the waterstop. The waterstop shall be sealed to the deck and/or substrate so that water shall not be allowed to travel under the new or existing roofing. The edge of the membrane shall be sealed in continuous heavy application of roof cement of 6 inches in width. When work resumes, the contaminated membrane shall be cut out. All sealant, contaminated membrane, insulation fillers, and other similar items shall be removed from the work area and disposed of off-site. None of these materials shall be used in the new work.

B. If inclement weather occurs while a temporary waterstop is in place, the Subcontractor shall provide the labor necessary to monitor the situation to maintain a watertight condition.

3.10 CLEANING

A. At the completion of the work, clean remove and cart away from the premises, all rubbish and accumulated materials and leave the work in a satisfactory condition.

B. All stains and/or damage to the exterior finish of the building caused by faulty workmanship and/or improper handling of materials in regard to the installation of roofing shall be cleaned or removed and replaced at the expense of the Roofing and Flashing Subcontractor.

C. Wash and rinse all metal work completely free from finger marks, smudges, labels, and other surface dirt.

3.11 ROOF PROTECTION

A. During the construction period after the installation of the roofing system, the General Contractor shall take strict precautions against unnecessary traffic on the roof surface.

B. After the satisfactory completion of all roofing and flashing work, the General Contractor shall be responsible for damages to the roof caused by work or materials of other trades.

END OF SECTION

SECTION 071326

AIR AND VAPOR BARRIERS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following, as shown on the Drawings and/or specified herein.

1. Continuous self-adhering membrane air barrier on new exterior wall and soffit construction including all necessary primers, sealants, spray foam insulation and similar items necessary to continuously seal the wall air and vapor barrier to adjacent construction (doors, roof, and similar items).
2. Repair wall and floor air and vapor barriers damaged by the work of other trades with self-adhering membrane.

B. This Subcontractor shall furnish, install and maintain in safe, adequate condition all staging and scaffolding that are necessary for the proper execution of the work of this section.

C. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. For all adhesives and sealants, meet the LEEDv4-S requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. For all paints and coatings applied on site and inside the air and vapor barrier, meet the LEEDv4-S requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

4. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

D. Exterior Envelope Commissioning - Refer to SECTION 019113-BUILDING COMMISSIONING REQUIREMENTS.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Construction of mock-up: SECTION 014339-EXTERIOR MOCK-UPS.
2. Sheet membrane waterproofing, foundation Dampproofing and protection board: SECTION 070001-WATERPROOFING, DAMPPROOFING AND CAULKING.
3. Construction of masonry back up walls, compressible joint fillers in masonry, and membrane flashing in masonry walls and installing rigid wall insulation in exterior masonry veneer walls: SECTION 040001-MASONRY.
4. Compressible joint fillers in cast-in-place concrete, and underslab moisture barrier and insulation: SECTION 033000-CAST-IN-PLACE CONCRETE.
5. Wood blocking and back up construction at soffits, fascias, and roof edges: SECTION 061000-ROUGH CARPENTRY.
6. Roof vapor retarder, metal and membrane flashings, and sealants in conjunction with roofing: SECTION 070002-ROOFING AND FLASHING.
7. Metal framing, wall insulation installation, panels, flashings and internal sealants at prefinished metal wall and soffit panel system: SECTION 074213-PREFORMED CLADDING and SECTION 074251-PORCELAIN TILE WALL SYSTEM.
8. Internal sealants in conjunction with metal window, curtainwall and storefront systems: SECTION 080001-METAL WINDOWS.
9. Perimeter joint sealants at exterior and interior window, curtainwall and storefront systems including sealing window system to the air and vapor barrier: SECTION 080001-METAL WINDOWS.
10. Gypsum board / metal stud exterior wall construction including sheathing and continuous insulation retainer clips: SECTION 092116-GYPSUM WALLBOARD.

1.04 SUBMITTALS

A. Submit the following samples in accordance with the provisions of SECTION 013300-SUBMITTALS.

1. Joint bead material - 12-inch length.

2. Sealants and caulking materials, 3-inch strips of each specified type, in all available colors for selection by the Architect, applied to pieces of hardboard.

3. Air Barrier - not less than 6 by 12 inches of each type.

B. Include, with samples submission, complete manufacturer's specifications, installation instructions and application data, and duplicate copies of certifications of compliance to the designated Standards and Specifications set forth herein for all material, together with supporting test data and chemical composition of each material. Written approval of the Architect must be obtained for all samples and data before delivering any material to the project.

C. Manufacturer's data - Submit to the Architect copies of manufacturer's specifications and installation and application instructions for all herein specified, certified test results, recommendations for sealing penetrations and perimeters, and other data as may be required.

1. If a substitution of the specified product is proposed, the manufacturer shall provide documentation from a major testing laboratory that the product has successfully been tested in compliance with NFPA 285 in the designated wall assembly systems.

2. In the absence of such above documentation, the manufacturer of the proposed substituted product shall submit documentation that the product has been successfully tested in accordance with NFPA 285 as a component of a successfully tested NFPA 285 wall assembly.

3. In addition to Item 2, above, the proposed manufacturer of the substituted product shall engage a fire scientist to provide a written analysis of the design wall assembly concluding that the proposed substituted product, in the professional judgment of the fire scientist, will meet the performance requirements of NFPA 285 for the design wall assembly systems.

D. General Contractor Review-accompanying approval request, submit to the Architect written statement signed by the Sub-contractor, stating that the Architect’s drawings and specifications for materials herein specified have been reviewed with an agent or the manufacturer of the primary materials and that he is in agreement that the selected systems and all other materials herein specified are proper, compatible and adequate for the application shown, and the conditions and details are not in conflict with the respective warranties. Show by copy of transmittal from that copy of statement that has been transmitted to respective manufacturers.

E. Shop Drawings for Air Barrier Membrane Mockup: Submit project specific shop drawings for mockup indicating size of mockup, details of construction, and expansion and control joints. Include relationship with adjacent materials, sequence of installation and materials and methods for sealing penetrations. Obtain approval of shop drawings prior to construction of mockup. Revise to show changes necessary to obtain approval of mockup.

F. Shop Drawings: Submit dew point analysis of wall and roof assemblies and shop drawings indicating details of construction, including expansion and control joints. Include relationship with adjacent materials, sequence of installation and materials and methods for sealing penetrations. At a minimum, shop drawings shall include details of the following connections, as applicable to the project:

1. Foundation and walls.
2. Walls and windows or doors.
3. Different wall systems.
4. Wall and roof.
5. Walls, floor and roof across construction, control and expansion joints.
6. Walls, floors and roof to utility, pipe and duct penetrations.
7. Walls and roof over unconditioned space.

G. Qualifications of Installer: Submit qualifications of firm installing air barrier membrane materials, including name and qualifications of supervisor for this project, and including name and location of three projects where similar work was performed by both firm and supervisor.

H. Mockups of Air Barrier Membrane Installation: Designate an area of the building to integrate the air barrier into the exterior wall as a mockup for approval by the Architect. Mockup shall show connection between wall and roof, and wall and window assembly. Mockup shall use actual air barrier membrane materials. Provide several mockups if necessary to include the various conditions. Remove mockup assemblies that are not approved. Rebuild mockups which are not approved at no additional cost to the Owner.

1. Refer to SECTION 014339-EXTERIOR MOCK-UPS for additional mock-up requirement.

2. Final Mock-Up: Following the Architect's review and approval of the mock-up panel, including those portions of the panel furnished and installed under other SECTIONS, a final mock-up final shall incorporate all approved materials, colors and methods of installation. This final mock-up shall be left on site to serve as the reference standard for appearance and workmanship as the work progresses. This Subcontractor shall, at no additional cost to the Owner, rebuild the portions of the mock-up furnished and installed under this SECTION using the final approved materials, colors and construction to complete the final mock-up.

I. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in Section 018113-Sustainable Design Requirements.

2. A completed LEED MATERIALS REPORTING FORM, per Section 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. Product substitution requests are subject to additional LEEDv4-S submittal requirements, see SECTION 012500-SUBSTITUTION PROCEDURES.

1.05 AIR BARRIER PRECONSTRUCTION CONFERENCE

A. Preconstruction conference – prior to the commencement of any construction work, a preconstruction conference shall be held.

B. After approval of all materials and prior to installation, a air barrier preconstruction conference shall be held at the job site. In attendance shall be (1) Architect, (2) Owner's Project Manager, (3) Commissioning Agent, (4) General Contractor, (5) Air Barrier Subcontractor, and (6) Manufacturer's representative.

C. The parties shall review Drawings, specifications and approved materials.

Correct conflicts, if any, between approvals and specification requirements. Examine job site conditions, including inspection of substrate, material labels and methods of storing materials. Review installation procedures, scheduling and temperature requirements, and establish protection methods for finished waterproofing from other trades.

D. Pre-Construction Meeting: After approval of mockup shop drawings, but prior to construction of mockup, convene a meeting with representatives of materials to be incorporated in the mockup and installers of mockup. Agenda shall include sequence and details of construction to ensure continuity of air barrier.

E. Pre-Installation Meeting: Convene a pre-installation meeting a minimum of one week prior to commencing work of this section. Attendees shall include representatives of air barrier manufacturer, exterior wall installers and project superintendent. Agenda shall include the following:

1. Review of approved submittals.
2. Review of mock-ups.
3. Coordination with sequence of installation with adjacent materials.
4. Schedule for subsequent work covering air barrier.
5. Procedures for quality assurance.

1.06 WARRANTY

A. This Subcontractor shall execute a written guarantee direct to the Owner, warranting all AVB system specified herein for a period of **one (1) year** after date of Substantial Completion of the building. Any imperfections as a whole or in part, by reason of defective materials, workmanship or arrangement of the various parts shall be made good to the satisfaction of the Owner at this Subcontractor's expense.

B. Silicone Sealant Systems

1. Manufacturer for the work of this SECTION shall review the Contract Documents, Shop Drawings and inspect the installation, and upon approval issue a standard 20-year warranty.

1.07 QUALITY ASSURANCE

A. The Subcontractor shall, for all materials and systems specified herein, submit a letter from each respective manufacturer certifying this Subcontractor is an authorized applicator.

1.08 PERFORMANCE REQUIREMENTS

A. Commonwealth of Massachusetts Building Code Requirements: The intent of this specification is to require compliance with 780 CMR 13, including Section 1304.3, Air Leakage.

B. Air and vapor barrier shall be NFPA 285 compliant and comply with the following ASTM standards:

1. E84 – Test Method for Surface Burning Characteristics of Building Materials.
2. E96 – Test Method for Water Vapor Transmission of Materials
3. E1677 – Specification for Air Retarder Material or System for Framed Building Walls

4. E2178 – Test Method for Air Permanence of Building Materials
5. E2357 – Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
6. E2266 – Standard Guide for Design and Construction of Low-Rise Frame Building Wall Systems to Resist Water Intrusion
7. E241 – Standard Guide for Limiting Water-Induced Damage to Buildings

C. Code 780 CMR 1304.3.1, Air Barriers: The building envelope shall be designed and constructed with a continuous air barrier to control air leakage into or out of the conditioned space. An air barrier shall also be provided with interior partitions between conditioned space and space designed to maintain temperature or humidity levels which differ from those in the conditioned space by more than 50 percent of the difference between the conditioned space and design ambient conditions. The air barrier shall have the following characteristics:

1. It must be continuous, with all joints made air tight.
2. It shall have an air permeability not to exceed 0.004 cubic feet per minute per square foot under a pressure differential of 0.3 inches of water as tested in accordance with ASTM E-2178.
3. It shall be capable of withstanding positive and negative design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load.
4. It shall be durable or maintainable.
5. The air barrier shall be joined in an air tight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between:
    a. Foundations and walls.
    b. Walls and doors.
    c. Different wall systems.
    d. Wall and roof.
    e. Wall and roof over unconditioned space.
    f. Walls, floor and roof across construction, control and expansion joints.
    g. Walls, floors and roof to utility, pipe and duct penetrations.

D. Code 780 CMR 1304.3.2, Air Barrier Penetrations: All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made airtight.

Design Intent: Air barrier membrane shall be located, constructed and flashed to perform as an air and water barrier to discharge to the outside any incidental condensation or water penetration. Air barrier membrane shall accommodate movements of building materials by providing expansion and control joints with appropriate air seal materials at such locations, changes in substrate and perimeter conditions.

1.09 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Each container must bear an unbroken seal, test number, and label of the manufacturer upon delivery to the site. Failure to comply with these requirements shall be sufficient cause for rejection of the material in question by the Architect and his requiring its removal from the site. New materials conforming to said requirements, shall be promptly furnished at no additional cost.

1.10 JOB CONDITIONS

A. Weather conditions must be dry and of the proper temperature during application operations. Surfaces receiving work of this SECTION must be absolutely dry and dust free. All joints receiving sealants and caulking materials shall be subject to the approval of the materials manufacturer for proper use of the specified materials.

B. Adjacent surfaces must be protected from damaged work performed under this SECTION.

1.11 FIELD ADHESION TESTS

A. Perform adhesion tests on samples of peel and stick vapor barrier applied to prepared substrates at the site to assure that the proposed materials and installation procedures achieve adequate adhesion and that the optimum primers are selected. The General Contractor shall schedule the testing and report the results at no additional cost to the Owner. The General Contractor shall request the sealant manufacturer's technical representative visit the site to assist with adhesion testing.

B. Perform jobsite sealant adhesion tests in accordance with the following:

1. Apply three sealant test strips to each jobsite substrate. Prepare three samples for each type of sealant proposed on each substrate.

2. Sealant test strips shall be a minimum of 4 inches long at each location. Apply a 1 inch wide strip of bond breaker tape across the edge of each test specimen to produce a tab for gripping the specimen during testing.

3. Prepare additional test samples for each primer or substrate preparation technique recommended by the sealant manufacturer. For substrates where adhesion may benefit from the use of a primer, prepare test strips with and without primer to evaluate the effect on adhesion.

4. Locate sealant test strips in areas approved by the Owner in advance. Remove all traces of sealant test residue on substrates to remain.

5. Install sealant sufficiently in advance of general sealant application to allow time for curing and testing, and in no case less than three weeks in advance.

6. After curing for at least three weeks, forcibly remove sealant test strips to check on the sealant adhesion. Failure must be by tearing within the sealant itself (cohesive failure). Sealant test samples that fail adhesively (that is, by pulling cleanly away from the substrate leaving little or no sealant residue) are unacceptable.

7. If sealant fails adhesively, modify sealant application procedures as recommended by the sealant manufacturer and repeat testing until satisfactory adhesion is achieved.

8. Notify Architect at least 48 hours prior to the installation of test samples and 48 hours in advance of performing pull-tests so that he can be present to observe the installation.

9. Provide a written report to the Architect describing the testing, the results, and the recommendations of the sealant manufacturer.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4 MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.

2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.

3. Furnish any adhesives, sealants, paints and coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 MATERIALS REQUIREMENTS

A. Deliver each material in manufacturer's unopened container or bundles, fully identified with brand, type, grade, class, and all other qualifying information.

B. Storage of Materials - Store all materials in properly protected and dry storage facilities until ready for use. Installation of wet or damp materials will not be accepted. Do not use materials which have been damaged in any manner.

C. Protect work from damage during construction period so that it will be without indication of abuse or damage at time of acceptance.

D. Protect the building from damage resulting from spillage, dripping, and dropping of materials. Repair and restore other work damaged during roofing operations.

E. Prevent waterproofing materials from running into the drains, clogging rain water conductors.

F. Take all necessary precautions against fire and other hazards, during delivery, storage, and installation of inflammable adhesives, solvents, and other materials specified herein. Comply with local ordinances and fire regulations in the installation of hazardous materials specified or required under this SECTION.

2.02 SELF-ADHERING AIR AND VAPOR BARRIER MEMBRANES

A. Self-Adhering Air and Vapor Barrier Membrane: Self-adhering, self-sealing membrane of inherent fire-resistant 40 mil composite consisting of foil-faced glass laminated with a fire-resistant, factory applied pressure sensitive adhesive.

1. To establish a standard of quality, design and function required, specifications are based on Carlisle 705FRA self-adhering barrier in widths to comply with job conditions.
2. Similar LEED-S compliant membranes by Grace Construction Products, York Manufacturing, or other manufacturer will be considered by the architect as an equal upon receipt of adequate supporting data.
3. **Refer to Article 1.04, Submittals, paragraph C for required documentation confirming compliance with NFPA 285.**

B. Transition Materials: To provide an air barrier between the membrane and adjacent materials (except window, curtainwall and storefront systems), provide transition materials consisting of extruded low-modulus silicone sheet and silicone sealant designed to adhere to polyethylene side of membrane and adjacent material. Provide the following materials as acceptable to the manufacturer of the air barrier membrane and meeting the VOC requirements of SCAQMD, Rule 1168.

1. Cleaning Agent.
2. Silicone Sheet: SIL-SPAN Preformed Silicone Profiles by Pecora or ULTRASPAN Weatherstripping by General Electric. Provide preformed corners.
3. Silicone sealant: Low modulus single component silicone sealant compatible with sealants furnished and installed under SECTION 070001- WATERPROOFING, DAMPPROOFING AND CAULKING, SECTION 074213 – PREFORMED CLADDING, SECTION 080001-METAL WINDOWS and SECTION 074251-PORCELAIN TILE WALL SYSTEM.
4. Carlisle Window and Door Flashing.

5. EPDM Transition Strips - Used when maintaining continuity across expansion joints, and/or when adhered to extruded polystyrene insulation or when application of a rubberized asphalt membrane will stain exposed to view sealants: Carlisle Elastoform. Similar EPDM Transition Strips by Firestone Building Products, Johns Mansville or other manufacturers will be considered by the architect as an equal upon receipt of adequate supporting data.

6. Spray Foam Insulation - Compatible with air and vapor barrier and transition materials, used to fill metal deck flutes to create a consistent plane for sealing A&VB to metal deck.

PART 3 EXECUTION

3.01 SELF-ADHERING AIR BARRIER MEMBRANES

A. System Selection - The air vapor barrier Subcontractor shall apply a self-adhering barrier. Only a self-adhering barrier may be used to repair damage caused by work of other trades only.

B. Clean substrate surfaces to receive air barrier membrane in accordance with manufacturer's instructions. Apply primer if recommended by manufacturer.

C. Strictly comply with air barrier membrane manufacturer's printed instructions, approved submittals and the following:

1. Apply materials within manufacturer's requirements for temperature and weather conditions.
2. Do not apply to wet or frozen substrates.
3. Do not allow contamination with dust or dirt.
4. Seal completely at edges, perimeter and penetrations.
5. Provide expansion control at all intermediate horizontal floor levels.

D. Protect installed work from damage due to harmful weather exposures, physical abuse, and other causes.

E. Provide temporary protection over air barrier membrane if materials covering air barrier membrane shall not be installed within manufacturer's recommended time limit for exposure.

F. **Repair damage to air barrier membrane caused by construction activities or subsequent work prior to covering. If exposed for a period greater than manufacturer's maximum time limit requirement, install new membrane over existing per manufacturer's requirements.**

3.02 CLEANING

A. Clean all surfaces of adjacent surfaces that have been marked or soiled by the work of this SECTION, removing all excess mastics, sealants, and caulking materials there from. Use only cleaning materials and solvents which shall not damage the surfaces in any way.

END OF SECTION

SECTION 072100

INSULATION

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following:

1. Spray applied polyurethane foam at concrete foundation and retaining walls below-grade furred wall construction.
2. Spray applied polyurethane foam at penetrations of exterior walls, including around structural steel members, and underside of roof drain structures. Sprayfoam at deck flutes where indicated on Drawings. Sprayfoam at exterior soffits below occupied floors. Maintain continuous building insulation and continuity of air/vapor barrier and where shown on the drawings.

B. Furnish the following for installation under the designated SECTIONS.

1. Provide insulation for mock-up exterior wall panels as specified under SECTION 014339-EXTERIOR MOCK-UPS.
2. Sound attenuating mineral wood batt insulation at interior partitions: SECTION 061000-ROUGH CARPENTRY and SECTION 092116-GYPSUM WALLBOARD.
3. Rigid wall insulation at masonry veneer walls having masonry back up: SECTION 040001-MASONRY.
4. Rigid wall insulation at metal stud back up walls for exterior masonry, metal and fiber cement panels: SECTION 040001-MASONRY, SECTION 074213-PREFORMED CLADDING and SECTION 074247-FIBER REINFORCED CONCRETE PANEL RAINSCREEN SYSTEM.
5. Rigid wall insulation at doghouse walls: SECTION 070002-ROOFING AND FLASHING.
6. Semi-rigid wall insulation at metal stud back up for phenolic wall and soffit panels: SECTION 074233-PHENOLIC RAINSCREEN SYSTEM.
7. Semi-rigid insulation at aluminum soffits as called for on the Drawings: SECTION 074213-PREFORMED CLADDING

8. Semi-rigid insulation at fiber cement panel soffits: SECTION 074247-FIBER REINFORCED CEMENTITIOUS PANEL RAINSCREEN SYSTEM.

9. Semi-rigid insulation at aluminum curtainwall spandrel panels: SECTION 080001-METAL WINDOWS.

10. Insulation at top of masonry at corrugated metal deck and at structural members penetrating masonry walls: SECTION 061000-ROUGH CARPENTRY.

11. Smoke and firesafing insulation at fire rated masonry walls: SECTION 040001-MASONRY.

C. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. For all adhesives and sealants, meet the LEEDv4-S requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. For all paints and coatings, meet the LEEDv4-S requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

D. Exterior Envelope Commissioning – Refer to SECTION 019113-BUILDING COMMISSIONING REQUIREMENTS.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be furnished and installed by the designated SECTIONS:

1. Construction of mock-up: SECTION 014339-EXTERIOR MOCK-UPS.

2. Underslab rigid insulation and vapor barrier: SECTION 033000-CAST-IN-PLACE CONCRETE.

2. Rigid insulation in conjunction with membrane roofing system: SECTION 070002-ROOFING AND FLASHING.

3. Continuous membrane air and vapor barrier: SECTION 071326-AIR AND VAPOR BARRIERS.

4. Rigid insulation in conjunction with below grade dampproofing and waterproofing systems: SECTION 070001-DAMPPROOFING, WATERPROOFING & CAULKING.

5. Fabric covered acoustical wall panels: SECTION 098400-ACOUSTICAL WALL TREATMENT.

6. Firesafing and smoke stopping (except as specified elsewhere): By Sub-trade making penetrations.

7. Doghouse insulation: SECTION 070002-ROOFING AND FLASHING.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with SECTION 013300-SUBMITTALS.

B. Shop drawings shall include manufacturer's specifications, and installation instructions and details.

C. Manufacturer's data - Submit to the Architect copies of manufacturer's specifications and installation and application instructions for all herein specified, certified test results, compliance with NFPA 285, recommendations for sealing penetrations and perimeters, and other data as may be required.

1. If a substitution of the specified product is proposed, the manufacturer shall provide documentation from a major testing laboratory that the product has successfully been tested in compliance with NFPA 285 in the designated wall assembly systems.

2. In the absence of such above documentation, the manufacturer of the proposed substituted product shall submit documentation that the product has been successfully tested in accordance with NFPA 285 as a component of a successfully tested NFPA 285 wall assembly.

3. In addition to Item 2, above, the proposed manufacturer of the substituted product shall engage a fire scientist to provide a written analysis of the design wall assembly concluding that the proposed substituted product, in the professional judgment of the fire scientist, will meet the performance requirements of NFPA 285 for the design wall assembly systems.

D. Submit letters from insulation material manufacturers confirming compatibility with adjacent system materials.

E. Submit samples of submitted insulation materials.

F. Provide insulation for mock-up exterior wall panels as specified under SECTION 014339-EXTERIOR MOCK UPS.

G. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS).

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. Product substitution requests are subject to additional LEEDv4-S submittal requirements. Refer to SECTION 012500-SUBSTITUTION PROCEDURES.

1.05 DELIVERY, STORAGE & HANDLING

A. Verify thermal insulation products bear the appropriate markings of Underwriters Laboratories.

B. Products shall be delivered to the site in original unopened packaging clearly marked with manufacturer's information, product type, size, grade, use, lot or batch number and quantity.

C. Protect material from UV and the weather per manufacturer's requirements. Store pallets off the ground and provide spaces to separate materials and allow for air circulation.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4 Materials Reporting Form shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) The Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) The Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
3. Furnish all adhesives and sealants such that they meet the LEEDv4-S requirements for IEQ Credit 2 as defined in SECTION 018113- SUSTAINABLE DESIGN REQUIREMENTS.
4. Furnish any paints and coatings such that they meet the LEEDv4-S requirements for IEQ Credit 2 as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.
5. Furnish any ceiling and wall system components, including gypsum board products, insulation, acoustical ceiling systems and wall coverings, such that they meet the LEEDv4-S requirements for IEQ Credit 2 as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

2.01 MATERIALS

A. Sound attenuating mineral wool batt insulation in partitions where designated on Drawings, a minimum of 3 inches thick, with a minimum NRC of 1.05 and a minimum density of 2.0 lbs./ft.

1. Unfaced sound attenuating mineral wool blankets as manufactured by Rockwool “AFB Evo”, Manville “Mineral Wool Sound Attenuation Fire Batts (SAFB)”, Owens Corning “Thermafiber SAFB FF” or approved equal and conforming to ASTM E-84.
2. At chase walls, batt insulation shall be provided in both LGMF partition rows at acoustic partitions and where otherwise indicated on the Drawings.

B. Rigid Thermal Insulation in cavity of masonry veneer walls, metal panel walls and fiber reinforced cementitious panel rainscreen system.

1. It is the intent of the SECTION that only one rigid insulation manufacturer and product be furnished regardless of the number of subcontractors installing same.

2. Glass-fiber reinforced polyisocyanurate foam core faced with smooth, acrylic-coated aluminum on one side and smooth aluminum on other side, "Thermax Square Edge" by Dow Chemical Co., Atlas "Energy Shield Pro," R-Max "Durasheath-3" or an approved equal complying with ASTM C1289, Type 1, Class 1, meeting IBC requirements for foam plastic insulation.

    a. **Refer to Article 1.04, Submittals, paragraph C for required documentation confirming compliance with NFPA 285.**

C. Spray Applied Polyurethane Foam in Furred Stud Space at Concrete Foundation and Retaining Walls, one inch thick, R-6.7

1. Two component spray polyurethane closed cell plastic foam, Styrofoam Polyurethane Spray Foam CM-2060, having a core density of 2.2 pct per ASTM D1622 with an R-value of 6.5 per inch, Demilev "Heat Lok Soy-200", having a core density of 2.1 pcf per ASTM D1622 with an R-value of 6.6 per inch, NCFI Poyurethane "InsulBloc" spray foam with a core density of 2.0 pcf per ASTM D1622 with an R-value of 6.8 per inch or an approved equal.

    a. Insulation installed inside the building shall be certified by the manufacturer and an independent laboratory that it meets LEEDv4-S Low-Emitting Materials Criteria (Section 01350).

    b. Refer to Article 1.04, Submittals, paragraph C for required documentation confirming compliance with NFPA 285.

D. Spray Applied Polyurethane Foam in Voids, Penetrations and Decking

1. Two component spray polyurethane closed cell plastic foam, Demilec "Heat Lok Soy-200," having a core density of 2.1 pcf per ASTM D1622 with an R-value of 6.6 per inch, NCFI Polyurethanes "InsulBloc" spray foam with a core density of 2.0 pcf per ASTM D1622 with an R-value of 6.8 per inch, Bayer Materials Science "Bayseal CC-X" having a core density of 2.0 pcf per ASTM D1622 with an R-value of 6.9 per inch or an approved equal.

2. Two-part Kits: Dow "Froth-Pak" or approved equal. May be used for out of sequence work as approved by the Architect. Kits shall provide minimum R-value of 6.6 per inch and have a core density of 1.75 per ASTM D1622.

E. Firesafing: Insulation at Fire Rated Masonry Walls

1. Thermafiber mineral fiber safing insulation and caulking as manufactured by US Gypsum Co., Knauf Insulation, Owens Corning or an approved equal.

   a. Insulation installed inside the building shall be certified by the manufacturer and an independent laboratory that it meets Low-Emitting Materials Criteria.

F. Semi-Rigid Thermal Insulation R4.3 per inch, in sizes as called for on the Drawings

1. Faced mineral wool fiber board, four inches thick and in other thicknesses as shown on the Drawings as manufactured by Roxul, Inc. “CavityRock DD”, Thermafiber, Inc. “RainBarrier 45”, Johns Manville “Thermafiber” or an approved equal conforming to ASTM C 612, Type I.

PART 3 EXECUTION

3.01 INSTALLATION

A. Insulation shall be installed under SECTION 040001-MASONRY, SECTION 061000-ROUGH CARPENTRY, SECTION 074213-PREFORMED CLADDING, SECTION 074233-PHENOLIC RAINSCREEN SYSTEM, SECTION 074247-FIBER REINFORCED CEMENTITIOUS PANEL RAINSCREEN SYSTEM and SECTION 092116-GYPSUM WALLBOARD. Provide all manufacturer approved application instructions for the various types of insulation specified hereunder.

B. Installers shall be advised of manufacturer's protection requirements to ensure that materials are not at risk of exposures that may be deleterious to the materials and products.

END OF SECTION

SECTION 074213

PREFORMED CLADDING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION. B.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following as shown on the Drawings and specified herein:

1. Complete Preformed Aluminum cladding systems from the AVB outward, including:
    a. Prefinished, preformed aluminum skinned composite metal (ACM) rainscreen systems including wall and soffit panels, copings, flashing, trim, metal sub-girt framing, mounting clips and all required fasteners.
    b. Prefinished, preformed aluminum single skin wall panels, flashings, fascias, flashing, trim and all required fasteners.
    c. Prefinished, preformed aluminum single skin soffit panels, flashing, trim and all required fasteners.
    d. Prefinished coping, flashing, trim and all required fasteners at the perimeter of Phenolic Rainscreen and Fiber Reinforced Cementitious Panel Rainscreen systems except as noted in Paragraph 1.02.B, below.
    e. Galvanized z-girt system including z-shaped girts, hat channels and other LGMF shapes, and all required fasteners.
2. Complete HVAC roof screen systems attaching directly to structural steel:
    a. Prefinished, preformed aluminum single skin roof screen panel, flashings, trim and all required fasteners.
    b. Galvanized LGMF hat channels, other LGMF shapes and all required fasteners.
3. Prefinished, preformed aluminum column covers for interior applications and all required supports and fasteners.
4. Prefinished downspouts, mounting brackets / straps and all required fasteners.

B. Furnish the following for installation under the designated SECTION:

1. Preformed and prefinished sill flashing and base wall flashing components: SECTION 040001-MASONRY, SECTION 070002-ROOFING AND FLASHING, SECTION 074233 PHENOLIC RAINSCREEN SYSTEM, SECTION 074247-FIBER CEMENT REINFORCED CEMENTITIOUS PANEL RAINSCREEN SYSTEM and SECTION 080001-METAL WINDOWS.

2. Preformed ~~scuppers and~~ parapet caps/copings: SECTION 070002-ROOFING AND FLASHING.

C. Install the following items as furnished under the designated SECTIONS:

1. Rigid cavity wall insulation behind preformed metal wall panels: SECTION 072100-INSULATION.

D. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEED-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

E. Exterior Envelope Commissioning – Refer to SECTION 019113-BUILDING COMMISSIONING REQUIREMENTS.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated Sections:

1. Construction of mock-up: SECTION 014339-EXTERIOR MOCK-UPS.

2. Structural steel framing: SECTION 051200-STRUCTURAL STEEL FRAMING.

3. Metal stud framing and exterior sheathing to receive rigid insulation cladding: SECTION 092116-GYPSUM WALLBOARD.

4. Continuous air and vapor barrier: SECTION 071326-AIR AND VAPOR BARRIERS.

5. Installation of exterior rigid insulation behind masonry veneer and fiber cement: SECTION 040001-MASONRY and SECTION 074247-FIBER REINFORCED CEMENTITIOUS PANEL RAINSCREEN SYSTEM.

6. Installation of semi-rigid insulation behind exterior phenolic panels: SECTION 074233-PHENOLIC RAINSCREEN SYSTEM.

7. Phenolic and fiber reinforced cementitious panels, subframes and z-girts: SECTION 074233-PHENOLIC RAINSCREEN SYSTEM and SECTION 074247-FIBER REINFORCED CEMENTITIOUS PANEL RAINSCREEN SYSTEM.

8. Membrane roofing systems, snap-on prefinished fascias, PVC clad and sheet metal flashing and fascia and related flashings: SECTION 070002-ROOFING AND FLASHING.

9. Window, curtainwall, aluminum entries and storefront systems and trim and louvers incorporated into window systems: SECTION 080001 – METAL WINDOWS.

10. Roof drains and downspout boots: SECTION 220001-PLUMBING.

11. Intercom, fire alarm, door operator actuators and other electric devices mounted in preformed cladding panels: SECTION 260001-ELECTRICAL and DIVISIONS 27 and 28.

1.04 SUBMITTALS

A. Submit the following in accordance with the provisions of SECTION 013300-SUBMITTALS.

B. Product Data for each type of cladding specified. Include technical data, material descriptions, dimensions of standard components and profiles, standard system construction details, test data, finish data and cleaning and maintenance instructions.

C. Samples:

1. Two, minimum 1 in x 2 in, color chips demonstrating match for each specified color for approval. Provide separate sets of two samples for ACM, single skin wall, single skin soffit and brake metal trim if sourced from different coating manufacturers.

2. Two, minimum 12” long, samples of each single skin panel in approved color.

3. One, minimum 6” long, sample of downspout with bracket/strap in approved color.

4. ACM System & Roof Screen Sample Panels: Before construction of the exterior mock-up panel structure, construct sample panels of the proposed ACM wall panel system and the Roof Screen system. System sample panel shall be in the approved color match.. Each system sample panel shall be not less than 24 x 24 inches. System sample panels shall be constructed as a cut away, showing all elements of construction and installation requirements for the panel system. Revisions, if required, shall be incorporated into the mock-up panel structure.

5. One 6" long sample of each size and gauge of Z-grit , hat channel & other LGMF members proposed for use.

D. Shop Drawings: Show fabrication and installation layouts of ACM and single skin wall and soffit panels. Include details of all edge conditions, joints, panel profiles, corners, anchorages, attachment systems, trim, flashings, closures, and accessories and special details. Distinguish among factory, shop, and field-assembled work. Shop drawings shall include:

1. Panel elevations, sections, and dimensions.
2. Panel thicknesses and fastener type and size. Note on elevations & details all locations of exposed fasteners where specified concealed is not possible
3. Joint and connection details.
4. Subframing arrangement, gauges and sizes, bracing and connection details
5. Erection details.
6. Panel cut-outs for Mechanical, Electrical, Plumbing, and Security devices and items.
7. Details of Z-girt and other LGMF systems including attachment to structure.
8. Erection sequence for special conditions.
9. Relationship of the preformed cladding systems to adjacent materials.
10. Shop Drawings for Mockups shall include elevations, sections, full-size details, and relationship to adjacent materials.

E. Provide design calculations for panels, fasteners, subframe and Z-girt systems including all fasteners with the shop drawings. Calculations and shop drawings shall be stamped by an engineer registered in the Commonwealth of Massachusetts.

F. Manufacturer's Certification Finish applicator (s) to provide written notification of approval from paint manufacturer (s) stating applicator is approved by manufacturer to apply the specified finish.

G. Fabricator Experience & References, submit:

1. Experience record showing the fabricator/installer's training and experience in similar work.

2. List and give brief description of similar work, satisfactorily completed, with location, date of contracts, together with names and addresses of owners.

H. Test Results – For each test indicated under Article titled: Performance Requirements below, submit complete test results and detail drawings of the test from an approved independent test facility.

I. Warranties: Sample of manufacturer's standard warrantees.

J. LEED for School Submittals:

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

K. Maintenance Stock: Provide Owner with one quart of touch up paint for each color panel. Submit to the Architect a signed letter of receipt stating that Owner has taken possession of materials.

1.05 COORDINATION OF ALUMINUM FINISH

A. Preformed aluminum ACM and single skin cladding panels, copings, flashing and trim to be furnished and installed under this section shall match in color and finish items furnished under the following Sections:

1. SECTION 070002-ROOFING AND FLASHING : Snap-on roof fascias and flashing.

2. SECTION 080001-METAL WINDOWS: Aluminum windows, curtainwalls, storefronts, doors and trim.

B. It shall be the responsibility of both the Preformed Cladding Subcontractor and the General Contractor to jointly coordinate the finish operation with the other listed trades to achieve a uniform finish.

1.06 MOCK-UP PANEL STRUCTURE

A. Provide and install all preformed cladding at the Exterior Mockup structure as shown on the Drawings. Mock-up structure shall include panels, insulation, trim, all sub-framing, Z-girts and transitions to adjacent materials as shown on the mock-up drawings. Mock-up shall use the final approved materials, colors and construction indicated on approved shop drawings. Deficiencies shall be corrected on the Mock-up prior to the start of work on the building at no additional cost to the owner. The mock-up structure shall be left on site to serve as the reference standard for appearance and workmanship as the work progresses.

B. Refer to the Drawings and SECTION 014339-EXTERIOR MOCK-UPS for sizes, configuration and other requirements for the mock-up panel structure.

C. Approval of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless Architect specifically approves such deviations in writing.

D. Mock-up panel structure will not remain as part of the Work.

1.07 REFERENCE STANDARDS

A. SMACNA, Architectural Sheet Metal Manual (latest edition).

B. American Architectural Manufacturer's Association (AAMA):

1. AAMA 508-07 – Voluntary Test Method and Specifications for Pressure Equalized Rain Screen Wall Cladding Systems
2. AAMA 509 – Voluntary Test and Classification Method for Drained and Back Ventilated Rain Screen Wall Cladding Systems.
3. AAMA 620 – Voluntary Specification High Performance Organic Coatings on Coil Coated Architectural Aluminum.
4. AAMA 2605 – Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

C. American Society of Civil Engineers (ASCE):

1. ASCE 7 – Minimum Design Loads for Buildings and Other Structures.

D. ASTM International (ASTM):

1. ASTM A 653 – Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM B 209 – Specification for Aluminum and Aluminum Alloy Sheet and Plate.
3. ASTM C 645 – Specification for Nonstructural Steel Framing Members.
4. ASTM D 3359 – Standard Test Methods for Measuring Adhesion by Tape Tests.
5. ASTM E 84 – Test Methods for Surface Burning Characteristics of Building Materials.
6. ASTM E 329 – Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.

E. National Fire Protection Association (NFPA):

1. NFPA 285 – Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

1.08 PERFORMANCE REQUIREMENTS

A. General: Provide composite wall panel system meeting performance requirements as determined by application of specified tests by a qualified testing agency on manufacturer's standard assemblies.

B. Structural Performance: Design composite wall panel system fabricated to withstand effects of indicated loads and stresses within limits and under conditions indicated below.

1. Wind Loading – +45 PSF/-49 PSF at non-salient areas, +45/-60 PSF at salient areas, unless greater design load is required by code.

2. Limits of Deflection: Composite wall panel system shall withstand scheduled wind pressure with the following allowable deflection:

a. Maximum allowable deflection limited to L/175 deflection of panel head and sill normal to plane of wall.

b. Maximum allowable deflection of panel stiffeners and aluminum panel material combined limited to L/60.

C. System Performance: A third party test report utilizing the standard ASTM E 283, E 331 and AAMA 501 procedures following the test protocol described in AAMA 508-07. Test panel must include a horizontal joint, with an imperfect air barrier.

D. Drained and Back Ventilated Rain Screen Performance: Per AAMA 509-09:

1. Water penetration through panel system: W1 classification.

2. Ventilation: V4 classification.

E. Thermal Movements: Allow for thermal movements from seasonal variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effect including oil canning.

F. Fire Performance Characteristics: Provide metal composite wall systems with the following fire-test characteristics determined by indicated test standard as applied by UL or other testing and inspection agency acceptable to authorities having jurisdiction.

1. Surface-Burning Characteristics: Provide metal composite wall system panels with the following characteristics when tested per ASTM E 84.

a. Flame spread index: 25 or less.

b. Smoke developed index: 450 or less.

2. Intermediate Scale Multistory Fire Test: Representative mockup tested per NFPA 285 for a complete wall system providing air, water, vapor and thermal barriers.

1.09 PRE-INSTALLATION MEETING

A. Conduct pre-installation meeting to verify project requirements, substrate conditions and manufacturer's installation instructions.

B. Conduct observation and evaluation of the first 300 sf area installed with report by manufacturer's representative.

1.10 DELIVERY, STORAGE AND HANDLING

A. Deliver components, metal mechanical screens, and other manufactured items so as not to be damaged or deformed. Package panels for protection during transportation and handling. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage from weather, excessive temperatures and construction operations.

B. Store and erect metal screen in a manner to prevent bending, warping, twisting, and surface damage. Do not store panels horizontally. Always store vertically with top of panel down.

C. Store covered with suitable weather tight and ventilated covering. Store panels to ensure dryness, with positive slope for drainage of water. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Remove strippable protective covering on metal plate wall panel prior to installation.

1.11 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal plate wall panels to be performed according to manufacturer's written instructions and warranty requirements.

B. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before metal plate wall panel fabrication and indicate measurements on Shop Drawings.

1.12 WARRANTY

A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of preformed cladding assemblies that fail in materials or workmanship within specified two year warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures, including rupturing, cracking, or puncturing.

b. Deterioration of metals and other materials beyond normal weathering.

2. Installer's Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish of preformed cladding materials that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Finish Warranty Period: (20) years from date of Substantial Completion.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4 MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) Aluminum sheet shall be produced using an average minimum 50% recycled materials (25% post-consumer and 25% post industrial). Steel framing shall be produced using an average minimum 25% recycled content.
2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
3. For all adhesives and sealants, meet the requirements for IEQ Credit 2, low-emitting materials, as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 ALUMINUM COMPOSITE MATERIAL (ACM) METAL PANEL SYSTEM

A. Standard of Quality and Design: To establish a standard of quality, function and design, drawings have been based upon style “Rainscreen II” by Alucobond Architectural. Similar ventilated dry seal rainscreen aluminum wall panel systems by Alpolic, Pac-Clad or other manufacturers will be considered as an equal upon submission of adequate supporting data.

B. Materials

1. Aluminum Sheet: Smooth surface coil-coated sheet, ASTM B209.
2. Aluminum Extrusions: ASTM B 221, 3105 Aluminum.

C. Composite Metal Panels: Factory-formed, aluminum-faced composite panels fabricated from two sheets of 0.020 inch (0.51 mm) thick aluminum facing sheets with metal facings bonded to thermoplastic core, and rout and return joinery.

1. Thickness: 6 mm nominal.
2. Panel Flatness: Maximum allowable distortion: 1/32 inch in 24 inches (0.794 mm in 600 mm) in any direction.
3. Panel Core: Thermo-set polymeric, fire-retardant.

4. Stiffeners: Manufacturer's standard stiffener required to meet performance requirements.

D. Face Sheet Surface: Smooth.

E. Face Sheet Coil Coated Finish:

1. As specified under 2.07, A.

F. Exposed Trim and Fastener Finish: Match panel finish.

G. Secondary Metal Framing

1. Miscellaneous Framing Components, General: Cold-formed metallic-coated steel sheet, ASTM C 645, Grade 50, with ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating.

a. Z-girts: 0.053 inch / 16 ga. (1.34 mm) minimum

b. Hat Channels: 0.053 inch/16 ga. (1.34 mm) minimum.

c. Sill Channels: 0.053 inch/16 ga. (1.34 mm) minimum.

d. Other Required Shapes: 0.053 inch/16 ga. (1.34 mm) minimum.

H. Accessories

1. Provide manufacturer's factory-formed clips, shims, flashings, sealants, and tapes for a complete installation.

2. Extruded Trim: Aluminum, minimum thickness 0.060 inch (1.59 mm) for trim and 0.90 inch (2.38 mm) for structural units.

3. Splines: Match panel material and finish.

4. Gaskets: Panel manufacturer's EPDM or neoprene, fire-retardant-treated.

5. Sealants: Type recommended by composite wall panel system manufacturer for application, meeting VOC limit requirements of SCAQMD, Rule 1168, effective July 1, 2005.

6. Flashing Tape: 4 inches (102 mm) wide self-adhering butyl flashing tape.

I. Fabrication

1. General: Fabricate composite wall panels and accessories at factory identical to tested units using manufacturer's standard procedures and processes necessary to meet performance requirements.

a. Provide components of composite wall panel system that are products of one manufacturer, including composite panels, gaskets, head and sill trim, bottom weep, base extrusion, and metal copings.

2. Composite Panels: Fabricate composite wall panels with extruded aluminum stiffeners requiring no further fabrication or modification in field.

a. Horizontal Joints: Dry seal, drained and back ventilated.

b. Vertical Joints: Pre-formed returns with [metal spline] [gasket] and aluminum extrusion receptors and extruded drain channels.

c. Reveals: 0.50 inch (12 mm).

d. Formed Panel Thickness: 2.50 inch (63.5 mm).

2.02 SINGLE SKIN METAL PANEL SYSTEMS

A. Standard of Quality and Design - To establish a standard of quality, function and design, drawings have been based upon style “Concept Series Concealed Fastener Panel” by Centria Architectural Systems. Similar vertical profile, concealed fastening wall panel systems by Fabral, Moran or other manufacturer will be considered as an equal upon submission of adequate supporting data.

B. Metal Wall Panel Materials

1. Aluminum Alloy: 3003-H14.

2. Thickness:

a. Thickness: 0.050 inches.

3. Panel Backside Coating: required

a. Coating Thickness: 60 microns

b. Abrasion Resistance, ASTM D 968, Method D: 140 liters

C. Concealed Fastener Metal Wall Panels

1. Wall panels shall be as follows:

a. Type A: Centria concealed fastener Concept Series horizontal clip, style CS-620, 7/8 in. thick x 12 inches wide having two 5-5/8 inch raised profiles.

b. Finish: As specified under 2.07, A.

D. Metal Wall Panel Accessories

1. Metal Wall Panel Accessories, General: Provide complete metal wall panel assembly incorporating trim, copings, fasciae, parapet caps, soffits, sills, inside and outside corners, and miscellaneous flashings. Provide manufacturer's factory-formed clips, shims, flashings, gaskets, lap tapes, closure strips, and caps for a complete installation. Fabricate and install accessories in accordance with SMACNA Manual.

2. Mitered Corners: Structurally-bonded horizontal interior and exterior trimless corners matching metal wall panel material, profile, and factory-applied finish, fabricated and finished by metal wall panel manufacturer.

3. Formed Flashing and Trim: Match material, thickness, and color of metal wall panel face sheets.

4. Sealants: Type recommended by metal wall panel manufacturer for application, meeting requirements of SECTION 070001-WATERPROOFING, DAMPPROOFING AND CAULKING.

5. Flashing Tape: 4-inch wide self-adhering butyl flashing tape.

6. Fasteners, General: Self-tapping screws, bolts, nuts, and other acceptable fasteners recommended by panel manufacturer. Material shall be 300 series stainless steel.

7. Concealed Clips: G90 Galvanized steel, 0.060 inch/16 ga. (1.52 mm) thick, designed to allow unimpeded thermal movement of panel and configured to hold panel minimum 3/4 inch (19.1 mm) from substrate.

E. Secondary Metal Sub-girt Framing

1. Miscellaneous Framing Components, General: Cold-formed metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z180).

a. Hat Channels: 0.053 inch/16 ga. (1.34 mm) minimum.

b. Sill Channels: 0.053 inch/16 ga. (1.34 mm) minimum.

2.03 MISCELLAEOUS TRIM, DOWNSPOUTS AND GUTTERS

A. Gauges of fascias, flashings, gutters and Miscellaneous Trim to be .050 inches thick unless otherwise shown on the Drawings. Fascias over 11 inches in width shall be .063 inch thick. Downspouts shall be 3 in. x 4 in. rectangular diameter, .050 thick with lapped and welded hemmed seams. Provide aluminum brackets and straps minimum 18 ga. at maximum 4 ft.-0 in. on center, provide brackets and fasteners straps appropriate to substrate: aluminum panel, masonry or structural steel.

B. Running trim shall be supplied in minimum 10 foot lengths unless otherwise shown on Drawings.

C. Finish: As specified under paragraph 2.07, A.

2.04 OVERFLOW SCUPPERS

A. Minimum gauge of scupper body to be .050 inches thick at prefinished aluminum formed with concealed fastening and welded.

B. Mounting fasteners to be stainless steel.

C. Line interior of scupper with compatible water proof membrane system.

D. Fabricate to the latest edition of SMACNA Standards.

E. Finish: As specified under paragraph 2.07, A.

2.05 SINGLE SKIN SOFFIT PANELS

A. Perforated soffit panels shall match the single skin panels in Article 2.02 for all requirements.

1. Type C Centria concealed fastener IW series “IW-14A”, 1-1/2 in. thick x 12 in. wide, having two 6 in. wide subdivisions.

2. Perforation size and spacing, if applicable, shall be as shown on the Drawings.

2.06 PREFINISHED ALUMINUM COLUMN COVERS (INTERIOR APPLICATION)

A. Round, flush joint, single skin column covers in sizes as shown on the Drawings shall be roll formed from .125-inch thick solid aluminum, 3003H-14 alloy for painted finish. To establish a level of quality and design and function specifications and drawings are based upon column covers as manufactured by PAC-CLAD. Similar covers by UNA-CLAD, SAF or approved equal will be considered by the Architect upon the submittal of adequate product data and samples.

1. The basis of design shall be PAC-CLAD 1000 F

2. Column covers shall be full length without horizontal joints. Refer to the drawings for column heights, shapes and sizes required.

3. Column covers shall be split and joined by a hairline keyslot system.

4. Provide caulk stops at top and bottom of column covers. Column shall be held off adjacent construction by ±1/8-inch at top and bottom.

5. Fasteners and attachment clips shall be non-corrosive and of type to eliminate electrolysis. All fasteners shall be concealed.

6. Seams shall be oriented as shown on the Drawings.

7. Finish shall be as specified under Article 2.07.

2.07 COLOR AND FINISH

A. Composite wall panels, fascias, soffits and related trim shall be finished as follows:

1. Finish: Fluoropolymer three-coat metallic system, consisting of 0.2 mil primer with a 0.80 mil PVCF fluoropolymer color coat containing metal flakes and a 0.50 mil PVDF fluoropolymer clear coat.

2. Color: One custom metallic color to match Fluropon Classic Pewter – Centria Sundance Metallic – Clearcoat: 430A307.

3. The Architect reserves the right to select the custom color match from the stated manufacturer's full line of metallic finishes.

B. Concealed fastener metal wall panels, metal wall louver units and related trim shall be finish as follows:

1. Fluoropolymer two-coat system consisting of 0.2 mil primer with 0.80 mil PVDF color coat.

2. Color: One Custom color to match Fluropon Classic Pewter – Centria Sundance Metallic – Clearcoat: 430A307.

C. Column cover finish as follows:

1. Fluoropolymer two coat system consisting of 0.2 mil primer with 0.80 mil PVDF color coat.

2. Color: One custom PPG color to match paint sample provided by the Architect.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal plate wall panel supports, and other conditions affecting performance of the Work.

1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal plate wall panel manufacturer.
2. Verify that the air and vapor barrier has been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal plate wall panels to verify actual locations of penetrations relative to seam locations of panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Miscellaneous Framing: Install sub-girts, base angles, sills, furring, and other miscellaneous metal plate wall panel support members and anchorage according to ASTM C 754 and panel manufacturer's written instructions.

B. Verify field dimensions before fabrication. Notify Architect of any discrepancies between field measurements and dimensions indicated in Construction Documents.

C. Place underlayment membrane and venting mat on substrate surfaces to receive metal panels; comply with manufacturer’s instructions.

1. Coordinate installation of underlayment with metal roofing, rain drainage work, flashing, trim and construction of parapets, walls, and other adjoining work to provide a weatherproof, secure and non-corrosive installation.
2. For underlayment end-laps and side-laps, see underlayment manufacturer’s instructions for proper attachment, seaming, and termination recommendations.

D. Conceal fasteners and expansion provision where possible in exposed work, and locate so as to minimize possibility of leakage. Cover and seal fasteners and anchors required for a tight installation.

E. Provide work as indicated on approved shop drawings

1. Form and fabricate sheets, seams, strips, cleats, edge treatments, integral flashings, and other components of metal wall cladding to profiles, patterns, and drainage arrangements shown and required for water shedding construction. Ensure that all shop & field fabricated bends have an acceptable “rounded” or radius bend. NO SHARP BREAKS.

F. Separate non-compatible materials with a rubberized asphalt underlayment.

3.03 INSTALLATION

A. Manufacturer’s Recommendations: Except as otherwise shown or specified, comply with Recommendations and instructions of manufacturer of sheet metal being fabricated and installed.

1. Do not install in inclement weather
2. Do not install over a damp substrate

B. Comply with SMACNA requirements unless otherwise indicated by the Contract Documents. In case of conflict, most stringent standards shall govern.

C. Install prefinished mechanical screens and associated items and sealant materials in accordance with the approved shop drawings and the manufacturer's written instructions.

1. Install panels plumb, level and straight with seams and ribs parallel, conforming to the design as indicated.
2. Install panels without waves, warps, buckles or distortions - and allow for expansion and contraction. Exercise care in handling panels and trim to prevent surface damage.
3. Caulk all flashings and panel joints that require caulking to prevent water penetration.
4. Ribbed pans shall be vertically broken under ridges and hooked at eves to insure weather-tightness.
5. Clip strips, cleats, and similar items shall be continuous along length of preformed cladding.
6. Fasteners shall be concealed. No exposed fasteners shall be accepted in the finished work. Do not use face nailing on exposed surfaces. Space fasteners per manufacturer's recommendations.
7. Hem exposed edges 1/2 inch.
8. Overlap seams at ends a minimum of 4 inches and fill with sealant. Lap seams to shed water.
9. Caulk all flashings and panel joints that require caulking to prevent water penetration.

10. Clip strips, cleats, and similar items shall be continuous along length of preformed cladding.

11. Hem exposed edges 1/2 inch.

12. Overlap seams at ends a minimum of 4 inches and fill with sealant. Lap seams to shed water.

13. Insulation shall be installed in strict accordance with manufacturer's recommendations. Joint tape and adhesive shall be compatible with the air and vapor barrier.

D. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." In case of conflict, the most stringent standards shall govern. Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that shall be permanently watertight and weather resistant.

E. Wall panels – Install composite and single skin aluminum panel systems in accordance with the approved shop drawings and the manufacturer's written instructions.

1. Surfaces to receive panels shall be even, smooth, sound, clean, dry and free from defects detrimental to work. Notify the General Contractor in writing of conditions detrimental to proper and timely completion of the work. Do not proceed with erection until unsatisfactory conditions have been corrected.

2. Surfaces to receive panels shall be structurally sound as determined by a registered Architect/Engineer.

3. Erect panels plumb, level and true.

4. Attachment system shall allow for the free and noiseless vertical and horizontal thermal movement due to expansion and contraction for a material temperature range of –20°F to +180°F. Buckling of panels, opening of joints, undue stress on fasteners, failure of sealants or any other detrimental effects due to thermal movement shall not be permitted. Fabrication, assembly and erection procedure shall account for the ambient temperature at the time of the respective operation.

5. Panels shall be erected in accordance with an approved set of shop drawings.

6. Anchor panels securely per engineering recommendations and in accordance with approved shop drawings to allow for necessary thermal movement and structural support.

7. Conform to panel fabricator's instructions for installation of concealed fasteners.

8. Do not install component parts that are observed to be defective, including: warped, bowed, dented, braised and broken members.

9. Do not cut, trim, weld or braze component parts during erection in a manner which would damage the finish, decrease strength, or result in a visual imperfection or failure in performance. Return component parts which require alteration to shop for re-fabrication, if possible, or for replacement with new parts.

10. Separate dissimilar metals and use gasketed fasteners where needed to eliminate the possibility of corrosive or electrolytic action between metals.

F. Protect factory finish from damage during installation. Field touch-up marred finish and field cuts to match factory finish.

3.04 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weather tight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal plate wall panel assembly including trim, copings, corner and standard extrusion covers, flashings and similar items.

2. Install panels and trims so that they are weather-tight - without waves, warps, buckles or distortions - and allow for expansion and contraction. Exercise care in handling panels and trim to prevent surface damage.

3. Caulk all flashings and panel joints that require caulking to prevent water penetration.

4. Clip strips, cleats, and other similar items shall be continuous along length of preformed cladding.

5. Hem exposed edges 1/2 inch.

6. Overlap seams at ends a minimum of 4 inches and fill with sealant. Lap seams to shed water.

7. At exposed fastener type panels, fasteners shall match color of panel.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." In case of conflict, the most stringent standards shall govern. Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that shall be permanently watertight and weather resistant.

3.05 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal plate wall panel units within installed tolerance of 1/4 inch in 20 feet, non-cumulative, on level, plumb, and location lines as indicated.

3.06 CLEANING

A. On completion of metal plate wall panel installation, clean finished surfaces as recommended by panel manufacturer.

B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt.

C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 074233

PHENOLIC RAINSCREEN SYSTEM

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following as shown on the Drawings and specified herein:

1. Complete exterior phenolic rainscreen cladding system from the AVB outward, including:
    a. Wall and soffit panels, exposed fastening system, J & hat channel aluminum sub-framing and all required fasteners.
    b. Galvanized Z-girt system including z-shaped sub-girts, trim pieces, fasteners, furring, internal sealants and all required fasteners.
    c. Fabric backer cloth at joints (horizontal and vertical) on vertical wall panel installations.
2. Interior phenolic slat panels and concealed clip fixing system.

B. Install the following items as furnished under the designated SECTIONS:

1. Semi-rigid cavity wall insulation between Z girts, behind exterior phenolic wall panels: SECTION 072100-INSULATION.
2. Preformed and prefinished sill flashing and base wall flashing: SECTION 074213-PREFORMED CLADDING.

C. LEEDv-4 S Requirements:

1. The work of this Section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEED -S Certification at “Silver” Level is an Owner requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein and additionally in DIVISION 1 of this Project Manual.

2. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

D. Exterior Envelope Commissioning – Refer to SECTION 019113-BUILDING COMMISSIONING REQUIREMENTS.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Construction of mock-up: SECTION 014339-EXTERIOR MOCK-UPS.
2. Structural steel framing: SECTION 051200-STRUCTURAL STEEL FRAMING.
3. Metal stud framing and exterior sheathing to receive continuous air and vapor barrier, insulation and cladding: SECTION 092116-GYPSUM WALLBOARD.
4. Continuous air and vapor barrier: SECTION 071326-AIR AND VAPOR BARRIER.
5. Installation of exterior insulation behind masonry veneer, preformed metal cladding and cementitious panels, respectively: SECTION 040001-MASONRY, SECTION 074213-PREFORMED CLADDING and SECTION 074247-FIBER REINFORCED CEMENTITIOUS PANEL RAINSCREEN SYSTEM.
6. Precast concrete base and stainless steel drip edge and thru wall flashing below phenolic panels: SECTION 040001-MASONRY
7. Prefinished aluminum panels, soffits, flashing, fascias, sills, coping and trim: SECTION 074213-PREFORMED CLADDING.
8. Membrane roofing systems and related fascias and flashings: SECTION 070002-ROOFING AND FLASHING.
9. Aluminum window, curtainwall, storefront and trim: SECTION 080001-METAL WINDOWS.
10. Intercom, fire alarm, door operator actuators and other electric devices mounted in phenolic slat panels: SECTION 260001-ELECTRICAL and DIVISIONS 27 and 28.
11. Plywood substrate at interior panels: SECTION 061000-ROUGH CARPENTRY.
12. Painting of substrate behind interior phenolic panels: SECTION 090007-PAINTING.

1.04 SUBMITTALS

A. Submit the following in accordance with the provisions of SECTION 013300-SUBMITTALS.

B. Product Data: Submit manufacturer's product data, including slat panels, sub framing & Z girt systems , fasteners and accessories. Include full range of available finishes for phenolic panels and visible accessories.

C. Samples as follows:

1. Minimum 3 in. x 6 in. samples of up to 5 colors/finishes for panels as chosen by the Architect from product data.
2. When color/finish is confirmed, submit three nominal 6 in wide x 12 in. long samples chosen color/finish in specified thickness with holes drilled for fasteners at proposed location in one exemplar for final approval.
3. Exposed fasteners: Two each of color matched and matte stainless steel screws for selection by the Architect.
4. Phenolic Rainscreen System Sample Panel: Before construction of the exterior mock-up panel structure, submit sample panel of the proposed phenolic rainscreen system. System sample panel shall be in the approved color with approved fasteners. System sample panel shall be not less than 18 x 18 inches. System sample panels shall be constructed as a cut-away, indicating all elements of construction and installation required for the panel system. Revisions, if required, shall be incorporated into the mock-up panel structure. Panels may be constructed by the manufacturer or installation contractor.

D. Shop Drawings: Show panel layout, fastener spacing, flashing locations, sub-framing spacing and member type, corner and transition details. Show Z girt system including gauges & spacing and special conditions. Shop drawings shall include:

1. Panel elevations, sections, and dimensions.
2. Panel thickness and fastener type and size. Note all locations of exposed fasteners.
3. Joint and connection details.
4. Erection details.
5. Panel cut-outs for Mechanical, Electrical, Plumbing, and Security devices and items.
6. Locations and details of z girt system including attachment to structure.
7. Erection sequence for special conditions.
8. Relationships to adjacent materials.
9. Shop Drawings for Mockups shall include elevations, sections, full-size details, and adjacent other work.

E. Provide design calculations for panels, fasteners, channel subframe and z-girt system. Calculations and shop drawings shall be stamped by an engineer registered in the Commonwealth of Massachusetts.

F. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.

1.05 QUALITY ASSURANCE

A. Phenolic panel products shall be stamped with manufacturer's name, address, product name, thickness, color, batch number and fire resistance evaluation report number (ESR-3462 or equal).

B. Exterior product MUST be installed in accordance to NFPA 285 requirements as shown by manufacturer's approved tested assembly.

C. Fabricator / Installer Qualifications

1. Installer shall be experienced in performing work with phenolic panels of similar type and scope. Supervisors and installers shall have a minimum 3 years of experience of projects of similar type or otherwise be certified by the manufacturer.

D. All exterior and interior phenolic panels must be sourced from the same manufacturer.

1.06 MOCK-UP PANEL STRUCTURE

A. Provide and install phenolic rainscreen system at the Exterior Mockup structure as shown on the Drawings. Mock-up structure shall include slats, insulation, trim, all sub-framing, Z-girts and transitions to adjacent materials as shown on the mock-up drawings. Mock-up shall use the final approved materials, colors and construction indicated on approved shop drawings. Deficiencies shall be corrected on the Mock-up prior to the start of work on the building at no additional cost to the owner. The mock-up structure shall be left on site to serve as the reference standard for appearance and workmanship as the work progresses.

B. Refer to the Drawings and SECTION 014339-EXTERIOR MOCK-UPS for sizes, configuration and other requirements for the mock-up panel structure.

C. Approval of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless Architect specifically approves such deviations in writing.

D. Mock-up panel structure will not remain as part of the Work.

1.07 PRE-INSTALLATION MEETING

A. Conduct pre-installation meeting to verify project requirements, substrate conditions and manufacturer's installation instructions.

B. Conduct observation and evaluation of the first 300 sf area installed with report by manufacturer's representative.

1.08 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with performance requirements specified, as determined by testing of manufacturers' products representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Failure also includes the following:

1. Thermal stresses transferring to building structure.
2. Solid exterior wall panels and support structure cracking or breakage.
3. Noise or vibration created by wind and thermal and structural movements.
4. Loosening or weakening of fasteners, attachments, and other components.

C. Structural Performance: Provide solid exterior wall panel and support system as follows:

1. Wind Loading: +45 PSF/-49 PSF at non-salient areas, +45/-60 PSF at salient areas, unless greater design load is required by code.
2. Deflection within specified limits.
3. Thermal Movement: Provide for thermal movement resulting from annual ambient temperature change of 120 degrees F
4. At 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, will not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
5. Durations: As required by design wind velocity, but not less than 10 seconds.
6. Design Panel anchorage and supporting frame to accommodate sub-frame and building deflection.
7. Deflection of Framing Members: At design wind pressure, as follows:
    a. Deflection Normal to Wall Plane: Limited to edge of panel in a direction perpendicular to panel plane not exceeding L/240 of the panel edge length for each panel or an amount that restricts edge deflection of individual panels to manufacturer's product limitations, whichever is less.
    b. Deflection Parallel to Panel Plane: Limited to L/360 of clear span or 1/8 inch, manufacturer's product limitations, whichever is smaller.
    c. Cantilever Deflection: Where framing members overhang an anchor point, limit deflection to 2 times the length of cantilevered member divided by 175, or manufacturer's product limitations, whichever is smaller.

D. Story Drift: Accommodate design displacement of adjacent stories.

E. Design Displacement: As indicated on Structural Drawings.

F. Maximum Solid Exterior Wall Panels Deflection: 1/360 of span or less when tested in accordance with positive and negative pressures.

G. Solid exterior wall panel system shall comply with 2015 International Building Code 1405.16.1 Panel Siding.

H. Anchorage system: Wall anchorages for exterior systems shall be designed to prevent thermal transfer through fasteners to interior side of cold-formed metal framing which could result in condensation inside the stud cavity.

I. Fire Performance Characteristics: Provide phenolic panel wall systems with the following fire-test characteristics determined by indicated test standard as applied by UL or other testing and inspection agency acceptable to authorities having jurisdiction.

1. Interior and Exterior Panels Surface-Burning Characteristics: Provide phenolic panel wall system with the following characteristics when tested per ASTM E 84 to conform to minimum Class B.

a. Flame spread index: 25 or less.

b. Smoke developed index: 450 or less.

2. Exterior Panel System Intermediate Scale Multistory Fire Test: Representative mock-up tested per NFPA 285 for a complete wall system providing air, water, vapor and thermal barriers.

1.09 WARRANTY

A. Provide manufacturer's standard 10-year warranty covering structural stability, color and finish retention.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Transportation:

1. Transport panels horizontally and strapped down to avoid sliding across one another.

2. Protect edges and corners.

3. Maintain in original protective packaging until use.

B. Storage:

1. Store panels horizontally with supports no more than 31-1/2 (80 mm) inches apart.

2. Store panels in clean dry location protected from rain and sun within manufacturer's recommended temperature and humidity range.

C. Handling:

1. Wear protective gloves when handling.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this Section of the Work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4 MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION.

2.01 PHENOLIC PANEL RAINSCREEN

A. To establish a standard of quality, design and function, manufacture has been based upon “Façade F” by Parklex, USA, Woodstock, GA (Navarra, Spain).

B. Similar exterior phenolic slat rainscreen systems: “ProdEx IGN” by Prodema Exterior, Guipuzcoa, Spain; “Max-Exterior F” by Fundermax-US, Charlotte, NC or others will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

2.02 EXTERIOR PANELS

A. Panels shall be Parklex “Façade F” or equal high pressure compact laminate, composed of natural wood veneer or high grade digital image and paper fibers treated with thermosetting resins, designed for flush assembly.

1. Size: Slats nominal 96 in. wide (95 ¾ in. panel face and ¼ in. joint) by nominal 6 in. high. (5 ¾ in. panel face and ¼ in. joint).
2. Thickness: 10 mm (3/8 in.)
3. Edges: Square edge.
4. Color: Parklex: “Copper”; Prodema: “Rustik”; Fundermax: “Creek Iconic”. The Architect reserves the right to choose from manufacturer’s full line of wood patterns and colors.

B. Panels Properties: EN438-7, and ICC ESR-3462:

1. Dimensional Stability: 0.3 percent cumulative dimensional change
2. Maximum Height of Impact with No Visible Signs of Cracking: ≥ 1,800 mm
3. Tensile Strength (Long Grain): ≥ 60 MPa
4. Flexural Strength:
   a. Long Grain: ≥ 80 MPa
   b. Cross Grain: ≥ 80 MPa
5. Thermal Resistance:
   a. Façade S: 0.266 k
   b. Façade F: 0.220 k
6. UV Resistance:

a. Contrast, Gray Scale Rating: ≥ 3

b. Aspect Rating: ≥ 4

7. Artificial Weathering Resistance:

a. Contrast, Gray Scale Rating: ≥ 3

b. Appearance Rating: ≥ 4

8. Water Vapor Permeability:

a. Wet Cup Method: 100µ

b. Dry Cup Method: 250µ

9. Density: ≥ 1.35 g/cm3

10. Water Absorption:

a. Façade S: ≤ 5 percent

b. Façade F: ≤ 8 percent

11. Fire Resistance ≥ 6 mm thickness:

a. Façade S: C-s2, d0

b. Façade F: B-s2, d0; ICC-ESR, ASTM E84: Class A, NFPA 285 (Exposed fastener system)

2.03 SUPPORT STRUCTURE (EXTERIOR)

A. Two-part support structure consisting of:

1. Aluminum sub-frame channels supporting the phenolic panels.

2. Galvanized steel z-girts attached to the building structure and supporting the aluminum sub-frame channels.

B. Aluminum sub-frame consists of vertical hat & J channels. Channels attach to z-girts. Aluminum channels spaced at maximum 24 in. o.c. Aluminum shall be painted black. Sub-frame channels at soffits shall run perpendicular to the phenolic panels.

1. Sub-Framing Assembly Materials:

a. Made from 6000 series architectural grade aluminum

b. Finish: Black painted.

2. Aluminum sub-frame channels attachment to z-girts: 304 series stainless steel fasteners size and spacing as required to meet specified performance requirements. Fasteners shall be painted black where visible through vertical panel joints.

C. Z-girt System: Horizontal z-girts fastened through the air and vapor barrier and exterior sheathing to the LGMF structure. Z-girts typically 4 in. deep, 3 in. deep where attached directly to underside of metal deck as noted on the Drawings. Z-girts spaced at maximum 24 in. o.c., minimum 16 ga.

1. Z-Girts and Miscellaneous Framing Components: Cold-formed metallic-coated steel sheet, ASTM C 645, Grade 50, with ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating.

    a. Z-girts: 0.053 inch / 16 ga. (1.34 mm) minimum

    b. Hat Channels: 0.053 inch/16 ga. (1.34 mm) minimum.

    c. Sill Channels: 0.053 inch/16 ga. (1.34 mm) minimum.

    d. Other Required Shapes: 0.053 inch/16 ga. (1.34 mm) minimum.

2.04 AUXILIARY MATERIALS

A. Panel Attachment: Exposed fasteners to attach phenolic panels to hat and "L" channels.

1. Manufacturer's stainless steel exposed screw fasteners. Provide two fasteners at each slat at each vertical channel.

2. Exposed fasteners at face of panels shall be coated to match panel color or natural matte stainless steel as chosen by the Architect.

3. Panel fastener holes to be factory drilled by panel manufacturer.

B. Stainless Steel Drill Screws: Of sufficient lengths and sizes to securely fasten support structure to building wall framing members, as follows:

1. Screws complying with ASTM C 1002 for fastening to steel members less than 0.033 inches (0.84 mm) thick.

2. Screws complying with ASTM C 954 for fastening to steel members from 0.033 to 0.112 inches (0.84 to 2.84 mm) thick.

C. Black felt breathable membrane to be applied to semi-rigid insulation at open joints on vertical wall surfaces at exterior phenolic panels: VaproShield RevealShield SA or equal compatible with insulation. Membrane function is solely visual. Membrane shall be installed at all locations where insulation is visible through joints, including:

1. From exterior; all locations from grade to 8 ft.-0 in. above grade.

2. From interior; as viewed through glazing; from viewing plane to 8 ft.0 in. above viewing plane. The viewing plane is defined as ground, first and second floor levels and intermediate stair landing levels, and at other locations as shown on the Drawings.

D. Vent Screen: As shown on the Drawings at the bottom and top of the elevation to close off the cavity: minimum 26 ga. brake metal aluminum, perforated with maximum ¼ in. openings and minimum 75% openness.

2.05 INTERIOR PANELS

A. Panels: Panels shall, in all material parameters, match "Façade F" specified in Article 2.02. Veneer color and grain to match exterior panels. Interior and exterior panel veneer shall be fabricated from the same or similar lots.

B. Concealed fixing clip system and all required fasteners to mount directly to painted plywood substrate.

1. Slim z-clips, “Monarch MF250” or equal with required fasteners to mount directly to painted plywood substrate.

2. Clip system shall secure interior panels rigidly in place to ensure alignment if contact is made with panels.

2.06 FABRICATION

A. Fabricate wall panels and accessory items in accordance with manufacturers’ recommendations and approved submittals.

B. Panels shall be fabricated to size, factory-edges shall be factory routed and slats shall by factory drilled as required by the phenolic panel manufacturer.

C. Field-cut panels and drill face-fastening anchor holes in accordance with the phenolic panel manufacturer’s written directions.

D. Fabricate all panels to profiles, colors and textures per samples and approved shop drawings.

E. Fabricate panels in accordance with manufacturers’ Quality Management System Tolerances and Acceptance Criteria.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrate and framing members for alignment

B. Notify Architect of conditions that would adversely affect installation.

C. Do not begin surface preparation or installation until unacceptable conditions are corrected.

D. Exterior Applications: Ensure that weather barriers (AVB) are properly installed, complete and undamaged.

E. Interior Applications: Ensure that plywood substrate is properly installed and painted.

3.02 PREPARATION

A. Securely install wall Z-girt system plumb and square, and correctly spaced to accommodate insulation, aluminum channels and phenolic panels.

3.03 INSTALLATION GENERAL

A. Install panels in strict compliance with manufacturer's written instructions.

B. Use recommended cutting tools, equipment, and procedures.

C. Provide a minimum of 1/4 inch (6 mm) expansion at panel edges.

1. Do not seal joints.
2. Provide ¾" joint at the bottom and top of exterior applications as detailed in the Drawings.

D. Follow shop drawings for sub-framing support, and fastener location and spacing.

E. Provide a minimum 3/4 inch (19 mm) clear air gap behind panel. Install vent strips at top and bottom of wall as detailed

3.05 INSTALLATION INTERIOR SYSTEM

A. Install z-clips directly to painted plywood substrate as at minimum 2'-0" O.C. horizontally at every slat. Provide two z-clips at ends, placed at top and bottom of phenolic planks to secure all corners. Offset as required. Arrange such that no part of the z-clips shall be visible when the panel is in place.

B. Plywood substrate to be painted (under SECTION 090007-PAINTING) flat black prior to installation of interior panels. Do not commence work until painted. Touch up substrate finish damaged in the course of panel installation.

3.06 CLEANING

A. Clean stains and excess adhesive from panels following manufacturer's instructions.

1. Do NOT use abrasive cleaning cloths or sponges, or harsh solvents such as acetone, ethyl acetate or MEK (Methyl Ethyl Keytone) on any surface to clean panels.

END OF SECTION

SECTION 074247

FIBER REINFORCED CEMENTITIOUS PANEL
RAINSCREEN SYSTEM

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Part A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following as shown on the Drawings and specified herein:

1. Complete reinforced cementitious rainscreen cladding system from the AVB outward, including:

a. Fiber reinforced cementitious direct fastened wall and soffit panels, rivets fasteners, aluminum sub-framing and all required fasteners.

b. Galvanized z-girt system including z-shaped sub-girts, trim pieces, fasteners, furring, internal sealants and all required fasteners.

c. Fabric backer cloth behind joints (horizontal and vertical) at vertical wall panel installations to 8 ft. above grade.

B. Install the following items as furnished under the designated SECTIONS:

1. Rigid cavity wall insulation behind fiber cement rainscreen panels: SECTION 072100-INSULATION.

2. Semi-rigid insulation at fiber cement soffit panels: SECTION 072100-INSULATION.

3. Preformed and prefinished sill flashing and base wall flashing: SECTION 074213-PREFORMED CLADDING.

C. LEEDv4-S Requirements:

1. The work of this Section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEED-S Certification at “Silver” Level is an Owner requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturer's product documentation for each product having an Environmental Product Declaration (EPD).

D. Exterior Envelope Commissioning – Refer to SECTION 019113-BUILDING COMMISSIONING REQUIREMENTS.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Construction of mock-up: SECTION 014339-EXTERIOR MOCK-UPS.
2. Structural steel framing: SECTION 051200-STRUCTURAL STEEL FRAMING.
3. Metal stud framing and exterior sheathing to receive AVB, rigid insulation and various cladding: SECTION 092116-GYPSUM WALLBOARD.
4. Continuous air and vapor barrier: SECTION 071326-AIR AND VAPOR BARRIER.
5. Installation of exterior rigid insulation behind masonry veneer and preformed metal cladding: SECTION 040001-MASONRY and SECTION 074213-PREFORMED CLADDING.
6. Installation of semi-rigid insulation behind phenolic panel: SECTION 074233-PHENOLIC RAINSCREEN SYSTEM.
7. Prefinished aluminum panels, soffits, flashing, fascias, sills, coping and trim: SECTION 074213-PREFORMED CLADDING.
8. Membrane roofing systems and related flashings: SECTION 070002-ROOFING AND FLASHING.
9. Aluminum window, curtainwall, storefront systems and trim: SECTION 080001-METAL WINDOWS.

1.04 RELATED DOCUMENTS & REFERENCES

A. ASTM: American Society for Testing and Materials.

1. ASTM A653/A653M; Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM A792; Standard Specification for Steel Sheet, 55 percent Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
3. ASTM C120; Standard Test Methods of Flexure Testing of Slate (Breaking Load, Modulus of Rupture, Modulus of Elasticity.

4. ASTM C1185; Standard Test Methods for Sampling and Testing Non Asbestos Fiber Cement Flat Sheet, Roofing and Siding Shingles, and Clapboards.

5. ASTM C1186; Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems.

6. ASTM E84; Standard Test Method for Surface Burning Characteristics of Building Materials.

7. ASTM E228; Standard Test Method for Linear Thermal Expansion of Solid Materials with a Push Rod Dilatometer.

8. ASTM E330 Standard Test Method for Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

9. ASTM G155; Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials.

B. National Fire Protection Agency (NFPA)

1. NFPA 285: Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

1.05 SUBMITTALS

A. Submit the following in accordance with the provisions of SECTION 013300-SUBMITTALS.

B. Product Data:

1. Technical Summary

2. Color Specifications Guidelines

3. Color Variation Data

4. Sealer Data Sheet

5. Hardware Technical Data

6. Anchor Product Data Sheet

7. Anchors and/or fasteners test reports

8. Attachment Components Product Data

9. Attachment Components Installation instructions

C. Shop Drawings: Show fabrication and installation details for fiber reinforced cementitious panels including the following:

1. Panel elevations, sections, and dimensions.

2. Panel thickness and fastener type and size.

3. Finishes.

4. Joint and connection details.

5. Erection details.

6. Panel cut-outs for Mechanical, Electrical, Plumbing, and Security devices and items.

7. Panel frame details for typical panels including sizes, spacings, thicknesses, and yield strengths of various members.

8. Locations and details of connection hardware attached to structure.

9. Sizes, locations, and details of flex, gravity, and seismic anchors for typical panels.

10. Erection sequence for special conditions.

11. Relationship to adjacent materials.

12. Shop Drawings for Mockups: Include plans, elevations, sections, full-size details, and attachments to other work.

D. Samples: Representative of finished exposed face of fiber reinforced cementitious panel, as follows:

1. For each color and pattern specified / selected, submit a minimum of two samples, each not less than 6 by 6 inches and of actual thickness. One of each color shall be pre-drilled for fasteners at the proposed locations.

2. Three color matched rivets.

3. Fiber Reinforced Cementitious Panel Rainscreen System Sample Panel: Before construction of the exterior mock-up panel structure, submit sample panel of the proposed FRC rainscreen system. System sample panel shall be in the approved color and fasteners. System sample panel shall be not less than 18 x 18 inches. System sample panels shall be constructed as a cut-away, indicating all elements of construction and installation required for the panel system. Revisions, if required, shall be incorporated into the mock-up panel structure.

E. Provide design calculations for panels, panel anchors and sub-frame – Calculations and shop drawings to be stamped by an engineer registered in the Commonwealth of Massachusetts.

F. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 as detailed in Section 018113-Sustainable Design Requirements.

2. A completed LEED MATERIALS REPORTING FORM, per Section 018113-Sustainable Design Requirements.

G. Quality Assurance Submittals:

1. Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties.
2. Independent QMS Certification and Listing Document
3. Qualification Certificates: Submit certificate indicating installer has experience in performing work with thin fiber reinforced cementitious panels of similar type and scope. Supervisors and installers shall have a minimum five-years of experience of projects of similar type.
4. Product certificates signed by manufacturers certifying materials comply with specified performance characteristics and criteria and physical requirements.
5. Manufacturer's Quality Documentation:
    a. Quality Management – Tolerances + Acceptance Criteria
    b. Certified Test Results
    c. Aggregate Acceptance Guidelines
    d. Uncrating, Storage, + Handling
    e. Field Cutting Instructions-Wet
    f. Field Drilling Instructions-Wet

H. Closeout Submittals:

1. Operation and Maintenance Data:
    a. Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section.
    b. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.

1.06 MOCK-UP PANEL STRUCTURE

A. Provide and install fiber reinforced cementitious panel rainscreen system as shown on the Drawings. Mock-up structure shall include panels. insulation, trim, all sub-framing and transition to adjacent materials as shown on the mock-up drawings and shall show the three colors / textures of panels in their proposed proportions. The final mock-up structure shall be left on site to serve as the reference standard for appearance and workmanship as the work progresses. This subcontractor shall, at no additional cost to the Owner, rebuild the portions of the mock-up furnished and installed under this SECTION using the final approved materials, colors and construction to complete the final mock-up.

B. Refer to SECTION 014339-EXTERIOR MOCK-UPS for sizes, configuration and other requirements for the mock-up panel structure.

C. Approval of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless Architect specifically approves such deviations in writing.

D. Mock-up panel structure will not remain as part of the Work.

1.07 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with performance requirements specified, as determined by testing of manufacturers' products representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Failure also includes the following:

1. Thermal stresses transferring to building structure.
2. Solid exterior wall panels and support structure cracking or breakage.
3. Noise or vibration created by wind and thermal and structural movements.
4. Loosening or weakening of fasteners, attachments, and other components.

C. Structural Performance: Provide solid exterior wall panel and support system as follows:

1. Wind Loading: +45 PSF/-49 PSF at non-salient areas, +45/-60 PSF at salient areas, unless greater design load is required by code.
2. Will not evidence deflection exceeding specified limits.
3. Thermal Movement: Provide for thermal movement resulting from annual ambient temperature change of 120 degrees F
4. At 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, will not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
5. Durations: As required by design wind velocity, but not less than 10 seconds.
6. Design Panel anchorage and supporting frame to accommodate sub-frame and building deflection.

7. Deflection of Framing Members: At design wind pressure, as follows:

   a. Deflection Normal to Wall Plane: Limited to edge of panel in a direction perpendicular to panel plane not exceeding L/240 of the panel edge length for each panel or an amount that restricts edge deflection of individual panels to manufacturer's product limitations, whichever is less.

   b. Deflection Parallel to Panel Plane: Limited to L/360 of clear span or 1/8 inch, manufacturer's product limitations, whichever is smaller.

   c. Cantilever Deflection: Where framing members overhang an anchor point, limit deflection to 2 times the length of cantilevered member divided by 175, or manufacturer's product limitations, whichever is smaller.

D. Story Drift: Accommodate design displacement of adjacent stories.

E. Design Displacement: As indicated on Structural Drawings.

F. Maximum Solid Exterior Wall Panels Deflection: 1/360 of span or less when tested in accordance with positive and negative pressures.

G. Solid exterior wall panel system shall comply with 2015 International Building Code 1405.16.1 Panel Siding.

H. Anchorage system: Wall anchorages for exterior systems shall be designed to prevent thermal transfer through fasteners to interior side of cold-formed metal framing which could result in condensation inside the stud cavity.

I. Fire Performance Characteristics: Provide fiber reinforced cementitious panel wall systems with the following fire-test characteristics determined by indicated test standard as applied by UL or other testing and inspection agency acceptable to authorities having jurisdiction.

   1. Surface-Burning Characteristics: Provide fiber reinforce cementitious panel wall system with the following characteristics when tested per ASTM E 84.

      a. Flame spread index: 25 or less.

      b. Smoke developed index: 450 or less.

   2. Intermediate Scale Multistory Fire Test: Representative mock-up tested per NFPA 285 for a complete wall system providing air, water, vapor and thermal barriers.

1.08 PRE-INSTALLATION MEETING

A. Conduct pre-installation meeting to verify project requirements, substrate conditions, and manufacturers' installation instructions.

B. Conduct observation and evaluation of the first 300 sf area installed with report by manufacturer's representative.

1.09 DELIVERY, STORAGE AND HANDLING

A. Deliver panels and support system components packaged to comply with manufacturers' requirements and adequately protected from damage during shipment.

B. Protect components from adverse job conditions prior to installation.

C. Protect components from damage after installation including, but not limited to, staining or solvents used in adjacent work, impact damage and abrasion.

D. Panels are to be stored and handled per manufacturer's recommendations until installed.

E. Store exterior solid wall panels and support system components on platforms or pallets, covered with tarpaulins so that water accumulations will drain freely.

F. Store with non-staining resilient spacers between panels. with suitable ventilation. Store components

G. Do not store cementitious panels and support system components in contact with other materials that might cause staining, denting, surface damage or other deleterious effects.

1.10 PROJECT CONDITIONS

A. Field Measurements: Verify locations of structural members and wall opening dimension by field measurements before concrete panel fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made with delaying the Work, either establish framing and opening dimensions and process with fabricating concrete panels without field measurements or allow for field trimming of panels. Coordinate wall construction to ensure that actual building dimensions, locations of structural members, and opening correspond to established dimensions.

2. Field trimming is required for all penetrations through panels.

PART 2 PRODUCTS

2.01 SOLID EXTERIOR FIBER REINFORCED CEMENTITIOUS WALL PANELS

A. To establish a standard of quality, design and function, manufacture has been based upon Swisspearl “Largo”, Niederurnen, Switzerland.

B. Similar exterior fiber reinforced cementitious wall panel systems by Equitone, Maryville, TN or others will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

C. MATERIALS

1. Panels made from
    a. Portland cement, ground limestone, additives
    b. Polyvinyl alcohol fibers and cellulose fibers
    c. Acrylic coating to panel face, rear side and edges
2. The following characteristics are not acceptable
    a. Autoclaved products
    b. Reinforcement with only cellulose fibers
    c. Efflorescence
3. Fiber reinforced cementitious panels air cured for minimum of 4 weeks.
4. Fastening system: Exposed

D. Panel Finishes:

1. Finish exposed, front-facing surface, to match approved design reference sample. Panel faces shall be free of joint marks, grain, or other obvious defects.
2. Pattern/Texture: Three colors / textures as shall be chosen by the Architect from the manufacturer’s line. For the Basis of Design, the three are as follows:
    a. Avera Crystal AV010
    b. Carat Crystal 7010
    c. Vintago V1011
3. to be selected by the Architect from full manufacturer’s line.
    a. Pattern Direction: Horizontal

E. Panel Sizes: As indicated on Drawings – nominal 6 inches (5 3/4-inch panel and 1/4 inch joint) wide panels / planks in up to 8 ft. nominal (7 ft.-11 ¾ in.) lengths.

F. Panel Layout: Running bond

G. Panel Dimensional Tolerances

H. Panel Thickness*: 12 mm (5/8-inch nominally), thickness variation +/- 0.05-inch*

I. Panel Edges: ***¼ in.****Open joint at all corners*

J. Panel Weight: *4.5 lbs./ ft², at 5/8-inch thickness*

K. Density: 1.8 g/cm^3 (0.065 lbs./in.^{3}) according to ASTM-C 1186.

2.02 SUPPORT STRUCTURE

A. Two-part support structure consisting of:

1. Aluminum frame assembly supporting and anchoring the cementitious panels.
2. Galvanized steel z-girt sub frame attached to the building structure and supporting the aluminum frame assembly.

B. Aluminum frame consists continuous vertical “L” and T”T profile furring strips, connecting to vertical “L” brackets. “L” brackets at minimum 24 inches o.c. vertically attached to horizontal z-girts. Aluminum frames spaced at maximum 24 inches o.c. Aluminum frame shall be painted black.

1. Aluminum Extrusions: ASTM C 221, Alloy 6005 T5.
2. Aluminum Sheet: ASTM B 209, Alloy 6061-T5.

C. Z-Girt System: 3 in. horizontal z-girts fastened through the air and vapor barrier and exterior sheathing to the LGMF structure. Z-girsts spaced at maximum 24 inches o.c., minimum 16 ga.

1. Z-Girts and Miscellaneous Framing Components: Cold-formed metallic coated steel sheet, ASTM C 645, Grade 50, with ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating.
   a. Z-girts: 0.053 inch / 16 ga. (1.34 mm) minimum
   b. Hat Channels: 0.053 inch/16 ga. (1.34 mm) minimum.
   c. Sill Channels: 0.053 inch/16 ga. (1.34 mm) minimum.
   d. Other Required Shapes: 0.053 inch/16 ga. (1.34 mm) minimum.

2.03 AUXILIARY MATERIALS

A. Rivets for exposed attachment flush to face of cementitious panels fastened into vertical “T” and “L” profile furring strip support members (horizontal soffits). Panel fastener holes to be factory-drilled by panel manufacturer.

1. Color-matched powder coated aluminum rivet face fasteners for façade panels; provided by panel manufacturer

B. Stainless Steel Drill Screws: Of sufficient lengths and sizes to securely fasten support structure to building wall framing members, and as follows:

1. Screws complying with ASTM C 1002 for fastening to steel members less than 0.033 inches (0.84 mm) thick.
2. Screws complying with ASTM C 954 for fastening to steel members from 0.033 to 0.112 inches (0.84 to 2.84 mm) thick.

C. Black felt breathable membrane to be applied to rigid insulation at all open joints from grade to 8 ft. above grade: Vaproshield Revealshield SA or equal compatible with insulation. Membrane function is solely visual.

D. Vent Screen: As shown on the Drawings at the top and bottom of the elevation to close off the cavity: minimum 26 ga. perforated aluminum brake metal with maximum ¼ inch openings and minimum 75% openness.

2.04 FABRICATION

A. Fabricate wall panels and accessory items in accordance with manufacturers' recommendations and approved submittals.

B. Panels shall be fabricated to size, with all concealed/undercut or face fastened anchor holes factory-drilled by the concrete panel manufacturer.

C. Field-cut panels and drill face-fastening anchor holes in accordance with the concrete panel manufacturer's written directions.

D. Fabricate all panels to profiles, colors and textures per samples and approval selected by the Architect.

E. Fabricate panels in accordance with manufacturers' Quality Management System Tolerances and Acceptance Criteria.

2.05 FABRICATION TOLERANCES

A. Manufacturing Tolerances: Manufacture GFR concrete panels so each finished unit complies with the following dimensional tolerances.

1. Overall Height and Width of Units, Measured at the Face Adjacent to Mold: plus or minus 1/16 inch.
2. Weight of finished panels not to exceed 4.5 pcf.
3. Edge Return Thickness: Plus 5/8 inch, minus zero inch.
4. Texture and Reveal Depth: Maximum 1/8 inch.
5. Thickness: Plus 1/8 inch, minus zero inch.

6. Variation from Square or Designated Skew (Difference in Length of Two Diagonal Measurements): Plus or minus 1/16 inch per 72 inches maximum.

7. Local Smoothness: 1/8 inch per 10 feet.

8. Bowing: Not to exceed L/240 unless unit complies with erection tolerances using connection adjustments.

9. Length and Width of Block Outs and Openings within One Unit: Plus or minus 1/4 inch.

10. Location of Window Opening within Panel: Plus or minus 1/4 inch.

11. Maximum Permissible Warpage of One Corner out of the Plane of the Other Three: 1/16 inch per 12 inches of distance from nearest adjacent corner.

B. Position Tolerances: Measured from datum line locations, as indicated on Shop Drawings.

1. Panel Alignment: Plus or minus 1/8 inch.

2. Special Handling Devices: Plus or minus 3 inches.(where applicable)

3. Location of Bearing Devices: Plus or minus 1/16 inch.

4. Cutouts: Plus or minus 3/8 inch. Refer to manufacturer's guide to cutouts and notching of panels in the field cutting instructions.

C. Color Variation and Aggregate Distribution Variation Acceptance Criteria: Per Manufacturer's Tolerances and Acceptance Criteria.

D. Blemishes and Chips Acceptance Criteria: Per Manufacturer's Tolerances and Acceptance Criteria.

E. Acceptance of installed panels shall be assessed when viewed from a distance of 20 ft., under even light, and from a position 90 degrees to the building elevation, except where panels are installed at or near grade along a paved path where they shall be assessed the greater distance of 5 ft., or the edge of the pavement closest to the panels.

PART 3 EXECUTION

3.01 MANUFACTURERS' INSTRUCTIONS

A. Compliance: Comply with manufacturers' product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.02 EXAMINATION

A. Examine substrate and framing members for alignment.

B. Notify Architect of conditions that would adversely affect installation.

C. Do not begin surface preparation or installation until unacceptable conditions are corrected.

D. Ensure that weather barriers (AVB) are properly installed, complete and undamaged.

3.03 ERECTION/INSTALLATION

A. Clean substrates of projections and substances detrimental to application.

B. Install panels in accordance with manufacturer's design and installation manual and recommendations.

C. Coordinate panel installation with rain drainage work, flashing, trim, soffit, roofing, parapet, wall and other adjoining work to provide a leak-proof, secure and non-corrosive installation.

D. Install wall reinforcements, black felt membrane, channel cleats, clips, hangers, and other accessories required for connecting wall panels to supporting members and backup materials per project/façade engineers approved design.

E. Lift concrete wall panels and install without damage.

F. Install concrete panels level, plumb, square, and in alignment.

G. Provide a minimum of ¼ inch (6 mm) expansion at panel edges.

1. Do not seal joints.
2. Provide 3/4" inch joint at the bottom and top of exterior applications as detailed in the Drawings.

H. Follow shop drawings for sub-framing support and fastener location and spacing.

I. Provide a minimum ¾ inch (19 mm) clear air gap behind panel. Install vent strips at top and bottom of wall as detailed.

J. Provide temporary supports and bracing as required to maintain position, stability, and alignment of panels until permanent connections are completed.

1. Maintain horizontal and vertical joint alignment and uniform joint width.
2. Remove temporary shims, wedges, and spacers as soon as possible after connecting is complete.
3. Remove temporary projecting hoisting devices.

3.04 ERECTION TOLERANCES

A. Erect cementitious panels to comply with the following noncumulative tolerances:

1. Top Elevation from Nominal Top Elevation as follows: 1/4 inch
2. Exposed Panel Face Relative to Adjacent Panel: 3/16 inch
3. Maximum Plumb Variation over the Lesser of Height of Structure or 25 feet: 1/4 inch
4. Plumb in any 10 feet of Element Height: 1/8 inch
5. Maximum Offset in Vertical/Horizontal Alignment of Matching Edges: 1/8 inch
6. Face Width of Joint as follows (governs over joint taper):
7. Panel Dimension 20 feet or Less: 1/4 inch
8. Maximum Joint Taper in 10 Feet: 1/8 inch
9. Differential Bowing, as Erected, between Adjacent Members of Same Design: 1/8 inch

3.05 CLEANING AND PROTECTION

A. Perform cleaning procedures according to GFR concrete C panel manufacturer's written instructions.

B. Clean soiled surfaces with water, using soft fiber brushes and sponges, and rinse with clean water. Mild detergent may be used if water alone is not satisfactory. Power washing is permitted, if the spray is not concentrated and nozzle is not held within 5 ft. for the panel surface. Prevent damage to concrete surfaces and staining of adjacent materials.

C. Should the standard cleaning procedure be found deficient is special circumstances, do not

D. Prevent damage to GFR concrete surfaces and staining of adjacent material.

E. The installer is responsible for removing all metal, and concrete scraps, clips, or fasteners along with crates and packing materials from this work, from the site when the installation is complete.

END OF SECTION

SECTION 078120

SPRAY APPLIED FIREPROOFING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following as shown on the Drawings and specified herein:

1. Intumescent fireproofing

2. Spray-on fireproofing

3. Other fireproofing shown on the drawings to be “By SECTION 078120”.

B. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDV4-S Certification is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDV4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. For all adhesives, sealants, paints and coatings, meet the LEED requirements for IEQ Credit 2 and as defined in Subparagraph 2.04 of Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be furnished and installed by the designated SECTIONS:

1. Structural Steel members: SECTION 051200-STRUCTURAL STEEL FRAMING.

2. Spray foam insulation: SECTION 072100-INSULATION.

3. Smoke and firesafing insulation at fire rated masonry walls: SECTION 040001-MASONRY.

4. Firesafing and smoke stopping at fire rated partition penetrations: By Trade responsible for penetration

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with SECTION 013300-SUBMITTALS.

B. Shop drawings shall include manufacturer's specifications, and installation instructions and details.

C. Manufacturer's data - Submit to the Architect copies of manufacturer's specifications and installation and application instructions for all herein specified, certified test results, recommendations for sealing penetrations and perimeters, and other data as may be required.

D. Fire Testing:

1. Submit evidence that the aggregate slurry fireproofing has been subjected to full-scale UL 263/ASTM E119 fire testing at Underwriters Laboratories Inc., or another accredited laboratory, by the manufacturer.

E. Thickness Schedule: Provide schedule indicating material to be used, structural elements to be protected with spray applied fireproofing, hourly rating and material thickness provided and appropriate references.

F. Test Data: Independent laboratory test results for fireproofing shall be submitted for the following performance criteria:

1. Bond Strength per ASTM E736
2. Compressive Strength per ASTM E761
3. Deflection per ASTM E759
4. Bond Impact per ASTM E760
5. Air Erosion per ASTM E859
6. Corrosion Resistant per ASTM E937
7. High Speed Air Erosion per ASTM E859
8. Surface Burning Characteristics per ASTM E84
9. Combustibility per ASTM E1354 Cone Calorimeter
10. Mold Resistance per ASTM G21

G. LEED for Schools submittals (Refer to SECTION 013300 – SUBMITTALS).

1. Relevant supporting documentation required by LEED for School v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. Product substitution requests are subject to additional LEEDv4-S submittal requirements, see SECTION 012500 – SUBSTITUTION PROCEDURES.

1.05 REFERENCE STANDARDS (INTUMESCENT)

A. Underwriters Laboratories Inc. (UL) Fire Resistance Directory.

B. ICC Evaluation Services – ES Report (ESR-1092)

C. Test Standards

1. UL 263 (ASTM E119) – Fire Tests of Building Construction and Materials.
2. ASTM E84 (UL723) – Surface Burning Characteristics of Building Materials. Flame Spread Maximum: 5 and Smoke Developed Maximum: 35.
3. ASTM D2240 – Durometer Hardness (Shore D Only). Minimum: 69 Shore D.
4. ASTM D2794 – Impact Resistance. Intrusion minimum: 152 inch-lb. (17.17 Nm).
5. ASTM D4060 – Abrasion Resistance. Maximum 0.2850 grams/1000 cycles.
6. ASTM D4541 – Bond Strength. Minimum: 280 psi. (1931 k Pa.)

D. Steel Structures Painting Council (SSPC) Surface Preparation Standards.

E. Material manufacturer's current published information including, but not limited to, application guide.

F. AWCI Technical Manual 12-B "Standard Practice for the Testing and Inspection of Field Applied Thin-Film Intumescent Fire-Resistive Materials; an Annotated Guide", Latest Edition.

1.06 REFERENCE STANDARDS (SPRAY-ON FIREPROOFING)

A. American Society for Testing and Materials (ASTM):

1. ASTM E84 Surface Burning Characteristics
2. ASTM E119 Standard Methods of Fire Tests of Building Construction and Materials
3. ASTM E605 Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material Applied to Structural Members
4. ASTM E736 Cohesion/Adhesion of Sprayed Fire-Resistive Material Applied to Structural Members
5. ASTM E759 Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members
6. ASTM E760 Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members

7. ASTM E761 Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members
8. ASTM E859 Air Erosion of Sprayed Fire-Resistive Material Applied to Structural Members
9. ASTM E937 Corrosion of Steel by Sprayed Fire-Resistive Material Applied to Structural Members
10. ASTM E1354 Cone Calorimeter
11. ASTM G21 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

B. Underwriters Laboratories Inc. (UL) Fire Resistance Directory (Latest Edition)

1. UL/ANSI 263 Fire Tests of Building Construction Materials

C. Association of the Wall and Ceiling Industry (AWCI)

1. AWCI Technical Manual 12-A: Standard Practice for the Testing and Inspection of Spray Applied Fire-Resistive Materials
2. AWCI Technical Manual 12: Design Selection Utilizing Spray Applied Fire-Resistive Materials

D. International Building Code (IBC)

1.07 QUALITY ASSURANCE

A. Intumescent Fireproofing:

1. Manufacturer – Company specializing in manufacturing fire protection products.
2. The intumescent fire resistive material shall be manufactured under the Follow-Up Service program of UL or ULC and bear the UL and/or ULC label (mark).
3. Applicator – A firm with expertise in the installation of fire resistive or similar materials.
4. Product – The product shall be approved by the architect and applicable authorities having jurisdiction.

B. Spray-On Fireproofing:

1. Fireproofing work shall be performed by a firm acceptable to the aggregate slurry fireproofing material manufacturer.
2. Products, execution, and fireproofing thicknesses shall conform to the applicable code requirements for the required fire-resistance ratings.
3. Contractor, fireproofing subcontractor and independent testing laboratory shall attend a pre-installation conference to review the substrates for acceptability, method of application, applied thicknesses, inspection procedures and other issues.

1.08 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the project in manufacturer's unopened packages, fully identified as to trade name, type and other identifying data. Packaged materials shall bear the appropriate labels, seals and UL label (mark) for fire resistive ratings and shall be stored at temperatures in compliance with manufacturer instructions in a dry interior location away from direct sunlight.

B. Material shall be delivered in original unopened packages, fully identified as to manufacturer, brand or other identifying data and bearing the proper independent testing laboratory labels for Surface Burning Characteristic and Fire Resistance Classification.

C. Material shall be stored off the ground, under cover, and in a dry location until ready for use. All bags that have been exposed to water before use shall be found unsuitable and discarded. Stock of material is to be rotated and used prior to its expiration date.

1.09 PROJECT/SITE CONDITIONS

A. When the temperature at the job site is less than 50º F (10º C), a minimum substrate and ambient temperature of 50º F (10º C) shall be maintained prior to, during, and a minimum of 72 hours after application. If necessary for job schedule, the General Contractor shall provide enclosures and heat to maintain proper temperatures and humidity levels in the application areas.

B. In enclosed areas, ventilation shall not be less than 4 complete air exchanges per hour until the material is dry.

C. Relative humidity shall not exceed 85% throughout the total period of application and drying for the intumescent fire resistive material, and must not exceed 85% throughout the application and drying for the protective decorative topcoat.

1.10 SEQUENCING AND SCHEDULING

A. Applicator shall cooperate in the coordination and scheduling of fire protection work to avoid delays in job progress.

B. The installation of piping, ducts, conduit or other suspended equipment shall not commence until the application of the thin-film fire resistive material is complete in that area.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION.

1. Furnish any paints and coatings such that they meet the requirements for IEQ Credit 2 as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

2.01 MATERIALS

A. Intumescent fireproofing where shown on the Drawings

1. Intumescent fireproofing shall be water-based primer and finish system, spray applied at minimum thickness for interior structural steel within rated egress stairwells for a smooth, architectural finish, “Albi Clad TF” and “Albi I490W” rust inhibitive acrylic primer as manufactured by Albi Manufacturing Division of Stan Chen, Inc., “A/D FireFilm III” manufactured by Carboline Company, “Cafco Sprayfilm WB-5” as manufactured by Isolatek International or an approved equal that has been tested and conforms to Underwriters Laboratory Tests for a one hour rating for the respective conditions shown on the drawings in accordance with the procedures of ASTM E119.

B. Intumescent fire resistive material shall be applied in accordance with drawings and/or specifications, and shall have been tested in accordance with the procedures of UL 263 or ASTM E119 or CAN/ULC-S101, and reported by Underwriters Laboratories, Inc. or Underwriters Laboratories of Canada only.

C. Thin-Film Fire-Resistive Intumescent Mastic Coating: Factory-mixed formulation.

1. Water-Based Formulation: Approved by manufacturer and authorities having jurisdiction for indicated use.
    a. Intumescent fireproofing shall meet the VOC requirements of CARB 2007 SCM for Architectural coatings or SCAQMD, Rule 1168.
2. Verify with manufacturer that products selected are suitable for use indicated.
3. UL Fire Tested Designs Only based on UL 263 (ASTM-E119).
4. Current ICC Evaluation Service Report
5. To assure an acceptable Architectural finish, no mesh is allowed.
6. A representative mock-up sprayed Architectural finish sample must be submitted, reviewed, and accepted by the architect in advance.

D. Sprayed-on fireproofing where designated on the Drawings

1. Sprayed-on fireproofing shall be factory mixed, medium density, non-asbestos cementitious material, “Monokote” Z-106 as manufactured by W.R. Grace and Co., Pyrolite 22 as manufactured by Carboline Company, “Cafco 400” as manufactured by Isolatek International or an approved equal that has been tested and conforms to Underwriters Laboratory Tests for the ratings for the respective column floor and roof system conditions shown on the drawings, in accordance with the procedures of ASTM E-119.

   Note: Non-cementitious materials will not be considered as an equal.

2. Physical Performance Characteristics: Fireproofing material shall meet the following physical performance standards:

   a. Dry Density: The field density shall be measured in accordance with ASTM Standard E605. Minimum average density shall be that required by the manufacturer, or as listed in the UL Fire Resistance Directory for each rating indicated, or as directed by the authority having jurisdiction, or a minimum average 350 kg/m^3 (22 pcf) whichever is greater.

   b. Deflection: Material shall not crack or delaminate from the surface to which it is applied when tested in accordance with ASTM E759.

   c. Bond Impact: Material subject to impact tests in accordance with ASTM E760 shall not crack or delaminate from the surface to which it is applied.

   d. Bond Strength: Fireproofing, when tested in accordance with ASTM E736, shall have a minimum average bond strength of 94.5 kN/m^2 (2,000 psf) and a minimum individual bond strength of 71.8 kN/m^2 (1,500 psf).

   e. Air Erosion: Maximum allowable total weight loss of the fireproofing material shall be 0.00 g/m^2 (0.00 g/ft^2) when tested in accordance with ASTM E859. Sample surface shall be “as applied” (not pre-purged) and the total reported weight loss shall be the total weight loss over a 24 hour period from the beginning of the test.

   f. High Speed Air Erosion: Materials to be used in plenums or ducts shall exhibit no continued erosion after 4 hours at an air speed of 12.7 m/s (47 km/h) [2500 ft/min (29 mph)] when tested per ASTM E859.

   g. Compressive Strength: The fireproofing shall not deform more than 10% when subjected to compressive forces of 966 kPa (20,189 psf) and 719 kPa (15,077 psf) for interior and exterior exposures respectively when tested in accordance with ASTM E761.

3. Corrosion Resistance: Fireproofing applied to steel shall be tested in accordance with ASTM E937 and shall not promote corrosion of steel.

4. Abrasion Resistance: No more that 15 cm3 shall be abraded or removed from the fireproofing substrate when tested in accordance with the test methods developed by the City of San Francisco, Bureau of Building Inspection

5. Impact Penetration: The fireproofing material shall not show a loss of more than 6 cm3 when subjected to impact penetration tests in accordance with the test methods developed by the City of San Francisco, Bureau of Building Inspection.

6. Surface Burning Characteristics: Material shall exhibit the following surface burning characteristics when tested in accordance with ASTM E84:
   Flame Spread 0
   Smoke Development 0

7. Resistance to Mold: The fireproofing material shall be formulated at the time of manufacturing with a mold inhibitor. Fireproofing material shall be tested in accordance with ASTM G21 and shall show resistance to mold growth for a period of 28 days for general use.

8. Combustibility: Material shall have a maximum total heat release of 20 MJ/m2 and a maximum 125 kW/m2 peak rate of heat release 600 seconds after insertion when tested in accordance with ASTM E1354 at a radiant heat flux of 75 kW/m2 with the use of electric spark ignition. The sample shall be tested in the horizontal orientation.

9. Provide accessories to comply with manufacturer's recommendations and to meet fire resistance design and code requirements. Such accessories include, but are not limited to, any required or optional items such as bonding agents, mechanical attachments; application aids such as metal lath, scrim, or netting; and Monokote Accelerator.

10. Submit evidence that the Portland cement based aggregate slurry fireproofing has been tested per ASTM E119 by Underwriters Laboratories Inc or an other accredited testing laboratory. Include evidence that the fire testing was sponsored by the manufacturer and that the material tested was produced at the manufacturer's facility under the supervision of laboratory personnel.

PART 3 EXECUTION

3.01 PREPARATION

A. All surfaces to receive thin-film fire resistive material shall be clean, dry and free of oil, grease, loose mill scale, dirt, dust or other materials which would impair bond of the thin-film fire resistive material to the surface. Any cleaning of the surfaces to receive fire resistive material shall be the responsibility of the General Contractor or steel erector, as outlined in the structural steel section.

B. Confirm compatibility of surfaces to receive thin-film fire resistive material. Steel surfaces shall be primed with a compatible primer approved by the thin-film fire resistive material manufacturer.

C. Provide masking, drop cloths or other suitable coverings to prevent overspray onto surfaces not intended to be coated with intumescent coating.

3.02 MOCK UP

A. Before proceeding with the work, the applicator shall apply the thin-film fire resistive material to a section witnessed by the architect's or owner's representative. The application shall be subject to their approval and shall be used as a guide for texture and thickness of the finished work.

3.03 INSPECTION AND TESTING

A. In addition to continuous Wet Film Thickness checks performed by applicator during application, the installed intumescent material shall be inspected by a qualified independent testing laboratory for thickness in accordance with the AWCI Technical Manual 12-B "Standard Practice For The Testing and Inspection Of Field Applied Thin-Film Intumescent Fire-Resistive Materials; an Annotated Guide", Latest Edition, before application of the topcoat.

B. The results of the above tests shall be made available to all parties at the completion of each area and approved prior to the application of topcoat.

3.04 SPRAY FIREPROOFING INSTALLATION

A. Apply sprayed-on cementitious and intumescent fireproofing in strict accordance with applicable U.L. Designs and manufacturer’s approved application instruction and procedures. The following fire resistance ratings are required; refer to drawings for locations.

1. Structural framing at stair shafts: 1 hour.
2. Underside of floor construction at third floor Electrical Room (BDA L316): 2 hours.
3. Underside of second floor construction above Elevator Machine Rooms B126 and L128B and top of elevator shafts: 2 hours.
4. Underside of second and third floor construction on either side of building separation joints: 2 hours.

B. Application of sprayed fireproofing shall not begin until the General Contractor and the Fireproofing Applicator have inspected the surfaces to receive fireproofing to determine if surfaces are acceptable to receive the fireproofing material. All surfaces to receive sprayed fireproofing shall be free of oil, grease, paint/primers, loose mill scale, dirt or other foreign substances which may impair proper adhesion of the fireproofing to the substrate. Where necessary, priming and/or cleaning or surfaces to receive fireproofing shall be the responsibility of the fireproofing applicator. The General Contractor shall provide heat, ventilation and temporary enclosure as may be required for the application of spray-on fireproofing in accordance with SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS.

C. Prior to application of fireproofing, clips, hangers, support sleeves and other attachments required to penetrate the fireproofing shall be in place. Ducts, piping, equipment or other suspended matter which would interfere with the application of fireproofing materials shall not be positioned until fireproofing work is complete.

D. Provide masking, drop cloths or other satisfactory coverings so as to prevent overspray of sprayed fireproofing.

E. Application equipment and application procedure shall conform to the material manufacturer's application instructions. All patching and repairing of sprayed fireproofing, due to the work of other trades, shall be performed under this SECTION.

F. The Architect shall select, and the Owner will pay, an independent testing laboratory to sample and verify the thickness and density of the fireproofing in accordance with provisions of ASTM E605, "Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Materials Applied to Structural Members", the "Inspection Procedure for Field-Applied Sprayed Fire Protection Materials" as published by the AWCI, or Uniform Building Code Standard No. 43-8 entitled "Thickness and Density Determination for Spray-Applied Fireproofing". The results of the above tests shall be made available to all parties at the completion of each floor.

G. After the completion of the fireproofing work, application equipment shall be removed. Permanently exposed to view walls, floors, piping and other surfaces are to be left in a scraped clean condition.

3.05 CLEAN UP AND REPAIR

A. Upon completion of installation, all excess material, overspray and debris shall be cleared and removed from the job site.

B. All patching of and repair to thin-film fire resistive material, due to damage by other trades, shall be performed under this section and paid for by the trade responsible for the damage. Patching shall be performed by an applicator with expertise in the installation of fire resistive or similar materials. Repair shall be in accordance with UL design number guidelines and manufacturers written application instructions.

END OF SECTION

Division 8
Doors and Windows

SECTION 080001

METAL WINDOWS

*(Filed Sub-Bid Required)

PART 1 GENERAL

1.00 TIME, MANNER AND REQUIREMENTS FOR SUBMITTING SUB-BIDS

A. Sub-bids shall be submitted in accordance with provisions of the General Laws (Ter. Ed.), Chapter 149, Section 44A to 44L, inclusive, as amended. The time and place for submission to Sub-Bids shall be set forth under INSTRUCTIONS TO BIDDERS.

B. Each Sub-Bid filed with the Awarding Authority must be accompanied by BID BOND, or CERTIFIED CHECK, or a TREASURER'S CHECK or CASHIER'S CHECK issued by a responsible bank or trust company, payable to the **City of Amesbury** in the amount stipulated in the INSTRUCTIONS TO BIDDERS. A Sub-Bid accompanied by any other form of bid deposit than those specified will be rejected.

C. Each Sub-Bid submitted for the work, under this SECTION, shall be on a form furnished by the Awarding Authority, and required by SECTION 44F of Chapter 149 of the General Laws, as amended.

D. Work to be performed under this SECTION is shown on Contract Drawings numbered:

G.0.01, G.0.02, G.0.04-G.0.08, inclusive; 2.1.00-2.8.03, inclusive; 3.4.01-3.9.15, inclusive; 4.1.01-4.3.02, inclusive; 5.1.01-5.2.07, inclusive; 5.4.01-5.4.11, inclusive; 5.6.01-5.6.13, inclusive; and 10.0.01-10.3.13, inclusive.

Remaining Contract Drawings are included for reference and coordination.

E. Additional Requirements:

1. Sub-bidder's attention is directed to Massachusetts G.L. Chapter 149 §44H, as amended, which provides in part as follows:

2. Each sub-bidder shall list in Paragraph E of the "Trade Contractor Bid Form" the name and bid price of each person, firm or corporation performing each class of work or part thereof for which the Section of the Specifications for that sub-trade requires such listing, provided that, in the absence of a contrary provision in the Specifications, any sub-bidder may, without listing any bid price, list his own name or part thereof and perform that work with persons on his own payroll, if such sub-bidders, after sub-bid openings, shows to the satisfaction of the Awarding Authority that he does customarily perform such class of work with persons on his own payroll and is qualified to do so. This Section of the Specifications

requires that the following classes of work shall be listed in Paragraph E under the conditions indicated herein.

Class of Work	Specification Paragraphs
(1) Security and UV Films	2.12., 2.14, 3.05, 3.06

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a sub-bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following items required to complete the work of this SECTION, as shown on the Drawings and specified herein:

1. Fixed and operable aluminum thermal-break window units.
2. Aluminum sills with finished end caps at aluminum windows, aluminum closure panels, insulated infill panels, brake metal covers, trim and flashing; extruded metal subframe extensions and panning; and all other trim indicated by “SECTION 080001-METAL WINDOWS” on the Drawings.
3. Aluminum pressure (curtain) walls with inserted operable “zero/low-sight line” vent units, aluminum entry doors and frames.
4. Interior aluminum pressure wall and aluminum doors.
5. Interior aluminum storefront framing and doors.
6. Steel angles attached to tubular steel girts and all supplemental steel, plates, angles and the like necessary for curtainwall bracing
7. All glass and glazing materials including spandrel glass panels for aluminum operable windows, fixed windows, curtainwall frames, storefront frames, and doors furnished and installed under this SECTION, factory installed to the fullest extent possible.
8. Insect screens at all operable window units with wickets as required to operate windows.
9. Perimeter sealants at exterior and interior joints of windows, curtainwalls and storefronts between adjacent masonry and/or other dissimilar materials as shown on the drawings.
10. Sealing windows, curtainwall system and exterior storefront system to the air and vapor barrier.
11. Internal sealants for joints between items furnished and installed under this Section including metal-to-metal caulking/ sealant.

12. Foam insulation within frame and mullions at windows, storefront, curtainwall, entry frames and panning trim and where shown on the drawings to be by SECTION 080001-METAL WINDOWS.

13. Security film applied to the interior surface of all building perimeter glass where any part of glass is ≤ 4 ft. above finished grade to the first mullion above 4 ft. (above grade) and as shown on the Drawings.

~~14. Mirror interlayer sandwiched between laminated outer lites at glazing units in Administration Area windows.~~

14. UV protection film applied to interior surface of designated windows in lobby.

15. Custom-sized interior security transaction window.

16. Aluminum sliding door system at Administration.

17. Sample windows / curtainwall at exterior mock-up. Refer to SECTION 014339-EXTERIOR MOCK-UPS.

B. NOTE: Windows, storefronts, curtainwall, entry configurations and accessory shapes as detailed and specified herein, shall establish the type of units and materials to be used to satisfy the performance and aesthetic requirements of this project. Particular attention should be paid to the details and sections of the material depicted on the architectural drawings which indicate required dimensions, depths and generally acceptable profiles.

C. Install the following items furnished under the designated SECTIONS:

1. Semi-rigid insulation at interior face of spandrel glazing: SECTION 072100-INSULATION.

2. Hardware for aluminum doors and frames within curtainwall and storefront systems: SECTION 087100-FINISH HARDWARE.

3. Magnetic intrusion alarm contacts for aluminum doors and frames: SECTION 260001-ELECTRICAL.

4. Preformed and prefinished sill flashing and base wall flashing at aluminum curtainwall sills: SECTION 074213-PREFORMED CLADDING.

D. Coordinate with SECTION 260001-ELECTRICAL for exit signs, fire alarm pull stations, door entry access system and other electrical items to be mounted on, and fed concealed within, curtainwall members.

E. Coordinate with SECTION 071326-AIR AND VAPOR BARRIERS for sealing all window systems to the air and vapor barrier.

F. The Metal Window Subcontractor shall furnish, install and maintain in safe, adequate condition all lifts, hoisting, staging and scaffolding that are necessary for the proper execution of the work of this SECTION.

G. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. For all adhesives, sealants, paints and coatings, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in Section 018113 – SUSTAINABLE DESIGN REQUIREMENTS.

3. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

H. Exterior Envelope Commissioning – Refer to SECTION 019113-BUILDING COMMISSIONING REQUIREMENTS.

~~I. Furnish the following for installation under the designated SECTIONS:~~

~~1. Prefinished aluminum sills at composite panel system: SECTION 074213-PREFORMED CLADDING.~~

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Construction of mock-up: SECTION 014339-EXTERIOR-MOCK-UPS.

2. Wood blocking: SECTION 061000-ROUGH CARPENTRY.

3. Furnishing and installing glass in interior wood and hollow metal doors and hollow metal windows: SECTION 080002-GLASS AND GLAZING.

4. Pressed metal frames and metal doors: SECTION 081113-HOLLOW METALWORK.

5. Aluminum panels, soffits, fascias and trim: SECTION 074213-PREFORMED CLADDING.

6. Continuous air and vapor barrier at exterior wall construction: SECTION 071326-AIR AND VAPOR BARRIERS.

7. Final cleaning and protection of installed materials: SECTION 017700-PROJECT CLOSEOUT.

8. Wiring of intrusion alarm system installed on doors, power assist panel, A-phone, card reader, interior and exterior light fixtures and exit signs. All cutting, drilling and channeling of frames and panels shall be performed by: SECTION 260001-ELECTRICAL.

9. Structural steel: SECTION 051200-STRUCTURAL STEEL FRAMING.

10. Miscellaneous steel: SECTION 050001-MISCELLANEOUS AND ORNAMENTAL IRON.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with SECTION 013300-SUBMITTALS.

1. Shop drawings shall include a complete window schedule, large scale detail of curtainwall, entrances, including jambs, trim sections, anchorage and reinforcements and methods of connections.

2. Include with shop drawings all engineering computations for windows, pressure wall members, mullions, connections and anchorages, and for sunscreen construction furnished under this SECTION, prepared and stamped by a Structural Engineer registered in the Commonwealth of Massachusetts, and independent laboratory test reports verifying compliance with specified performance requirements.

3. Shop drawings shall show the various methods of glazing and a complete schedule of the locations of the various types of glass and thicknesses.

4. Shop drawings shall clearly show connection to and continuity with adjacent thermal, weather, air and vapor barriers.

B. Submit the following samples in accordance with SECTION 013300-SUBMITTALS.

1. Curtainwall, window and storefront: Frame section of each specified type showing all pertinent details – 12 x 12 inches, for each system specified herein.

2. Sealants, tapes and compounds requested by the Architect.

3. Color samples matching specified finishes and colors on 24” extruded section.

4. Each type of glass – 8 x 8 inches.

5. Operable window unit hardware of each specified type.

6. Security Film – 12 x 12 inches

~~7. Mirror Film – 12 x 12 inches.~~

7. UV Film – 12 x 12 inches.

C. Furnish and install sample window units in the mock-up exterior wall panels as specified under SECTION 014339-EXTERIOR MOCK-UPS and as shown on the Drawings.

1. Final Mock-Up: Following the Architect's review and approval of the mock-up panel, including those portions of the panel furnished and installed under other SECTIONS, a final mock-up panel shall incorporate all approved materials, colors, and methods of installation. This final mock-up shall be left on site to serve as the reference standard for appearance and workmanship as the work progresses. This Subcontractor shall, at no additional cost to the Owner, rebuild the portions of the mock-up furnished and installed under this SECTION using the final approved materials, colors and construction to complete the final mock-up.

2. Refer to SECTION 014339-EXTERIOR MOCKUPS for additional requirements.

D. Metal Window / Curtainwall / Storefront Manufacturer and Installer and Glass Manufacturer must mutually review the glass and glazing and metal windows submissions and individually warrant their products on the basis of that review. No Shop Drawings for Metal Windows and related glass and glazing shall be reviewed by the Architect without prior review and approval of these documents by both the window and glass manufacturers and the installer.

E. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in Section 018113-Sustainable Design Requirements.

2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. Product substitution requests are subject to additional LEED-S submittal requirements, Refer to SECTION 012500-SUBSTITUTION PROCEDURES.

1.05 COORDINATION OF ALUMINUM FINISH

A. Aluminum windows, curtainwalls, storefronts, doors and trim to be furnished and installed under this Section shall match in color and finish items furnished under the following Sections:

1. SECTION 074213-PREFORMED CLADDING: Preformed aluminum ACM and single skin cladding panels, copings, flashing and trim.

2. SECTION 070002-ROOFING AND FLASHING: Snap-on roof fascias and flashing.

B. It shall be the responsibility of both the Preformed Cladding Subcontractor and the General Contractor to jointly coordinate the finish operation with the other listed trades to achieve a uniform finish.

1.06 QUALITY ASSURANCE

A. Manufacturer shall have not less than five years of experience in manufacture of windows of this type and quality.

B. Engineering Responsibility: Engage a qualified professional engineer to prepare design calculations, shop drawings and other structural data.

1. The engineer shall make two visits to the site (once during installation and once after completion of the work) to inspect their respective components for conformance with the shop drawings.

C. Window Source Quality Control – 41/2 inch (minimum depth), aluminum windows: AW-PG135-C tested in accordance with AAMA/WDMA/CSA 101/I.S.2/A440-08:

1. Air infiltration test

a. ASTM E 283-04

b. Maximum air infiltration 0.1 CFM/Ft. of crack length at a test pressure of 6.24 PSF.

c. Refer to SECTION 019113-BUILDING COMMISSIONING REQUIREMENTS for additional field testing and performance criteria.

2. Water penetration test

a. ASTM E 547 & 331-00

b. No water penetration for 15 minutes when window is subjected to a rate of flow of 5 gal./hr./sq. ft. with differential pressure across window unit of 15 PSF.

c. Refer to SECTION 019113-BUILDING COMMISSIONING REQUIREMENTS for additional field testing and performance criteria.

3. Uniform load structural test

a. ASTM E 330-02

b. No member shall deflect more than 1/175 of its span when tested at static air pressure difference of 165 PSF with high pressure applied first on one side of unit and then on the other side.

c. At the conclusion of the test, with high pressure applied first on one side of unit and then on the other side, there shall be no glass breakage, permanent damage to fasteners, hardware parts (support arms or activating mechanisms) nor any other damage to window which would cause it to be inoperable. Permanent deformation of any frame or ventilator member shall not exceed 0.2% of its span.

4. Condensation Resistance Test:

   a. AAMA 1503.1

   b. Condensation Resistance Factor shall not be less than 72 (frame) and 67 (glass) when glazed with .25 center of glass U-Factor.

5. Thermal transmittance test:

   a. Tested with vents closed and locked per NFRC 100-2010.

   b. U-value (system rating) of the operable windows shall be not more than .46 (based on the center of glass U-value of .25 BTU/hr/sf/degree.

D. Curtain Wall Source Quality Control:

1. Air Infiltration Test

   a. Test unit in accordance with ASTM E 283 at a static air pressure difference of 6.24 psf (300 Pa).

   b. Air infiltration shall not exceed .06 cfm/SF (0.31 l/s•m²) of unit.

2. Water Resistance Test

   a. Test unit in accordance with ASTM E 331.

   b. The test for static water penetration (ASTM E 331) shall be conducted at an air pressure difference of 15.0 psf (720 Pa). There shall be no water leakage as defined by AAMA 501.1, paragraph 5.5.

3. Uniform Load Deflection Test

   a. Test in accordance with ASTM E 330.

   b. Deflection under design load shall not exceed L/175 for spans less than 162 in. (4114 mm).

   c. Deflection under design load shall not exceed L/240 +1/4 in. (6 mm) for spans greater than 162 in. (4114 mm).

4. Uniform Load Structural Test

   a. Test in accordance with ASTM E 330 at a pressure 1.5 times the design wind pressure.

b. At conclusion of the test there shall be no glass breakage, permanent damage to fasteners, curtain wall parts, or any other damage that would cause the curtain wall to be defective.

5. Condensation Resistance Test (CRF)

a. Test unit in accordance with AAMA 1503.1.

b. Condensation Resistance Factor (CRF) shall not be less than 74 (frame) and 65 (glass) when glazed with .25 center of glass U-Factor.

6. Thermal Transmittance Test (Conductive U-Factor)

a. For curtainwall performance based on fixed units, test unit in accordance with NFRC 100-2010.

b. Conductive thermal transmittance (U-Factor) shall not be more than .32 BTU/hr. when glazed with .25 center of glass U-Factor.

7. Seismic Performance

a. Test unit in accordance to AAMA 501.4 system to meet design displacement of 0.010 x the greater adjacent story height and ultimate displacement of 1.5 x the design displacement.

8. Sound Transmission Loss

a. Test unit in accordance with ASTM E 90-02.

b. Sound Transmission Class (STC) shall not be less than 29.

E. Storefront Quality Control (Fixed Units):

1. Air Infiltration Test

a. Test unit in accordance with ASTM E 283 at a static air pressure difference of 6.24 psf (299 Pa).

b. Air infiltration shall not exceed .06 cfm/SF (.30 l/s•m²) of unit.

2. Water Resistance Test

a. Test unit in accordance with ASTM E 331.

b. There shall be no uncontrolled water leakage at a static test pressure of 10.0 psf.

3. Uniform Load Deflection Test

a. Test in accordance with ASTM E 330.

b. Deflection under design load shall not exceed L/175 of the clear span.

4. Uniform Load Structural Test

a. Test in accordance with ASTM E 330 at a pressure 1.5 times the design wind pressure.

b. At conclusion of the test, there shall be no glass breakage, permanent damage to fasteners, storefront parts, or any other damage that would cause the storefront to be defective.

5. Condensation Resistance Test (CRF)

a. Test unit in accordance with AAMA 1503.1.

b. Condensation Resistance Factor (CRF) shall not be less than 56 (frame) / 63 (glass) when glazed with 63 center of glass U-Factor. (See chart at end of section).

6. Thermal Transmittance Test (Conductive U-Factor)

a. With ventilators closed and locked, test unit in accordance with NFRC 100-2010.

b. Conductive thermal transmittance (U-Factor) shall not be more than .38 BTU/hr•ft^2•°F when glazed with .25 center of glass U-factor using standard NFRC size.

F. Aluminum Window Inserts in Curtainwall Quality Control:

1. Air, water and structural test unit shall conform to requirements set forth in ANSI/AAMA/NWWDA 101/I.S.2/NAFS-08 and manufacturer's standard locking/operating hardware and insulated glazing configuration.

2. Test Procedures and Performances.

a. Windows shall conform to all ANSI/AAMA/NWWDA 101/I.S.2/NAFS-08 requirements for the window type referenced in 1.01.B. In addition, the following specific performance requirements shall be met.

3. Air Infiltration Test

a. With ventilators closed and locked, test unit in accordance with ASTM E 283 at a static air pressure difference of 6.24 psf (299 Pa).

b. Air infiltration shall not exceed .10 cfm/SF (.50 l/s·m^2)

4. Water Resistance Test

a. With ventilators closed and locked, test unit in accordance with ASTM E 331/ASTM E 547 at a static air pressure difference of 15.0 psf (720 Pa).

b. There shall be no uncontrolled water leakage.

5. Uniform Load Structural Test

a. With ventilators closed and locked, test unit in accordance with ASTM E 330 at a static air pressure difference of 90.0 psf (4309 Pa), both positive and negative.

b. At conclusion of test there shall be no glass breakage, permanent damage to fasteners, hardware parts, support arms or actuating mechanisms, nor any other damage that would cause the window to be inoperable.

6. Condensation Resistance (CRF)

a. Test unit in accordance with AAMA 1503.1.

7. Condensation Resistance (CR)

a. With ventilators closed and locked, test unit in accordance with NFRX 500-2010.

8. Thermal Transmittance Test (Conductive U-Factor)

a. With ventilators closed and locked, test unit in accordance with NFRC 100-2010.

G. Minimum structural design requirements for window and curtain wall systems.

1. Wind loading – +45 PSF/-49 PSF at non-salient areas. +45 PSF/-60 PSF at salient areas, unless greater design load is required by code.

H. Warranties: Copies of manufacturers' actual warranties for all materials to be furnished under this SECTION, clearly defining all terms, conditions, and time periods for the coverage thereof, including the following:

1. Total Window System

a. The metal window Subcontractor shall assume full responsibility for repair or replacement and shall in writing warrant for **three (3) years** following the date of substantial completion of the General Contract the satisfactory performance of the total window/curtainwall and storefront installation which includes that of the curtainwall members, hardware, glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, and similar items as it relates to air, water, and structural adequacy or which exhibits defects in materials, workmanship, design or erection as called for in the specifications and approved shop drawings.

b. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor at contractor's expense during the warranty period.

c. The window manufacturer shall submit a signed warranty guaranteeing materials and workmanship for up to ten **(10) years** following the date of substantial completion of the General Contract, including repair or replacement of window, curtainwall and storefront extrusions weather-stripping, trim, finish and all hardware supplied by the curtainwall manufacturer.

2. Glass manufacturer's written standard of SIGMA warranty for insulating glass, covering replacement of insulating glass, wherever the hermetic seal has failed, for a period of ten (10) years from date of manufacture, said date being as impaired on each unit of insulating glass.

   a. Glass manufacturer's or film manufacturer's warranty shall cover all insulating glass having an applied security or UV film.

3. Finish system manufacturer's written warranty covering the prefinish system against color fading, chalking, and failure of film integrity for a period of not less **than 20 years** from date of Substantial Completion of the Contract.

1.07 TESTING

A. Field Testing – The Owner's 3rd party testing agency shall field test installed samples of windows and curtain walls in accordance with ASTM E1105. Cost of the initial testing shall be paid by the Owner, and cost to retest failed window / curtain wall units shall be paid by the window Subcontractor. The window Subcontractor shall assist with the Owner's field testing and shall make corrections to window installation required by the test results at no additional cost to the Owner.

B. Mock-Up Testing:

1. Contractor shall prepare and install mock-up samples in method proposed for building.
2. Contractor shall replace, repair or rebuild window installation in mock-ups until satisfactory field test results are obtained.
3. Satisfactory testing of mock-ups must be completed prior to installation of window assemblies on building.

C. Window Testing on Building:

1. Prior to the scheduled start of functional performance tests, Installer to submit Pre-Functional Test Statement to Project and Commissioning Teams indicating written acceptance of completed work and confirming readiness for functional field of this project to be tested are 100% complete and ready to be tested to confirm compliance with the Project's Performance Requirements.
2. Field testing shall be performed on representative production fenestration assemblies following both 50% and 75% completion as chosen by the CxA, OPM and Architect. Test specimens shall consist of different fenestration configurations/types during each test.

3. Partial Test Specimens:

   Some of the curtainwall assemblies in this project are large in size. Due to the length and width of these types of assemblies, there may be issues in constructing the test chamber specified by AAMA and ASTM – a test chamber that is able to encapsulate, and introduce a test pressure differential on the entire assembly.

   - To accommodate these conditions, some of the field testing performed on this project may be performed on a partial assembly/specimen, with prior approval by the CxA in advance.
   - This partial test specimen may consist of a portion of the curtainwall with a minimum size of 100 sf.
   - Each modified test specimen shall consist of a width of at least three vertical mullions and extend at least three horizontal mullions in height, including either or both the sill and head of the assembly.
   - No more than two total curtainwall tests shall be performed with a partial test specimen configuration.
   - With this partial test specimen configuration, air infiltration readings taken during this test may not be representative of the entire installed assembly and should be taken for reference only and not for measurement of conformance with project performance requirements.

D.

Minimum Functional Testing Performed by Third-Party Testing Agency			
Component	Test Method	Quantity	Frequency
Windows	Air Infiltration & Water Penetration: ASTM E783, ASTM E1105, AAMA 502	1 assembly	Mock-up
		2 assemblies	50% of Completion
		1of each window type assembly (5)	75% of Completion
Curtainwall Assemblies	Air Infiltration & Water Penetration: ASTM E783 ASTM E1105, AAMA 503	1 assembly	Mock-up or 25%
		2 assemblies	75% of Completion
	Water Penetration: AAMA 501.2	1 assembly	Mock-up or 25%
		2 assemblies	75% of Completion

Additional testing may be performed at the discretion of the OPM and Architect.

1. Successful tests will result in no water leakage after 15 minutes (static) or cumulative 15 minutes (cyclic) of 5.0 US gallons/ft^2 at a minimum pressure of 6.24 PSF.

2. Successful test will result in air infiltration no greater than 1.5 times the rate specified for each type of fenestration under Article 1.05 QUALITY ASSURANCE. Successful field testing for air infiltration of installed units will result in infiltration rates of:

   a. Windows: Less than 0.15 CFM/ft. of crack length at test pressure 6.24 PSF.

   b. Curtainwall (with fixed glazing): Less than 0.09 CFM/SF at air pressure differential of 6.24 PSF.

   c. Curtainwall (with ventilation inserts): Less than 0.15 CFM/SF at air pressure differential of 6.24 PSF.

   d. Storefront: Less than 0.09 CFM/SF at air pressure differential of 6.24 PSF.

E. Failed tests will result in additional testing of the failed specimen. Additional inspection and testing costs are at the cost of the GC. If the GC determines a subcontractor is responsible for a failed test, the GC will be responsible for collecting costs from the same. Test will be concluded only when satisfactory results are achieved. The following guidelines will be used in the event of a failed assembly test.

1. A failed mock-up test will result in a repeat of that test following repairs and requisite curing times. These tests will be repeated until the mock-up passes.

2. Field tested assemblies that fail will result in re-testing similar, randomly selected assemblies using a ratio of 5:1 up to 10 re-tested samples for a specific assembly type.

3. Failure of more than 10 similar assemblies will be grounds for testing every exemplar of the assembly type or demolition and re-construction of the assembly type for every instance of that assembly.

1.08 MAINTENANCE STOCK AND GLAZING SCHEDULE

A. Maintenance stock upon completion of the metal window work, furnish to the maintenance representative of the Owner the following materials for future maintenance replacement:

1. Window Operators – Four (4) of each type operators.

2. Insulating “Low-E” Glass Panels –Two (2) panels, sizes to be determined by the Architect.

3. Insect Screens – One for of each size of operable units.

B. Glazing Schedule – Upon completion of the metal windows work, furnish to the maintenance representative of the Owner three copies of a detailed glazing schedule, showing glass manufacturer, size, type, and location for every piece of glass installed under this section.

1.09 FIELD ADHESION TESTS

A. Perform adhesion tests on samples of sealant applied to prepared substrates at the site to assure that the proposed materials and installation procedures achieve adequate adhesion and that the optimum primers are selected. Schedule the testing and report the results at no additional cost to the Owner. If required by the Architect, request the sealant manufacturer's technical representative visit the site to assist with adhesion testing.

B. Perform jobsite sealant adhesion tests in accordance with the following:

1. Apply three sealant test strips to each jobsite substrate. Prepare three samples for each type of sealant proposed on each substrate.
2. Sealant test strips shall be a minimum of 4 inches long at each location. Apply a 1 inch wide strip of bond breaker tape across the edge of each test specimen to produce a tab for gripping the specimen during testing.
3. Prepare additional test samples for each primer or substrate preparation technique recommended by the sealant manufacturer. For substrates where adhesion may benefit from the use of a primer, prepare test strips with and without primer to evaluate the effect on adhesion.
4. Locate sealant test strips in areas approved by the Owner in advance. Remove all traces of sealant test residue on substrates to remain.
5. Install sealant sufficiently in advance of general sealant application to allow time for curing and testing, and in no case less than three weeks in advance.
6. After curing for at least three weeks, forcibly remove sealant test strips to check on the sealant adhesion. Failure must be by tearing within the sealant itself (cohesive failure). Sealant test samples that fail adhesively (that is, by pulling cleanly away from the substrate leaving little or no sealant residue) are unacceptable.
7. If sealant fails adhesively, modify sealant application procedures as recommended by the sealant manufacturer and repeat testing until satisfactory adhesion is achieved.
8. Notify Architect at least 48 hrs. prior to the installation of test samples and 48 hrs. in advance of performing pull-tests so that he can be present to observe the installation.
9. Provide a written report to the Architect describing the testing, the results, and the recommendations of the sealant manufacturer.

1.10 PRE-INSTALLATION CONFERENCE

A. After approval of all materials and at least 10 days prior to starting installation, a pre-installation conference shall be held at the job site. In attendance shall be (1) Architect, (2) General Contractor, (3) Window Subcontractor, (4) Manufacturer's Representative, and (5) Building Envelope Commissioning Agent.

B. The parties shall review Drawings, Specifications and approved materials. Correct conflicts, if any, between approvals and specification requirements before starting installation. Examine job site conditions, including inspection of substrate, material labels and methods of storing materials. Review installation procedures, scheduling and temperature requirements, and establish protection methods for finished work from other trades.

PART 2 PRODUCTS

2.00 LEEDV4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4 MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Furnish any adhesives, sealants, paints and coatings, meet the requirements for IEQ Credit 2 as defined in SECTION 018113 – SUSTAINABLE DESIGN REQUIREMENTS.
2. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) Aluminum framing members shall be produced using a minimum of 80% recycled materials (57% post-consumer and 23% pre-consumer).
3. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.

2.01 MANUFACTURE

A. To establish a standard of quality, design and function, manufacture has been based upon EFCO Corporation, Monett, Missouri.

B. Similar window, curtainwall, storefront and entry systems by Architectural Window Manufacturing Corp., Rutherford, NJ; Wausau Window and Wall Systems, Wausau, WI or others and aluminum doors by Tubelite, Kawneer, or others will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

2.02 ALUMINUM WINDOWS

A. Windows shall be aluminum thermal break windows with fixed lights and project-out awning vents and casement vents, as follows (Refer to Drawings for locations of window types):

1. “Series 450 X” frame depth: four and one half inches.

B. Materials:

1. Aluminum extrusion frame section shall be depths indicated in drawings for each location. Wall thickness shall be 1/8 inch minimum. Corners shall be of screw spline construction, and back sealed. Provide all reinforcing of frames necessary to meet the specified structural criteria.

2. Corners of ventilator frames shall be miter cut, reinforced with extruded corner blocks, hydraulically crimped, epoxied and mechanical fastened throughout. Corners of window frames shall be machined, mechanically fastened and sealed to form a watertight joint.

3. Windows shall be double weather-stripped using neoprene weather-stripping securely interlocked.

4. Windows shall be inside glazed except for:

    a. Spandrel glass covered by interior construction

    b. Glass that is obstructed by steel framing or interior construction and where indicated on the Drawings.

    c. Aluminum glazing beads shall be not less than ¾ inch in height.

5. No component of the window assembly, including but not limited to, the window frame, ventilator frames or hardware shall bridge or otherwise violate the thermal barrier in any way. Separation in frames, ventilator and mullions shall be a rigid, structural thermal barrier. The thermal barrier may be either "crimped-in place glass reinforced polyamide nylon" or "poured and de-bridged type." Reinforcing inserted in frames to meet specified performance requirements shall not bridge the thermal barrier.

6. Mullions, where required, shall be extruded aluminum incorporating the thermal-break feature.

7. Hardware for operable window vents shall be as follows:

    a. Hinges – Four bar type of heavy duty stainless steel fastened to both frame and ventilator with stainless steel screws.

    b. Locking Handles – Truth type 24 locking handles, single point or multiple point required for height.

    c. Operators for Project Out Awning Vents – Cam handles by Truth Hardware 25 Series TrimLine or an approved equal. Finish to be aluminum clear anodized.

    d. Furnish and install limit stops on all project out vents at all windows to restrict maximum opening to 4 in. Do not install limiters at casement windows used to access roof.

    e. Operators for Casement Vents – Rotovents, crank type series 22 by Truth Hardware, twin push arm design.

8. Screens – Screens at operable sections shall be of extruded aluminum frames, re-wireable and filled with 18 x 16 mesh aluminum cloth. Screen fastenings shall permit easy attachments and removal from the interior. Finish to match sash color. Access to operable window hardware shall be by wickets.

9. Finish – Windows shall be factory finished:

   a. Three coat system having a minimum film thickness of 1.2 mils, following specifications issued by the finish manufacturer, and meeting or exceeding AAMA SPEC. 2605 for High Performance Organic Coatings on Architectural Extrusions and Panels.

   b. Application of the finish shall be by an applicator approved by the finish manufacturer and shall be an approved equal product to manufacturer, color and finish.

   c. Coats: Fluoropolymer three-coat metallic system, consisting of 0.2 mil primer with a 0.80 mil PVCF fluoropolymer color coat containing metal flakes and a 0.50 mil PVDF fluoropolymer clear coat.

   d. Color: One custom metallic color to match Fluropon Classic Pewter – Centria Sundance Metallic – Clearcoat: 430A307.

   e. The Architect reserves the right to select the custom color match from the stated manufacturer's full line of metallic finishes.

2.03 ALUMINUM PRESSURE WALL

A. Curtainwall framing shall be EFCO 5600 Series with fiberglass pressure plates as follows:

1. Aluminum: Provide material of 6063-T5 alloy and temper to meet specified requirements and compatibility with specified finishes. Extrusions shall confirm with ASTM B 221, with extrusion tolerances complying with ANSI H35.2. Aluminum sheet shall comply with ASTM B209, with formed wall section of 1/8th inch.

2. Frames: Minimum principal wall thickness .093 inches. **Frame depth shall be as shown on the drawings**, with 2-1/2 inch sight-line and a glazing pocket accommodating 1/4 inch to 1 inch infill panels. Units shall be machined, mechanically fastened and sealed to form a watertight joint. Frames at exterior shall be thermally broken and shall be designed so that water entering the space around the unit shall be drained and shall not remain in contact with the edge seal of the glass at any point. System shall be outside glazed. Provide all reinforcing of frames necessary to meet the specified structural criteria.

3. Anchoring: Material shall be of adequate strength required to meet the uniform load deflection and structural requirements specified under paragraph 1.05.

   a. Fasteners: Concealed fasteners shall be aluminum, cadmium plated steel or heavy cadmium plated steel per GSA QQ-P-416C or ASTM A 165, zinc plated steel per ASTM B 633 or ASTM A 123, or 300 Series stainless steel. Exposed fasteners shall be 300 Series stainless steel.

b. Anchors: Concealed anchors shall be aluminum, zinc plated steel (after fabrication) per ASTM B633 or ASTM A123, stainless steel or carbon steel painted (after fabrication) with zinc chromate or other acceptable primers not containing lead. Exposed anchors shall be aluminum or 300 Series stainless steel.

c. Aluminum that is not protected by an organic coating shall be insulated from direct contact with steel, masonry, and non-compatible materials by a suitable insulating materials.

4. Pressure Plate:

a. Material shall be fiberglass composite with a flexural strength of 82 ksi (565 mpa) along the lineal's major axis.

b. Material thermal conductivity shall be no more than 2 BTU-in/hr-ft^2. °F (0.289 W/m^2-k).

5. Operable Vents: Thermally broken zero/low sightline storefront vent system, EFCO WV430 or equal.

a. Units to be structural silicone glazed per manufacturer's requirements.

b. Hardware, operators and screens shall conform to specification for aluminum windows under Article 2.02, paragraphs B.7-9.

6. Primary sealant at perimeter of curtainwall system shall be ultra-low modulus silicone rubber sealant, Dow Corning 790, or approved equal, meeting the following minimum requirements:

a. TT-S-001543A (COM-NBS) Class A.

b. TT-S-00230C (COM-NBS) Class A.

c. ASTM C-290 Type S, grade NS, Class 50, Use T, NT, M, G, A, O.

d. SCAQMD, Rule 1168 for low VOC sealants.

e. Primer shall be of a type as recommended by the manufacturer of the sealant. Primers shall be non-staining.

f. Joint beads shall be closed-cell polyethylene foam rod or closed-cell polyurethane foam rod, 1/3 greater in diameter than joint width. Beads shall be Tremco Backing, or equal, as recommended by the sealant manufacturer.

7. Finish and color shall be as specified under paragraph 2.02, B,9.

2.04 ALUMINUM STOREFRONT FRAMING

A. Interior storefront system shall be single glazed screw spline block (shear block at doors).

1. EFCO Series 402 (Flush Glazed Screw Spline), Wausau 1400 Series, AW 1700 series or approved equal.

B. General

1. All aluminum frame extrusions shall have a minimum wall thickness of .080 inches (2 mm).

2. All exposed work shall be carefully matched to produce continuity of line and design with all joints. System design shall be such that raw edges shall not be visible at joints.

C. Frame

1. Depth of frame shall not be less than 4 ½ inches (114 mm).

2. Face dimension shall not be less than 2 inches (50 mm).

D. Glazing

1. All units shall be “dry glazed" with gaskets on both exterior (as applicable) and interior of the glass.

E. Finish and Color

1. Shall be as specified under paragraph 2.02, B.9.

2.05 HINGED STILE AND RAIL DOORS

A. Except as otherwise specified, doors shall be EFCO Thermastile, thermally broken, Heavy Duty Series single acting aluminum, or approved equal, as noted below.

1. Wide stile exterior doors shall be EFCO D-502 wide stile (5 inches), thermally broken single action aluminum or approved equal.

2. Wide stile interior doors shall be EFCO D-518 non-thermal single action aluminum door or approved equal.

B. General: Refer to the Drawings for location and details.

C. Materials

1. Extrusions shall be 6063-T5 alloy and temper (ASTM B221 alloy G.S. 10A-T5). Major portions of the stiles shall be .1875 inches thick. Glazing beads shall be .050 inches thick, square edge. Stiles and rails shall be 2 inches deep.

a. Dimensions – Wide Stile Doors: 5 inch vertical stiles, 5 inch top rail and 10 inch bottom rail.

b. Refer to the drawings for sizes of intermediate horizontal rails.

2. Fasteners, where exposed, shall be aluminum, stainless steel or plated steel in accordance with ASTM A164. Perimeter anchors shall be aluminum or steel, providing that the steel is properly isolated from the aluminum.

3. Finish shall be as specified under paragraph 2.02, B,9.

4. Hardware – Shall be furnished under SECTION 087100-FINISH HARDWARE for installation under this Section.

5. Weatherstripping – Shall be manufacturer's standard for the various installation conditions. Weatherstripping shall be applied to door jambs, head, meeting stile and bottom rail.

6. Frame – Aluminum extrusions and stops integral with systems specified herein.

7. Prepare doors and frames required and install intrusion alarm system contacts specified under SECTION 260001-ELECTRICAL.

8. Threshold –aluminum mill finish meeting MAAB access requirements, width required by installation conditions.

2.06 PREFINISHED ALUMINUM SILLS, INFILL PANELS & TRIM

A. Prefinished window sills shall be .090 inches thick, fabricated in the profiles shown on the drawings. Provide end caps where sills project from the face of the adjacent cladding. End caps shall be .090 inches thick. End caps shall be factory (AC-TIG) welded and ground smooth before finishing; mechanically fastened and sealant at seams such that seams are tight and rivets are not visible in installed condition; or brake formed from sill sheet with top seam folded and side and bottom seams sealed. All sills shall be fabricated in the same manner per the approved shop drawings.

B. Prefinished closure panels and insulated aluminum infill panels at curtainwall:

1. Where panels are glazed into the curtainwall glazing pocket, the outward face shall be pre-finished .125 inch aluminum with 2” rigid insulation core sandwiched between outward face and minimum 20 gauge inner aluminum closure sheet.

2. Where panels are mechanically fastened to curtainwall frames, closure panel shall be minimum .125 inch prefinished aluminum . All exposed fasteners shall be countersunk and shall match panel finish. Install semi-rigid insulation behind closure panels where shown on the drawings.

C. Panning and extended subframe trim shall be extruded with caulkstops in profiles shown on the drawings.

D Flashings and miscellaneous trim – factory formed from 3003H-14 solid aluminum sheets to profiles indicated on the Drawings.

1. Gauges of flashings and miscellaneous trim shall be .050 inch thick unless otherwise noted. Running trim shall be supplied in minimum 10 foot lengths.

2. Concealed receiver strips, cleats, clip strips, and similar items. shall be factory formed from aluminum in gauges recommended by the manufacturer. Fasteners shall be non-corrosive. Fasteners shall be concealed unless otherwise shown on the Drawings. Exposed fasteners shall match panel color and shall be of type approved by the Architect.

3. Min. 20 gauge aluminum sheet metal back pan at concealed locations as shown on the Drawings.

E. Finish and Color of all sills, panels & trim – shall be as specified under paragraph 2.02,B.9.

2.07 GLASS PANELS

A. General – Glass shall be of domestic manufacture conforming to the ASTM C-1036 (latest edition), Standard Specification for Flat Glass, and ASTM C-1048 (latest edition), Heat Treated Flat Glass as manufactured by Pittsburgh Plate Glass Company (PPG), Libbey-Owens-Ford Company (LOF), American Saint-Gobain Corporation (ASG), Viracon, Guardian Industries or an approved equal. All glass shall be factory fabricated, labeled on each panel stating the strength, type, thickness, and quality. Labels shall remain on glass until final cleaning. Refer to the Drawings for locations of glass types and thicknesses.

1. All glass supplied under this SECTION shall be by the same manufacturer.

2. All spandrel glass supplied under this SECTION shall be by the same manufacturer.

B. Types

1. **Type 1** (Float Glass) – ¼ inch thick, clear, glazing quality float glass as manufactured by PPG, LOF, ASG, or an approved equal to be used at interior applications only.

2. **Type 2** (Laminated Safety Glass) to be used at interior applications only – ¼ inch thick, laminated safety glass, comprised of two layers 1/8 inch clear glazing quality float glass with .060 in PVB. laminating interlayer. Glass shall be as manufactured by PPG Herculite, LOF Tuf-Flex, ASG Tru-Temp, or an approved equal.

3. **Type 3** (Insulated "Low-E" Glass) – One-inch thick units comprised of ¼-inch thick clear float glass inner and outer lights separated by metal or organic spacers, double hermetically sealed with No. 3 surface receiving 'soft' Low- E coating with 90% Argon, 10% air between lights, or an approved equal as follows:

a. North and East elevations: Solarban 60, having 70% visible light transmittance, ASHRAE winter/summer U-value of .25/.22, shading coefficient of .43, solar heat gain coefficient of .37 and light to solar gain ratio of 1.88.

b. South and West elevations: Solarban 70XL, having 64% visible light transmittance, ASHRAE winter/summer U-value of .24/.21, shading coefficient of .31, solar heat gain coefficient of .27 and light to solar gain ratio of 2.37.

4. **Type 4** (Insulated "Low-E" Tempered Glass) – One-inch thick units, comprised of ¼-inch thick clear tempered safety glass outer light, ¼-inch thick clear tempered safety glass inner light, separated by metal or organic spacers, and double hermetically sealed with No. 3 surface receiving soft "Low-E" coating with 90% Argon, 10% air between lights or an approved equal. Units shall comply with SIGMA Class A.

   a. Large Lights – Where dimensions exceed those recommended by glass manufacturer for ¼- inch thick glass, one-inch thick insulated units shall be comprised of 3/8 inch clear tempered inner and outer lights.

   b. Provide Solarban 60 at north and east elevations and Solarban 70XL at south and west elevations per Article 2.07.B.(3).

5. **Type 5** (Insulated Spandrel Glass) – One-inch thick units comprised of ¼ inch strengthened glass having a solid color ceramic frit bonded to the inner surface (No. 2) of ¼ inch clear strengthened glass, separated by metal or organic spaces, and hermetically sealed with No. 3 surface receiving soft "Low-E" coating (Solarban 70XL) with 90% Argon, 10% air between lights or an approved equal. Units shall comply with SIGMA Class A.

6. **Type 6** – Not Used.

7. **Type 7** – Not Used.

8. **Type 8** – Not Used.

9. **Type 9** (Tempered Insulated Translucent "Low-E" Glass) – Where shown on the Drawings, light diffusing and insulating glass, one inch thick overall.

   a. To establish a level of quality, function and design, the Specifications and Drawings are based on Okalux by Schott. Similar products by Advanced Glazings or others will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

b. Okalux light diffusing and insulating glass with Low-E coatings (hard coat on #4 surface) as required for the specified performance. Units shall be comprised of insulating glass units which incorporate a capillary slab fiber optic tube structure within the insulating glass cavity, and having the following thermal and light transmittance characteristics:

1) Direct light transmittance: minimum 50%

2) Diffuse light transmittance: minimum 40%

3) Visible light transmittance (VLT): minimum 50% (or 1.25 times SHGC)

4) Solar Heat Gain Coefficient (SHGC): 40% maximum

5) U-Valve (C.O.G.): 36 or less

6) VLT/SHGC Ratio: 1.25 minimum

c. Solera glass-based light diffusing units by Advanced Glazings, Limited comprised of insulating glass units which incorporate translucent veils attached to both glass surfaces or other equal meeting the same performance characteristics listed in above paragraph b.

10. **Type 10** (Insulated Tempered High Reflectivity (Mirror) Low-E Glass) – One-inch thick units comprised of ¼-inch thick clear tempered safety glass outer lite, ¼-inch thick clear tempered safety glass inner lite, separated by metal or organic spacers and double hermetically sealed, with reflective Low-E coating on the No. 2 surface and 90% Argon, 10% air between lights, or an approved equal. Units shall comply with SIGMA Class A.

a. High Reflectivity (Mirror) Low-E coating, all orientations: Solar Ban R100, having 42% visible light transmittance; winter U-value of .25; solar heat gain coefficient of .23; light to solar gain ratio of 1.83 and exterior reflectance of 32%; or equal.

11. **Type 11** (Tempered, Insulated, Optic Core, Light Diffusing, Low-E Glass) – Where shown on the Drawings, light insulating, light diffusing one inch units with an optic core that permits clear vision from the interior at eye height and limits direct sunlight and glare.

a. To establish a level of quality, function and design, the Specifications and Drawings are based on Clearshade by Panelite. Similar products such as Kapilux by Okalux or others will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

b. Units shall be comprised of insulating glass units with low-E coating on #3 surface which incorporate plastic honeycomb, transparent fibers, or fixed thin louvers to control solar gain, minimize glare and permit clear vision through the glazing unit within the insulating glass cavity. Core shall be equal to Clearshade "random mix" TTWR3 and have the following thermal and light transmittance characteristics:

1) **Total Direct Light** (0 angle) = 69.9% per LBNL WINDOW 7.6

2) **Total Diffuse Light** (0 angle) = 70% per ASRAE Standard 74-1998: Method for Measuring Solar-Optical Properties of Materials.

3) **VLT** = 69.9% – 8% variable based upon sun angle.

4) **SHGC** = 59% – 8% variable based upon sun angle

5) **U-Value** = 0.33

6) **VLT/SHGC** = 7.37 (10° angle VLT / 80° angle SHGC)

12. **Type 12** (1/2" Clear Laminated Glass) – At acoustic assemblies as indicated on the drawings. ½ inch thick, laminated (two sheets 1/4" with laminating interlayer), clear, glazing quality float glass as manufactured by PPG, LOF, ASG or an approved equal to be used at interior applications where acoustic separation is required as indicated on the drawings.

13. **Type 13** (Insulated Laminated Acoustic Glass) – One inch thick unit comprised of 1/4" thick (two sheets 1/8" with laminating interlayer) laminated glass at both lites, separated by metal or organic spacers and hermetically sealed. Units shall comply with Sigma Glass A. To be used at interior locations where a high level of acoustic separation is required as indicated on the drawings.

2.08 GLAZING MATERIALS AND ACCESSORIES

A. Hybrid Butyl Tape – Preformed, reinforced, self-adhering Hybrid butyl, containing 100 percent solids, black in color. Tape shall be 440 by Tremco, GT-304 by CRL Co., MB-10A by GSSI Sealants or an approved equal. Tape shall be 3/8-inch wide by 3/16-inch minimum thickness, depending on glass thickness. Refer to FGJA Manual, latest edition, for determination of actual clearance required between glass and receiving members.

B. Glazing Sealant – Tremco Spectrum 2 or approved equal, a one-part silicone confirming to:

1. TT-S-00230C (COM-NBS), Type II, Class A

2. Class A TTS-001543A (COM-NBS), Class A

3. ASTM C 920-79, Type S, Grade NS, Class 25, Use NT, M, G, A and O.

4. SCAQMD, Rule 1168 for low VOC sealants.

C. Setting Blocks and Wedges – Made from resilient materials such as Neoprene with 70-90 durometer hardness for setting blocks and 40-50 durometer for wedges.

D. Foam Glazing Tape – Norseal V786 by Saint Gobain, Series V800 by Gaska Tape, ARclad 2000 Series by Adhesive Research or an approved equal. Tape shall be pressure sensitive one side closed cell vinyl foam, 1 ½ inches wide (min) x 3/16 inches thick.

E. Neoprene Wedge Gasket – Precision extruded neoprene "Poly-Wej" gasket as manufactured by Tremco or an approved equal.

F. Glazing Gaskets – Resilient EPDM elastomeric extrusions of 70 +/-5 Durometer, of the profiles recommended by the aluminum curtainwall and entrance framing system manufacturer for dry/pressure glazing.

2.09 PANNING, SUBSILL, MUNTINS, MULLIONS SYSTEMS

A. Subframe – Subframe shall be extruded to match the shapes and profiles shown on the architectural drawings. Subframe extensions shall be an integral part of the subframe extrusion. Subframes shall be factory tooled at head to jamb and jamb to sill connections. Field fabrication of subframe joints shall not be acceptable. Sub sills shall be end dammed. End dams shall be 6 inches tall 0.0625 aluminum and shall be mechanically fastened and sealed to sill. NOTE: Custom dies or customization of existing products and accessories may be required to satisfy the performance of aesthetic requirements of this project. No product or accessory shown on the Drawings or described herein is the exclusive property of any particular Manufacturer.

B. Mullions- Horizontal transition mullions shall be extruded to match the depth and sightlines indicated on drawings. Horizontal transition mullions shall be thermally broken with reinforced nylon struts, and shall be flush and in the same plane as the window system. Vertical mullions at curtainwalls shall be designed to, both, wind load and accept the attachment of sunshades. If sunshades are not provided by the metal window manufacturer, the metal window manufacturer must provide engineering data that verifies that the window system shall support the sunshades in response to the specified wind and snow loads.

C. Anchors

1. Provide concealed anchors of a type recommended by the window manufacturer for the specific type of construction. Anchors and fasteners shall be compatible with the window and the adjoining construction and in accordance with manufacturers recommended spacing and location.

2.10 SEALANT AT PERIMETER JOINTS

A. Materials

1. Sealant at perimeter joints at window, curtainwall and storefront systems and adjacent materials shall be 790 Ultra-low Modulus Silicone Building Sealant by Dow Chemical, 890 NST Silicone Sealant by Pecora, Spectrem 1 Silicone Sealant by Tremco or an approved equal, meeting the following minimum requirements:

   a. TT-S-001543A (COM-NBS) Class A.

   b. TT-S-00230C (COM-NBS) Class A.

   c. ASTM C-920 Type S, Grade NS, Class 50, USE T, NT, M, G, A, O.

   d. SCAQMD, Rule 1168, for low VOC sealants.

2. Primer shall be of a type as recommended by the manufacturer of the sealant. Primers shall be non-staining.

3. Backer Rod – Closed-cell polyethylene foam rod or closed-cell polyurethane foam rod, 1/3 greater in diameter than joint width. Backer rod shall be Tremco Backing, Sonolastic by BASF, HBR by Nomaco or an approved equal.z

B. Materials (Caulking)

1. Caulking Material – Pecora Acrylic Latex Caulk AC-20, Tremco Tremflex 834, Bostik Findley Chem-Calk 600, or an approved equal, in color as selected by the Architect.

2. Primer – Of a type as recommended by the manufacturer of caulking material and shall be non-staining.

3. Joint Beads – As specified herein for sealant materials.

2.11 INTERNAL SEALANT AT WINDOW, CURTAINWALL AND STOREFRONT SYSTEMS AND AIR AND VAPOR BARRIER

A. Sealant: Provide internal transition sealant between window, curtainwall and storefront systems and air and vapor barrier membrane consisting of extruded low-modulus silicone sheet and silicone sealant designed to adhere to polyethylene side of air and vapor barrier membrane and adjacent material. Provide the following materials as acceptable to the manufacturer of the air barrier membrane.

1. Cleaning Agent: Toluene.

2. Silicone Sealant: Low modulus single component silicone sealant compatible with polyethylene side of air and vapor barrier membrane (furnished and installed under SECTION 071326-AIR AND VAPOR BARRIERS.

3. Sealant shall be 790 Silicone Building Sealant as manufactured by Dow Coring, 890 NST Silicone Sealant as manufactured by Pecora, Spectrem 1 Silicone Sealant as manufactured by Tremco or an approved equal meeting the low VOC requirements of SCAQMD, Rule 1168.

B. Transition Membrane: To provide an air barrier between the membrane and adjacent materials (window, curtainwall and storefront systems), provide transition materials consisting of custom formed aluminum sheet, extruded low-modulus silicone sheet and silicone sealant designed to adhere to polyethylene side of membrane and adjacent material. Provide the following materials as acceptable to the manufacturer of the air barrier membrane.

1. Cleaning Agent: Toluene.

2. Silicone Sheet: SIL-SPAN Preformed Silicone Profiles by Pecora or ULTRASPAN Weatherstripping by General Electric. Provide preformed corners.3. Silicone sealant: Low modulus single component silicone sealant compatible with sealants furnished and installed under 2.14.A.

4. Formed aluminum sheet for inserting in curtainwall glazing channel as shown on the drawing.

2.12 SAFETY AND SECURITY GLAZING FILM

A. Manufacturers: To establish a standard of quality, design and function, specifications are based on Ultra S800 Safety and Security Film by 3M. Similar film manufactured by Lumar, GLOBAL, Madico or others will be considered for approval as an equal by the Architect upon receiving adequate supporting data and samples.

B. Optically clear, micro-layered tear resistant film, nominal thickness 8 mil applied to interior surface of glass lights to hold the glass in the window frame in the event of a forced entry attempt.

C. Physical Properties:

Tear Resistance – 1,200 lbs. %
Tensile Strength – 28,000 PSI
Break Strength – 224 lbs./in.
Elongation at break – 130%
Peel Resistance – >8 lbs./in.
Abrasion Resistance – <5%

2.13 NOT USED

2.14 UV PROTECTION FILM

A. Manufacture: To establish a standard of quality, design and function, Specifications are based upon 3M “Prestige Sun Control”. Similar film manufactured by ContraVision, Gila or others will be considered by the Architect for approval upon receipt of adequate supporting data and samples.

B. Characteristics: Optical clear

2.15 INTERIOR SECURITY TRANSACTION WINDOW

A. Manufacture: To establish a level of quality, design and function, interior transaction window is based on AVT Bullet Resistant Transaction Window by Insulgard Security Products. Similar transaction windows by InterBack Equipment, TBS, or other manufacturers will be considered by the Architect as an equal upon submission of adequate supporting data.

B. Features:

1. Extruded aluminum rails with natural voice transmission system utilizing holes at the sides of rails.
2. UL Listed Level 3
3. Stainless steel deal tray to be recessed in countertop.

C. Size: Custom size as shown on the Drawings. Up to a maximum of 36 in. wide x 68 in. high.

2.16 ALUMINUM SLIDING DOOR SYSTEM

A. To establish a standard of quality, design and function, manufacture has been based on Facade 2820 Series Custom Architectural Sliding Mall Front by Arcadia, Inc., Vernon, CA. Similar sliding doors by Sliding Door Company, NY, NY, La Cantina Doors, Oceanside, CA or others will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

B. Sliding Door Framing:

1. Members shall be 1-3/4 inch deep, with face dimensions as follows:
   a. Vertical stile: 5 inch
   b. Top rail: 6 11/16 inch
   c. Bottom rail: 6 11/16 inch
   d. Mid rail: 4-1/2 inch
2. Major portions of the door stiles shall be a nominal .125 inch and glass stops shall be .050 inch thick.

C. Materials and Accessories

1. Door members: Extruded 6063-T6 aluminum alloy (ASTM B221 – Alloy G.S. 10aT5).
2. Screws, fastening devices, and internal components: Aluminum, stainless steel, or zinc plated steel in accordance with ASTM A-164 shall be aluminum or steel, providing the steel is properly isolated from aluminum.
3. Glazing Gasket: compression-type design.

D. Hardware

1. Hardware for Sliding Mall Front shall be furnished and installed by the manufacturer and shall include the following standard hardware:
   a. Weatherstripping: A hard-backed polypile weatherstrip shall be installed in frame and interlockers and meeting stiles of bi-parting doors. Sliding panel supplied with double sweep at sill.
   b. Sill track: stainless steel cap.
   c. Tandem ballbearing caster.
   d. Adams Rite maximum security lock. (2) Flush Bolt 1870 Series.
   e. Cylinders (interior and exterior).
   f. Flush face pull at each door.

E. Door Fabrication

1. Stiles and rails shall be tubular sections accurately joined, flush and hairline at corners with heavy concealed reinforcement brackets secured with machine bolts, with optional MIG weld. Exposed screws not permitted.
2. Prepare internal reinforcement for hardware.
3. Custom hardware templates and physical hardware must be submitted prior to any fabrication.

F. Finish as specified under paragraph 2.02, B 9. Color shall be selected from the manufacturer's full range of colors.

PART 3 EXECUTION

3.01 ERECTION

A. Install all items furnished hereunder in strict accordance with the approved shop drawings and manufacturer's specific recommendation, coordinating the installation with the project conditions.

B. Carefully check all receiving openings and where necessary request the General Contractor to correct any conditions which may be detrimental to proper installation and performance of the windows and doors. Commencement of installation work shall be construed as acceptance of the openings by the Metal Window Subcontractor.

C. Provide and install all of the required anchors, clips, reinforcing members, screws, nuts and bolts and anchorage materials to provide a proper installation.

D. Fill window frames and panning trim with insulation.

E. Plumb and align window faces in a single plane for each wall plane. Erect square and true. Anchor to maintain position when subjected to normal thermal and building movement, seismic forces and specified wind loads. Apply internal sealants and primary weather seal to provide watertight installation. Internal soft joints shall be provided in all exterior window systems and curtainwall systems with vertical slip connections to the supporting structure. Not applicable at windows supported by cold formed metal framing.

F. Check all installation anchorage items, and ensure that all such times have been properly set, firmly anchored to adjacent construction, and without unnecessary projections beyond frame, door, or hardware surfaces.

G. Upon completion of erection work clean all aluminum surfaces free from finger marks, dirt, and other foreign matter, using cleaning procedures recommended by the materials manufacturer.

H. Adequately anchor sunshades to maintain positions permanently when subjected to normal thermal movement, specified building movement, and specified wind, snow and dead loads.

3.02 INSTALLATION – ALUMINUM TRIM

A. Do not proceed with work until substrate construction is completed. Inspect substrate and verify substrate complies with allowable tolerances and shop drawing layout. Cooperate following with trades responsible for installation of adjacent construction.

B. Comply with SMACNA requirements unless otherwise indicated by the Contract Documents. In case of conflict, most stringent standards shall govern.

C. Install prefinished trim items and sealant materials in accordance with the approved shop drawings and the manufacturer's written instructions.

1. Clip strips, cleats, and other similar items shall be continuous along length of preformed cladding.

2. Fasteners shall be concealed. No exposed fasteners will be accepted in the finished work. Do not use face nailing on exposed surfaces. Space fasteners per manufacturer's recommendations.

3. Hem exposed edges 1/2 inch.

4. Butt ends of running trim, keeping a 1/8 inch gap at ends (1/4 inch at lengths of 10 feet). Install 6 inch minimum splice plate behind joint, with full sealant bed at each side of joint.

D. Protect factory finish from damage during installation. Field touch-up marred finish and field cuts to match factory finish.

3.03 GLAZING

A. General

1. All glazing labor shall be performed in accordance with the standards of the FGJA Glazing Manual, latest edition, and materials manufacturer's recommendations. Unless specifically expected hereinafter, all general conditions shall apply. Refer to drawings for details of installation.

2. Glass clearance dimension shall be based on the type and thickness of the glass as determined by the FGJA Glazing Manual and as hereinafter specified.

3. Surfaces shall be dry and free from dust, or other foreign materials before glazing. Clean all surfaces with cloth saturated with mineral spirits of high-flash naptha as recommended by glazing sealant manufacturer, before glazing. All glass shall be set with the wave parallel to the sill, without springing and proper clearance at all edges.

4. Maintain centered position of glass with setting blocks at sill, and shims or splicers on all four sides wherever glass dimensions are larger than 50 unit inches unless otherwise specified herein.

5. Check all openings, prior to glazing, to make certain that the opening is square, plumb, and secure in order that uniform face and edge clearances are maintained. Inspect all butt and miter joints and remove all projections from fixed rabbets.

6. All glass shall be factory installed to the greatest extent possible.

B. Installing Glass in Interior Glazed Aluminum Windows Where Aluminum Snap-On Glazing Beads Are Provided (Wet System)

1. After surfaces receiving the butyl glazing tape are cleaned and wiped dry, apply pre-shimmed butyl tape to fixed rabbet leg, setting tape 1/8 inch below the top of the rabbet leg. Tape is butted together, paper backing is removed, and butted corners dabbed with sealant to assure a positive seal.

2. Apply a continuous toe bead along the bottom edge of the glazing tape. Place setting blocks at quarter points. Position the lite of glass and firmly press to make contact with tape. Install glazing stops and neoprene gasket.

3. Install a gun applied cap bead of silicone sealant above the glazing tape, between the exterior glass face and the rabbet leg. Tool excess sealant to a slight angle.

C. Installing glass in aluminum framing system where extruded aluminum pressure plates and covers are provided (Dry/Pressure System).

1. Install glass and setting blocks, and glazing gaskets, extruded pressure plates and covers as per the written instructions of both the aluminum framing system manufacturer and insulated glass manufacturer.

3.04 INSTALLATION OF SILICONE SEALANTS AND LATEX CAULKING MATERIALS

A. Thoroughly clean all joints, removing all loose mortar, oil, grease, dust, frost, and other foreign materials which will prevent proper adhesion. Apply masking tape to each exposed surface of joints. Rake out joints to properly receive new sealant.

B. After cleaning, and if so recommended by the materials manufacturer, apply primer to all joint surfaces, taking care not to stain adjacent surfaces.

C. Install joint bead back-up in all joints in excess of 5/8 inch depth (from face of wall to edge of compressible joint filler), and joints which have no back-up therein, placing the joint bead in the joint in a manner which shall assure a constant depth 1/8 inch greater than the sealant and caulking material depth tolerances specified hereunder. Set beads into joints continuously, by slightly stretching during placement, to permit compression against sides of joint, without surface wrinkles or buckles.

D. Apply sealant material in joint using a hand caulking gun or power gun with a gun nozzle of proper size and sufficient pressure to completely fill joints. The depth of sealant materials shall be in accordance with the recommendations of the materials manufacturer for the specific joint function but in no case shall exceed 5/8-inch depth, not be less than 1/4 inch, regardless of the width of the joints; and outer edge of sealant material shall be kept back 1/8 inch from face of wall. Tool with a dry or water-wet tool only. Do not use detergents or soapy water for tooling operations. Joints shall be given a slight concave surface. Remove masking tape immediately after tooling and/or before sealant and caulking material has taken initial set.

E. Do not apply materials when temperatures are below 40 degrees F. without prior approval of the Architect.

F. Primer, if used, shall be maintained within the joint area and not allowed to overlap any adjacent surface.

3.05 SECURITY GLAZING FILM

A. At exterior windows and curtainwall where any part of the glass pane is ≤ 4 ft. above finished grade, entire pane shall be protected with security glazing film. Apply film to innermost surface of all such exterior windowpanes. Film shall be applied in accordance with the security film manufacturer's requirements.

3.06 UV FILM

A. Apply film to innermost surface of all lites of curtainwall adjacent to feature wall display installation in the lobby as shown on the drawings.

3.07 CLEANING

A. Upon completion of the glazing installation, remove all protective covering and thoroughly clean all glass and aluminum surfaces free from dirt and erection marks.

END OF SECTION

SECTION 080002

GLASS AND GLAZING

*(Filed Sub-Bid Required)

PART 1 GENERAL

1.00 TIME, MANNER AND REQUIREMENTS FOR SUBMITTING SUB-BIDS

A. Sub-bids shall be submitted in accordance with provisions of the General Laws (Ter. Ed.), Chapter 149, Section 44A to 44L, inclusive, as amended. The time and place for submission to Sub-Bids shall be set forth under INSTRUCTIONS TO BIDDERS.

B. Each Sub-Bid filed with the Awarding Authority must be accompanied by BID BOND, or CERTIFIED CHECK, or a TREASURER'S CHECK or CASHIER'S CHECK issued by a responsible bank or trust company, payable to the **City of Amesbury** in the amount stipulated in the INSTRUCTIONS TO BIDDERS. A Sub-Bid accompanied by any other form of bid deposit than those specified will be rejected.

C. Each Sub-Bid submitted for the work, under this SECTION, shall be on a form furnished by the Awarding Authority, and required by SECTION 44F of Chapter 149 of the General Laws, as amended.

D. Work to be performed under this SECTION is shown on Contract Drawings numbered:

G.0.01, G.0.02, G.0.04-G.0.08, inclusive; 3.4.01-3.9.15, inclusive; 4.1.01-5.2.07, inclusive; and 5.4.01-5.4.11, inclusive.

Remaining Contract Drawings are included for reference and coordination.

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a sub-bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following items required to complete the work of this SECTION, as shown on the Drawings and specified herein:

1. Glass and glazing panels for the following:
    a. Vision panels at wood and hollow metal doors.
    b. Fixed interior hollow metal sidelights, transoms, borrowed light frames ~~and interior hollow metal windows~~.

2. Foam glazing tape, glazing compound, extruded silicone gaskets and other related glazing accessories, except as otherwise specified hereunder.

3. Acoustical glass.

B. Install the following as furnished by the designated SECTIONS:

1. Metal glazing beads for pressed steel frames: SECTION 081113-HOLLOW METALWORK.

2. Glazing beads for wood doors: SECTION 081416-WOOD AND PLASTIC DOORS.

3. Glazing beads for partition transoms: SECTION 062000-FINISH CARPENTRY.

C. This Subcontractor shall furnish, install and maintain in safe and adequate condition all lifts, hoisting, staging and scaffolding that are necessary for the proper execution of the work of this SECTION.

D. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. For all adhesives and sealants, meet the requirements for IEQ Credit 2, Low-Emitting Materials and as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Standard sized framed mirrors: SECTION 102813-TOILET AND BATH ACCESSORIES.

2. Final cleaning of glass and aluminum after cleaning specified herein: SECTION 017700-PROJECT CLOSEOUT.

3. Glazing of aluminum windows, storefronts and pressure wall systems: SECTION 080001-METAL WINDOWS.

4. Glass display case doors and shelving: SECTION 062000-FINISH CARPENTRY.

5. Ornamental glass guard rail system at floor openings: SECTION 050001-MISCELLANEOUS AND ORNAMENTAL IRON.

6. Hollow metal doors and frames and wood doors, respectively: SECTION 081113-HOLLOW METALWORK and SECTION 081416-WOOD AND PLASTIC DOORS.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with the requirements of SECTION 013300-SUBMITTALS.

B. Shop drawings shall show the various methods of glazing and a complete schedule of the locations of the various types of glass and thickness.

C. Include complete details of glazing accessories, sizes, and proposed methods of attachment.

D. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentations required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENETS.
3. Product substitution requests are subject to additional LEED-S submittal requirements, see SECTION 012500-SUBSTITUTION PROCEDURES.

E. Submit the following samples in accordance with the requirements of the SECTION 013300-SUBMITTALS.

1. Each type of glass and mirror – 4 x 4 inches.
2. Glazing tape and gaskets – 4-inch length of specified types.
3. Setting blocks – two (2).

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4 MATERIALS REPORT FORM shall be submitted for all materials in this SECTION:

1. Furnish any adhesives and sealants such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.

3. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.

2.01 GLASS

A. General – Glass shall be of domestic manufacture, conforming to the ASTM C-1036-90, Standard Specification for Flat Glass, and ASTM C-1048-90, Heat Treated Flat Glass, as manufactured by Pittsburgh Plate Glass Company, Libbey-Owens-Ford Company, American Saint-Gobain Corporation or an approved equal. All glass shall be factory labeled on each panel stating the strength, type, thickness, and quality. Labels shall remain on glass until final cleaning. Refer to the Drawings for locations of glass types and thicknesses.

B. Types

1. Float Glass – ¼ inch, clear, glazing quality float glass, as manufactured by PPG, LOF, ASG or an approved equal.

2. Clear Laminated Safety Glass to be used at interior applications only – ¼ inch thick, laminated safety glass, comprised of two layers 1/8 inch clear glazing quality float glass with .060 in. PVB laminating interlayer. Glass shall be as manufactured by PPG Herculite, LOF Tuf-Flex, ASG Tru-Temp, or an approved equal.

3. 1 Hour Fire Rated Glass – To establish a level of quality, function and design, the Specifications and Drawings are based on TGP/Pinkington, Snoqualmie, WA (Pyrostop) laminated fire rated glass. Similar products by Safti-first, Brisbane, CA (Pyran Platinum L); Vetrotech, Corrbevoie, France or other manufacturers will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

4. Acoustical Glass – ½" laminated clear acoustic glass comprised of two sheets of ¼" with laminated interlayer as manufactured by PPG, LOF, ASG or an approved equal.

5. Clear Laminated Glass – 3/8 inch.

2.02 GLAZING MATERIALS AND ACCESSORIES

A. Hybrid Butyl Tape – Preformed, reinforced, self-adhering Hybrid butyl, containing 100 percent solids, black in color. Tape shall be 440 Butyl Tape by Tremco, GT-304 Butyl Tape by CRL Co., MB-10A Butyl Tape by GSSI Sealants or approved equal. Tape shall be 3/8-inch wide by 3/16-inch minimum thickness, depending on glass thickness. Refer to FGJA Manual, latest edition, for determination of actual clearance required between glass and receiving members.

B. Glazing Sealant – Dow Corning 790, GE SilPruf LM SCS2700, Tremco Spectrum 1 or approved equal, a one-part silicone conforming to ASTM C 920 with a VOC content of 250g/L or less when calculated according to 40 CFR 59, Subpart D (EPA method 24).

1. Extruded silicone gaskets as manufactured by CCRL Laurence Co. Inc. or an approved equal may be used at interior butt glazing of transom glass.

C. Setting Blocks and Wedges – Made from resilient materials such as Neoprene with 70-90 durometer hardness for setting blocks and 40-50 durometer for wedges.

D. Foam Glazing Tape – Foam tape shall be Norseal V786 Foam Tape as manufactured by Saint-Gobain, Series V800 Tape by Gaska Tape, Inc., ARclad 2000 Series by Adhesive Research or an approved equal. Tape shall be pressure sensitive one side closed cell vinyl foam, 1 ½ inches wide (min.) by 3/16 inches thick.

PART 3 EXECUTION

3.01 ACCEPTANCE OF INSTALLATION CONDITIONS

A. Be fully responsible for the proper execution and performance of the work described herein. Inspect all installation conditions and request the General Contractor to have corrected any conditions which may affect work adversely.

3.02 DELIVERY AND STORAGE

A. Deliver materials when and store in a safe location as directed. Do not unpack material until it is to be set, unless unpacking is required for inspection by the Architect.

3.03 GLAZING

A. General

1. All glazing labor shall be performed in accordance with the standards of the FGJA Glazing Manual, latest edition, and materials manufacturer's recommendations. Unless specifically expected hereinafter, all general conditions shall apply. Refer to Drawings for details of installation.
2. Glass clearance dimension shall be based on the type and thickness of the glass as determined by the FGJA Glazing Manual and as hereinafter specified.
3. Surfaces shall be dry and free from dust, or other foreign materials before glazing. Clean all surfaces with cloth saturated with mineral spirits of high-glass naphtha as recommended by glazing sealant manufacturer, before glazing. All glass shall be set with the wave parallel to the sill, without springing and proper clearance at all edges.
4. Maintain centered position of glass with setting blocks at sill, and shims or splicers on all four sides wherever glass dimensions are larger than 50 unit inches unless otherwise specified herein.
5. Check all openings, prior to glazing, to make certain that the opening is square, plumb, and secure in order that uniform face and edge clearances are maintained. Inspect all butt and miter joints and remove all projections from fixed rabbets.

B. Glazing for all interior doors and interior frames.

1. Place setting blocks at quarter points, for glass installation only. Apply continuous strip of foam tape around perimeter of glass and plastic with adhesive side of tape toward glass or plastic. Tape shall be turned into each surface of the glass or plastic to form a channel around the entire perimeter. Set glass and plastic in place and attach the glazing beads with sufficient pressure against the tape to compress the tape approximately seventy (70) percent of its original thickness. After applying glazing beads, trim off excess tape with razor blade, or other sharp tool, level with sight line.

C. Polished Edges

1. All glass where edges are exposed shall have ground and polished edges. Locations include, but not limited to the sliding windows at the main office reception area.

3.04 CLEANING

A. Upon completion of the glazing installation, remove all protective covering and thoroughly clean all surfaces free from dirt and erection marks.

END OF SECTION

SECTION 081113

HOLLOW METALWORK

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish the following items for installation under the designated SECTIONS:

1. Flush metal doors and pressed steel frames for doors, side lights, transoms borrowed light frames ~~and interior hollow metal window frames~~: SECTION 062000-FINISH CARPENTRY, for all locations.
2. Metal glazing beads for doors and frames: SECTION 080002-GLASS AND GLAZING.
3. Exterior thermal break hollow metal frames.
4. Internal reinforcing for required operations and applications.

B. Perform all cut-out work in doors and frames, and furnish and install all required reinforcing therein, from hardware templates provided under SECTION 087100-FINISH HARDWARE, and for intrusion alarm system magnetic contacts provided under SECTION 260001-ELECTRICAL.

C. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at “Silver” Level is an Owner Requirement. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. For all paints and coatings, meet the LEEDv4-S requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers’ product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Grouting of hollow metal frames built into CMU walls - SECTION 040001 -MASONRY.
2. Wood doors: SECTION 081416-WOOD AND PLASTIC DOORS.
3. Finish painting for items furnished hereunder: SECTION 090007-PAINTING.
4. Furnish and install glass and install glazing beads furnished hereunder: SECTION 080002-GLASS AND GLAZING.
5. Building-in of frame anchors: By trade responsible for wall and partition erection.
6. Application of hardware and installation of magnetic door contacts: SECTION 062000-FINISH CARPENTRY.
7. Wiring of magnetic door contacts and other low voltage devices in frames: SECTION 260001- ELECTRICAL.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with the requirements of SECTION 013300-SUBMITTALS.

B. Include a complete door, panel and frame schedule, large scale details of door, panel and frame construction, indicating all gauges, reinforcing, cut-outs, anchor clips, and anchors as well as certification from the manufacturer that all UL fire-resistive requirements for the required labels have been met. Indicate all seams and field joints on elevations and profile details.

C. Submit the following samples in accordance with the requirements of SECTION 013300-SUBMITTALS.

1. Corner section of typical welded steel frame, in specified thickness, showing reinforcing, welding and prime painting, all as specified hereunder.
2. Corner section of typical flush door construction, as specified hereunder.

D. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. Product substitution requests are subject to additional LEED-S submittal requirements. See SECTION 012500-SUBSTITUTION PROCEDURES.

1.05 CERTIFICATION

A. The metal doors and frames manufacturer shall submit the following certificate, signed by an officer of the company with the schedule:

"I certify that all materials listed on the attached schedules, to be supplied for the NEW AMESBURY ELEMENTARY SCHOOL, AMESBURY, MA site comply with specifications in all respects."

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Packaging

1. Doors shall be fully wrapped in corrugated cardboard, single-faced paper 42 pound with a 26-pound liner medium "B" flute, protecting all surfaces of the door. Flute shall run the full height of the door.
2. Wood strips, 3/8 inch by 2 inches commercial grade, finished one side for marking, extending 1/2 inch beyond the top and bottom of the door shall be temporarily applied to the edges of the door.
3. The corrugated cardboard and wood strip shall be held firmly in place by three 3/8 inch by 0.18 steel bands on each door.
4. Wood strips shall be marked clearly giving door type, size, hand, lock preparation and mark number. The metal banding shall not interfere with the marking.

B. Storage and Protection

1. Properly store and protect this material. Should the priming coat be faulty or rust or scale appear, clean exposed surfaces to bright metal and apply a suitable approved priming coat applied before finish painting.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Furnish any paints and coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in Subparagraph 2.04 of SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 DOORS

A. General - Refer to the Drawings for various types of doors, including sizes and fire resistive label ratings.

B. Manufacture - To establish a standard of quality and design desired, specification shave been based on the use of doors manufactured by the Steelcraft Manufacturing Company, Superior Steel Company, or the Republic Steel Corporation. Similar doors of other manufacturers will be considered for approval as an equal, by the Architect, upon receipt of adequate supporting data, including samples if requested and a certificate of compliance as specified hereunder.

C. Door Construction - Full flush, beveled on hinge and lock edges, fabricated with vertical edge joints completely filled and ground smooth, and meeting the following additional requirements:

1. Faces – 18-gauge stretcher-leveled steel for interior doors (unless otherwise noted) and 16-gauge galvanized stretcher-leveled steel for exterior doors.
2. Core - Kraft honeycomb, (foamed-in-place polyurethane for all exterior doors) or continuous steel reinforcing spaced not more than six inches on center with sound deadening insulation, as standard with the specified manufacturers. Exterior polyurethane core doors shall be max. U-value of 0.09 when tested in accordance with ASTM C-1363.
3. Hardware reinforcement - hinges, 8 gauge, minimum; closers, 10 gauge, minimum; locks, 10 gauge, minimum; kick plates, 18 gauge, minimum; all other hardware, 10 gauge, minimum.
4. Top and bottom weather caps - Flush, 18 gauge, minimum, fully welded to exclude water.
5. Glazing beads - Steel or aluminum, as standard with the manufacturer, with edges flush with faces.
6. Galvanizing for exterior doors – **G90** hot-dipped galvanized as specified hereunder and in accordance with ASTM A653.

7. Galvanizing for designated interior doors as identified herein – As shown on the Drawings and **G90** hot-dipped galvanized as specified hereunder and in accordance with ASTM A653.

8. Treatment and priming - As specified hereunder.

9. Underwriter's Laboratories label doors - Provide all modifications to specified door construction required by Underwriters' Laboratories, Inc. and National Board of Fire Underwriters, to meet required fire-resistive rating, and equip each door with the appropriate UL label identification plate.

10. Recycled Content – Steel shall be produced using a minimum 20% recycled content.

2.02 METAL FRAMES

A. General - Refer to the Drawings for sizes and profiles of frames, related items, and locations of pressed steel frames. Provide welded frames for all locations.

1. Refer to the Drawings for frames and sidelights in fire resistive rated assemblies requiring a Factory Mutual (FM) label.

B. Materials - Frames, reinforcements, anchors, anchor clips, and related items shall be fabricated from prime quality cold-rolled steel (galvanized for all exterior frames and for interior frames so noted), and where so indicated, all of the following minimum gauges:

1. Interior frames – 16-gauge steel.

a. All interior frames at areas designated under paragraph 2.03,A – 16-gauge **G90** galvanized steel in accordance with ASTM A653.

2. Exterior thermal-break frames – 14-gauge galvanized steel, **G90** in accordance with ASTM A653, hot dipped with continuous, three sided, bonded, non-conductive compression type weatherstripping.

3. Reinforcing channels, where shown, and in heads of frames 36 inches wide and greater, except where UL label requirements prohibit same – 12-gauge steel for steel frames.

4. Hinge, lock and strike reinforcement - 3/16-inch thick steel for steel frames.

5. Door closer reinforcement – 12-gauge steel for steel frames.

6. Floor clips - 3/16-inch thick steel for steel frames.

7. Frame splines - Same thickness as frames.

8. Glazing beads for steel frames, where indicated – 16-gauge steel.

9. Recycled Content – Steel shall be produced using a minimum 20% recycled content.

C. Construction

1. Frames shall be mitered, fully welded and ground smooth. Exposed surfaces of welded joints shall be dressed to produce invisible connections. Weld construction joints for full depth and width, or weld equivalent spline plates on unexposed faces of the frames.
2. Reinforcements, stiffeners, and base angle clips shall be welded to inside surfaces of frames.
3. The finished work shall be strong and rigid, neat in appearance, and free from warp and buckle. Miters shall be well formed and in true alignment.
4. Locate hardware cut-outs and reinforcing from templates obtained from the hardware supplier. Weld sheet steel dust covers over all cut-outs in frames to prevent contact of mortar with reinforcing and lock strikes.
5. Turn edges of frames to form retainers for anchors, where applicable.
6. Punch three holes in stop of strike jamb of door frames for application of silencers.
7. Before shipping, provide removable angle spreaders securely fastened to bottom of each jamb; do not remove until frames are secured in place.
8. Frames, for UL label doors, shall be constructed in strict accordance with the requirements of Underwriters' Laboratories for the designated fire rating and shall bear the UL identification plate for same.
9. Frames in one and two-hour rated construction shall be constructed in accordance with and shall bear the UL identification plate for same.

D. Anchorage

1. Anchor clips for frames in metal stud partitions: 12-gauge steel (3/16-inch thick aluminum for aluminum frames) Zee shaped clips, 1-1/2 inch upturned and downturned legs, of the sizes indicated on the Drawings, shop-welded to frames, for field attachment to metal studs. Anchors for masonry partitions shall be adjustable strap-type.
2. Floor clips for frames - 2 x 2-3/16-inch angles, full width of frame, and provided with two (2) holes for power-driven (or expansion type) attachment to the concrete floors.
3. Spacing of anchors - Provide four (4) anchors, anchoring bolts, or anchor clips, per jamb. For frames greater than 7 feet 6 inches in height, provide five (5) anchors, anchoring bolts, or anchor clips per jamb. Anchors shall be located 12 inches below the head and spaced equivalent from that point to floor.

2.03 GALVANIZING AND SHOP PRIMING

A. All exterior doors, frames, anchors, reinforcing, designated interior frames, and other related items therefore, shall be fabricated from zinc-coated steel. This coating shall consist of zinc applied by a hot-dipped process on both side of all base metals and in accordance with ASTM A653.

B. Zinc shall be applied in such a manner as to provide a ductile coating that is tightly adherent to base metal and which shall conform to bend tests conducted in accordance with ASTM Specification A-525 and ASTM A653 for **G90** galvanizing Zinc coating shall be not less than .90 ounces total (both surfaces) per square foot of steel. Following fabrication of exterior frames, touch up all welds with liquid zinc (Galvicon, Z.R.C, or other approved equal method).

C. Clean all surfaces of hollow metal doors, panels, frames, anchors, and related items specified hereunder, by hot or cold phosphate treatment standard with the manufacturer. Clean and caustic-etch all aluminum items. Following cleaning, apply one coat of grey rust-inhibitive prime paint to both steel and aluminum work, and bake on. Prime all surfaces, including those which shall be inaccessible after erection.

D. Galvaneal mill finish is NOT an "approved equal" product for hot dipped galvanized steel. ***Any submittal of this product shall result in a summary rejection of the entire submittal.***

2.04 INTRUSION ALARM DOOR CONTACTS

A. Prepare doors and frames to receive magnetic contacts for intrusion alarm system, furnished under SECTION 260001-ELECTRICAL. Contacts shall be installed flush in doors and frames.

PART 3 EXECUTION

3.01 DOORS AND FRAMES

A. Installation shall be performed under SECTION 062000-FINISH CARPENTRY.

END OF SECTION

SECTION 081416

WOOD AND PLASTIC DOORS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish the following items for installation under the designated SECTIONS:

1. Flush **pre-finished** wood solid core doors including matching transoms at doors so scheduled: SECTION 062000-FINISH CARPENTRY.
2. Glazing beads, loosely attached to doors for removal and permanent installation: SECTION 080002-GLASS AND GLAZING.
3. Metal louvers (factory primed) for finish painting by SECTION 090007-PAINTING.

B. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. For all adhesives, sealants, paints and coatings, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. For all composite wood and agrifiber products, meet the LEED-S requirements for IEQ Credit 2, Low-Emitting Materials as defined in Section 018113-SUSTAINABLE DESIGN REQUIREMENTS.
4. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers’ product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Furnishing of finish hardware: SECTION 087100-FINISH HARDWARE.
2. Pressed steel frames for doors: SECTION 08113-HOLLOW METALWORK.
3. Air movement requirements for undercuts and door louvers: SECTION 230001-HVAC.
4. Installation of doors and hardware: SECTION 062000-FINISH CARPENTRY.
5. Glass for door lites: SECTION 080002-GLASS AND GLAZING.
6. Wood phenolic panels: SECTION 074233-PHENOLIC RAINSCREEN SYSTEM.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with SECTION 013300-SUBMITTALS.

B. Include a complete new wood door schedule and a certified statement from the manufacturer that the doors proposed to be furnished meet or exceed the requirements specified hereunder, together with a sample copy of the manufacturer's warranty which is specified herein.

C. Submit the following samples in accordance with the requirements of SECTION 013300-SUBMITTALS.

1. Corner section of each typical door, showing construction, methods of joinery and type of veneer.
2. Mounted pre-finished veneer samples, three each available type, 12-inch x 12-inch in size.
3. Mounted 24 inch x 24 inch, prefinished veneer sample of specified veneer in accordance with Article 2.01C.

D. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. Product substitution requests are subject to additional LEED-S submittal requirements, see SECTION 012500-SUBSTITUTION PROCEDURES.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Each door shall be carefully packed with non-staining moisture-proof covering and spacers, prior to shipping, in a manner which shall protect the doors against damage in transit.

B. The manufacturer shall convey to the General Contractor special on-site care and handling requirements.

1.06 GUARANTEE

A. The manufacturer shall submit directly to the General Contractor for transmittal to the Architect, two (2) copies of the manufacturer's full warranty covering all doors. Said warranty shall be signed by the manufacturer and shall be submitted at the same time doors are shipped. Warranty shall be as follows:

1. Flush doors for lifetime of installation, including rehanging and refinishing.

1.07 REFERENCE STANDARDS

A. ASTM E152 – Methods of fire tests of door assemblies.

B. AWI – Quality standards of the Architectural Woodwork Institute (Premium Grade).

C. NFPA 80 – Fire doors and windows.

D. NFPA 252 – Standard method of fire tests for the door assemblies.

E. UL 10C – Fire tests of door assemblies.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) General Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.

2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) General Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.

3. Certified Wood (FSC). (See Section 018113 Sustainable Design Requirements for overall project FSC-Certified wood content requirements.) For the sum of all wood products in this section, a minimum of 50% FSC wood is required.

4. Furnish any composite wood and agrifiber products such that they meet the formaldehyde emissions requirements for CARB ATCM for ultra-low-emitting formaldehyde (ULEF) or no-added formaldehyde (NAF) resins. Laminating adhesives used to fabricate on site and shop applied composite wood and agrifiber assemblies must also meet this requirement. Refer to the requirements for IEQ Credit 2 as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

5. Furnish any paints and coatings applied on site and inside the air and vapor barrier, such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in Section 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 WOOD FLUSH DOORS

A. Manufacture – To establish a standard of quality, design and function, specifications are based on wood flush doors manufactured by VT Industries, Holstein, IA. Doors by Marshfield Door Systems, Inc., Marshfield, WI; Eggers Industries, Neenah, WI; and Algoma Hardwoods, Algoma, WI. and by other manufacturers will be considered as an equal by the Architect upon receipt of adequate supporting data and samples.

B. General – Refer to the drawings for sizes of doors and for glazing cut-outs and louvers therein.

C. Veneers – Shall be AWI Premium Grade, Type 1, **rift cut, Red Oak.** Vertical exposed edge of stiles shall be of same species as door facing.

1. Field Painted Doors - Face material shall be medium density overlay.

D. Finish – **Factory finished doors** shall be in accordance with AWI Division 1500-S-4-Finish System Standards. Factory finish shall be ultraviolet (UV) cured polyurethane to comply with EPA Title 5 guidelines for Volatile Organic Compound (VOC) emissions limitations. Finish shall meet or exceed performance standards or TR-6 catalyzed polyurethane. Doors shall be furnished with a **stain and clear finish**.

1. Door stain shall be chosen by the Architect from manufacturer's full line of colors to approximate wood phenolic panels.

E. Lumber Core Doors (Unrated and 20 Minute Labels) – Institutional solid lumber core doors consisting of the following:

1. Core – Structural composite lumber material.
2. Stiles – (5/8-inch min.) and top and bottom rails (1-1/8-inch, min.) glued to core.
3. Cross Banding – 1/16 inch minimum, low density hardwood.
4. Veneers and cross banding bonded to core with Type I waterproof glue in a hot press, following sanding of core unit.
5. Factory machine doors for finish hardware in accordance with hardware templates and dimensions provided under SECTION 087100. Do not factory machine for surface hardware. Factory pre-fit doors to frame openings of hollow metal frames furnished under SECTION 081113-HOLLOW METALWORK.
6. Staved core doors so noted on the door schedule shall carry 20 minute UL Labels.
7. Security rating – Class 40, tested in accordance with ASTM F-476.
8. Products shall meet the LEED-S requirements for Certified Wood and Low Emitting Materials.
9. Acoustic Doors shall be equal to VT wood flush door with 'sound dampening core'. Door leafs designated "acoustic", shall be rated to STC-40 or greater. The leafs shall be installed in standard Hollow Metal frames (SECTION 081113-HOLLOW METALWORK) with gasketing hardware (SECTION 0871000-FINISH HARDWARE) and acoustic glass (SECTION 080002- GLASS AND GLAZING). The resulting opening assembly STC is not specified.

F. Mineral Core Doors (45, 60 and 90 minute labels) - Institutional, rated mineral core doors shall be fabricated in accordance with the manufacturer's UL requirements, including the following:

1. Stiles shall have a minimum screw withdrawal performance of 740 lbs.
2. Mineral core doors shall have inner blocking to attach surface applied hardware with screws. **Through bolts are not acceptable.**
3. Cross Banding – 1/16-inch minimum hardwood.
4. Veneers and cross banding to core with Type I waterproof glue, following sanding of core unit.
5. Factory machine doors for finish hardware in accordance with hardware templates and dimensions provided under SECTION 087100. Do not factory machine for surface hardware. Factory pre-fit doors to frame openings of the hollow metal frames furnished under SECTION 081113-HOLLOW METALWORK.
6. Doors shall carry Fire Rating labels as noted under door schedule.
7. Security rating – Class 30, tested in accordance with ASTM F-476.
8. Products shall meet the LEED-S requirements for Certified Wood and Low-Emitting Materials.
9. ~~Acoustic doors shall be sound rated to STC-40 or greater.~~

2.02 GLAZED OPENINGS

A. For all rated and non-rated doors – Flush wood or veneered beads similar to Marshfield Door Systems W-6 profile, species to match face veneer. Secure glazing beads to one side of the door at the factor for field glazing. Field applied glazing beads shall be factory pre-cut and secured inside light cutout of each door.

Special note on acoustic doors: Door beads and machining for lites in acoustic doors shall be sized to accept ½ in. monolithic glass.

2.03 WOOD LOUVERS

A. Where wood doors are scheduled to have louvers, wood louvers shall be factory finished and installed.

1. Louver blades and stops shall match species of door veneer.
2. Louver blades in operable doors shall be flat slat type.
3. Louvers shall have 50% free area.

PART 3 EXECUTION

3.01 DOORS

A. Installation shall be performed under SECTION 062000-FINISH CARPENTRY.

END OF SECTION

SECTION 087100

FINISH HARDWARE

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish the following, for installation under the designated SECTIONS:

1. Finish hardware, for the types set forth in the schedule contained hereunder, SECTION 062000-FINISH CARPENTRY.
2. Templates for hardware cutouts and reinforcing in door and frames: To fabricator of such items.
3. Services of a qualified hardware consultant to prepare detailed schedules of hardware required for the project.
4. Miscellaneous hardware as indicated under Article 2.12.

B. LEEDv4-S Requirements (Refer to SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS):

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from Massachusetts School Building Authority. LEEDv4-S requirements for the work of this section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. For all adhesives and sealants, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. For all flooring systems, meet the requirements for IEQ Credit 2, Low-Emitting Materials as identified in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
4. For all paints and coatings, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

5. Meet the LEEDv4-S requirements for MR Credit 4, Building Product Disclosure and Optimization – Health Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having a Health Product Declaration (HPD).

6. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Wood blocking at wall mounted door closers, door stops and other finish hardware items: SECTION 061000-ROUGH CARPENTRY.

2. Metal doors and frames: SECTION 081113-HOLLOW METALWORK.

3. Wood doors: SECTION 081416-WOOD AND PLASTIC DOORS.

4. Toilet room accessories; SECTION 102813-TOILET AND BATH ACCESSORIES.

5. Hardware for millwork: SECTION 062000-FINISH CARPENTRY.

6. Hardware for casework: SECTION 123533-CLASSROOM CASEWORK.

7. Threshold and weatherstripping for aluminum entrances, except as specified hereunder: SECTION 080001-METAL WINDOWS.

8. Hold-open devices and power for door hardware: SECTION 260001-ELECTRICAL.

9. Exterior door video/intercom control system: SECTION 27500-DISTRIBUTED COMMUNICATION SYSTEMS (PART OF SECTION 260001).

10. Exterior door access control system: SECTION 281000-INTEGRATED SECURITY SYSTEMS.

1.04 SUBMITTALS

A. Submit the following in accordance with SECTION 133000-SUBMITTALS:

1. Schedule: Submit to the Architect six (6) copies of the complete hardware schedule within fourteen (14) days after the receipt of the contract award. Submit therewith complete catalog cuts and descriptive data of all products specifically schedule therein. No materials shall be ordered or templates issued until the hardware schedule has been approved by the Architect. Form and detail of hardware schedule shall be in vertical format in conformance to the door and hardware industry standards. All hardware sets shall be clearly cross-referenced to the hardware set numbers listed in this specification.

2. Samples: If requested, submit to the Architect for approval a complete line of samples, as directed. Samples shall be plainly marked giving hardware number used in this Specification, the manufacturer's numbers, types and sizes. The Architect will deliver approved samples to the project site to be stored. Samples will remain with the Architect until delivery of all hardware to the project is complete, after which time they will be turned over to the General Contractor for incorporation into the work.

3. Keying System Submission: Before cylinders are ordered, submit a complete proposed keying system for approval.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery of hardware shall be made to the project by the Hardware Supplier in accordance with the instructions of the General Contractor.

B. The General Contractor shall provide adequate locked storage space with shelving for the hardware, shall be responsible for all items of hardware after receipt from the Supplier, and shall replace all hardware lost or damaged after delivery and receipt.

C. The General Contractor shall furnish the Hardware Supplier with receipts for all hardware and accessory items received and shall send copies of these receipts to the Architect, if requested.

1.06 REGULATORY REQUIREMENTS

A. Conform to all applicable codes. Provide all throws, projections, coatings, knurling, opening and closing forces, and other special functions required by State and Local Building Codes, and all applicable Handicap Code requirements.

B. For fire rated openings, provide hardware complying with NFPA 80 and NFPA 101 without exception. Provide only hardware tested and listed by UL for the type and size of door installed and fire resistance rating required.

1.07 QUALITY ASSURANCE

A. Hardware Supplier shall have in his employ one or more members of the Door and Hardware Institute to include at least one certified Architectural Hardware Consultant in good standing, which shall be responsible for preparation of the Finish Hardware Schedule. This Consultant shall be acceptable to the Architect and is to ensure that the intent requirement of this specification is fulfilled, and to certify that the work of this Section meets or exceeds the requirements specified in this Section and the requirements of authorities having jurisdiction.

B. Hardware Supplier shall warrant and guarantee, in writing, that hardware supplied is free of defective material and workmanship. Supplier shall further warrant and guarantee for a period of one year from Owner's Use and Occupancy that the hardware shall function in a satisfactory manner without binding, collapse, or dislodging of its parts, provided the installation is made to the manufacturer's recommendations.

C. The Hardware Supplier shall repair or remedy, without charge, any defect of workmanship or material for which he is responsible hereunder.

1.08 INTENT

A. The intent of the work of this Section is to provide hardware for every door in the project, except as indicated, so that each door functions correctly for its intended use. Provide only hardware that complies with applicable codes and requirements of authorities having jurisdiction including requirements for barrier-free accessibility.

1.09 SPECIAL REQUIREMENTS

A. Hardware Supplier shall determine conditions and materials of all doors and frames for proper application of hardware.

B. The Hardware Schedule shall list the actual product series numbers. Bidders are required to follow manufacturer's catalog requirement for the actual size of door closers, brackets and holders. All door opening sizes are as noted on the Door Schedule and all hardware shall be in strict accordance with requirements of height, width, and thickness.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. To establish a standard of quality, design and function, manufacture has been based upon the following manufacturers.

B. Similar products will be considered for approval by the architect upon receipt of adequate supporting data and samples.

Hinges	McKinney	Scranton, PA
	Ives	Indianapolis, IN
	Stanley	Indianapolis, IN
Geared Hinges	Pemko	Memphis, TN
	McKinney	Scranton, PA
	ABH	Itasca, IL
Locksets	Sargent	New Haven, CT
	Schlage	Colorado Springs, CO
	Best	Indianapolis, IN
Exit Devices	Sargent	New Haven, CT
	Von Duprin	Indianapolis, IN
	Precision	Indianapolis, IN
Door Closers	Sargent	New Haven, CT
	LCN	Princeton, IL
	Norton	Charlotte, NC
Flush Bolts	Ives	Indianapolis, IN
	Trimco	Los Angeles, CA
	Rockwood	Rockwood, PA
Door Stops	Trimco	Los Angeles, CA
	Ives	Indianapolis, IN
	Rockwood	Rockwood, PA
Push/Pulls	Rockwood	Rockwood, PA
	Trimco	Los Angeles, CA
	Ives	Indianapolis, IN
Protective Plates	Rockwood	Rockwood, PA
	Trimco	Los Angeles, CA
	Ives	Indianapolis, IN
Thresholds/	NGP	Memphis, TN
Weatherstripping/	Pemko	Memphis, TN
Rain Drips	Reese	Rosemount, MN

Silencers	Ives	Indianapolis, IN
	Rockwood	Rockwood, PA
	Hager Companies	St Louis, MO

2.02 MATERIALS AND QUALITY

A. All hardware shall be of the best grade of solid metal entirely free from imperfections in manufacturer and finish.

B. Qualities, weights, and sizes given herein are the minimum that will be accepted. It is the responsibility of the Hardware Supplier to supply the specified size and weight of hardware and the proper function of hardware in each case and to provide UL approved hardware at all fire-rated doors.

C. Provide, as far as possible, locks of one lock manufacturer and hinges of one hinge manufacturer. Modifications to hardware that are necessary to conform to construction shown or specified shall be provided when required for the specified operation and functional features.

2.03 HARDWARE DESIGNATIONS

A. All items of hardware are referenced by manufacturer's names and numbers. The manufacturer's names and numbers are used to define the function, design, and quality of the material to be supplied. Substitution of products other than those listed shall be submitted to the Architect **prior to** the submission of the finish hardware schedule. The Architect shall be the sole judge of any proposed substitution.

2.04 TEMPLATES

A. Hardware supplier shall immediately, but not later than three (3) days after approval of his Schedule by the Architect, furnish the General Contractor with complete template information necessary for the fabrication of doors, frames, etc. No templates shall be furnished prior to the approval of the hardware schedule.

2.05 HARDWARE FOR LABELED FIRE DOORS, EXIT DEVICES AND SMOKE DOORS

A. Hardware shall conform to requirements of NFPA 80 for labeled fire doors and to NFPA 101 for exit doors, as well as to other requirements specified. Labeling and listing by UL Building Materials Directory, for class of door being used will be accepted as evidence of conformance to these requirements. Install minimum latch throw as specified on label of individual doors. Provide hardware listed by UL except where heavier materials, larger sizes, or better grades are specified herein under paragraph entitled "Hardware Sets". In lieu of UL labeling and listing, test reports from a nationally recognized testing agency may be submitted showing that hardware has been tested in accordance with UL test methods and that it conforms to NFPA requirements. Specific hardware requirements of door or frame manufacturers which exceed sizes or weights of hardware herein listed shall be provided with no additional charge.

2.06 KEYS AND KEYING

A. The hardware supplier shall review the specific hardware functions with the Architect and owner at the time of the keying review, to assure the appropriateness of each of the hardware functions. Failure to make this review does not relieve the hardware supplier from providing the proper functions.

B. Key System: Cylinders shall be Masterkeyed and/or Grandmasterkeyed to a new system as directed.

1. Master Keys, Grandmasterkeys: Furnish six (6) keys for each set, if required.
2. Cylinders for use at the aluminum doors, as well as the cylinders being used with the exit devices, are to be of the interchangeable core type. These cylinders are to be furnished complete with temporary removable construction cores for use by the contractor during the construction period. These construction cores are to be operated by the same construction key that is established for the balance of the locksets, cylinders. Furnish three (3) control keys each for the removal of the construction cores and the installation of the permanent cores.
3. Furnish three (3) change keys for each cylinder keyed differently: six (6) change keys for each set keyed alike, and in sets where only (2) cylinders are keyed alike, four (4) change keys will be required.
4. Keying is to be done at the factory to avoid duplication of the new cylinders.
5. Master Keys shall be sent to the owner by registered mail, return receipt required.
6. Supply a bitting list for all change keys and master keys to the owner.
7. Set lock cylinders to a Construction key for use by the Contractor during the construction period. Furnish ten (10) Construction keys and two (2) keys for voiding the Construction key feature

2.07 FASTENERS

A. Manufacture hardware to conform to published templates, generally prepared for machine screw installation.

B. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Furnish exposed screws to match the hardware finish, or, if exposed in surfaces of other work, to match the finish of such other work as closely as possible, except as otherwise indicated.

C. Provide concealed fasteners for hardware units which are exposed when the door is closed, except to the extent no standard manufactured units of the type specified are available with concealed fasteners. Do not use thru-bolts unless specifically approved by the Architect.

D. All hardware shall be installed **only** with fasteners supplied by manufacturers of specific products.

2.08 PACKING AND MARKING

A. All hardware shall have the required screws, bolts and fastenings necessary for proper installation and shall be wrapped in the same package as the hardware item for which it is intended and shall match finish of hardware with which to be used.

B. Each package shall be clearly labeled indicating the portion of the work for which it is intended.

2.09 ENVIRONMENTAL CONCERN FOR PACKAGING

A. The hardware shipped to the jobsite is to be packaged in biodegradable packs such as paper or cardboard boxes and wrapping. If non-biodegradable packing such as plastic, plastic bags or large amounts of styrofoam is utilized, then the General Contractor will be responsible for the disposal of the non-biodegradable packing to a licensed or authorized collector for recycling of the non-biodegradable packing.

2.10 FINISH HARDWARE DESCRIPTION

A. Hardware items shall conform to respective specifications and standards and to requirements specified herein.

B. Materials and Finish: Materials and Finish shall be:

1. Interior Butts: US26D (BHMA 652)
2. Geared Hinges US28 (BHMA 628)
3. Door Closers: Sprayed to match hardware finish
4. Exit Devices: US26D (BHMA 626)
5. Kick, Push and Armor Plates, Door Pulls, Push/Pull Bars: US32D (BHMA 630)
6. All other hardware shall be: US26D (BHMA 626), or as scheduled

C. Hinges and Pivots:

1. Number of hinges or pivots per door: two hinges or pivots are intended to be provided for doors up to and including five feet in height, and an additional hinge for each two-and-one-half feet or fraction thereof, of the height of the door.

2. All hinges on exterior doors shall be full-mortise Continuous Geared Hinges. Geared Hinges shall be manufactured of extruded 6063-T6 aluminum alloy temper. Hinges shall consist of three interlocking extrusions in a pinless assembly applied to the full height of the door and frame. All hinges shall be manufactured non-handed. Door leaf and jamb leaf shall be geared together for the entire length of the hinge and joined by a cover channel. All Geared Hinges shall be heavy duty (HD).

3. Geared Hinges shall be Pemko, McKinney or ABH as follows:

At 1 ¾" doors	
Pemko	CFM SLFHD Series
McKinneyMCK	12HD
ABH	A110HD

At 2" doors	
Pemko	CFM_SLI
McKinney	MCK-14HD
ABH	A260HD

4. Hinges on interior doors shall be steel and sized as follows, unless otherwise specified in the hardware sets below:

Door Thickness	Door width	Hinge Weight	Hinge
1-3/4"	40" and under	Regular	4-1/2"
1-3/4"	Over 40"	Extra heavy	5 x 4-1/2"

Width of hinge shall be determined by trim conditions

5. All bearing hinges shall have flush bearings and button tips.

6. Hinges shall be McKinney, Ives or Stanley as follows:

McKinney	Ives	Stanley
TA714	3CB1	CB1900R
TA786	3CB1HW	CB1901R

D. Door Closers:

1. Door closers shall have fully hydraulic, full rack and pinion action. Cylinder body shall be 1-1/2" in diameter, and double heat-treated pinion shall be 11/16 inches in diameter.

2. Hydraulic fluid shall be of a type requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.

3. Spring power shall be continuously adjustable over the full range of closer sizes and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed, and hydraulic back-check.

4. All closers shall have solid forged steel main arms (and forged forearms for parallel arm closers).

5. Closer arms (and metal covers when specified) shall have a powder coating finish.

6. Provide drop, mounting plates where required.

7. Do not locate closers on the side of doors facing corridors, passageways or similar type areas. Where it is necessary, due to certain conditions and approval of the Architect, to have closers in corridors, provide such closers with parallel or track type arms.

8. All door closers shall be adjusted by the installer in accordance with the manufacturer's templates and written instructions. Closers with parallel arms shall have back-check features adjusted prior to installation.

9. Closers shall conform to all applicable code requirements relative to setting closing speeds for closers and maximum pressure for operating interior and exterior doors.

10. Door closers meeting this specification are as follows:

	LCN	Sargent	Norton
Exterior	4111S-CUSH	281-CPS	CPS7500
	4111S-H-CUSH	281-CPSH	CPS7500T

Note: Furnish necessary heavy duty parallel arm accessories such as blade stop spacer kits, brackets and or spacers for proper installation of the parallel arm foot to the frame.

Interior	4011 (Reg. arm)	281-0	7500
	4111 (Par, arm)	281-P10	PR7500
	4000T	281-OT x spec. temp.	7700STP

E. Exit Devices:

1. Shall be Von Duprin, Sargent or Precision as follow:

Function	Von Duprin	Sargent	Precision
A	99L-NL-F	12-8804ET	FL-2103x4903
B	CD9927L x LBR	16-NB8713ET	2208x4908xLBR
C	99L	8813ET	2108x4908
D	E9927L-F x LBR	12-NB8774ETL	E-FL2208 4908LBR
E	RXQEL99NL-OP	55-56-8804	TS-MRL2103-C03
F	RXQEL99EO	55-56-8810	TS-MRL2191
G	E9927L x LBR	NB8774ETL	E-162208 4908LBR
H	RXCD99EO	55-56-8810	TS-2101CD

NOTE: Lever design shall match lock trim.

Add No. 106 control at the Sargent exit devices 12-NB8774 and NB8774 when used.

F. Power Transfers: Provides a means to transfer power from the frame to the door stile. When the door is closed the unit is concealed and tamper resistant. Markar D, AR4611 or 4611-2, Securitron EPT or EPTL, Von Duprin EPT-2 or EPT-10.

G. Power Supplies: Power for use with the electrified exit devices shall be taken from the DSX power supply being supplied by the Security Contractor.

H. Key removable Mullion: Shall be Von Duprin KR 4954, Sargent L980, or Precision KR822 at non-fire rated openings. All mullions are to be furnished complete with mullion stabilizers.

I. Flush Bolts:

1. Shall be self-latching or automatic type at label doors, manual flush bolts at non-label doors.

	Ives	Trimco	Rockwood
Manual HM	FB458	3917-12”	555
WD	FB458	3917-12”	555
Self-Latching HM	FB51P	3820 x 3810	1845
WD	FB61P	3825 x 3815	1945

2. Dust Proof Strikes shall be furnished at all floor locations.

J. Automatic Coordinating: Shall be provided at all pairs of label doors equipped with overlapping astragals or where improper closing sequence would interfere with proper operating of the doors. Coordinators shall be Ives COR series, Trimco 3094 series or Rockwood 1600 series. Furnish filler pieces to close opening between coordinator and jamb of frame. Provide mounting brackets required for proper mounting of additional hardware.

K. Locksets, Latch Bolts:

1. Mortise type shall be heavy-duty ANSI A156.13, Series 1000, Grade 1 Operational, 2-3/4" backset, with lever handles. Strikes are to have curved lips and complete with a wrought strike box.

Manufacturer	Series	Lever Design
Schlage	L9000	06A
Sargent	8200	LNL
Best	40H	15H

L. Lock functions as indicated in the hardware schedule shall be as follows:

Function	Schlage	Sargent	Best
A (Spec Classroom)	71	38	INL
B (Privacy)	40	65	L
C (Storeroom)	80	04	D x Knurled O/S Lever
D (Classroom)	70	37	R
E (Office)	50	05	A
F (Vestibule)	60	16	B6/B7
G (Passage)	10	15	N
H (Storeroom)	80	04	D
I (Electric lockset)	80EL	70	EWEL (Fail safe)

Note: The above privacy set, (Function B), is to be furnished complete with occupancy indicator reading “vacant / occupied”.

M. Push Plates, Door Pulls, Push / Pull Bars:

1. Shall be as manufactured by Rockwood, Trimco or Ives.

   a. Push plates: 8” x 16”. Stile permitting, or 4" x 16" for narrow stile x .050 thickness:

Rockwood	70 Series
Trimco	1001 Series
Ives	8200 Series

   b. Door Pulls, Type A:

Rockwood	BF111
Trimco	1195-2
Ives	8103EZ-0

   c. Door Pulls, Type B: x **Mod. to have 7” CTC**

Rockwood	157
Trimco	1191-3
Ives	8190

   d. Push / Pull Bars Sets:

Rockwood	15747 x T4HD fastening
Trimco	1737JG x sim. Fastening
Quality	484 x 10” x sim. fastening

N. Kick Plates, Armor Plates:

1. Kick plates shall be 8 in. high unless otherwise noted. Armor plates shall be 34 in. high. All plates shall be 2 in. less the width of door. Plates shall be .050 thickness, bevel 4 edges, screws shall be oval head counter-sunk.

O. Stops:

1. Shall be furnished at all doors. Wherever an opened door or any item of hardware thereon strikes a wall, at 90 degrees. Provide wall bumpers, unless otherwise indicated in hardware sets.

2. Where wall bumpers cannot be effectively used, a floor stop shall be furnished and installed.

3. Provide roller bumpers for each door where two doors interfere with each other in swinging.

Manufacturer	Wall Bumpers	FloorStops	Roller
Rockwood	409	440,442	456
Ives	WS407CCV	FS436B, FS438B Series	RB470
Trimco	1270WV	1211	1244

P. Thresholds, Weatherstrip, Seal:

1. Thresholds shall be as detailed and furnished on all doors where shown on drawings. Thresholds shall be aluminum unless otherwise indicated. Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants".

2. All exterior and interior doors must meet the requirements of the Massachusetts Building Code 780 CMR 13.

3. Weatherstripping shall be furnished on all exterior doors unless otherwise indicated.

Product	Pemko	Reese	NGP
Threshold	as detailed		
Brush Seal	45062AP	970	A626A
Auto. Door	434ARL	430A	422N
Bottom (mortise-WD door)			
Door Sweep – Type A	345AV	353A	101VA
Door Sweep – Type B	307A	806A	97VA
Flat Bar Astragal	357SP x S88	183SP x 797B	139SP x 5050

Q. Gasketing:

1. Shall be #105 "Cush-N-Seal" as manufactured by Door and Hardware Systems, Inc. Color as selected.

R. Self-Adhesive Door Astragal Seal:

1. Shall be #SA as manufactured by Door and Hardware Systems, Inc. Color as selected.

S. Mullion Seal:

1. Shall be #MS-SA75 as manufactured by Door and Hardware Systems, Inc. Color as selected.

T. Silencers:

1. Provide silencers on all metal and wood frames. Silencers shall be Ives SR64 / SR65, Hager 307D / 308D or Rockwood 608/609.

2.11 HARDWARE SETS

A. Each Hardware Set listed below represents the complete hardware requirements for one opening (single door or pair of doors). Furnish the quantities required for each set for the work.

Set No. EX1

2 – Continuous Hinges
1 – Lockset (Function F-vestibule) x strike 7/8" LTC
2 – Manual Flush Bolts
1 – Dust Proof Strike
2 – Door Closers – CUSH
2 – Armor Plates
1 – Threshold – as detailed
2 – Door Sweeps – type A
1 – Rain Drip
1 – Flat Bar Astragal
1 – Set Weatherstripping (H, J)
2 – Door Contacts – furnished, installed by security contractor

Set No. EX2

1 – Continuous Hinge
1 – Lockset (Function C-storeroom) x tactile warning on o/s lever
1 – Door Closer (Reg. arm)
1 – Kick Plate
1 – Threshold – as detailed
1 – Door Sweep – type B
1 – Set Weatherstripping (H, J)

1 – Door Contact – furnished, installed by security contractor

Note: Install lockset at door C202A.1 so that the cylinder is on the alcove side of the door.
Install lockset at door SB03.1 so that the cylinder is on the stair SB03 side of the door. This will allow free egress from the roof.

Set No. EX3

1 – Continuous Hinge
1 – Continuous Hinge x prep for EPT
1 – Power Transfer
1 – Electric Lockset (Function I) x strike 7/8" LTC
1 – I/C Cylinder
1 – I/C Cylinder Core
1 – Power Supply – see paragraph 2.10, G
2 – Manual Flush Bolts
1 – Dust Proof Strike
2 – Door Closers – CUSH
2 – Armor Plates
1 – Threshold – as detailed
2 – Door Sweeps – type A
1 – Rain Drip
1 – Flat Bar Astragal
1 – Set Weatherstripping (H, J)
2 – Door Contacts – furnished, installed by security contractor

Note: Race way is required in the active leaf to carry power to the electric lockset.
Card reader – Furnished, installed by Section 28 23 00

Set No. EXAL1

Active leaf

1 – Continuous Hinge – 2"door x prep for EPT
1 – Power Transfer
1 – Exit Device (Function E)
1 – I/C Cylinder
1 – Cylinder Core
1 – Power Supply – see paragraph 2.10, G
1 – Door Pull – type B
1 – Power-Assist Door Operator – LCN No. 4640 Series (Flush ceiling mount)
2 – Push Plate Actuators – LCN No. 8310-853T / 8310-818T when required
1 – Overhead Concealed Door Stop
1 – Kick Plate
1 – Door Sweep – door manufacturers Standard

Inactive leaf

1 – Continuous Hinge – 2” door
1 – Exit Device (Function F)
1 – Door Pull – type B
1 – Door Closer - EDA
1 – Mounting Plate – if required
1 – Overhead Concealed Door Stop
1 – Kick Plate
1 – Door Sweep – door manufacturers standard

For the opening

1 – Key Removable Mullion
1 – I/C Cylinder
1 – Cylinder Core
1 – Mullion Seal
1 – Threshold – as detailed
1 – Set Weatherstripping – door manufacturers standard

Note: Card Reader – Furnished, installed by Section 28 23 00.
No Card Reader at door no. 002A.1

Operation: Immediate egress always allowed. Door can be manually or automatically operated. Access control system to retract and hold exit device latchbolt and enable exterior automatic operator actuator wall plate switch. Door can be manually pulled open or automatically operated by pushing wall plate which signals automatic operator to open door. Interior wall plate switch to signal automatic operator to open door. Locate wall plate actuators as directed by the architect.

Secure operation: Access by key, card reader, or buzzer system. Card reader or buzzer system will retract the exit device latchbolt and allow access, and temporarily enable exterior wall plate actuator to allow automatic operation.

Set No. EXAL2

1 – Continuous Hinge – 2” door
1 – Exit Device (Function C)
1 – I/C Cylinder
1 – Cylinder Core
1 – Door Closer – H-CUSH
1 – Mounting Plate – if required
1 – Kick Plate
1 – Threshold – as detailed
1 – Door Sweep – door manufacturer’s standard
1 – Set Weatherstripping – door manufacturer’s standard

No. EXAL3

Active leaf

1 – Continuous Hinge x prep for EPT – 2" door
1 – Power Transfer
1 – Exit Device (Function E)
1 – I/C Cylinder
1 – Cylinder Core
1 – Power Supply – see paragraph 2.10, G
1 – Door Pull – type B
1 – Door Closer - EDA
1 – Mounting Plate – if required
1 – Overhead Concealed Door Stop
1 – Kick Plate
1 – Door Sweep – door manufacturers standard

Inactive leaf

1 – Continuous Hinge – 2" door
1 – Exit Device (Function F)
1 – Door Pull – type B
1 – Door Closer - EDA
1 – Mounting Plate – if required
1 – Overhead Concealed Door Stop
1 – Kick Plate
1 – Door Sweep – door manufacturers standard

For the opening

1 – Key Removable Mullion
1 – Mullion Seal
1 – I/C Cylinder
1 – Cylinder Core
1 – Threshold – as detailed
1 – Set Weatherstripping – door manufacturers standard

Note: Card Reader – Furnished, installed by Section 28 23 00.

Operation: Immediate egress always allowed. Access control system to retract and hold exit device latchbolt. Door can be manually pulled open.

Secure operation: Access by key, card reader, or buzzer system. Card reader or buzzer system will retract the exit device latchbolt and allow access.

Set No. EXAL4

2– Continuous Hinges – 2" door x prep for EPT
2 – Power Transfers
2– Exit Device (Function H)
2 – I/C Cylinders
2 – Cylinder Cores
2 – Door Pulls – type B
1 – Key Removable Mullion
1 – I/C Cylinder
1 – Cylinder Core
1 – Mullion Seal
2 – Door Closers – H-CUSH
2 – Mounting Plates – if required
2 – Kick Plates
1 – Threshold – as detailed
2 – Door Sweeps – door manufacturer's standard
1 – Set Weatherstripping – door manufacturer's standard

Set No. AL1

2 – Continuous Hinges – 2" door
2 – Sets Push / Pull Bars
2 – Overhead Concealed Door Stops
1 – Power-Assisted Door Operator – LCN No. 4640 (flush ceiling mount)
2 – Push Plate Actuators – LCN No. 8310-853T / 8310-818T when required
1 – Door Closer (Par. arm)
1 – Mounting Plate – if required
2 – Kick Plates

Set No. AL2

2 – Continuous Hinge – 2" door
2 – Sets Push / Pull Bars
2 – Overhead Concealed Door Stops
2 – Door Closers (Par. arm)
2 – Mounting Plates – if required
2 – Kick Plates

Set No. AL3

2– Continuous Hinges – 2" door
2– Exit Devices (Function B)
4- I/C Cylinders – 2/for locking 2/for CD feature
4- Cylinder Cores
2– Overhead Concealed Door Stops
2– Door Closers (Par. arm)
2 – Mounting Plates – if required
2 – Kick Plates
Note: Provide threshold as detailed at door 114.2.

Set No. AL4

2 – Continuous Hinges – 2" door x prep for EPT
2 – Power Transfers
1 – Exit Device (Function E)
1 – I/C Cylinder
1 – Cylinder Core
1 – Power Supply – see paragraph 2.10, G
1 – Exit Device (Function F)
1 – Key Removable Mullion
1 – I/C Cylinder
1 – Cylinder Core
1 – Mullion Seal
2 – Door Pulls – type B
1 – Door Closer (Par. arm)
1 – Mounting Plate – if required
1 – Power-Assist Door Operator – LCN No. 4640 (Flush ceiling mount)
2 – Push Plate Actuators LCN- No. 8310-853T / 8310-818T
1 – Pushbutton Mini Box – Von Duprin No. 660 Series
2 – Kick Plates
Note: Card reader – Furnished, installed by security contractor. Locate wall plate actuators as directed by the architect.

Set No. AL5

2– Continuous Hinges – 2" door x prep for EPT
2 – Power Transfers
2- Exit Devices (Function H)
2 – I/C Cylinders
2 – Cylinder Cores
2– Door Closers (Par. arm)
2 – Mounting Brackets – if required
1 – Key Removable Mullion
1 – I/C Cylinder
1 – Cylinder Core
1 – Mullion Seal
2 – Kick Plates

Set No. 1

Butts
1 – Lockset (Function A-spec. classroom)
1 – Door Stop
3 –Silencers

Note: Delete door stop and silencers at door 202.1

Set No. 1A

1 – Continuous Safety Hinge – Pemko No. CFM_SF-HD1
1 – Lockset (Function A-special classroom)
1 - Door Stop
3 - Silencers
Note: Cased opening frame required at the hinge jamb.

Set No. 1B

Butts
1 – Lockset (Function E-office)
1 – Door Stop
1 – Mortise Automatic Door Bottom
1 – Set Gasketing (H, J)

Set No. 1C

Butts
1 – Lockset (Function E-office)
1 – Door Stop
3 – Silencers
Note: Furnish Continuous Safety Hinge – Pemko No. CFM_SF-HD1 at door 018.1.
Note: Provide threshold as detailed at door 115.1.

Set No. 2

Butts
1 – Latchset (Function G)
1 – Door Stop
1 – Set Gasketing (H, J)

Set No. 2A

1 – Continuous Safety Hinge – Pemko No. CFM_SF-HD1
1 – Latchset (Function G)
1 – Door Stop
1 – Set Gasketing (H, J)
Note: Cased opening frame required at the hinge jamb.

Set No. 3

Butts
1 – Push Button Access Control Lock – Alarm Lock No. DL4100 – US26D x I/C cylinder when required x optional curved lever.
1 – Cylinder Core
1 – Door Stop
1 – Door Closer (Reg. arm)
1 – Kick Plate
1 – Set Gasketing (H, J)

Note: The contractor / installer is to program the lockset, after installation, based on the code given to them by the school department.

Set No. 4

Butts
1 – Lockset (Function H-storeroom) x less strike
1 – Electric Strike
1 – Power Supply – see paragraph 2.10, G
1 – Door Stop
1 – Door Closer (Reg. arm)
1 – Kick Plate
3 – Silencers
Note: Card reader – furnished, installed by security contractor.

Set No. 5

Butts
1 – Privacy Set (Function B)
1 – Door Stop
1 – Door Closer (Reg. arm)
1 – Kick Plate
1 – Set Gasketing (H, J)

Set No. 5A

Butts
1 – Privacy Set (Function B)
1 – Door Stop
1 – Set Gasketing (H, J)

Set No. 5B
1 – Continuous Safety Hinge – Pemko No. CFM_SF-HD1
1 – Privacy Set (Function B)
1 – Door Stop
1 – Door Closer (Reg. arm)
1 – Kick Plate
1 – Set Gasketing (H,J)
Note: Cased opening frame required at the hinge jamb.

Set No. 6

Butts
1 – Lockset (Function C-storeroom) x tactile warning on o/s lever
1 – Door Stop
1 – Door Closer (Reg. arm)
1 – Kick Plate
3 – Silencers
Note: Install parallel arm door closer at doors 015.2, 016.1, 021.1, 148E.1, 248E.1 and SD02.2.

Set No. 7

Butts
1 – Lockset (Function C-storeroom)
1 – Set Self-Latching Flush Bolts
1 – Dust Proof Strike
1 – Door Coordinator x mounting bracket (when required)
2 – Door Closers (Par. Arm)
2 – Overhead Stops
2 – Silencers

Set No. 7A

Butts
1 – Lockset (Function D-classroom)
2 – Manual Flush Bolts 1/18” top location 1/12” bottom location
1 – Dust Proof Strike
2 – Door Stops
2 – Silencers

Set No. 8

Butts
1 – Exit Device (Function A) x tactile warning on o/s lever
1 – I/C Cylinder
1 – Cylinder Core
1 – Door Stop
1 – Door Closer (Par. Arm)
1 – Kick Plate
3 – Silencers

Set No. 9

Butts
1 – Lockset (Function A-special classroom)
2 – Manual Flush Bolts
1 – Dust Proof Strike
2 – Door Closers (Reg. Arm)
2 – Kick Plates
2 – Silencers
2 – Door Stops

Set No. 10

1 – Continuous Hinge
1 – Lockset (Function A-special classroom)
1 – Door Stop / Holder
3 – Silencers
1 – Kick Plate

Set No. 11

1 – Continuous Hinge
1 – Lockset (Function A-special classroom)
1 – Door Stop
1 – Door Closer (Par. Arm)
1 – Armor Plate
3 – Silencers
Note: Furnish regular arm door closer at door 005.1.

Set No. 12

Butts
1 – Lockset (Function H-storeroom)
1 – Door Stop
3 – Silencers

Set No. 13

Butts
1 – Lockset (Function H-storeroom)
1 – Door Stop
3 – Silencers
Note: Furnish lockset (Function D-classroom) at doors 006.1, 154.1 and 233A.1
Note: Provide threshold as detailed at door 116.1.

Set No. 13A

Butts
1 – Lockset (Function H-storeroom)
1 – Door Stop
3 – Silencers
1 – Door Closer (Reg. Arm)
1 – Kick Plate

Set No. 13B

Butts
1 – Lockset (Function H-storeroom)
1 – Door Stop
3 – Silencers
1 – Door Closer (Par. Arm)

Set No. 14

1 – Set Bi-Passing Door Hardware – Stanley BPC150N-00-72
1 – Pc. Facia – Stanley BP250N-02-72
2 – Flush Pulls – Ives 227B26D
1 – Set Rubber Bumpers

Set No. 15

Butts
1 – Lockset (Function A-special classroom)
1 – Door Stop
1 – Mortise Automatic Door Bottom
1 – Set Gasketing (H, J)

Set No. 16

Butts
1 – Lockset (Function A-special classroom)
1 – Door Stop
1 – Door Closer (Reg. arm)
1 – Kick Plate

Set No. 17

Butts
2 – Exit Devices (Function B)
4 – I/C Cylinders – 2/for locking - 2/for CD feature
4 – Cylinder Cores
2 – Door Stops
2 – Door Closers (Par. Arm)
2 – Kick Plates
2 – Silencers
Note: Provide threshold as detailed at 114.1.

Set No. 18

Butts
1 – Lockset (Function A-special classroom)
1 – Door Stop
1 – Mortise Automatic Door Bottom
1 –Set Gasketing (H, J)
Note: Furnish Passage Set (Function G) at door 130A.1.

Set No. 19

Butts
1 – Lockset (Function C-storeroom) x tactile warning on outside lever
1 – Set Self-Latching Flush Bolts
1 – Dust Proof Strike
1 – Door Coordinator x mounting bracket (when required)
2 – Door Closers (Par. Arm)
2 – Silencers

Set No. 20

2 – Sets – Henderson No. H440A-OH
1 – Joining Bracket – Henderson No. 1BX
2 – Single Wall Mounted Stay Rollers – Henderson No. 31S
2 – End Plate Kits – Henderson No. F200ECP
2 – Manual Flush Bolts – 12" (install face mount at the bottom of each door on the Kitchen / Servery side of the door to lock into the dust proof strikes).
2 – Dust Proof Strikes
2 – Flush Pulls – Rockwood No. BF97-US32D (mount on the Kitchen / Servery side of each door).

Set No. 21

2 – Continuous Hinges-UL x prep for EPT
2 – Power Transfers
2 – Exit Devices (Function D)
1 – Power Supply – Von Duprin PS 902-8P
2 – Door Stops
2 – Electro-Magnetic Door Holders – furnished by Section 26 00 01
2 – Door Closers – LCN 4000T Series (wall pocket mount)
1 – Self-Adhesive Door Astragal Seal
1 – Set Gasketing (H, J)
Note: Blocking is required in the wall, behind the door, to allow the door closer body to be installed on the wall. Raceway is required in the door to carry power from the frame to the exit device trim.

Card reader: Furnished, installed by security contractor.

Operation: Both doors will close, latch and lock when the fire alarm / intruder alarm system is activated as a part of the building "lock down" system. If the doors are in the closed, locked mode an authorized person can access the doors with a key or the card access system from the pull side.

Set No. 22

2 – Continuous Hinges x prep for EPT
2 – Power Transfers
2 – Exit Devices (Function G)
1 – Power Supply – Von Duprin PS 902-8P
2 – Door Stops
2 – Electro-Magnetic Door Holders – furnished by Section 26 00 01
2 – Door Closers – LCN 4000T Series (wall pocket mount)
2 – Silencers
Note: Blocking is required in the wall, behind the door, to allow the door closer body to be installed on the wall. Raceway is required in the door to carry power from the frame to the exit device trim.

Card reader – furnished, installed by security contractor.

Operation: Both doors will close, latch and lock when the fire alarm / intruder alarm system is activated as a part of the building “lock down” system. If the doors are in the closed, locked mode an authorized person can access the doors with a key or the card access system from the pull side.

Set No. 23

All hardware is to be furnished by the aluminum sliding door system supplier / roll-up shutter supplier, except as follows:

1 – I/C Cylinder (Rim or Mortise as required)
1 – Cylinder Core

2.12. MISCELLANEOUS HARDWARE (Not associated with numbered doors)

A. At transition between platform (wood floor by SECTION 096466-WOOD AND ATHLETIC FLOORING) and ramp (LCT by SECTION 090005- RESILIENT FLOORING), provide aluminum threshold, as detailed on the drawings.

PART 3 EXECUTION

3.01 GENERAL

A. Installation of hardware shall be performed under SECTION 062000-FINISH CARPENTRY and SECTION 080001-METAL WINDOWS in conformance with the following requirements.

3.02 INSPECTION

A. It shall be the General Contractor responsibility to inspect all door openings and doors to determine that each door and door frame has been properly prepared for the required hardware. If errors in dimensions or preparation are encountered, they are to be corrected by the responsible parties prior to the installation of hardware.

3.03 PREPARATION

A. All doors and frames, requiring field preparation for finish hardware, shall be carefully mortised, drilled for pilot holes, or tapped for machine screws for all items of finish hardware in accordance with the manufacturers templates and instructions.

3.04 INSTALLATION/ADJUSTMENT/LOCATION

A. All materials shall be installed in a workmanlike manner following the manufacturer's recommended instructions.

B. Exit Devices shall be carefully installed so as to permit friction free operation of crossbar, touch bar, lever. Latching mechanism shall also operate freely without friction or binding.

C. Door Closers shall be installed in accordance with the manufacturer's instructions. Each door closer shall be carefully installed, on each door, at the degree of opening indicated on the hardware schedule. Arm position shall be as shown on the instruction sheets and required by the finish hardware schedule.

D. The adjustments for all door closers shall be the installers responsibility and these adjustments shall be made at the time of installation of the door closer. The closing speed and the latching speed valves, shall be adjusted individually to provide a smooth, continuous closing action without slamming. The delayed action feature or back check valve shall also be adjusted so as to permit the correct delayed action cycle or hydraulic back check cushioning of the door in the opening cycle. All valves must be properly adjusted at the time of installation. Each door closer has adjustable spring power capable of being adjusted, in the field, from size 2 thru 6. It shall be the installers responsibility to adjust the spring power for each door closer in exact accordance with the spring power adjustment chart illustrated in the door closer installation sheet packed with each door closer.

E. Installation of all other hardware, including locksets, overhead stops / holders, door stops, plates and other items, shall be carefully coordinated with the hardware schedule and the manufacturer's instruction sheets.

F. Locations for finish hardware shall be in accordance with dimensions listed in the pamphlet "Recommended locations for Builders' Hardware" published by the Door and Hardware Institute.

3.05 FIELD QUALITY CONTROL

A. Upon completion of the installation of the finish hardware, it shall be the responsibility of the finish hardware supplier to visit the project and to examine the hardware for each door on which he has provided hardware and to verify that all hardware is in proper working order. Should he find items of hardware not operating properly, he should make a report, in writing, to the General Contractor, advising him of the problem and the measures required to correct the problem.

3.06 PROTECTION

A. All exposed portions of finish hardware shall be carefully protected, by use of cloth, adhesive backed paper or other materials, immediately after installation of the hardware item on the door. The finish shall remain protected until completion of the project. Prior to acceptance of the project by the Architect and owner, the General Contractor shall remove the protective material exposing the finish hardware.

3.07 CLEANING

A. It shall be the responsibility of the General Contractor to clean all items of finish hardware and to remove any remaining pieces of protective materials and labels.

3.08 INSTRUCTIONS AND TOOLS

A. It shall be the responsibility of the finish hardware supplier to provide installation and repair manuals and adjusting tools, wrenches, etc. for the following operating products:

1. Locksets (all types)
2. Exit Devices (all types)
3. Door Closers

END OF SECTION

Division 9
Finishes

SECTION 090002

TILE

*(Filed Sub-Bid Required)

PART 1 GENERAL

1.00 TIME, MANNER AND REQUIREMENTS FOR SUBMITTING SUB-BIDS

A. Sub-bids shall be submitted in accordance with provisions of the General Laws (Ter. Ed.), Chapter 149, Section 44A to 44L, inclusive, as amended. The time and place for submission to Sub-Bids shall be set forth under INSTRUCTIONS TO BIDDERS.

B. Each Sub-Bid filed with the Awarding Authority must be accompanied by BID BOND, or CERTIFIED CHECK, or a TREASURER'S CHECK or CASHIER'S CHECK issued by a responsible bank or trust company, payable to the **City of Amesbury** in the amount stipulated in the INSTRUCTIONS TO BIDDERS. A Sub-Bid accompanied by any other form of bid deposit than those specified will be rejected.

C. Each Sub-Bid submitted for the work, under this SECTION, shall be on a form furnished by the Awarding Authority and required by SECTION 44F of Chapter 149 of the General Laws, as amended.

D. Work to be performed under this SECTION is shown on Contract Drawings numbered:

G.0.01, G.0.02, G.0.04-G.0.08, inclusive; 2.1.00-2.8.03, inclusive; 3.4.01-3.9.15, inclusive; 4.1.01-4.3.02, inclusive; 5.2.01-5.6.13, inclusive.

Remaining Contract Drawings are included for reference and coordination.

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a sub-bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following items to complete the work of this SECTION, as shown on the Drawings and specified herein.

1. Unglazed ceramic floor tile and base, and other required shapes, installed with latex Portland Cement bond coat. Install over waterproof membrane at toilet rooms on concrete slabs on grade and slabs on deck.

    a. Multi-fixture toilet rooms shall include sloped mortar bed.

2. Glazed ceramic wall tile at multi-fixture toilet rooms, single user toilet rooms, corridor wainscots, cafeteria, kitchen and in areas otherwise shown on the Drawings, including all required shapes, installed with Latex Portland Cement bond coat, over cement backer board.

3. Porcelain tile at interior walls including all required shapes installed with Latex Portland Cement bond coat on cement backer board.

4. Quarry floor tile and integral cove base tile, including all required shapes, mud-set at servery and kitchen areas, epoxy bond in freezer/cooler units.

5. Caulking between ceramic or porcelain tile and all penetrations and dissimilar materials in the wall and floor tile and sealant at control joints in ceramic or porcelain tile floors and walls.

6. Engineered quartz stone thresholds (full width of adjacent wall assembly) with beveled edges meeting accessibility Code requirements at ceramic and porcelain tile floors and adjacent dissimilar flooring material.

7. Engineered quartz stone vertical end wall caps as shown on the drawings at wing walls in toilets.

8. Tile joint accessories, including but not limited to:

    a. Edge trim on straight surfaces, exterior corners, inside corners and termination (end) pieces.

    b. Edge reveals and corner guards.

9. **Cement grout with latex additive** for all ceramic and porcelain floor, base and wall tile**, except** use Epoxy grout at all Quarry floor and base tile.

10. Waterproof Membrane at all ceramic & quarry floor tile installed over a recessed slab **(both slab-on-grade and slab-on-deck**) with mortar bed, including at base tile at these locations. **Waterproof Membrane at all ceramic floor tile installed at slab-on-deck locations where there is no recessed slab, including at base tile at these locations**.

11. Anti-fracture Membrane at all **ceramic** floor tile **installed at slab-on-grade locations where there is no recessed slab**.

B. This subcontractor shall level and prepare surfaces as necessary to receive the work of this SECTION.

1. This subcontractor shall finish the joints between panels and corner bead flanges at cement backer board walls receiving tile.

C. This subcontractor shall furnish, install and maintain in safe adequate condition all lifts, hoisting, staging and scaffolding that are necessary for the proper execution of the work of this SECTION.

D. LEEDv4-S Requirements (Refer to SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS):

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from Massachusetts School Building Authority. LEEDv4-S requirements for the work of this section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. For all adhesives and sealants, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. For all flooring systems, meet the requirements for IEQ Credit 2, Low-Emitting Materials as identified in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
4. For all paints and coatings, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
5. Meet the LEEDv4-S requirements for MR Credit 4, Building Product Disclosure and Optimization – Health Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having a Health Product Declaration (HPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Concrete slab depressions and concrete floors: SECTION 033000-CAST IN PLACE CONCRETE.
2. Prefinished wood trim: SECTION 062000-FINISH CARPENTRY.
3. Interior gypsum wall board partitions, cement backer board and corner beads: SECTION 092116-GYPSUM WALLBOARD.
4. Toilet partitions: SECTION 102113- COMPARTMENTS AND CUBICLES.
5. Toilet and bath accessories: SECTION 102813-TOILET AND BATH ACCESSORIES.

1.04 INSTALLATION QUALITY ASSURANCE

A. Work under this SECTION shall be performed by a tile installation firm certified by the tile manufacturer and qualified by experience and in a financial position to do the work specified hereunder.

B. Submit, with transmission of initial samples required, the following:

1. Experience record showing the tile installation firm's training and experience in similar work.

2. List and give brief description of similar work, satisfactorily completed, with location, date of contracts, together with names and addresses of owners.

3. List of facilities and equipment available to do the work.

4. Letter from tile manufacturer certifying the installation firm is an approved installer of the submitted product

C. The tile installer shall be experienced in the supervision of tile installation in this type of work. The actual work shall be done by qualified and experienced mechanics working under his supervision or under the supervision of an experienced workroom supervisor.

D. The Architect reserves the right to reject the tile installation firm if (1) the required qualification data is not received, or (2) the data submitted indicates an unsatisfactory experience record.

E. In the event of conflicts between the Contract Drawings, the manufacturer's standards, and this specification SECTION, the more stringent requirements shall govern.

F. The tile installer shall be certified by the Manufacturer.

G. Prepare new surfaces to properly receive the materials to be furnished and installed hereunder to ensure the specified level of tolerance and bonding of tile.

1.05 GUARANTEES

A. In addition to the manufacturer's wear warranties specified herein, upon completion of the work, submit to the Architect, for transmission to the Owner, two (2) copies of a written guarantee, covering prompt and proper replacement and repair of any and all improper work and material that may become apparent within 12 months after the date of substantial completion under which the work is performed.

1.06 SUBMITTALS

A. Submit the following samples in accordance with the provisions of SECTION 013300-SUBMITTALS.

1. Manufacturer's standard samples of ceramic tile (glazed and unglazed, matte and glossy finish), quarry tile, porcelain wall and floor tile, and thresholds indicating full range of available colors for selection by the Architect.

2. Full size tiles: Up to three of each size and color of each chosen ceramic, porcelain and quarry tile. Upon the request of the Architect, one sheet of each chosen color and size dot mounted mosaic tile.

3. Descriptive literature regarding epoxy mortar, epoxy grout, dry-set Portland Cement mortar, and other grouts to be used, for approval by the Architect.

4. Color samples for grout in full range of available colors for selection by the Architect.

5. Six-inch length of each joint accessory.

6. Manufacturer's standard samples of full range of available colors for engineered stone thresholds and wall caps.

B. After final selection of colors by the Architect, submit one 12-inch x 12-inch mock-up panel of each type and color tile selected, with joint accessories, edge trim, and grouted joints in grout colors selected by the Architect.

1. Wall / Floor Condition – Include a minimum 24-inch x 24-inch mock-up panel for floor and adjacent wall condition utilizing cove accessory and wall and floor tiles.

2. Inside Corner Condition – Include a minimum 12-inch x 12-inch mock-up panels for wall to wall corner condition utilizing inside corner accessory and wall tiles.

3. Outside Corner Condition – Include a minimum 12-inch x 12-inch mock-up panels showing two (2) outside corner conditions (simulating an end wall condition) utilizing corner accessories and wall tile.

4. Bullnose Wall Condition – Include a minimum 12-inch x 12-inch tiled mock-up panel utilizing extruded aluminum cap at top of wall tile.

5. Termination (End) Condition – Include 12-inch x 12-inch outside corner conditions utilizing extruded aluminum termination accessory with wall tile on one panel only.

C. Maintenance Stock – Upon completion of the project submit to the Owner one full case of each tile type and color used.

D. LEEDv4-S Requirements (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. Product substitution requests are subject to additional LEEDv4-S submittal requirements; see SECTION 012500-SUBSTITUTION PROCEDURES.

1.07 STANDARDS

A. Unless otherwise indicated on the Contract Drawings or supplemented or modified hereunder, all materials and installation thereof shall comply with the requirements of:

1. The American National Standards Institute and the Tile Council of America specifications, which are made a part of this SECTION to the extent required by the referenced thereto:

a. Materials Specifications ANSI A136.1.

b. Specifications for Ceramic Tile ANSI A137.1.

2. Installation of Ceramic Tile, A108 Series and A118 Series.

3. International Standards Organization (ISO), ISO 13007 Classification for Grout and Adhesives.

4. Tile Council of North America (TCNA):

a. Handbook for Ceramic, Glass and Stone Tile Installation (latest edition).

5. Trim accessories manufacturer's product guidelines and installation requirements (latest edition).

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Furnish any adhesives and sealants such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.
2. Recycled Content. (See SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS for overall project recycled content requirements.) General Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
3. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) General Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
4. Furnish any paints and coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.
5. Furnish all flooring materials and all setting bed and grout materials such that they meet the requirements for IEQ Credit 2 as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

2.01 MATERIALS

A. Quality, Grade and Certificate – Tile containers shall be grade-sealed in accordance with minimum grade specifications described in ANSI A137.1 (latest edition), with cartons clearly marked as to contents, color, and quantity, and shall be unbroken when received at the project. In addition to grade seal, furnish, with initial shipment, Master Grade Certificate stating grade, kind of tile, identification marks for tile packages and the name and location of the project, signed by the manufacturer.

B. Manufacture – To establish a standard of quality and design, drawings are based on the following products. Tile by other manufactures matching the specified products in color, sheen and size will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

1. Quarry Tile – Kitchen and support rooms, servery, cooler/freezer.

   a. Manufacture: American Olean

   b. Size: 8-inch x 8-inch x ½-inch thick with a 5-inch x 8-inch coved base, including manufacturer's inside and outside corners.

   c. Finish: Abrasive Grain.

   d. Color: Color selection will be from Color Group 2.

   e. Quarry Tile by Metropolitan Ceramics, Daltile or other manufacturers matching the specified products in color, texture, sheen and size will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

   f. Sealer – A sealer as recommended by the tile and grout manufacturers at all quarry tile floors.

2. Porcelain Wall Tile – **PT Type 1** – Community and lobby corridors.

   a. Supplier: Garden State Tile

   b. Manufacturer: Alfalux

   c. Product Line: Valmalenco

   d. Size: 6-inch x 24-inch (Wainscot – field tile)

   e. Finish: Natural

   f. Color: Val Cenere

   g. Porcelain Wall Tile by Crossville (Retroactive), Daltile, American Olean Stone Source Boston or other manufacturers matching the specified products in color, texture, sheen and size will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

3. Unglazed Ceramic Floor Tile and Base – **CT Types 1 & 1A** –Toilet room floors and coved base.

   a. Supplier: Daltile

   b. Product Line: Keystones

   c. Colors: 2 colors selected from manufacturer's standard colors – Color Group 2.

   d. **Type 1**: 2-inch x 2-inch (Toilet Room Floor and Cove Base installed in all toilets with full height and/or wainscot tile above cove base.)

   e. **Type 1A**: 2-inch x 2-inch (Toilet Room Floor and Cove Base with bullnose in all toilets GWB installed above cove base.)

   f. Ceramic Wall Tile by American Olean, ProSpec or other manufacturers matching the specified products in color, texture, sheen and size will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

4. Ceramic Wall Tile – **CT Types 2A, 2B & 2C** – Academic corridors, cafeteria, main lobby, toilets and stairs.

   a. Supplier: Daltile

   b. Product Line: Color Wheel

   c. **Type 2A**: 4-inch x 4-inch (Academic Corridors, Single User and Multi-Fixture Toilet Rooms)

   d. **Type 2B**: 4-inch x 8-inch (Single User and Multi-Fixture Toilet Rooms)

   e. **Type 2C**: 4-inch x 12-inch (Academic Corridors, Stairs B and C, Kitchen / Servery)

   f. Finish: High Gloss

   g. Colors: Up to 5 colors will be chosen. Field color shall be chosen from standard stock colors. Accents shall be from manufacturer's full line of colors and custom colors to match Pantone System colors. Colors shall be as shown on the drawings.

   h. Ceramic Wall Tile by Johnson Tiles, Mosa Tile, Garden State Tile "Chromatica" or other manufacturers matching the specified products in color, texture, sheen and size will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

5. Ceramic Wall Tile – **CT Type 3** – Multi-fixture toilet rooms.

   a. Supplier: Daltile

   b. Product Line: Festiva

   c. **Type 3:** 4-inch x 4-inch (Toilet room walls and as otherwise shown on the Drawings.)

   d. Finish: Matte

   e. Colors: Up to 6 colors selected from manufacturer's full range of colors and custom colors to match Pantone System colors.

   f. Ceramic Wall Tile by Johnson Tiles, Mosa Tile, Garden State Tile "Chromatica" or other manufacturers matching the specified products in color, texture, sheen and size will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

6. Ceramic Wall Tile – **CT Type 4 (Hexagon)** – Main entry vestibule, drinking fountain alcoves, multi-fixture toilet rooms, elevator surround and cafeteria.

   a. Supplier: Daltile

   b. Product Line: Natural Hues

   c. **Type 4:** 8-inch hexagon (Full height at multi-fixture toilet sinks, cafeteria servery wall, main entry vestibule, drinking fountain alcoves, elevator surrounds and as otherwise shown on the Drawings

   d. Colors: Up to 7 colors selected from manufacturer's full line of colors and up to 2 custom colors.

   e. Ceramic Wall Tile by Johnson Tile "Prismatics", Garden State Tile "Hexa" or other manufacturers matching the specified products in color, texture, sheen and size will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

C. Tile Trim –To establish a standard of quality, function and design, the trim for porcelain and ceramic tile, has been based upon trim by Schluter Systems LP, Plattsburg, NY. Similar trim by other manufacturers will be considered as an equal by the Architect upon receipt of adequate supporting data and samples.

1. Finishing & Edge Protection Aluminum Trim: **"Jolly"** shall be installed horizontally at the top of all wall tile (except, where tile extends above the finish ceiling or bullnose tile is specified for the base tile at non-tiled walls); horizontally at the bottom of all tile above the 4" resilient base; horizontally between the top of square edged cove base mosaic tile and ceramic wall tile where the installed depth of wall tile is greater than the base; vertically and horizontally between tile and the jambs and heads of all hollow metal and stainless steel door frames; vertically at outside corners where tile turns a corner; vertically and horizontally at the termination of a tile finish along a wall where the adjacent finish continues in the same plane; and as otherwise indicated on the drawings.

   a. Color/Finish: Satin Nickel Anodized Aluminum (AT)

2. PVC Movement Trim: **"Dilex-BWA"** at all inside corners between tile and tile and inside corners between tile and dissimilar materials, for example GWB (except where Finishing & Edge Aluminum Protection trim is called for at door frames).

   a. Color to be selected by Architect from manufacturers full line of colors to match grout choices– multiple colors will be selected if required.

3. The size/depth of the trim profiles shall match the thickness of the submitted/approved tile. Coordination with the approved tile is required and may result in more than one size required for each profile.

4. Provide tile trim in maximum available lengths. In no case shall trim pieces less than 12 inches long be used. In all cases, runs of 4 ft. or less shall be made with one continuous piece of trim.

D. Thresholds and Vertical Wall Caps – Engineered stone thresholds shall be as manufactured by Cambria Co., LLC, Le Sueur, MN, Caesarstone, Charlotte, NC, or Silestone, Coral Gable, FL. Other manufacturers may be considered as an equal by the Architect upon receipt of adequate supporting data and samples.

1. Color: As selected by the Architect from full range of available colors. Colors at thresholds and wall caps shall be chosen independently.
2. Material for thresholds shall be ½-inch or ¾-inch as shown on the Drawings and as required for the transition between materials.
3. Material for wall caps shall be nominal ¾-inch thick or as otherwise shown on the Drawings.

E. Mud-Set Portland Cement (at depressed slab-on-grade areas to receive ceramic tile or quarry tile) – Setting bed materials including Portland Cement (conforming to ASTM C-150, Type 1), sand reinforcing (conforming to ASTM C-144, passing a No. 8 sieve), 4 mil polyethylene film and expansion joint materials, all conforming to ANSI A108.1 and TCNA specifications F111.

F. Epoxy mortar and grout conforming to ANSI A108.6 and A118.3.

G. Grout for floor and wall tile-50 percent fine silica sand and 50 percent white Portland Cement, with special latex additive, in colors as selected by Architect.

H. Caulking materials, having a VOC content of 250 g/L or less, as follows:

1. For floor control joints – One-part mildew resistant silicone rubber sealant: Dow Corning 786, Pecora 898 Sanitary Silicone Sealant, GE Silicones sanitary 170, or approved equal.
2. For walls – Pecora acrylic latex caulk AC-20, DAP acrylic latex caulk, Gibson Holman acrylic latex caulk, or equal, in color as selected by Architect.

I. Anti-Fracture Membrane – For application over floor slabs prior to installing conventional setting bed – 2-part system consisting of a liquid rubber and reinforcing fabric, “Blue 92 Anti-fracture” as manufactured by Laticrete or an approved equal.

J. Reinforcing for Mortar Bed at Tile Flooring – 2-inch x 2-inch 16/16 welded wire mesh.

K. Latex Portland Cement Bond Coat – Mixture of Portland Cement, sand and special latex additive for setting tile, conforming to ANSI A108.5 and ANSI A118.4.

~~L. Division Strips – Plastic angle type, ¼-inch deep, with 1/8-inch exposed thickness, in color as selected by the Architect, Manhattan American Thin set Dividing Strip, Rudel Floor Strip Company, or approved equal.~~

L. Waterproofing Membrane – fluid applied fabric reinforced waterproofing and crack suppression membrane compatible with the tile setting system specified herein with a VOC content of 65 g/L or less: Laticrete 9235 waterproof membrane, MAPEI PRP M19, Summitville S-9000, or approved equal.

PART 3 EXECUTION

3.01 PRE-INSTALLATION REQUIREMENTS

A. Be fully responsible for the execution and performance of the work described herein. Inspect all surfaces and request that the General Contractor correct any conditions which may affect this work adversely. Report to the Architect, prior to commencing any portion of this work, any failure of the General Contractor to provide suitable surfaces or working conditions for this portion of the work. Failure to make such a report shall be construed as an acceptance of the conditions.

B. Schedule pre-installation meeting with Architect to review layouts and patterns prior to commencing any portion of this work.

3.02 INSTALLATION OF CERAMIC TILE, PORCELAIN TILE, QUARRY TILE AND RELATED ITEMS

A. Follow installation procedures as set forth in the following:

1. Trim – Install trim in accordance with the TCNA and manufacturer's recommendations.

a. Aluminum Finishing & Edge Protection Trim:

1) Install aluminum trim wherever tile abuts hollow metal and stainless steel door frames, at the perimeter of wall tile installations (including the top of wainscots, where full height tile stops at or below the finished ceiling, at the bottom of tile installation above resilient bases), between tile of different installed thicknesses, at outside corners where tile installation continues around corners and as shown on drawings.

2) Corners shall be mitered and all field cut edges filed smooth.

b. PVC Movement Trim:

1) Install PVC trim, at inside corners between two walls with tile, and at inside corners between tile and GWB (or other dissimilar finish) and as shown on the drawings.

2) Where full height tile and tile wainscot meet at an inside corner, PVC Trim shall be used between the full height tile and the GWB above the wainscot and at the wainscot tile where it meets the full height tile wall. Wainscot tile shall be capped with aluminum trim as specified above.

2. For ceramic floor tiles in toilet rooms and lobby/corridors over slabs-on-grade where there is no slab depression, over an anti-fracture membrane: TCNA F113 and ANSI A118.4 (latex Portland cement mortar as recommended by manufacturer for above-ground use).

3. For ceramic tile floors over waterproof membrane on slabs-on-deck where there is no slab depression: Thin set (TCNA F122 and ANSI 108.5).

4. For ceramic tile floors in multi-fixture toilet rooms with a slab depression, with sloped reinforced mortar bed over a waterproof membrane: TCNA F121 and ANSI 108.1 and A108.10.

5. For ceramic and porcelain wall tile on cement backer board: TCNA W244C and ANSI A118.4 (latex Portland cement mortar).

6. Quarry tile at designated mud-set in kitchen areas shall have epoxy grout and sealer in accordance with TCNA F-114.

    a. Quarry tile in freezer / cooler units shall be epoxy set with epoxy grout.

    b. All quarry tile shall be sealed in accordance with manufacturer's recommendation

B. Joint Treatment at Cement Backer Board - Fill horizontal and vertical joints solid and finish cornerbead flanges with latex-Portland cement mortar and tape with 2-inch alkali resistant glass fiber tape in accordance with the tile manufacturer's recommendation and applicable TCNA Design Standard. At corners tape joints using skim coat of latex-Portland cement mortar, but do not fill.

C. Set tile in strict accordance with specified standards and manufacturer's recommendations. Install control joints per TCNA recommendations for the various flooring conditions.

~~1. Movement Trim – Jolly trim and Quadec trim.~~

1. Using a notched trowel, apply thin-set mortar to the area where the profile is to be placed. At outside wall corner, finish tiling one wall first, then trowel thin-set mortar over the corner area of the second wall. Large format tile (any dimension 15 inches or greater) shall be back buttered with the trowel's non-notched edge.

2. Press the perforated anchoring leg of profile into the mortar and align.

3. Trowel additional thin-set mortar over the perforated anchoring leg to ensure full coverage and support of the tile edges.

4. Solidly embed the tiles so that the tiled surface is flush with the top of the profile; the profile should not be higher than the tiled surface, but rather up to approximately 1/32 inch (1 mm).

5. Set the tile to the integrated joint spacer (spline), which ensures a uniform joint of 1/16 inch - 1/8 inch

6. To set tile along the face, apply thin-set mortar (**medium-set mortar at tiles where one or more dimensions exceed 15 inches**) to the back of the tile using a margin trowel. Press the back-buttered tiles into the face of the profile, making sure to force thin-set mortar (medium-set where applicable) fully into the dovetailed grooves. The tiled surface should be flush with the outer edge of the profile.

7. Fill joints completely with grout or setting material.

8. Work with materials and tools that will not scratch or damage sensitive surfaces. Setting materials must be removed immediately.

9. Corners and end caps shall be held in place with thin-set mortar (**medium-set where applicable**.) Fill the ends of the profile with thin-set mortar (medium-set where applicable) prior to inserting the accessories. Connector shall be held in place with a friction fit. Insert the connector into the profile approximately half the length of the connector piece and connect the adjacent profile.

D. Set tile with all joints in true line, and with faces of tile in absolutely true plane, free from projecting or recessed edges. Use surface bullnose units and applicable jolly accessories wherever edges will be exposed.

E. Carefully cut tile around penetrations therein, such as piping and accessories.

F. Base – Install cove base pieces where ceramic tile bases are scheduled. Use bullnose top of base tile below GWB and FRP wall finishes. Use tile with square edged top below ceramic tile wall finishes. Where ceramic wall tile is of a greater installed depth than the base use metal aluminum edge trim between cove base tile and wall tile.

G. Grouting of tile shall be performed in accordance with tile manufacturer's recommendations, using a pressure gun provided with a special grouting nozzle.

H. Mask adjacent areas not intended to receive grout including, but not limited to, gap between Schluter trim and hollow metal frames.

I. After grouting, all areas shall be thoroughly cleaned by washing and sponging and buffing with clear, dry cloths.

J. All work shall be cured as recommended by manufacturers.

K. Apply specified caulking materials around all items penetrating the wall and floor tile surfaces, tooling the materials to a smooth, dense finish.

L. Perform all cleaning of tile surfaces as specified in the applicable Standards.

3.03 INSTALLATION OF LATEX CAULKING MATERIALS

A. Thoroughly clean all joints, removing all loose mortar, oil, grease, dust, frost, and other foreign materials which will prevent proper adhesion. Apply masking tape to each exposed surface of joints. Rake out joints to properly receive new sealant.

B. After cleaning, and if so recommended by the materials manufacturer, apply primer to all joint surfaces, taking care not to stain adjacent surfaces.

3.04 PROTECTION

A. Exercise every reasonable precaution to avoid damage to the work of other trades and repair any damage so caused bearing all expenses therefore. Protect the work at all times and arrange with the General Contractor for closing off of all traffic and other work when this is necessary to avoid all damage to the finished surfaces before they are set up.

END OF SECTION

SECTION 090003

ACOUSTICAL TILE

*(Filed Sub-Bid Required)

PART 1 GENERAL

1.00 TIME, MANNER AND REQUIREMENTS FOR SUBMITTING SUB-BIDS

A. Sub-bids shall be submitted in accordance with provisions of the General Laws (Ter. Ed.), Chapter 149, Section 44A to 44L, inclusive, as amended. The time and place for submission to Sub-Bids shall be set forth under INSTRUCTIONS TO BIDDERS.

B. Each Sub-Bid filed with the Awarding Authority must be accompanied by BID BOND, or CERTIFIED CHECK, or a TREASURER'S CHECK or CASHIER'S CHECK issued by a responsible bank or trust company, payable to the **City of Amesbury** in the amount stipulated in the INSTRUCTIONS TO BIDDERS. A Sub-Bid accompanied by any other form of bid deposit than those specified will be rejected.

C. Each Sub-Bid submitted for the work, under this SECTION, shall be on a form furnished by the Awarding Authority and required by SECTION 44F of Chapter 149 of the General Laws, as amended.

D. Work to be performed under this SECTION is shown on Contract Drawings numbered:

G.0.01, G.0.02, G.0.04-G.0.08, inclusive; 2.1.00-2.8.03, inclusive; 3.4.01-3.9.15, inclusive; 4.3.01-5.4.11, inclusive; 5.6.01-5.6.13, inclusive; 6.1.00-6.2.01, inclusive; 7.4.01-7.4.03, inclusive; 8.4.01-8.5.03, inclusive; 9.4.01-9.7.07, inclusive; and 10.0.01-10.3.13, inclusive.

Remaining Contract Drawings are included for reference and coordination.

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a sub-bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following, as shown on the Drawings and specified herein:

1. Suspended acoustical tile ceilings, in the size and lay-in type, including grid suspension system, prefinished metal trim, and accessories as specified herein.

2. Perform all cutting in new ceilings furnished hereunder for items which penetrate these surfaces.

B. This subcontractor shall furnish, install, and maintain in safe adequate condition all lifts, hoisting, staging and scaffolding that are necessary for the proper execution of the work of this Section.

C. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. Meet the LEEDv4-S requirements for MR Credit 4, Building Product Disclosure and Optimization – Health Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having a Health Product Declaration (HPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Gypsum wallboard (acoustical) ceiling installed above lay-in ceiling at designated spaces and gypsum wallboard construction at project area "clouds": SECTION 092116-GYPSUM WALLBOARD.

2. Electrical fixtures, including supports therefor, wiring and correlated electrical work: SECTION 260001-ELECTRICAL.

3. Kitchen exhaust hood, HVAC registers and grilles, and related mechanical work: SECTION 114000-FOOD SERVICE EQUIPMENT, and SECTION 230001-HEATING, VENTILATING and AIR CONDITIONING.

4. Sprinkler heads and piping and related fire protection work: SECTION 210001-FIRE PROTECTION.

5. Roller shade ceiling pocket: SECTION 122413-ROLLER SHADES.

1.04 QUALITY ASSURANCE

A. Installation of the work under this SECTION shall be performed by an acoustical subcontractor approved by the manufacturers of the materials.

B. Warranty: Manufacturer's standard 30-year systems warranty against visible sag, mold and mildew.

1.05 SUBMITTALS

A. Submit complete shop drawings in accordance with the provisions of SECTION 013300-SUBMITTALS.

1. Shop drawings shall include a complete reflected ceiling plan of each type of ceiling, indicating by dimension, locations of lighting fixtures, and other items penetrating acoustical ceilings. Shop drawings shall include details of ceiling cove systems,
2. Submit shop drawings and structural calculations for "cloud" suspension system, prepared and stamped by a structural engineer registered in the Commonwealth of Massachusetts.
3. Include, with initial shop drawings submitted, certified Underwriter's Laboratories tests for ceiling systems proposed for use, applicable to the various structural conditions to which the systems will be installed.

B. Submit the following samples in accordance with the provisions of SECTION 013300-SUBMITTALS.

1. Sample of each acoustical tile proposed for use.
2. Sample of each member of acoustical tile fastening system and suspension system proposed for use, 4 inches long.
3. Sample of each member of curved and flat perforated metal suspended ceiling systems, including panels and each member of fastening system and suspension including insulating accessories and colors.

C. Submit additional tile units equal to 2% of the total installed for each type of tile used for use by the Owner.

D. LEEDv4-S Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. Product substitution requests are subject to additional LEEDv4-S submittal requirements, see SECTION 012500-SUBSTITUTION PROCEDURES.

1.06 JOB CONDITIONS

A. Ensure that all wet work, including masonry and concrete, is completed and dried out prior to commencing tile work. Start no work until uniform temperatures of at least 60 degrees F. before, during and after installation of ceiling system can be assured. Be responsible for examination and acceptance of all surfaces and conditions affecting the proper installation of materials required hereunder and do not proceed until all unsatisfactory conditions have been corrected.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) The Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) The Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
3. Certified Wood (FSC). (See Section 018113 Sustainable Design Requirements for overall project FSC-Certified wood content requirements.) For the sum of all wood products in this section, a minimum of 50% FSC wood is required.
4. Furnish any composite wood and agrifiber products installed inside the air and vapor barrier such that they do not contain any added urea-formaldehyde resins. Laminating adhesives used to fabricate on site AND shop applied composite wood and agrifiber assemblies must also not contain any added urea-formaldehyde resins.
5. Furnish any adhesives and sealants such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
6. Furnish any paints and coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
7. Furnish any ceiling and wall system components, including gypsum board products, insulation, acoustical ceiling systems and wall coverings, that are inside the air and vapor barrier, such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 SUSPENDED ACOUSTICAL TILE SYSTEMS

A. General – Refer to the reflected ceiling plans and room finish schedules for layout and locations of lay-in and concealed grid acoustical tile ceilings, and to the Drawings for details of installation methods.

B. Manufacturer (Ceiling Grid) – To establish a standard of quality, design and function, drawings have been based upon Armstrong. Acoustical tile ceiling grid systems by Rockfon, USG Corp., Certainteed or other manufacturers of similar quality, design, and function will be considered for approval as an equal upon receipt of adequate supporting data and samples.

C. Suspension System (15/16") (storage, custodial, electrical/data closets, privacy toilets) – intermediate duty system, "Prelude XL" by Armstrong or approved equal. The system shall accommodate readily available 24 x 24 inch lay-in panels, light fixtures, and air diffusers.

1. Recycled Material Content: At least 23% post-consumer, 30% total.
2. Fasteners for hangers:
   a. For concrete overhead – Power activated acoustic hanger eyes, Ramset, Phillips, or equal.
   b. For steel overhead – Nelson acoustical hanger studs, or equal.
   c. GWB above ceiling – Occurs in Music and Practice Rooms and fire-rated GWB duct terminations in classrooms.
3. Hangers – 12-gauge galvanized steel wire.
4. Main runners – intermediate duty, conforming to ASTM C 635, of cold rolled galvanized steel. Main runners shall be of double-web construction, web height 1-1/2 inch with rectangular top bulb and 15/16 in. bottom flange with painted electro-galvanized steel capping and slotted at 6 inches o.c. to receive cross tees for 24 x 24-inch grid and for 24 x 48 inch grid.
5. Cross tees – identical in cross-section to main runners, 4 feet and 2 feet nominal length, with stab-type end detail allowing removal without tools, and override at each end.
6. Wall angles – 90 degrees cross-section, 15/16 in. by 15/16 in. hemmed legs, 12 feet 0 inches nom. length.
   a. Wall angles at metal Vector tiles – Channel molding, 90° channel section, 7/8 in. x 1 ¾ in. x 9/16 in. hemmed legs, prefinished to match grid, with spreader channel at cut panels.

7. Main runners, cross tees and wall angles shall have baked polyester finish.

    a. Colors shall be gun metal at wood look metal tiles, custom color to match clouds (four colors to be selected) and matte white at all other ceilings.

8. Curved wall angles (where applicable) – Flexible wall co-polymer vinyl angles, 15/16 in. by 2 in., matte white, by Flex Trim Corp., Bedford, TX, Armstrong, or approved equal. Flexible wall angle shall be fire-rated in accordance with ASTM - UL94 Flame Test V-O.

9. Ceiling trim – Prefinished trim as shown on the drawings, as follows:

    a. Extruded aluminum perimeter, including for vector edge tiles, and ceiling cove and light slot trim – Armstrong Axiom or approved equal, in profiles shown on the drawings, custom color to match suspension system.

10. See 2.03 Miscellaneous Specialties for other materials.

D. Suspension System (kitchen) – intermediate duty system, "Prelude Plus XL Fire Guard" (kitchen). The system shall accommodate readily available 24 x 24 inch lay-in panels, light fixtures, and air diffusers.

1. Recycled Material Content: At least 23% post-consumer, 30% total.

2. Fasteners for hangers:

    a. For concrete overhead – Power activated acoustic hanger eyes, Ramset, Phillips, or equal.

    b. For steel overhead – Nelson acoustical hanger studs, or equal.

3. Hangers – 12-gauge galvanized steel wire.

4. Main runners – Intermediate duty, conforming to ASTM C 635, of minimum G90 hot dipped galvanized steel. Main runners shall be of double-web construction, web height 1-1/2 inch with rectangular top bulb and 15/16 in. bottom flange with painted aluminum capping (interior) and prefinished hot dipped galvanized steel capping (exterior) and slotted at 6 inches o.c. to receive cross tees for 24 x 24 inch grid and for 24 x 48 inch grid.

5. Cross tees – Identical in cross-section to main runners, 4 feet 0 inches and 2 feet 0 inches nom. length, with stab-type end detail allowing removal without tools, and override at each end.

6. Wall angles – 90 degrees cross-section, 15/16 in. by 15/16 in. hemmed legs, 12 feet 0 inches nom. length.

    a. Wall angles at metal vector tiles: Channel molding, 90° channel section, 7/8 in. x 1 ¾ in. x 9/16 in. hemmed legs, custom painted to match grid.

7. Main runners, cross tees and wall angles shall have matte white baked polyester finish unless otherwise specified.

8. Curved wall angles (where applicable) – Flexible wall co-polymer vinyl angles, 15/16 in. by 2 in., matte white, by Flex Trim Corp., Bedford, TX, Armstrong, or approved equal. Flexible wall angle shall be fire-rated in accordance with ASTM - UL94 Flame Test V-O.

9. See 2.03 Miscellaneous Accessories for other materials.

E. Suspension System (Typical) – Intermediate duty environmental system, "Suprafine XL" by Armstrong or approved equal. The system shall accommodate readily available 24 x 24 inch lay-in panels, light fixtures, and air diffusers.

1. Fasteners for hangers:

   a. For concrete overhead – Power activated acoustic hanger eyes, Ramset, Phillips, or equal.

   b. For steel overhead – Nelson acoustical hanger studs, or equal.

2. Hangers – 12-gauge galvanized steel wire.

3. Main runners – Intermediate duty, conforming to ASTM C 635, of cold rolled hot-dipped galvanized and coated steel. Main runners shall be of double-web construction, web height 1-1/2 inch with rectangular top bulb and 9/16" bottom flange with pre-painted aluminum capping and slotted at 6 inches o.c. to receive cross tees for 24 x 24 inch grid.

4. Cross tees – Identical in cross-section to main runners, 4 feet 0 inches and 2 feet 0 inches nom. length, with stab-type end detail allowing removal without tools, and override at each end.

5. Wall angles – 90 degrees cross-section, 9/16 by 9/16-inch hemmed legs with aluminum caps, 12 feet 0 inches nom. length.

6. Main runners, crosstees and wall angles shall have matte white baked polyester finish.

7. Extended wall trim at window heads – Armstrong Fascia Molding for reveals less than eight inches and Armstrong Axiom extruded perimeter trim for reveals greater than eight inches.

8. Suspension systems by USG, Certainteed, Chicago Metallic or other manufacturers will be considered as an equal by the architect upon receipt of adequate supporting data and samples.

F. Manufacturer (Acoustical Tile) – To establish a standard of quality, design, and function, drawings have been based upon Armstrong. Acoustical ceiling tiles manufactured by USG Corp., CertainTeed Ceilings and Metal Ceiling tile systems by Steel Ceilings, Inc. or other manufacturers of similar quality, design and function as determined by the Architect will be considered for approval as an equal upon receipt of adequate supporting data.

G. Acoustical Panels (**ATC-1**: Classrooms, Kindergarten Classrooms, Music, Practice, Work Rooms, Staff Lunch, Admin Offices, Nurse's Suite, Offices and Conference Rooms) – Beveled tegular edge, "Ultima" No. 1912, 24 inches x 24 inches x ¾ inch thick lay in, color matte white, as manufactured by Armstrong or an approved equal.

1. NRC – .75
2. CAC – 35
3. Light Reflectance – .88
4. Fire Resistance – Class A
5. Recycled Material Content – Up to 76% total
6. Emissions Testing: SECTION 01350 Protocol, <13.5 ppb of formaldehyde when used under typical conditions required by ASHRAE Standard 62.1 – 2004, "Ventilation for Acceptable Indoor Air Quality".
7. Panels by USG, Certainteed, or other manufacturers will be considered as an equal by the architect upon receipt of adequate supporting data and samples.
8. Suspension system: 9/16-inch system as specified under 2.01 E.

H. Acoustic Panels (**ATC-1A**: Corridors, Stairs, Student Toilets and Project Areas (high/low)) – The acoustical tile panels shall be angled tegular edged "School Zone Fine Fissured" No. 1719, 24 inches x 24 inches x 3/4 inch lay-in, color white, as manufactured by Armstrong, or approved equal.

1. NRC – .70
2. CAC – 40
3. Light Reflectance – .85
4. Fire Resistance – Class A
5. Recycled Material Content: Up to 56%.
6. Emissions testing: Section 01350 Protocol, <13.5 ppb or formaldehyde when used under typical conditions required by ASHRAE Standard 62.1 - 2004, "Ventilation for Acceptable Indoor Air Quality".
7. Panels by USG ("Radar CP Hi NRC #22121"), Certainteed or other manufacturers will be considered as an equal by the Architect upon receipt of adequate supporting data and samples.
8. Suspension system: 9/16-inch system as specified under 2.01 E.

I. Acoustic Panels (**ATC-1B**: Pre-Kindergarten Classrooms, Library and Cafeteria Ceilings) – The acoustical tile panels shall be square tegular edged, "Optima" No. 3251 PB and 3257 PB, 24 inches x 24 inches x 1 inch and 24 inches x 48 inches x 1 inch, respectively, color white, as manufactured by Armstrong, or approved equal.

1. NRC – .95
2. CAC – N/A
3. Light Reflectance – .88
4. Fire Resistance – Class A
5. Recycled Material Content: At least 72% total.
6. Emissions testing: Section 01350 Protocol, <13.5 ppb or formaldehyde when used under typical conditions required by ASHRAE Standard 62.1 - 2004, "Ventilation for Acceptable Indoor Air Quality".
7. Panels by USG, Certainteed or other manufacturers will be considered as an equal by the Architect upon receipt of adequate supporting data and samples.
8. Suspension system: 9/16-inch system as specified under 2.01 E.

J. Moisture Resistant Acoustical Panels (**ATC-2**: Kitchen, Kitchen Office, Dry Storage and Mop) – The non-perforated acoustical tile panels shall be "Kitchen Zone 673", 24 inches x 24 inches x 5/8 inch lay in, color matte white, having a scrubbable face, as manufactured by Armstrong, or an approved equal.

1. NRC – N/A
2. CAC – 33
3. Light Reflectance – .89
4. Fire Resistance – Class A
5. Recycled Material Content: Up to 36%
6. Emissions Testing: SECTION 01350 Protocol, <13.5 ppb of formaldehyde when used under typical conditions required by ASHRAE Standard 62.1 – 2004, "Ventilation for Acceptable Indoor Air Quality".
7. Panels by USG ("Kitchen lay-in 3210"), Certainteed "VinylRock", or other manufacturers will be considered as an equal by the architect upon receipt of adequate supporting data and samples.
8. Suspension System: 15/16 in. system as specified under 2.01.C.

K. Acoustic Panels (**ATC-3**: Privacy Toilets and PE Office) – The acoustical tile panels shall be angled tegular edged "Fine Fissured" No. 1732, 24 inches x 24 inches x 5/8 inch lay-in, color white, as manufactured by Armstrong, or approved equal.

1. NRC – .55
2. CAC – 35
3. Light Reflectance – .85
4. Fire Resistance – Class A
5. Recycled Material Content: Up to 73% total.
6. Emissions Testing: Section 01350 Protocol, <13.5 ppb or formaldehyde when used under typical conditions required by ASHRAE Standard 62.1 - 2004, "Ventilation for Acceptable Indoor Air Quality".
7. Panels by USG ("Radar CP Hi NRC #22121"), Certainteed or other manufacturers will be considered as an equal by the Architect upon receipt of adequate supporting data and samples.
8. Suspension System: 15/16 in. system as specified under 2.01.C.

L. Acoustic Panels (**ATC-3A**: Platform) – The acoustical tile panels shall be angled tegular edged "Fine Fissured" No. 1732, 24 inches x 24 inches x 5/8 inch lay-in, color Grey Stone (GS), as manufactured by Armstrong, or approved equal.

1. NRC – .55
2. CAC – 35
3. Light Reflectance – N/A
4. Fire Resistance – Class A
5. Recycled Material Content: At least 72% total.
6. Emissions Testing: Section 01350 Protocol, <13.5 ppb or formaldehyde when used under typical conditions required by ASHRAE Standard 62.1 - 2004, "Ventilation for Acceptable Indoor Air Quality".
7. Panels by USG ("Radar CP Hi NRC #22121"), Certainteed or other manufacturers will be considered as an equal by the Architect upon receipt of adequate supporting data and samples.
8. Suspension System: 15/16 in. system as specified under 2.01.C in matching Grey Stone.

M. Acoustical Panels (**ATC-4**: Project Area Clouds): Square edged "Calla Colorations" #2820, 24 inches x 24 inches x 1 inch thick lay-in, in factory painted custom colors as selected by the Architect (six colors to be selected), as manufactured by Armstrong or an approved equal. Cloud perimeter edge trim shall be straight at Project Areas "High Axiom Classic," custom color (up to six colors to be selected).

1. NRC – .85
2. CAC – .35
3. Light Reflectance – .85 (white) – varies by colors chosen.
4. Fire Resistance – Class A
5. Biobased Material Content: Up to 81%
6. Emissions Testing: SECTION 01350 Protocol, <13.5 ppb of formaldehyde when used under typical conditions required by ASHRAE Standard 62.1 – 2004, "Ventilation for Acceptable Indoor Air Quality".
7. Panels by USG, Certainteed, or other manufacturers will be considered as an equal by the architect upon receipt of adequate supporting data and samples.
8. Suspension System: 15/16 in. system as specified under 2.01 C. Cloud tile panels, suspension system and perimeter trim shall be factory painted to match custom tile colors. Up to six colors will be selected by the Architect for the clouds.
9. Clouds are suspended below other acoustic ceilings or GWB soffits.

N. Canopies (**ATC-5**: Cafeteria at platform above proscenium): The rectangular canopies shall be "WoodWorks Linear Veneered Planks" as manufactured by Armstrong or an approved equal.

1. Type: WoodWorks (unperforated) linear veneered planks
2. Size and Shape: Nominal 6 in. wide planks cut to lengths shown on drawings.
3. Finish: Chosen from manufacturer's full lines of "Natural Variations", "Constants" and "Bamboo".
4. Suspension: Linear carriers with integral concealed clips Armstrong 5371 or equal.
5. Trim: Perimeter trim shall be upturned linear veneer plank material at all sides of suspended canopies matching the chosen finish.
6. Canopies shall be sized to include full 6 in. width panels. Coordinate exact sizing of canopies with MEP requirements for gaps between each unit.

O. Metal Mesh (**ATC-6**: Media Center Cloud): Square edged 'Lattice #6136AM' 24 in. x 24 in. lay-in as manufactured by Armstrong or an approved equal. Cloud perimeter edge trim shall be curved, 4-in. "Axiom AXCUR-WH". Openness factor, including suspension system, must be ≥ 70% for the entire assembly meeting NFPA 13.

1. NRC – N/A
2. Color: White (WH)
3. Fire Resistance: Class A
4. Openness Factor of Tile Minimum: 76.5% (assembly: minimum 70%)
5. Material: Cold rolled steel
6. Recycled Content: 25%
7. Suspension System: 15/16" system as specified under 2.01.C. Color: White (WH)
8. Cloud is suspended below other acoustic ceilings. Sprinklers and pendant light supports are installed in upper acoustic ceilings. Pendant cords to pass through openings in mesh panels.

2.02 MISCELLANEOUS ACCESSORIES

A. Furnish and install all acoustic ceiling trim, clips, suspension system hardware, fasteners and accessories required for a complete installation, as shown on the drawings and required for a complete installation. Such accessories include but are not limited to the following:

1. Uptight clip / cloud perimeter light fixture support (Armstrong QSUTC) with continuous light gauge metal fixture mounting plate.
2. Direct Load Ceiling Clip: For suspending cafeteria clouds (Armstrong DLCC) or Erico Independent Support Clip
3. Extruded Aluminum Column Rings: "Shadow Style" (Armstrong AXM 5075 CUR) color to match grid.
4. Extruded Aluminum "F" Transition Trim (Armstrong AXTR 7906-STR) Note: two custom colors shall be used.
5. Fascia moulding, 4 inches x 1 inch with prefinished exposed flanges (Armstrong 7814) color to match grid.
6. Light Cove Reveal Trim: 8-inch extruded aluminum (Armstrong Axiom AX8 STR and CUR) with premitered outside corners (AX8QSOS) color white.
7. Light Cove Trim: 4 inch straight extruded aluminum (Armstrong Axiom AX4 STR and CUR) with premitered outside corners (AX4 QSOS) color white.

8. Edge Trim at Metalworks Vector Ceilings at cut tiles and at light fixtures: Preformed edge cap (Armstrong 6098/MY) factory gunmetal grey finish matching grid.

PART 3 EXECUTION

3.01 INSTALLATION

A. The ceiling suspension systems shall be installed per the recommendations of ASTM C 636 and ASCE 7. Loading of any component shall not cause deflection of more than 1/360 of the span.

B. Main runners shall be installed 48 inches on center and be directly suspended by 12-gauge galvanized steel wire spaced 48 inches on center along the main runners. Hanger wires shall be wrapped tightly at least 3 full turns.

C. Wall moldings shall be installed wherever suspension components meet vertical surfaces.

1. Install flexible vinyl wall angle at all inside and outside radius curved walls per manufacturer's recommendations. At inside radius curves use conventional heat gun to remove ripples.

D. Acoustical panels shall be installed in accordance with the manufacturer's recommendations.

E. Integral Cove Ceilings: Install in accordance with the approved shop drawings and the manufacturer’s requirements.

3.02 CLEANING

A. Following installation, clean soiled or discolored surfaces of tiles and suspension grid system. Remove or replace units, which are damaged or improperly installed.

B. Touch-up prefinished metal and wood ceiling systems in accordance with the recommendations of the finish manufacturer.

END OF SECTION

SECTION 090005

RESILIENT FLOORING

*(Filed Sub-Bid Required)

PART 1 GENERAL

1.00 TIME, MANNER AND REQUIREMENTS FOR SUBMITTING SUB-BIDS (TRADE BIDS)

A. Sub-bids (Trade Bids) shall be submitted in accordance with provisions of the General Laws (Ter. Ed.), Chapter 149 Section 44A-44L, inclusive, as amended. The time and place for submission to Sub-Bids shall be set forth under INSTRUCTIONS TO BIDDERS.

B. Each Sub-Bid (Trade Bid) filed with the Awarding Authority must be accompanied by BID BOND, or CERTIFIED CHECK, or a TREASURER'S CHECK or CASHIER'S CHECK issued by a responsible bank or trust company, payable to the **City of Amesbury** in the amount stipulated in the INSTRUCTIONS TO BIDDERS. A Sub-Bid (Trade Bid) accompanied by any other form of bid deposit than those specified will be rejected.

C. Each Sub-Bid (Trade Bid) submitted for the work, under this SECTION, shall be on a form furnished by the Awarding Authority required by SECTION 44F of Chapter 149 of the General Laws, as amended.

D. Work to be performed under this SECTION is shown on Contract Drawings numbered:

G.0.01, G.0.02, G.0.04-G.0.08, inclusive; 2.1.00-2.8.03, inclusive; 3.4.01-3.4.03, inclusive; 3.7.01-4.3.02, inclusive; and 5.2.01-5.6.13, inclusive.

Remaining Contract Drawings are included for reference and coordination.

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a sub-bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following items of work as shown on the Contract Documents and as specified hereunder.

1. Synthetic Rubber (“Rubber”) Flooring, for floors so indicated, include:
   a. Step tread of one piece for nosing-tread-riser with smooth color contrasting insert at edge, stair landings, and ramp surfaces (sloping and flat), including rubber bases, corners, and end stops.
   b. Synthetic rubber tiles for floors and landings in stairwells.

c. Rubber coved and straight wall base adjacent to all rubber tiles and treads/risers/stringers.

2. Linoleum Composition Tile (LCT) for floors so indicated.

3. Quiet Room Padded Floor

4. Leveling materials required to achieve the acceptable tolerance levels specified hereunder.

5. Tile reducers and feature strip where resilient flooring meets dissimilar adjoining material (except carpeting) or where resilient flooring terminates at a level change (i.e. step down).

6. Coved vinyl base with matching end stops and preformed internal and external corners at all locations scheduled on Room Finish Schedule to receive resilient cove base including at all sealed concrete floors.

7. Coved rubber base with matching end stops and preformed internal and external corners at all locations where adjacent to rubber flooring products.

8. Straight vinyl base at carpeting.

9. Rubber floor tile at elevator cab.

10. Epoxy joint filler with a primer and a moisture-resistant patching underlayment skim coat at floor concrete controls joints to be covered by products specified herein.

11. Adhesives complying with minimum relative humidity of 99% and a level of alkalinity (pH) not less than 8 or greater than 12.

B. Prepare new surfaces to properly receive the materials to be furnished and installed hereunder. Include sanding, cleaning, and installing mastic underlayment, as necessary, to ensure the specified level of tolerance and bonding of tile and base.

C. Test moisture content/relative humidity (RH) and alkalinity (pH) level of concrete slabs to receive finishes specified herein.

D. This Subcontractor shall furnish, install, and maintain in safe adequate condition all lifts, hoisting, staging and scaffolding that are necessary for the proper execution of the work of this Section.

E. Perform all cleaning and finishing of materials furnished and installed hereunder.

F. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. For all adhesives and sealants, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. For all flooring systems, meet the LEED-S requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

4. For all paints and coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

5. Meet the LEEDv4-S requirements for MR Credit 4, Building Product Disclosure and Optimization – Health Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having a Health Product Declaration (HPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. New concrete slabs including floor leveling to comply with industry flatness standards: SECTION 033000-CAST-IN-PLACE CONCRETE.

2. Edging for carpeting: SECTION 096816-CARPETING.

3. Carpeting and entry mat moisture mitigation: SECTION 09816-CARPETING and SECTION 124813-MATS, respectively.

4. Elevator wall and ceiling finishes and elevator flooring substrate: SECTION 140001-ELEVATORS.

5. Polyethylene membrane barrier at wood flooring of gym and stage: SECTION 096466-WOOD AND ATHLETIC FLOORING.

6. Unit prices for moisture mitigation where RH is greater than 99% and/or pH is less than 8 and/or greater than 12: SECTION 012200-UNIT PRICES.

1.04 INSTALLATION QUALITY ASSURANCE

A. Work under this SECTION shall be performed by a resilient flooring installation firm certified by the resilient flooring manufacturer and qualified by experience and in a financial position to do the work specified hereunder.

B. Submit, with transmission of initial samples required, the following:

1. Experience record showing the resilient flooring installation firm's training and experience in similar work.

2. List and give brief description of similar work, satisfactorily completed, with location, date of contracts, together with names and addresses of owners.

3. List of facilities and equipment available to do the work.

4. Letter from tile manufacturer certifying the installation firm is an approved installer of the submitted product

C. The resilient flooring installer shall be experienced in the supervision of resilient flooring installation in this type of work. The actual work shall be done by qualified and experienced mechanics working under his supervision or under the supervision of an experienced workroom supervisor.

D. The Architect reserves the right to reject the resilient flooring installation firm if (1) the required qualification data is not received, or (2) the data submitted indicates an unsatisfactory experience record.

E. In the event of conflicts between the Contract Drawings, the manufacturer's standards, and this specification SECTION, the more stringent requirements shall govern.

F. The resilient flooring installer shall be certified by the Manufacturer.

G. Prepare new surfaces to properly receive the materials to be furnished and installed hereunder to ensure the specified level of tolerance and bonding of tile.

1.05 GUARANTEES

A. In addition to the manufacturer's wear warranties specified herein, upon completion of the work, submit to the Architect, for transmission to the Owner, two (2) copies of a written guarantee, covering prompt and proper replacement and repair of any and all improper work and material that may become apparent within 12 months after the date of substantial completion under which the work is performed.

1.06 SUBMITTALS

A. Submit the following samples in accordance with the requirements of SECTION 013300-SUBMITTALS.

1. Manufacturer's standard samples of rubber flooring, rubber base adjacent to rubber flooring, linoleum flooring and vinyl bases in available colors for selection by the Architect.

a. For linoleum tile, furnish full sized tiles of each of the selected tile colors. Up to 10 colors shall be selected.

b. For rubber submit one full sized tile in selected colors.

2. Product Data: Submit complete manufacturer’s product data for materials specified herein including manufacturer’s complete installation instructions.

3. Relative humidity (RH) and alkalinity (pH) test data submitted a minimum of 45 calendar days prior to any installation of resilient flooring.

B. Qualifications:

1. Resilient Flooring Subcontractor shall have a master mechanic or associate mechanic on his staff. As part of the submittal process, submit master mechanic or associate mechanics credentials.

C. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIIREMENTS.
3. Product substitution requests are subject to additional LEED-S submittal requirements; see SECTION 012500 – SUBSTITUTION PROCEDURES.

D. Resilient flooring and base required for Sample Classroom as specified under SECTION 013300-SUBMITTALS, Article 1.10.

1.05 ADDITIONAL MATERIALS

A. Upon completion of the resilient flooring work, furnish to maintenance representative of the Owner, the following materials for future maintenance replacement:

1. One half (1/2) case of rubber flooring of each color and type used.
2. Forty (40) lineal feet of base, in each color used.
3. One half (1/2) case of each modular composite tile used in each color and each size.

B. Additional materials shall be taken from the same manufacturer's run used on the project, to avoid possible deviation in colors.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All materials shall be delivered in their original unopened packages and protected from exposure to the elements.

B. Damaged or deteriorated materials shall be removed from the premises.

C. Liquid materials shall be stored at a temperature not less than 45 degrees F.

1.07 PRE-FLOORING CONFERENCE

A. Before concrete slabs on deck and slabs on grade are placed, and after approval of all resilient flooring materials, a pre-flooring conference shall be held at the job site. In attendance shall be (1) Architect, (2) General Contractor, (3) Concrete Subcontractor, (4) Resilient Flooring Subcontractor and (5) Flooring manufacturer’s representatives.

B. The parties shall review drawings, specifications and approved materials and coordinate concrete surface, curing, moisture requirements and moisture mitigation for the finish flooring materials.

C. Coordinate with adhesive manufacturer and Concrete Subcontractor for review and approval of concrete slab finish as part of the Pre-flooring Conference.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S Materials Credits, and a completed LEEDv4-S Materials Reporting Form shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements). The General Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
3. Furnish all flooring materials and all associated adhesives/sealants and paints/coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in Section 018113-SUSTAINABLE DESIGN REQUIREMENTS.
4. For all adhesives and sealants, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in Section 018113-SUSTAINABLE DESIGN REQUIREMENTS.
5. Furnish any paints and coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in Section 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 SYNTHETIC RUBBER FLOORING

A. Manufacture

1. To establish a standard of quality, construction and color selection, manufacture has been based upon NORA FLOORING, Madison, Wisconsin.
2. Similar flooring and base by Johnsonite, Mannington or others will be considered for approval by the Architect, upon receipt of adequate supporting data and samples.

B. Materials

1. Flooring material shall be 46% rubber. There shall be no reground rubber, natural rubber, course fillers or sand in the content of the floor. The rubber floor shall perform as follows:
   a. Shore hardness “A” – ASTM D-2240 ≥ 85 psi.
   b. Slip resistance – ASTM D 2047 > 0.6.
   c. Flammability – ASTM E648, E662, Class 1, < 0.45 watts/cm.

d. Resistance to Abrasion (Taber Abrasion) - Caliber H-18 wheels, 500 grams/1000 cycles, not greater than .4 grams weight loss.

2. Flooring at all stairs shall be “Norament 825C’ tile with hammered texture, smooth back. Tile size one half meter square x 3 mm thick.

3. Step tread shall be one piece for nosing-tread-riser with a smooth color contrasting insert – NORA “Visually Impaired Strips”; Mohawk “Visually Impaired”; Johnsonite “Striping Solutions” or approved equal – at the edge of the tread, extending fully between stringer. Rubber base shall be used adjacent to all rubber flooring.

4. Colors shall be as selected by Architect from manufacturer’s full range of available textures and finishes. A maximum of two colors shall be used.

5. Leveling Materials – Skim coat finish for trowel application from feather edge to ½ inch maximum thickness (Ardex Feather Finish or approved equal) as recommended by the manufacturer(s) for the various conditions of the surfaces.

C. Miscellaneous Materials

1. As specified under 2.02, C.

2.02 LINOLEUM COMPOSITE TILE (LCT)

A. Manufacture

1. To establish a standard of quality, construction and color selection, manufacture has been based upon Forbo, Marmoleum “Modular Tile”, Hazelton, PA.

Linoleum floor tile of comparable quality and color range by Johnsonite (Harmonium), Green Floors Linoleum Flooring or other manufacturers will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

a. Tile shall be 2.5 mm thick. Modular tile shall be 20 in. x 20 in., ~~10 in. x 20 in. and 10 in. x 40 in. (plank)~~ in patterns as shown on drawings.

b. Up to ten colors shall be selected by the Architect. Colors shall be selected from the full range of available colors.

c. Tile patterns and number of colors used in each space shall be as shown on Drawings 5.5.01, 5.5.02 and 5.5.03.

B. Materials

1. Linoleum tile shall be a homogeneous floor covering made of primarily natural materials consisting of linseed oil, wood flour, rosin binders, dry pigments mixed and calendared onto a polyester backing, and shall have an occupancy ready finish (meaning the floor shall not require any initial coats of finish). The linoleum tile shall perform as follows:

a. Reference Specification: Meets or exceeds all technical requirements of ASTM F2195.

b.	Slip resistance:	Meets or exceeds .6 for flat surfaces (dry surface) (ASTM D2047).
c.	Fire resistance:	ASTM E-662/ NFPA 258-450 or less ASTM E-648/ NFPA 253 – Class I
d.	Castor resistance:	Suitable for office chairs with castors (EN 425)

C. Miscellaneous Materials

1. Tile reducers, floor transitions and thresholds – 1/8-inch thick by 1 inch wide as manufactured by Johnsonite, Roppe Corporation, Flexco, or an approved equal.
2. Bases – Vinyl, coved and straight, 4 in. and 6 in. high and as shown on the drawings, 1/8-inch wall thickness, in colors as selected by the Designer, furnished with pre-moulded corners and matching end stops wherever ends of base are exposed to view. Bases shall be manufactured by Johnsonite, Roppe Corporation, Flexco or an approved equal. Base shall be supplied in continuous rolls of 120 feet or greater. Provide base in 6 in. or taller sizes as called for at specific details on the Drawings. Provide 6 in. base trimmed to fill space below tile and wood wainscots at all locations where distance between finish floor and bottom of wainscot is greater then 4 in.
3. Leveling Materials – Skim coat finish for trowel application from feather edge to ½ inch maximum thickness (Ardex Feather Finish or approved equal) as recommended by the manufacturer(s) for the various conditions of the surfaces.
4. Floor Finish – Provide if recommended by the manufacturer(s) whose flooring is used**.**

2.03 QUIET ROOM PADDED RESILIENT FLOOR COVERING

A. Product Characteristics

1. To establish a standard of quality, design and function, the specification and Drawings are based on 3/8 inch thick Heavy Duty Rubber Rolls as manufactured by Rubber Flooring Inc., Mesa, AZ. Similar padded floor covering by American Floor Mats, Rockville, MD, Shaw Flooring and others will be considered for approval by the Architect upon receipt of adequate supporting data and samples.
2. Characteristics of Flooring
   a. Flooring shall be provided in a minimum 4 ft. – 0 in. width, available in roll form so as to minimize the seams required. No cross seams allowed.
   b. Flooring shall be hydroscopic and have a durable wear surface.
   c. Wear surface shall have pebble grain finish and be available with a minimum 1/8 in. wear layer thickness.
   d. Top grade resilient sponge backing: Inorganic by reducing agents, detergents, alcohols, mineral oil, amines and aldehydes.

i. Foam cushion: ± 3/8 in., minimum

ii. Density: 14 lb./ft.^{3}

iii. Tensile Strength: 75 lb./in.^{2} ASTM D412

iv. Tear: 15 lb./in. minimum ASTM D1004

e. Flooring shall resist tearing and chemical degradation.

B. Installation shall be by manufacturer's recommended methods. All side seams shall be adhered to the subflooring.

C. Miscellaneous Materials:

1. Stainless steel transition threshold at doorsills, flush with adjacent floor finishes (LCT): Schluter Schiene E series (E160, E200)
2. Cementitious floor leveling as required to bring padded floor flush with adjacent finishes.
3. As specified under 2.02.C.

2.04 BASE AT NON-RESILIENT FLOORS

A. Coved resilient and straight resilient base as called for on Room Finish Schedule shall be as specified under 2.02, C.2.

2.05 ADHESIVES

A. Adhesives– as recommended by the respective Flooring Manufacturers and in compliance with:

1. Relative humidity (RH) up to 99%.
2. Alkalinity (pH) range not less than 8 or greater than 12.

B. **Base Contract (Adhesive**) – Manufacturers shall be compatible with products provided herein and be one of the following or an approved equal:

1. "EZ-On 100" adhesive (by Forbo International)
2. "Magellan XPA" adhesive (by LJM Technologies)
3. "AquaFlex" adhesive (by Formulators, Inc.)
4. "EnviroStix" adhesive (by Base King, Inc.)
5. Other manufacturers of similar moisture mitigation system / product / adhesives meeting SCAQMD, Rule 1168 for low VOC adhesives will be considered as an equal upon receipt of adequate supporting data and performance criteria.

C. Limitation

1. Only one product as noted in paragraph B, above, is allowed for each concrete slab condition. (Clarification: Mixing and matching products and systems within each paragraph is not allowed.)

2.06 EPOXY CONTROL JOINT FILLER

A. Product Characteristics:

1. To establish a standard of quality, design and function, the specification and Drawings are based on “Ardex MRF” by Ardex America. Similar moisture resistant patching underlayment coating products by others will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

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PART 3 EXECUTION

3.01 MOISTURE CONTENT OF CONCRETE SLABS

A. Monitor Moisture Content of Concrete Slabs

1. Monitor moisture content of new concrete floor slabs to receive floor finishes to verify that moisture control procedures are sufficient to dry slabs sufficiently to permit floor finishes to be installed.

2. Continuously monitor relative humidity and moisture content of floor slabs starting after curing of concrete is complete. Perform the following procedures at least once every two weeks, increase frequency to once per week for the month prior to floor finish installation.

   a) Perform a hydrous calcium chloride test, ASTM F 1869.

   b) Perform relative humidity test using in situ probes, ASTM F 2170.

3. **Conduct minimum of one test for each 5000 sq. ft.** of floor area or more frequently when drying rate is slower than anticipated.

3.02 PRE-INSTALLATION CONDITIONS

A. Inspect all surfaces and assure that they are in proper condition to receive work to be performed under this SECTION. The starting of work in any space shall be construed as acceptance of such surfaces as being satisfactory, and any defects to the work resulting from such accepted surfaces shall be corrected under the scope of this SECTION.

B. Fill all minor cracks in sub-floors with mastic and/or leveling compound as recommended by the tile manufacturer.

C. A temperature of not less than 70 degrees shall be maintained for not less than 48 hours before commencing installation of resilient materials and continued 48 hours after completion.

D. No work shall start until samples have been submitted to and approved by the Architect. All material shall be labeled, stating colors, locations, type of adhesive and primer (if required), and the areas in which materials are to be used.

3.03 INSTALLATION

A. Wet adhesives shall be applied following recommendations of the manufacturer.

B. Follow additional manufacturer recommendations for the installation of sheet rubber flooring.

C. Sub floor preparation, including installation of moisture mitigation system and leveling materials as recommended by the respective resilient flooring material manufacturers.

1. The Resilient Flooring Subcontractor shall be responsible for furnishing and installing leveling materials as recommended by respective manufacturers for the various substrate conditions resulting in smooth, feathered changes in plan.

2. Concrete subfloor preparation, including leveling to be performed under this SECTION, shall include but is not limited to the following:

   a. Filling of minor cracks and imperfections in new concrete subfloors and blending of dissimilar subfloor conditions, in area to receive resilient flooring and walk-off mats under SECTION 124813-MATS.

D. Resilient flooring shall extend under all equipment shown on the Contract Drawings and into the wall lines, unless otherwise noted on the Contract Drawings. Resilient flooring shall be carried to fit neatly into breaks and recesses, against non-resilient bases, around pipes, and under saddles. Floors shall not be subjected to traffic until adhesive is dry and hard (approximately 24 hours).

E. Adhesive shall be applied using a notched steel trowel (3/32 x 3/32 x 18 inch size) following recommendations on the adhesive label.

F. Follow additional manufacturer recommendations for the installation of rubber flooring.

G. Installation of resilient base:

1. Both cove and straight, use roll materials. Plan for seams only at inside corners. Where seams are required for runs in excess of roll capacity (120 feet), place seam at least conspicuous location. Hide seams at backs of columns or aligned with changes of wall finish above. Manage material such that there are no seams in any straight run less than the roll length (120 ft.). Where seams permitted in longer runs, no segment shall be less than 10 ft.

2. Additionally, at cove base only: use pre-molded corners at all outside corners. Deformed base at corners will not be accepted. Use preformed end caps at all locations where end of cove base transitions to other (PCT, QT, wood) base, or ends.

3.05 CLEANING OF FLOORING

A. Clean all resilient flooring as recommended by their respective flooring manufacturers.

END OF SECTION

SECTION 090007

PAINTING

*(Filed Trade Sub-Bid Required)

PART 1 GENERAL

1.00 TIME, MANNER AND REQUIREMENTS FOR SUBMITTING TRADE SUB-BIDS

A. Trade Sub-bids shall be submitted in accordance with provisions of the General Laws (Ter. Ed.), Chapter 149, Section 44A to 44L, inclusive, as amended. The time and place for submission to Sub-Bids shall be set forth under INSTRUCTIONS TO BIDDERS.

B. Each Trade Sub-Bid filed with the Awarding Authority must be accompanied by BID BOND, or CERTIFIED CHECK, or a TREASURER'S CHECK or CASHIER'S CHECK issued by a responsible bank or trust company, payable to the **City of Amesbury** in the amount stipulated in the INSTRUCTIONS TO BIDDERS. A Trade Sub-Bid accompanied by any other form of bid deposit than those specified will be rejected.

C. Each Trade Sub-Bid submitted for the work, under this SECTION, shall be on a form furnished by the Awarding Authority and required by SECTION 44F of Chapter 149 of the General Laws, as amended.

D. Work to be done under this SECTION is shown on Contract Drawings numbered:

G.0.01, G.0.02, G.0.04-G.0.08, inclusive; 2.1.00-2.8.03, inclusive; 3.4.01-3.9.15, inclusive; 4.1.01-5.4.11, inclusive; 5.6.01-5.6.13, inclusive; 6.1.00-6.2.01, inclusive; 7.4.01-7.4.03, inclusive; 8.4.01-8.5.03, inclusive; 9.4.01-9.6.01, inclusive; 9.7.01-9.7.07, inclusive; and 10.0.01-10.3.13, inclusive.

Remaining Contract Drawings are included for reference and coordination.

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a sub-bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Perform the following items of work as shown on the Contract Documents.

1. Examine the various trade SECTIONS of the PROJECT MANUAL and be thoroughly familiar with all provisions regarding painting and finishing work included therein.
2. Refer to the Room Finish Schedule and other Contract Drawings for various surfaces required to be painted or finished.

3. Apply specified finish coats of paint to all pre-primed work and complete finishing system to unprimed work required to be painted or finished hereunder.

4. Prime and paint galvanized metal frames and doors, and galvanized steel exposed to view.

5. Backprime, with new specified first coat material, all surfaces of new finish and wood trim which will be concealed after installation.

6. Clean, and properly prepare to receive paint and finishing materials, all salvaged items designated on the Contract Drawings and/or specified hereunder to be painted.

7. Exposed to view MEP/FP systems unless otherwise noted.

8. Exposed to view structural steel members and metal decking.

9. Clean, and properly prepare to receive paint and finishing materials, all existing surfaces and items designated on the Contract Drawings and/or specified hereunder to be painted.

10. Prime and paint substrate behind interior phenolic panels flat black.

B. This subcontractor shall furnish, install and maintain in safe adequate condition all lifts, hoisting, staging and scaffolding that are necessary for the proper execution of the work of this SECTION.

C. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. For all paints and coatings, meet the LEED requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. Meet the LEEDv4-S requirements for MR Credit 4, Building Product Disclosure and Optimization – Health Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having a Health Product Declaration (HPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Shop priming and touch-up of structural steel: SECTION 051200-STRUCTURAL STEEL.

2. Shop priming and touch-up of miscellaneous and ornamental iron: SECTION 050001-MISCELLANEOUS AND ORNAMENTAL IRON.

3. Shop priming and touch-up of miscellaneous metals: SECTION 055000-MISCELLANEOUS METALS.

4. Prefinished hardwood trim and prefinished millwork: SECTION 062000 – FINISH CARPENTRY.

5. Primed and galvanized hollow metal frames and doors: SECTION 081113-HOLLOW METALWORK

6. Prefinished wood doors – SECTION 081416 – WOOD AND PLASTIC DOORS.

7. Stenciling above ceilings for partition ratings: SECTION 092116-GYPSUM WALLBOARD.

8. Dry erase primer and coating system applied to GWB: SECTION 099737-DRY ERASE COATING.

B. The following items of work do not require painting or finishing under this SECTION 090007-PAINTING.

1. Prefinished items.

2. Prefinished aluminum, plain and lead coated copper and stainless steel, except as otherwise specifically noted on the Drawings to receive paint.

3. Concealed from view items and surfaces, except as specified hereunder, and equipment and ducts in mechanical rooms.

4. Exterior masonry.

5. Exterior and interior concrete surfaces, except where specifically designated on the Drawings to receive paint.

6. Prefinished wood doors and hardwood trim.

7. All natural, prefinished wood casework, millwork, paneling and wood trim.

8. GWB walls where dry erase coating is called for on the Drawings. Do not paint or prime these walls.

1.04 SUBMITTALS

A. Submit the following samples in accordance with the requirements of SECTION 013300-SUBMITTALS.

1. Sample boards of all colors and types of paint proposed for the project. Colors shall be selected by the Architect.

2. Samples of finishing system applied to the specified species of wood trim where specified hereunder to receive natural finish, for selection and approval by the Architect.

B. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. Product substitution requests are subject to additional LEEDv4-S submittal requirements. Refer to SECTION 012500-SUBSTITUTION PROCEDURES.

1.05 COLORS

A. Color scheme shall be in accordance with schedules provided by the Architect and all tinting and matching shall be to the satisfaction of the Architect. Up to 20 paint colors shall be used. The Architect reserves the right to select multiple paint colors on any given surface, using natural breaks (change of plane, material, control joint) as the color break.

B. Provide all facilities for comparison and adjustment of colors, and place final samples for approval directly on the surface to be finished. Machine mixing by the manufacturer's representative shall be permitted where advantageous, but only after final approval of colors by the Architect.

C. After completion of all painting work, submit to the Owner, one unopened gallon of each type and color of all paints and enamels used, taken from the same job-run as those used on the project, with manufacturer's name and his designation of the paint and color for the purpose of future re-ordering of paint. Submit to the Architect a signed receipt stating that the Owner has taken possession of the additional painting materials.

1.06 PROTECTION

A. Furnish and lay drop cloths in all rooms and areas where painting and finishing is being done to adequately protect flooring and other work from damage during painting.

B. Remove all canopies of light fixtures, all electric switch plates, and similar equipment, and set them carefully aside and cover adequately to protect the fixtures and replace the canopies, plates, and miscellaneous equipment in as good condition as when found.

C. Materials shall be stored only where directed. Oily rags and waste must be removed from the building at the end of each working day, and under no circumstances allowed to accumulate.

D. All paint surfaces damaged during the progress of the work shall be repainted between natural breaks in surfaces and only as approved by the Architect. The Painting Subcontractor shall see that all other work in a room is completed before starting his painting, except as directed by the Architect.

E. No plumbing fixture or drain shall be used for the mixing or disposal of any refuse material or for washing brushes and other painting utensils.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEED v4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Furnish any paints and coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 APPROVED MATERIALS

A. Before purchasing materials for the work, submit to the Architect a list of the products proposed for use. No commitment for the purchase of materials prior to the written approval by the Architect.

B. All materials shall be delivered to the building in unopened original containers bearing the manufacturers labels.

2.02 MATERIALS

A. General – All paints for gypsum wallboard surfaces in wet areas (kitchens, toilets, janitor / custodian closets, service areas, mechanical rooms) shall have:

1. Non-bacterial additive if not included in the paint product.
2. If included in the paint product provide documentation of the non-bacterial agent.

B. Interior Work for New Surfaces (Refer to Drawings for applicability.)

1. Galvanized metal doors and galvanized pressed steel frames exposed to view on the interior.
   a. Same as exterior galvanized metal doors and frames.
2. Metal doors, hollow metal steel frames and doors, metal handrails, exposed-to-view surfaces of steel lintels, exposed structural steel, including all AESS beams, columns and trusses, and all other ferrous metals which are exposed to view on the interior.
   a. Two coats:

      Benjamin Moore – Ecospec Interior Latex Semi-Gloss 376)

      Sherwin Williams – ProMar 200 Zero VOC Interior Semi-Gloss (B31W02651)

      PPG – Pure Performance Latex Semi-Gloss

      Glidden – Professional Utlrahide No VOC Semi-gloss (1415)

b. Hollow metal frames and door finish shall be spray applied.

3. Vertical surfaces of gypsum board

   a. First Coat:

      Benjamin Moore – Ecospec Interior Latex Primer Sealer (372)

      Sherwin Williams – ProMar 200 Zero VOC Interior Latex Primer (B28W02600)

      PPG – Pure Performance Primer

      Glidden – Professional Lifemaster No VOC Primer (9116)

   b. Two coats:

      Benjamin Moore – Pristine Ecospec Interior Latex Eggshell (374)

      Sherwin Williams – ProMar 200 Zero VOC Interior Latex Eg-Shel (B20W12651)

      PPG – Pure Performance Latex Eggshell

      Glidden – Professional Ultrahide No VOC eggshell (1411)

4. Gypsum board ceilings and soffits.

   a. First Coat:

      Benjamin Moore – Ecospec Interior Latex Primer Sealer (372)

      Sherwin Williams – ProMar 200 Zero VOC Interior Latex Primer (B28W02600)

      PPG – Pure Performance Latex Primer

      Glidden – Professional Lifemaster No VOC Primer (9116)

   b. Two coats:

      Benjamin Moore – Pristine Ecospec Interior Latex Flat (373)

      Sherwin Williams – ProMar 200 Zero VOC Interior Latex Flat (B30W12561)

      PPG – Pure Performance Latex Eggshell

      Glidden – Professional Ultrahide No VOC flat (1209)

5. Exposed-to-view uncovered metal ducts, metal conduits, uncovered cold piping, and all hangers therefore, except in mechanical rooms, and other concealed-from-view areas.

   a. First coat for galvanized items only prior to finish coats:

      Benjamin Moore – Ecospec Interior Latex Primer Sealer (372)

      Sherwin Williams – Pro Industrial Pro-Cryl Universal Acrylic Primer (B66W01310)

      PPG – Pure Performance Latex Primer

Glidden – Professional Lifemaster No VOC Primer (9116)

b. Two coats:

Same paint specified herein for adjacent surfaces

6. Concrete and concrete masonry unit walls.

a. First coat:

Benjamin Moore – Ecospec Interior Latex Primer Sealer (372)

Sherwin Williams – SW Prep Rite Interior/Exterior Latex Block Filler (B25W00025)

PPG – Pure Performance Latex Primer

Glidden – Professional Lifemaster No VOC Primer (9116)

b. Two coats:

Benjamin Moore – Ecospec WB Semi-Gloss (376)

Sherwin Williams – ProMar 200 Zero VOC Latex Semi-Gloss (B31W02651)

PPG – Pure Performance Latex Semi-Gloss

Glidden – Professional Ultrahide No VOC Semi-Gloss (1415)

7. Wood trim for painted finish.

a. First coat:

Benjamin Moore – Ecospec Interior Latex Primer Sealer (372)

Sherwin Williams – ProMar 200 Zero VOC Interior Later Primer (B28W02600)

PPG – Pure Performance Latex Primer

Glidden – Professional Life Master no VOC Primer (9116)

b. Two coats:

Benjamin Moore – Ecospec Interior Latex Semi-Gloss (376)

Sherwin Williams – ProMar Zero VOC Latex Semi-Gloss (B31W02651)

PPG – Pure Performance Latex Semi-Gloss

Glidden – Professional Ultrahide No VOC Semi-Gloss (1415)

8. Concrete and concrete masonry units for epoxy glazed wall finish (GWF).

a. First coat:

PPG – Pure Performance Latex Primer Sealer (372)

Sherwin Williams – SW Prep Rite Interior/Exterior Block Filler (B25W00025)

b. Second coat:

PPG – Pitt-Glaze WB Acryllic Epoxy 16-510 (semi-gloss)

Sherwin Williams – Pro Industrial Water Based Epoxy Eg-Shel (B73W00361)

c. Third Coat:

PPG – Pitt-Glaze WB1 Acryllic Epoxy 16-510 (semi-gloss)

Sherwin Williams – Pro Industrial Water Based Epoxy Eg-Shel (B73W00361)

9. Vertical and horizontal surfaces of gypsum board for epoxy glazed wall finish (GWF).

a. First coat:

Prime per manufacturer's recommendations for substrates

b. Second coat:

PPG – Pitt-Glaze WB Acryllic Epoxy 16-510 (semi-gloss)

Sherwin Williams – Pro Industrial Water Based Epoxy Eg-Shel (B73W00361)

c. Third Coat:

PPG – Pitt-Glaze WB Acryllic Epoxy 16-510 (semi-gloss)

Sherwin Williams – Pro Industrial Water Based Epoxy Eg-Shel (B73W00361)

10. Exposed-to-view structural steel (EVSS) metal roof and floor deck (two coats):

a. Sherwin Williams – Pro Industrial Hi Performance Acrylic, Semi-Gloss Finish (B66W00651).

b. Kelly-Moore – 5885 DTM High Performance Semi-Gloss Enamel

c. Benjamin Moore – UltraSpec HP 25 low luster enamel < 145g/l.

NOTE: DO NOT FILL PERFORATIONS IN ACOUSTIC DECK WITH PAINT.

11. Concrete floors:

Surface Preparation and Application – per manufacturer's recommendations for concrete floors, including filing cracks prior to painting. (Two coats)

a. PPG – Pitt-Glaze WBI Semi-Gloss Water Borne Epoxy

b. Sherwin Williams – FPLX 8100 (B70W08161)

c. or an approved equal meeting IEQ requirements.

12. Fibrous wood acoustic panels:

    a. First coat (spray applied)

       Benjamin Moore – Ecospec Interior Latex Primer Sealer (372)

       Sherwin Williams – Pro Mar 200 Zero VOC Interior Latex Primer (B28W2600)

       PPF – Pure Performance Latex Primer

       Glidden – Professional Lifemaster No VOC Primer (9116)

    b. Three coats (Spray coats – minimum 2.0 mil dry film thickness per coat.)

       Benjamin Moore – Ecospec Interior Latex Eggshel (374)

       Sherwin Williams – Pro Mar 200 Zero VOC Interior Latex, Eggshell (B20W1265)

       PPG – Pur Performance Latex Eggshell

       Glidden – Professional Ultrahide No VOC Eggshell

C. Exterior Work for New Surfaces

1. Metal doors, pressed steel frames and all other galvanized and non-galvanized ferrous metals that are exposed to view and designated to be painted.

    a. Surface preparation for galvanized steel items not previously factory primed including, but not limited to, galvanized deck.

       SP 1 wash and mechanically abrade surface.

    b. First coat: (spray applied)

       TNEMEC – Series 27 epoxy primer

       Kelly-Moore – DTM 5725 Primer/Finish

       Dunn-Edwards – Ultra-Grip Select UGSL00

       Sherwin Williams – PI Procryl Primer (B66W01310)

    c. Second coat: (spray applied)

       Kelly-Moore – 5885 High Performance Acrylic Semi-Gloss Enamel

       PPG – Pitt-Tech Plus Interior/Exterior Semi-Gloss Industrial Enamel

       Sherwin Williams – ProIndustrial DTM Acrylic Semi-Gloss (B66W01151)

PART 3 EXECUTION

3.01 ACCEPTANCE OF SURFACES

A. Inspect all surfaces and assure that they are in proper conditions to receive work to be performed under this SECTION. Any questions as to the proper performance of the various paint systems specified herein shall be brought to the Architect's attention no later than 15 calendar days prior to the date of commencing work, otherwise, the Painting Subcontractor shall assume the responsibility for providing the desired results.

B. The commencement of work in any space by the Painting Subcontractor shall be construed as acceptance of the surfaces as being satisfactory, any defects to his work resulting from such accepted surfaces shall be corrected by him at his own expense.

C. If the existing surfaces cannot be put in proper condition to receive paint by customary cleaning methods, or sanding, furnish and install necessary bonding agents, and/or other preparation required to ensure proper application and performance of the painting and finishing materials, and include the costs for same in the base bid for the work of this SECTION.

3.02 WORKMANSHIP

A. Perform all work with skilled mechanics under adequate supervision.

B. Apply all materials under adequate illumination, evenly spread, and smoothly flowed on without runs, sags, or holidays.

C. Do no work in the rain, dew, or fog, when the temperature is below 50 degrees F., or before the other finish materials have been thoroughly dried out.

D. Clean all surfaces to be painted free of loose dirt and dust before painting is started. Remove all pealing or scaling paint from existing surfaces by sanding and scraping.

3.03 SURFACE PREPARATION

A. New wood and plywood to be painted.

1. Minor defects shall be made smooth by sanding and/or by the use of steel wool.
2. Wash sap spots and knots with mineral spirits. When dry, touch-up spots and knots with white shellac.
3. Fill up nail holes, cracks, and similar imperfections with lead putty or plastic wood after primer of first coat of finish is dry.

B. New ferrous metals:

1. Remove rust and all foreign materials down to bright metal by wire brushing, scraping, and sanding. Spot prime bare metal with exterior or interior alkyd base metal primer, as applicable. Use only rust-inhibiting type primer for exterior metal priming.

2. Remove all grease or dirt with mineral spirits before applying the paint.

C. **Galvanized metal** – All galvanized metal surfaces shall be chemically treated with copper sulfate or with a compound made for this purpose in accordance with the manufacturer's directions, after applying the first coat of paint.

D. New gypsum board and plaster:

1. Sand smooth any rough spots in gypsum board compound surfaces and plaster and seal before application of first coat.

2. Touch-up all suction spots of plaster and compound surfaces (hot spots) after the application of the first coat before applying the second coat to produce an even result in the finish coat.

3.04 APPLICATION

A. Apply all materials in accordance with the manufacturer's specific recommendations, coverage rates, thinning no more than the recommended amount. Assure that all materials are free from skinning, lumps or any foreign matter and keep well stirred during application.

B. Evenly brush out each finish coat and permit to dry at least 24 hours before applying any subsequent coats.

C. Make each coat a different tint from that of the preceding coat, with final coat tinted to the exact shade selected by the Architect. Lightly sand surfaces between each coat and wipe clean.

D. Apply one coat of metal primer, of the types specified hereunder, and one coat of flat black metal enamel, to the surfaces of all new duct-work behind grilles, for a distance of 18 inches.

E. Perform all required back-priming work before items are installed.

3.05 SPRAY PAINTING

A. Spray painting, utilizing power equipment, may be allowed by the Architect subject to the following conditions:

1. ***The Painting Subcontractor must obtain from the Architect written approval prior to the commencing of any spray painting***. All surfaces spray painted without the Architect's prior written approval shall be considered as unpainted surfaces subject to the full requirements of this SECTION. If approved, all spray applied coats must be back rolled.

2. The Architect reserves the right to revoke authorization to spray paint, if in the Architect's sole judgment, the quality of the paint finish is unacceptable or if proper safeguards have not been taken to protect adjacent surfaces.

3.06 COMPLETION

A. Cleaning – At the completion of the work, remove all paint spots and oil or grease stains, caused by this work from floors, walls, fixtures, hardware and equipment, leaving the finishes in a satisfactory condition. Remove all materials and debris and leave the site of the work in a clean condition so far as this work is concerned.

B. Final inspection – Protect all painted surfaces against damage until the date of final acceptance of the work. The Architect will conduct a final inspection of all painters' work and the Painting Subcontractor will be required to repaint or retouch any areas found which do not comply with the requirements of this SECTION.

END OF SECTION

SECTION 092116

GYPSUM WALLBOARD

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following items required to complete the work of this SECTION, as shown on the Drawings and specified herein.

1. Metal stud partition framing, including screw studs, stud tracks, bracing, gypsum board, control joints and accessories.
2. Suspended gypsum board ceilings and soffits including metal hangers, metal studs, carrying channels, furring channels, and gypsum board.
3. Drywall construction system for backing exterior masonry veneer, preformed metal panels, and rainscreen wall systems, including steel screw studs, stud tracks, gypsum wallboard, glass faced sheathing, fire rated exterior sheathing at exterior rated walls and all related items.
4. Gypsum board applied to metal studs and blocking as shown on the Drawings.
5. Drywall construction for various furring conditions indicated on the Drawings, including, as applicable metal furring channels, steel screw studs, stud tracks, and gypsum wallboard.
6. **All gypsum panels shall be mold resistant throughout**.
7. Cement backer board for interior ceramic tile walls.
8. Abuse resistant gypsum wallboard in stairwells (full height) and corridors (up to eight feet above finish floor).
9. All metal and flexible accessories including, but not limited to casing beads, corner beads, abuse resistant radius corner beads, column/beam clips as required in conjunction with the various gypsum board conditions indicated on the Drawings.
10. Miscellaneous gypsum board trim including decorative reveals and picture mold reveals.
11. Internal metal struts, bracing, supplementary framing, and reinforcing necessary to ensure complete stability within the various drywall construction systems.

12. All additional supplementary framing and bracing required for the support of concentrated loads imposed by light fixtures, access panels and other items indicated to be attached to, or hung from, gypsum board surfaces, except where indicated to be wood.

13. Compressible filler between stud tracks of interior partitions and adjacent surfaces.

14. Tape-joint finishing system for gypsum board surfaces including above finish ceilings.

15. Caulking and acoustical sealant, bead applied to legs of stud tracks of interior partitions, prior to application of gypsum board and where else indicated on the Drawings.

16. Firesafing and smoke stopping insulation where indicated on the Drawings.

17. All metal stud framing, furring, reinforcing, bracing, Z-girt channels, accessories and fastening systems shown on the drawings, unless otherwise specified.

18. Framing and wall sheathing of rooftop mounted mechanical doghouses including hardware, such as nails, bolts, screws and clips required.

19. Gypsum board shaft wall system, including gypsum liner panels and metal C-H studs and accessories.

20. Miscellaneous gypsum wallboard trim.

21. Stenciling above ceilings of all fire and smoke barrier wall assemblies (both sides).

22. Level 5 finish at stairwells and as indicated on the drawings and listed herein.

B. This subcontractor shall furnish, install, and maintain in a safe, adequate condition all staging and scaffolding that are necessary for the proper execution of the work of this SECTION.

C. LEEDv4-S Requirements:

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. Meet the LEED requirements for IEQ Credit 2, Low-Emitting Materials and as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

4. Meet the LEEDv4-S requirements for MR Credit 4, Building Product Disclosure and Optimization – Health Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having a Health Product Declaration (HPD).

1.03 ITEMS TO BE INSTALLED ONLY

A. Install the following items furnished under the designated sections:

1. Access panels occurring in gypsum wallboard surfaces: By trade requiring same.
2. Installation of anchor clipping for metal door frames provided under SECTION 081113-HOLLOW METALWORK.
3. Unless otherwise noted, all insulation indicated within the stud systems for drywall construction, above soffits and ceilings: SECTION 072100-INSULATION.

1.04 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Painting of gypsum board: SECTION 090007-PAINTING.
2. Wood furring, wood studs and framing, blocking for attachment of items to wall and ceiling construction, and other rough carpentry: SECTION 061000-ROUGH CARPENTRY.
3. Unless otherwise noted herein, woodwork, including plywood sheathing, indicated in conjunction with gypsum board: SECTION 061000-ROUGH CARPENTRY.
4. Fire retardant treated exterior plywood sheathing at mechanical doghouses: SECTION 061000-ROUGH CARPENTRY.
5. Through-wall flashing at exterior masonry veneer: SECTION 040001-MASONRY.
6. Continuous air and vapor barrier: SECTION 071326-AIR AND VAPOR BARRIERS.
7. Acoustical tile ceiling systems including edge trim over which gypsum board panels are installed: SECTION 090003-ACOUSTICAL TILE.
8. Finishing joints between panels and corner bead flanges in cement backerboard wall surfaces to receive ceramic and porcelain tile: SECTION 090002-TILE.
9. Dry erase coatings: SECTION 099737-DRY ERASE COATING.
10. Printed vinyl wall covering: SECTION 101400-IDENTIFYING DEVICES.

1.05 SUBMITTALS

A. Submit complete shop drawings in accordance with the requirements of SECTION 013300-SUBMITTALS and SECTION 012500-SUBSTITUTION PROCEDURES, as applicable.

B. Shop Drawings – Shop drawings shall include a complete layout, engineering and design calculations for all light gauge metal framing both exterior and interior, including but not limited to, exterior drywall back-up system, for light gauge framing at rooftop doghouses, interior partitions, suspended stud construction, gypsum wallboard ceilings, acoustic separation ceilings and framing of transom openings. Shop drawings shall be prepared and stamped by a structural engineer registered in the Commonwealth of Massachusetts. Shop drawings shall include stud arrangement, stud gauges and sizes, bracing, reinforcing and connection details. Indicate type, grade and manufacturer of all materials intended to be used.

C. Manufacturer's Data – Submit to the Architect copies of manufacturer's specifications and installation and application instructions for all herein specified, certified test results, recommendations for sealing penetrations and perimeters, and other data as may be required.

1. If a substitution of the specified product is proposed, the manufacturer shall provide documentation from a major testing laboratory that the product has successfully been tested in compliance with NFPA 285 in the designated wall assembly systems.
2. In the absence of such above documentation, the manufacturer of the proposed substituted product shall submit documentation that the product has been successfully tested in accordance with NFPA 285 as a component of a successfully tested NFPA 285 wall assembly.
3. In addition to Item 2, above, the proposed manufacturer of the substituted product shall engage a fire scientist to provide a written analysis of the design wall assembly concluding that the proposed substituted product, in the professional judgment of the fire scientist, shall meet the performance requirements of NFPA 285 for the design wall assembly systems.

D. Submit the following samples in accordance with the requirements of SECTION 013300-SUBMITTALS.

1. Metal stud – 12-inch length in each size and gauge required.
2. Gypsum wallboard – 4 inches x 6 inches, minimum, in each specified type and thickness.
3. Gypsum sheathing – 4-inch x 6 inches, in each specified type and thickness.
4. Cement backer board – 4 inches x 6 inches, minimum, in specified thickness.
5. Metal accessories and trims – 6-inch length of each type.
6. Caulking and sealant materials – complete data, no physical samples required.
7. Compressible filler – 6 inches x 6 inches x 1 inch thick, of specified type.

E. Mock-Up – Provide mock-up exterior wall panels as specified under SECTION 014339-EXTERIOR MOCK-UPS.

1. Final Mock-Up: Following the Architect's review and approval of the mock-up panel, including those portions of the panel furnished and installed under other SECTIONS, a final mock-up panel shall incorporate all approved materials, colors and methods of installation. This final Mock-up shall be left on site to serve as the reference standard for appearance and workmanship as the work progresses. This Subcontractor shall, at no additional cost to the Owner, rebuild the portions of the mock-up furnished and installed under this SECTION using the final approved materials, colors and construction to complete the final mock-up.

F. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. Product substitution requests are subject to additional LEEDv4-S submittal requirements, see SECTION 012500-SUBSTITUTION PROCEDURES.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Engineering Responsibility: Engage a qualified professional engineer to prepare design calculations, Shop Drawings, and other structural data.

1. The engineer shall make two visits to the site (once during installation and once after completion of the work) to inspect their respective components for conformance with the shop drawings.

C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.

D. Mill Certificate – Mill certificates signed by steel sheet producer or test reports from a qualified independent testing agency, indicating steel sheet complies with requirements, including uncoated steel thickness, yield strength, tensile strength, total elongation, chemical requirements, ductility, and galvanized-coating thickness.

E. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E329 to conduct the testing indicated, as documented according to ASTM E548.

F. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

G. AISI Specifications: Comply with AISI's "Specification for the Design of Cold Formed Steel Structural Members" or "Load and Resistance Factor Design Specification for Cold-Formed Steel Structural Members" and the following for calculating structural characteristics of cold-formed metal framing:

1. CCFSS Technical Bulletin: "AISI Specification Provisions for Screw Connections."

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Recycled Content. (SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS for overall project recycled content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under SECTION 018113 shall govern.

2. Regional Content. (See SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS for overall project regional content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.

3. Furnish any ceiling and wall systems components, including gypsum board products, insulation and acoustical ceiling systems and wall coverings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

4. Furnish any adhesives and sealants such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 MATERIALS

A. General – To establish a standard of quality and design desired, Specifications are based on drywall system members, as manufactured by U.S. Gypsum Company. Similar systems and materials, manufactured by National Gypsum Company and Georgia Pacific will be considered for approval as an equal by the Architect, upon receipt of adequate supporting data, and samples.

B. Studs, tracks, and joists – USG galvanized steel screw studs with matching floor and ceiling tracks, in sizes indicated on the Drawings. Gauges shall be in accordance with the requirements of the GYPSUM CONSTRUCTION HANDBOOK (latest edition) as printed by U.S.G., with a minimum of 16 gauge at exterior drywall backup system, a minimum of 20 gauge at jambs of interior door openings, 20 gauge x 8 inches deep at joists, minimum 20 gauge at acoustic wall partitions Type 9/9A/9B/9C, minimum 18 gauge at interior acoustic separation ceilings spanning between beams, and a minimum of 25 gauge at interior partitions. Studs at exterior wall backup system shall be C-shaped, with stiffened flanges, complying with ASTM C955, 8 inches wide, and a minimum of 1-5/8 inches deep. Tracks shall be U-shaped, unpunched, with a minimum 1-1/4- inch deep flange. Single deflection tracks shall be deep-leg, U-shaped, unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with 2 inch minimum deep flanges, designed to support horizontal and lateral loads. ~~Studs at interior acoustic partition walls shall be minimum 16 gauge.~~

1. Minimum structural requirements for drywall construction system backing exterior face masonry veneer and metal wall panels are as follows. Loads are based on ultimate strength values (in accordance with ASCE 7-10/2015 IBC) and are minimum design loads, unless greater design load is required by code.

    a. Wind loading: +45 PSF/-49 PSF at non-Salient areas
    +45 PSF/-60 PSF at Salient areas.

    b. Stud design for deflection: L/600 non-composite at masonry veneer areas, L/360 at non-masonry veneer areas.

2. Minimum structural requirements for interior stud systems supporting gypsum wallboard finish is as follows:

    a. Interior loading: 5 PSF typical

    b. Stud design for deflection: L/360

3. Minimum structural requirements for interior acoustic separation ceilings spanning between beams as follows:

    a. Loading: 25 PSF

    b. Deflection: L/360.

4. Minimum structural requirements for light gauge doghouse roof joists supporting plywood decking shall be 105 psf.

5. Provide multiple jamb studs (two minimum) at each side of all openings in exterior drywall back-up system. The approximate number of additional studs at each side shall be equal to 1/2 the number of studs interrupted by the opening or required by actual design.

    a. Provide extended-leg slip tracks at the tops of exterior drywall back-up system when attaching to the building structure. Slip tracks shall allow the structural to deflect vertically without bearing on the exterior wall members, but shall resist all lateral loads imposed on them by these members. Provide slip track reinforcing at built up jambs and elsewhere necessary by actual design.

6. In the event of conflict among contract drawings, contract specifications, and referenced standards, the most stringent requirements shall govern.

7. Provide G90 galvanization at all studs, tracks and runners exposed to the weather and G60 galvanization at all metal studs, tracks and runners located inside the air and vapor barrier of the building envelope.

8. Provide deflection track at all LGMF walls (at interior and exterior locations) where LGMF is to be secured to beams, floor decks and roof deck above.

C. Gypsum Panels, Shaft Wall Liner, Cement Backer Board, and Gypsum Sheathing:

1. Regular Gypsum Panels (ASTM C 1396): National Gypsum Co. Gold Bond "XP" gypsum panels, U.S. Gypsum Co. "Mold Tough" gypsum panels, CertainTeed "ProRoc M2Tech" Moisture and Mold Resistant gypsum panels, or an approved equal, 5/8 inches thick or as otherwise indicated on the Drawings. ASTM C 1396

2. Fire Rated Gypsum Panels (ASTM C 1396): National Gypsum Co. Gold Bond "XP Fire-Shield" Type X panels, U.S. Gypsum Co. "Mold Tough" Firecode Core Type X panels, CertainTeed "ProRoc M2Tech" Type X panels, or an approved equal, 5/8 inches thick or as otherwise indicated on the drawings.

3. High Abuse Resistant Gypsum Panels (ASTM C1629): National Gypsum Co. Gold Bond "Hi-Abuse XP" Type X panels, U.S. Gypsum Co. "Abuse Resistant" Firecode Type X panels, CertainTeed "ProRoc Abuse Resistant" Type X panels, or an approved equal, 5/8 inches thick or as otherwise indicated on the Drawings.

4. Shaft Wall Liner Panels (ASTM D 3273): National Gypsum Co. Gold Bond "Fire-Shield Shaftliner XP" (moisture/mold resistant) Type X panels, U.S. Gypsum Co. "Sheetrock Mold Tough Gypsum Liner" Type X panels, CertainTeed "M2Tech" Type X Shaftliner panels or an approved equal, 1 inch thick or as otherwise indicated on the Drawings.

5. Cement Backer Board (ASTM C 1325): National Gypsum Co. "PermaBase" Cement Board, U.S. Gypsum Co. "Durock" Cement Board, FinPan Inc. "Util-A-Crete" cement board, or an approved equal, 5/8 inches thick or as otherwise indicated on the Drawings.

6. Exterior Glass Faced Gypsum Sheathing (ASTM C 1177): Georgia-Pacific "DensGlass" Exterior Sheathing, National Gypsum Co. eXP Sheathing, U.S. Gypsum Co. "Securock", Temple Inland Green Glass Sheathing, or an approved equal, ½ inch thick, square edge panels.

7. 1-Hour Fire Rated Exterior Glass Faced Gypsum Sheathing (ASTM C 1177): Georgia-Pacific (DensGlass) "DensGlass Fire Guard" Exterior Sheathing, National Gypsum Co. "eXP Fireshield" Sheathing, U.S. Gypsum Co. "Securock – FireCodeX", Temple Inland Green Glass Sheathing, or an approved equal, 5/8 in. thick, square edge panels, ASTM C 1177).

   a. **Refer to Article 1.05, Submittals, paragraph C for required documentation confirming compliance with NFPA 285.**

8. Recycled content: Gypsum wallboard shall be produced using an average minimum 5% post-consumer recycled content.

D. Caulking and Acoustical Sealant Materials:

1. For penetrations in wallboard surfaces, and exposed-to-view joints between drywall accessories and dissimilar materials – Tremco Latex Caulk, DAP Latex Caulk, Pecora AC-20 Latex or an approved equal.

2. Polymer Caulk, or an approved equal product in colors as selected by the Architect.

3. For application to legs of stud tracks, and concealed from view joints between gypsum board and dissimilar materials - Gold Bond Acoustical Sealant, Tremco Acoustical Sealant or an approved equal.

E. Compressible Filler – Between stud tracks and adjacent construction fiberglass sill sealer, 1/4 inch thick.

F. Suspension System for Gypsum Board and Sheathing Ceilings and Soffits:

1. Hangers – Galvanized steel wire, No. 8 gauge.

2. Carrying Channels – 1-1/2 inch channels, weighing 475 pounds per thousand lineal feet, primed with rust-inhibitive paint, or where specifically indicated on the Drawings, metal studs, as herein before specified.

3. Furring Channels – USG Screw Furring Channels (used in conjunction with carrying channels only).

4. Furring Channel Clips – Wire type, as provided by the manufacturer of the channels.

5. Alternate Suspension System – As an alternate to the suspension system specified used in F.1 through F.4 above, suspension system shall consist of drywall “tee” grid system, Armstrong “Screw Stop”, USG, Chicago Metallic or an approved equal.

   a. Main beams with 1-1/2-inch wide face x 1-1/16-inch high “bulb tee” installed 4 feet on center.

   b. Cross Tees with 1-1/2-inch wide face x 1-1/2-inch high “bulb tee” installed 16 inches on center.

   c. Hanger spacing as recommended by manufacturer for ceiling construction, maximum 4 feet on center.

   d. Include all clips and moldings required by conditions for a complete installation.

G. Channels for Furring – USG RC-1 Resilient Channels, Sheet Rock Z-furring channels, and Unimast furring channels, as shown on the Drawings and required by the various construction conditions.

H. Fasteners:

1. For single layer gypsum board to wood receiving members and metal studs and furring channels, and for first layer board of double layer application – Self-drilling Phillips bugle head, one inch long.

2. For stud tracks to concrete – Ramset or Phillips power-actuated fasteners. Concrete stub nails may be used for securing floor tracks.

3. For securing hangers to concrete overhead – Ramset or Phillips power-actuated eye pin anchors.

4. For securing hangers to metal overhead – Nelson acoustical stud welds.

5. For stud tracks to metal members – Spot welds or screws spaced as recommended by the manufacturer to assure a rigid installation.

6. For gypsum sheathing to metal studs – Self drilling Phillips bugle head, galvanized, 1-1/4 inches long.

7. Fasteners for exterior wall backup system shall be as follows:

   a. All fasteners connecting light gauge members and accessories shall be a minimum of No. 10 size having a minimum diameter of 0.153 inches.

   b. All fasteners connecting light gauge members to structural steel shall be power driven fasteners of 5/32 inch diameter minimum 16 inches on center maximum. All fasteners of light gauge members to concrete shall be power driven fasteners of 5/32 inch diameter minimum with a minimum of 1-1/4-inch embedment 16 inches on

I. Bridging and Bracing - Provide all necessary bridging and bracing; provide additional bridging and backing at wall stud areas where sheathing is not to be applied to both faces.

J. Accessories:

1. Casing Beads ("J" Beads) – Clark Dietrich 200 A and B, mudable casing and "L" beads, 5/8-inch size, 1 ¼-inch punched flanges. Similar casing beads as manufactured by Phillips Manufacturing or an approved equal will be considered upon submission of adequate supporting data

2. Corner Beads – Clark Dietrich 103 Deluxe cornerbead, galvanized, 1-1/4 inch by 1-1/4-inch punched flanges. Similar casing beads as manufactured by Phillips Manufacturing or an approved equal will be considered upon submission of adequate supporting data.

3. Abuse Resistant Radius Corner Beads – Galvanized steel, ¾ in. radius model CBB by Clark Dietrich. Similar abuse resistant radius corner beads as manufactured by Phillips Manufacturing or an approved equal will be considered upon submission of adequate supporting data.

4. Control Joints – Clark Dietrich No. 093, roll-form zinc. or other control joints by Cemco, US Gypsum or an approved equal.

   a. Control Joints in Fire Rated Partitions – Clark Dietrich No. FAS-093X or other UL listed control joints by Cemco, US Gypsum or an approved equal.

5. Reglets – Clark Dietrich, reveals or other similar profile reglets by Fry Reglet Corp., Cemco or an approved equal.

   a. Reglet Molding – Fry Reglet Corporation in dimensions shown on the Drawings, including but not limited to:

      1) 1/4 in. and 3/4 in. reveal moulding (sizes as called for on the Drawings) with flanges for tape and joint compound.

   b. Reglet Backer at Fire Rated Partitions – Clark Dietrich Flat Strap Backer (FSB) or other UL listed reglet backers by Cemco, US Gypsum or an approved equal.

c. Reglet Reveal/Picture Hanger – Fry Reglet Corporation

1) DRMH – 50

2) Provide one reveal picture hanger for every two linear feet of reveal.

6. Steel Column and Beam Clips – 2-3/8-inch wide x 2-inch high x 2-inch deep, 25 gauge, galvanized steel at designated furring areas by Grabber or an approved equal.

K. Exterior Plywood Sheathing at Mechanical Doghouses – C-C EXT-APA, unsanded, of thickness indicated on the Drawings.

L. Joint Tape Treatment (WALLBOARD) – Self-adhering fiberglass mesh with compound recommended by the manufacturer for the particular application conditions.

1. Level 5 finish at stair walls and where designated on the Drawings – Primer surfacer, first coat, pre-coat.

M. Joint Treatment at Cement Backer Board – Latex Portland cement mortar and two (2) inch wide alkali-resistant glass fiber mesh.

N. Joint Treatment of Gypsum Wallboard Covered by Tile – Tape (paper or fiberglass mesh) and joint compound.

O. Fire Safing – Roxul Safe-N-Sound insulation with clips and fire stop sealant/compound, in configurations to suit job conditions per reference standards. Similar firesafing by Thermafiber, CertainTeed or an approved equal will be considered upon submission of adequate supporting data.

P. USG C-H Studs and Accessories – 2 1/2 inches deep and 6 inches deep.

2.02 STENCILING IDENTIFICATION

A. Fire and Smoke Barrier Identification – All fire and smoke partitions (corridors and stairs) shall be labeled above the ceilings as such on both sides of rated partitions. Painting shall be performed in conjunction with stencil. Text shall be as follows:

"FIRE (OR SMOKE) RATED PARTITION – PROTECT ALL PENETRATIONS"

1. Lettering shall be minimum 3 inches in height, all upper case in the color 'RED.'

2. Identification shall be within 15 feet of the end of each wall (within rooms and along corridors) with a minimum of one sign for each space/room. Signage shall be spaced at intervals not exceeding 30 feet measured horizontally along the wall or partition.

PART 3 EXECUTION

3.01 ERECTION PROCEDURES

A. General – Erection procedures for the various drywall construction conditions, as set forth in the published specifications of the U.S. Gypsum Company, latest editions for the various system types, shall govern this work, with the additional requirements specified hereunder and indicated on the Drawings.

3.02 PARTITIONS, CEILING, FASCIAS, SOFFITS AND FURRED AREAS

A. Refer to the Drawings for various conditions and details of the work of this SECTION.

B. Coordinate the installation work with that of related trades, in particular the work of SECTION 06100-ROUGH CARPENTRY for proper installation of wood supporting members within drywall.

C. Apply a continuous bead of specified sealant to receiving legs of stud tracks, in interior partitions, prior to installing gypsum board thereon.

D. Install corner beads at all external corners of gypsum wallboard, and casings wherever gypsum wallboard abuts a dissimilar material. Use tape joint treatment for internal corners, for all joints.

E. Install expansion joint reveal reglets where indicated on the Drawings, and as recommended by the gypsum wallboard manufacturer, ***and in no event shall expansion joints exceed 30 feet on center.*** Install fire safing at expansion joint reveals reglets in rated walls and where shown in the Drawings.

F. Caulk around all items which penetrate gypsum wallboard including electrical receptacle boxes, witch boxes, piping, and the like.

G. Provide cased and reinforced openings for all major items penetrating the gypsum board surfaces.

H. Furnish and install cross bracing, knee braces, and other internal reinforcing and the like to assure a completely rigid assembly on gypsum board faced partitions, ceiling, and fascias as per the gypsum wallboard system manufacturer's recommendations, whether or not such bracing has been indicated on the Drawings.

I. Where acoustic partitions are indicated on the Drawings, provide heavy gauge (minimum 20 gauge) LGMF such that the two sides of the partition are self-supported from slab to deck and are not braced to each other.

J. Install access panels, occurring in gypsum board surfaces, which are furnished by trades requiring same, securing the flanges of the panels as recommended by the manufacturer.

K. Install compressible filler between stud tracks and adjacent construction in locations indicated on the Drawings.

L. Install double 20 gauge studs at door openings.

M. At door and window openings, cut gypsum wallboard and lath to fit around openings with joints centered above openings, **not at corners**.

3.03 EXTERIOR WALL BACK-UP ERECTION PROCEDURES

A. Studs and Runners

1. Align runners accurately according to exterior wall layout and secure to base and head with power-driven fastener spaces as per manufacturer's technical data.

2. Positions studs vertically in runners and space no greater than 16 inches on center. Securely anchor each stud to runner with four No. 10 ½-inch Type S-12 Low-Profile Head Screws, two at top and two at bottom, with one screw in each flange.

3. For the slip track system, allow 1/2 inch to ¾-inch clearance between top of studs and UR-runner. Do not fasten studs to UR-runner. Install 1-1/2 cold-rolled channel bridging within 10 inches to 12 inches of tops of studs. Connect bridging to each stud using welded or screw-attached USG Clip Angle.

4. Bridging of studs shall be provided at slip tracks (as described above) and according to the following schedule:

a. Walls up to 10 ft. height: One row bridging at mid-height.

b. Walls over 10 ft. height: Bridging rows equally spaced, not to exceed 5 ft. on center.

B. Exterior Sheathing

1. Glassmat Faced Sheathing – Install per manufacturer's instructions, using recommended fasteners and spacing. Coordinate installation with air and vapor barrier requirements.

3.04 ACCESSORY APPLICATION

A. Gypsum Panel Joints – Finish all face layer joints and internal angles with a U.S. Gypsum Joint System installed according to manufacturer's directions. ***Panel joints above finish ceilings shall have joints finished by this SECTION 092116.*** Spot exposed fasteners on face layers and finish corner bead, control joints and trim with at least three coats of joint compound, feathered out onto panel faces. Sand lightly between coats and following the final application of compounds to provide a smooth surface ready for painting. Do not roughen face paper when sanding.

B. Corner Bead – Reinforce all vertical and horizontal exterior corners with corner bead fastened with screws or staples 9 inches o.c. on both flanges along entire length of bead. Abuse resistant radius corner beads shall be used at all exposed corners along corridors and in stairs.

C. Casing Bead Trim – Where wall terminates against masonry or other dissimilar material, apply metal trim over face layer edge and fasten with screws or staples spaced 9 inches o.c.

D. Screws – Power-drive at least 3/8 inch from edges or ends of gypsum panels to provide uniform dimple 1/32 inch deep. In gypsum base, set flush with surface without tearing face paper.

E. Control Joints and Expansion Joints – Break face layer behind joint. Attach control joint to face layer with staples spaced 6 inches o.c. on both flanges along entire length of joint.

F. Finishing Fasteners – Apply a taping, all-purpose type or ready-mixed Plus 3 compound to fastener depressions as the first coat. Follow with a minimum of two additional costs of topping or all-purpose compound, leaving all depressions level with the surface. (Exception: ready-mixed Plus 3 Compound needs only one additional coat.)

G. Finishing Beads and Trims at Gypsum Wallboard:

1. Apply first coat to all bead and trim and properly feather out from ground to plane of surface. Compound must thoroughly dry prior to application of second coat. (Exception: Durabond joint compounds need only have hardened prior to application of next coat).

2. Apply second coat in same manner as first coat, extending compound slightly beyond onto face of panel. Compound must be thoroughly dry prior to application of finish coat.

3. Apply finish coat to all bead and trim, extending compound slightly beyond the second coat and properly feathering from ground to plane or surface. (Exception: Only two coats of ready-mixed Plus 3 Compound are needed). Sand finish as necessary to provide a flat smooth surface ready for decoration. When sanding take care not to roughen face paper.

4. Level 5 Finish – Where shown on the drawings, gypsum wallboard surfaces shall receive a Level 5 Finish (Gypsum Association Publication GA.214).

   a. Provide Level 5 finish at all locations indicated to received dry erase coating, at full extent of wall to natural breaks for full height of GWB.

   b. Provide Level 5 finish at all locations to received printed vinyl wallcovering (SECTION 101400-IDENTIFYING DEVICES).

H. Installation of Cement Backer Board – Center cement backer board end of edge joints on the framing and stagger joints in adjacent rows to four corners do not come together within same plane. Spacing panels with 1/8 inch joints in accordance with manufacturer's recommendations.

I. Joint Treatment at Cement Backer Board – Fill horizontal and vertical joints solid with latex-Portland cement mortar and tape with 2-inch alkali-resistant glass fiber mesh tape in accordance with the tile manufacturer's recommendation and applicable TCNA design standard. At corners tape joints using skim coat of latex-Portland cement mortar, but do not fill. Install specified corner bead accessories.

J. Joint Treatment at Gypsum Wallboard Covered with Tile – Treat joints with tape (paper or fiberglass mesh) and joint compound, bedding coat only with screws covered with one coat only.

3.05 SHAFT WALL SYSTEM

A. Position steel runners at floor and ceiling with the short leg toward finish side of wall. Securely attach runners to structural supports with power driven fasteners at both ends and maximum 25 inches on center.

B. Cut liner panels 1 inch less than floor-to-ceiling height and erect vertically between J-Runners. Where shaft walls exceed maximum available panel height, position liner panel end joints within upper and lower third points of wall. Stagger joints top and bottom in adjacent panels and reinforce end joints with horizontal C-H stud. Screw-attach studs to runners on walls over 16 feet high, if applicable.

C. Use steel C-H studs 3/8 inch to not more than 1/2 inch less than floor-to-ceiling height, and install between liner panels with liner inserted in the groove. Install full-length steel E-Studs or J-Runners vertically at T-intersections, corners, door jambs, and columns. Install full-length E-studs over gypsum liner panels at both sides of closure panels. Frame openings cut within a liner panel with J-Runner around perimeter. For openings, frame with vertical E-Stud or J-Runner at edges, horizontal J-Runner at head and sill, and reinforcing as shown on the drawings. Suitably frame all openings to maintain structural support for wall.

D. Install floor-to-ceiling steel J-Runners or E-Studs each side of steel hinged door frames to act as strut-studs. Attach strut-stud to floor and ceiling runners with two 3/8-inch Type S-12 Pan Head Screws. Attach strut-studs to jamb anchors with ½-inch Type S-12 screws. Over steel doors, install a cut-to-length section of J-Runner and attach to strut-studs with 3/8-inch Type S-12 Screws.

E. For double-layer finish, apply base layer ½-inch Sheetrock Brand Firecode "C" Panel vertically one side of studs. Fasten base layer to studs with 1 inch Type S Screws 24 inches on center. Caulk perimeter of base layer. Apply ½-inch Sheetrock Brand Firecode "C" Gypsum Panel face layer vertically over base layer with joints staggered and attached with 1-5/8 inch Type S. screws staggered from those in base, spaced 12 inches on center and driven into studs and runners.

3.06 STENCILING RATED PARTITIONS

A. Perform identification of fire rated partitions prior to installation of ceiling guards. Identifications shall be on both sides of fire and smoke partitions above the ceilings.

3.07 CUTTING AND PATCHING

A. When so directed by the Architect, and prior to any painting of gypsum board surfaces, check all drywall throughout the work, doing any and all cutting, patching, and joint treatment required in a manner satisfactory to the Architect.

3.08 PROTECTION AND CLEANING

A. During the operation of drywall work, protect the work of other trades against undue soilage and damage by the exercise of reasonable care and precautions. Repair and/or replace any work so damaged and soiled.

END OF SECTION

SECTION 096466

WOOD AND ATHLETIC FLOORING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following items required to complete the work of this SECTION, as shown on the Drawings and specified herein:

1. Gymnasium wood flooring system comprised of the following:
    a. Polyethylene membrane.
    b. Natural rubber pads with air channels on plywood sub flooring panels, and all necessary fasteners.
    c. Maple flooring, with sealer and finish.
    d. Perimeter ventilating base.
    e. Game lines and floor paint.
    f. Leveling of sub floor to blend wood flooring with adjacent finish elevations and to provide a level surface due to concrete slab shrinkage.
2. Cafeteria platform wood flooring system comprised of the following:
    a. Polyethylene membrane.
    b. Natural rubber pads with air channels on plywood sub flooring panels, and all necessary fasteners.
    c. Red Oak flooring and exposed edge apron, with sealer and finish.
    d. Perimeter ventilating base at GWB wall at back wall of Platform.
    e. Leveling of sub floor to blend wood flooring with adjacent finish elevations and to provide a level surface due to concrete slab shrinkage.

B. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. Wood flooring system components must meet the flooring requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. For all adhesives, sealants, paints and coatings, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

4. For all composite wood and agrifiber products, meet the LEED requirements for IEQ Credit 2 as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

5. CERTIFIED WOOD – 100% of wood products furnished under this section shall be FSG certified.

6. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Concrete slab and concrete finish: SECTION 033000-CAST-IN-PLACE CONCRETE.

2. Wood paneling, detailed to provide ventilation at wood-paneled side walls at Platform: SECTION 062000-FINISH CARPENTRY.

3. Floor mounted game standards SECTION: SECTION 116600-ATHLETIC AND SPORTS EQUIPMENT.

4. Cafeteria platform risers/treads: SECTION 062000-FINISH CARPENTRY.

5. Sound vibration and seismic control: SECTION 134800-SPRING LIFT CONCRETE SLAB FLOATING FLOOR SYSTEM.

6. Thresholds and expansion covers, provided by: SECTION 087100-FINISH HARDWARE, installed by SECTION 062000-FINISH CARPENTRY.

1.04 SUBMITTALS

A. Submit complete shop drawings, including manufacturer's specifications, and installation data for wood flooring systems and finishes specified herein, in accordance with the provisions of SECTION 013300-SUBMITTALS.

B. Submit the following samples in accordance with the provisions of SECTION 013300-SUBMITTALS.

1. Assembled section of the respective floor systems, 24-inch x 24-inch minimum, including all components and finish.

2. Fasteners for systems flooring.

C. Submit care and maintenance instructions for flooring.

D. LEED for Schools Submittals (Refer to SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIRE,MENTS.

3. Product substitution requests are subject to additional LEED-S submittal requirements. Refer to SECTION 012500-SUBSTITUTION PROCEDURES.

1.05 QUALIFICATIONS

A. Work of this SECTION shall be performed by an established flooring installation firm approved by the flooring system manufacturer and qualified by a minimum of five (5) years of experience and in a financial position to do the work specified hereunder.

B. Submit, with transmission of initial samples required, the following:

1. Experience record showing the wood flooring installation firm's training and experience in similar work.

2. List and give brief description of similar work, satisfactorily completed, with location, date of contracts, together with names and addresses of owners.

3. List of facilities and equipment available to do the work.

C. The flooring installer shall be experienced in the supervision of wood and athletic flooring installation in this type of work. The actual work shall be done by qualified and experienced mechanics working under his supervision.

D. The Architect reserves the right to reject the wood and athletic flooring firm if (1) the required qualification data is not received, or (2) the data submitted indicates an unsatisfactory experience record.

1.06 DELIVERY, STORAGE AND HANDLING

A. Materials shall not be delivered or installed until all masonry, painting, plastering and tile work are completed and all overhead mechanical work, lighting, backstops, scoreboards have been installed. Room temperature shall be at least 55 degrees or higher, and moisture content of concrete slab of 4.5% or less, or vapor transmission not to exceed 4.5 pounds per 1,000 square feet. Environmental temperatures must average a minimum of 65 degrees and relative humidity 50% or lower for a period of one week before, during, and 72 hours following installation.

B. Area where materials are to be stored shall be maintained at 55 degrees and under 50% relative humidity by the General Contractor. Store materials at project site for sufficient length of time to equalize with site conditions. Open cartons minimum 48 hours before installation.

1.07 GUARANTEE

A. Upon completion of the work, submit to the Architect, for transmission to the Owner, two (2) copies of a written guarantee, covering prompt and proper replacement and repair of any and all improper work and materials that may become apparent within twelve (12) months after the date of Substantial Completion under the work is performed.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEED v4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. For IEQ Credit 2: Submit a completed Materials Reporting Form for VOC content of adhesives, sealants, paints and coatings.
2. For IEQ Credit 2: Submit a completed Materials Reporting Form for each type of composite used product and adhesive indicating the product meets the formaldehyde emissions requirements for CARB ATCM for ultra-low-emitting formaldehyde (ULEF) or no-added formaldehyde (NAF) resins.
3. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
4. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
5. Certified Wood (FSC). (See Section 018113 Sustainable Design Requirements for overall project FSC-Certified wood content requirements.) Submit a completed Materials Reporting Form for each Certified Wood Product.

2.01 MANUFACTURER – GYM FLOORING SYSTEMS

A. To establish a standard of quality, design and function, the gym floor system is based on “Action Thrust I” by Action Floor Systems. Similar systems by Robbins, Inc., Connor Sports Flooring and other manufacturers of similar quality, design, and function flooring systems will be considered for approval as an equal upon receipt of product literature as requested by the Architect.

2.02 MATERIALS – GYM WOOD FLOORING SYSTEM (Action Thrust I)

A. Membrane – 15-mil Stego Wrap or an approved equal with 6 inch lapped and continuously taped joints.

B. Pads – AirTech IV or an approved equal, ¾-inch thick natural rubber with a durometer hardness of 48 or less. Install pads on underside of lower plywood sub floor, 32 pads per 4 foot by 8 foot sheet in accordance with manufacturer’s recommendations.

C. Panel Sub Floor System

1. Sub Floor

a. Plywood – Two (2) layers of 15/32 inch thick x 4 feet x 8 feet hardwood premium sheathing (HPS). Sheets shall be laid diagonal to each other and laminated with waterproof panel adhesive and with screws or annular nails as recommended by the manufacturer. Wood Staples are not allowed.

D. Finish Flooring Materials:

1. **Maple** finish flooring

a. Maple flooring – 25/32 inches thick x 2 1/4 inches in width, first grade Edge Grain, T&G and EM, KD Northern Hard Maple, continuous strip flooring, grade in accordance with MFMA Standards and FSC Certified.

b. Finishing materials – As specified under 2.04.

c. Total system thickness – 2-1/2 inches.

E. Perimeter Vented Base at Walls – Coved, 3 inches x 4 inches ventilating type with pre-molded corners in color as selected by the Architect.

F. Leveling Materials – As recommended by the floor system manufacturer for concrete sub floor conditions.

2.03 MATERIALS – CAFETERIA PLATFORM WOOD FLOORING SYSTEM (Action Thrust I)

A. Membrane – 15-mil Stego Wrap or an approved equal with 6-inch lapped and continuously taped joints.

B. Pads – AirTech IV or an approved equal, 3/4 inches thick natural rubber with a durometer hardness of 48 or less. Install pads on underside of lower plywood sub floor, 32 pads per each 4 foot x 8 foot sheet in accordance with manufacturer's recommendations.

C. Panel Sub Floor System

1. Sub Floor

a. Plywood – Two (2) layers of 15/32 inch thick x 4 feet x 8 feet C-D exposure I, 4 ply minimum plywood. Sheets shall be laid diagonal to each other and laminated with formaldehyde and VOC compliant waterproof panel adhesive and with screws or annular nails as recommended by the manufacturer. Wood Staples are not allowed.

D. Finish Flooring Materials

1. **Maple** Finish Flooring

a. Maple flooring – 25/32 inches thick x 2 1/4 inches in width, first grade Edge Grain, T&G and EM, KD Northern Hard Maple, continuous strip flooring, grade in accordance with MFMA Standards and FSC Certified.

b. Finishing materials – As specified under 2.04.

c. Total system thickness – 2-1/2 inches.

E. Perimeter Vented Base at Walls – coved, 3 inches x 4 inches ventilating type with pre-molded corners in color as selected by the Architect.

F. Leveling Materials – As recommended by the floor system manufacturer for concrete sub floor conditions.

2.04 WOOD FLOOR FINISH

A. To establish a standard of quality, design and function, the gym wood floor finish has been based upon Hillyard 350 gym floor finish as specified below. Similar systems by Bona or other manufacturers meeting the VOC and emissions requirements will be considered by the Architect as an equal based upon receipt of adequate supporting data.

1. Sealer – As recommended by the floor finish manufacturer meeting the VOC and emissions requirements,

2. Water based finish coats – Hillyard 350. Four (4) coats. Clear high solids solvent-based urethane-tough finish. The product shall be approved by Underwriters Laboratories for slip resistance, with the following statement on all container labels: Classified by Underwriters Laboratories, Inc. as to slip all resistance only 1865. The Gymnasium product shall be currently listed by Maple Flooring Manufacturers Association in Group 5.

3. Game line paint, LEEDv4-S compliant water-borne paint as recommended by floor finish manufacturer.

PART 3 EXECUTION

3.01 PRE-INSTALLATION CONDITIONS

A. Do not install floor system until concrete has been cured 60 days and the proper depression and floor tolerance with steel trowel finish has been provided.

B. After floors are finished, the floor shall be protected by covering with non-fibered kraft paper or red rosin paper with taped joints by the General Contractor.

3.02 INSTALLATION – WOOD FLOOR SYSTEM

A. All products covered by this SECTION shall be installed by qualified personnel in strict accordance with the manufacturer's written specifications, and the additional provisions herein specified.

B. Install polyethylene with joints lapped a minimum of 6 inches and turned up 4 inches at the walls.

C. Install first layer of sub floor perpendicular to direction of finished flooring. Apply ribbons of panel adhesive in a double box-X pattern. Over this, secure second layer of underlayment on a diagonal (approximately 45 degrees) to first layer with fasteners placed no greater than 12 inches on center in both directions and 6 inches along perimeter. All sub floor joints shall be staggered and spaced ¼ inch.

D. Machine nail maple finish flooring 10 inch to 12 inch on center running the direction of the main playing court with end joint properly driven up and proper spacing provided for humidity conditions. Provide 2-inch expansion voids at the perimeter and at all vertical obstructions. ***Staples are not allowed.***

E. Sanding – Floors shall be sanded after all other trades are finished. All wood floors shall be sanded with a heavy power-driven sander. For the first cut, the floor shall be traversed in both directions going with the grain of the flooring using No. 2-1/2 sandpaper. Follow with No. 1-1/2 paper, then with No. 1/2 and finishing with No. 00. All cuts should be made with the grain. Rough or finish sanding on the diagonal will not be permitted without specific permission from the Architect. Particular attention should be given on each finishing cut to completely remove the coarser grit marks from the preceding cut. Sanding machine shall not be moved more than two boards at a time for each traverse on any of the four cuts. After sanding, subcontractor shall thoroughly vacuum floor with heavy duty commercial type vacuum and request inspection by the Architect or his authorized representative before any finishing work shall start.

F. Sealing – After sanding, floor shall be thoroughly swept and vacuumed. Tack rag floor with a Turkish towel dampened with recommended solvent until no traces of sanding dust remain on floor. With a clean synthetic lamb's wool applicator, apply an even coat of sealer. While working 4 ft. by 4-ft. sections, apply product first across the grain then smooth out (feather) with the grain. After the first coat is thoroughly dry (usually 2-4 hour's) entire surface should be abraded using blue or green scrub pad under a single brush floor machine. Floor shall again be tack ragged using a Turkish towel slightly moistened with water. Apply the second coat of sealer following manufacturer's recommended procedures. Allow the floor to dry overnight.

G. Painting Game Lines (Gym Floor) – Mark game lines with proper colors of recommended game line paint according to Architect's drawings and with the use of precision taping machine for circles and arches. Note: Masking tape should be pulled as soon as the paint starts to set and not allowed to stand overnight. Paint should be allowed to dry for at least 12 hours.

H. Finishing

1. After lines have dried overnight, abrade with blue or green scrub pad and tack rag with Turkish towel slightly moistened with water until no traces or powder remain on floor. Now apply the first coat of finish following same procedures as the first coat of finish. Allow to dry overnight. Abrade the floor with green or blue scrub pad and tack rag the floor with Turkish towel slightly moistened with water. Apply the second and third coats of finish in the same manner as above. After the final coat of finish do not use floor for at least 72 hours. Avoid heavy traffic for at least one week.
2. During product application and drying time, floor must be free of dust and dirt. Following the final coat turn on the air handling system to get good air movement. Temperatures of the floor, room, and materials should be 65 degrees F. or above during treatment and curing. Allow adequate ventilation for proper curing. Product must be abraded with 150 grit screens (instead of blue or green scrub pad) if allowed to cure more than 48 hours between coats.
3. Total coats, floor finish system: (2) sealer coats plus (4) finish coats.

I. Perimeter Base – Install Robbins vent cove base anchored to walls with base cement or screws and anchors. Use pre-moulded outside corners and neatly mitered inside corners.

J. Coordinate gym wood floor installation with athletic equipment mountings, flush mounted thresholds and expansion covers.

K. Coordinate cafeteria platform wood floor installation with wood platform risers.

3.03 CLEAN-UP

A. Clean up all unused materials and debris and remove same from the premises and legally dispose of.

END OF SECTION

SECTION 096816

CARPETING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following items of work as shown on the Contract Drawings and as specified herein:

1. Carpet, edging strips at dissimilar materials, and related accessories where indicated on the Finish Schedule and other Drawings.
2. Leveling of all floor surface areas designated to receive carpet.

B. Prepare new surfaces to properly receive the materials to be furnished and installed hereunder. Include sanding, cleaning, and installing mastic underlayment, as necessary, to ensure the specified level of tolerance and bonding of tile and base.

C. Test moisture content/relative humidity (RH) and alkalinity (pH) level of concrete slabs to receive finishes specified herein.

D. Furnish and install adhesives complying with minimum relative humidity of 99% and a level of alkalinity (pH) not less than 8 or greater than 12.

E. Vacuum clean all carpet upon completion of the work of this SECTION.

F. LEEDv4-S General Requirements

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. For all adhesives or sealants, meet the LEED-S requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. For all flooring systems, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

4. Meet the LEEDv4-S requirements for MR Credit 4, Building Product Disclosure and Optimization – Health Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having a Health Product Declaration (HPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be prepared under the designated SECTIONS:

1. Resilient base in conjunction with carpeting: SECTION 090005-RESILIENT FLOORING.

2. New concrete slabs including floor leveling to comply with specified floor flatness and floor levelness criteria: SECTION 033000-CAST-IN-PLACE CONCRETE.

3. Walk-off mats: SECTION 124813-MATS.

4. Moisture mitigation at resilient flooring and walk-off mats: SECTION 090005-RESILIENT FLOORING and SECTION 124813-MATS, respectively.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with the requirements of SECTION 013300-SUBMITTALS.

B. These shop drawings shall show the directional layout of pattern and lay of pile of all carpet sections, all seams and cross joint locations, locations of edge strips and details of cutouts.

C. Submit the following samples in accordance with the requirements of SECTION 013300-SUBMITTALS.

1. Carpet, for quality only - 18 x 18 inches, accompanied by manufacturer's carpet specifications and certified laboratory flame spread tests.

2. Carpet, for color only - 13 x 18 inches of manufacturer's standard color blends for selection of a maximum of four (4) color blends by the Architect.

3. Edging – 6-inch length, with available colors for selection by the Architect.

D. Manufacturer's data sheets for all adhesives and leveling materials specified herein.

E. Submit two (2) copies of a complete manual on the manufacturer's maintenance recommendations for care, cleaning and maintenance of carpets installed.

F. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. Product substitution requests are subject to additional LEED-S submittal requirements. Refer to SECTION 012500 – SUBSTITUTION PROCEDURES.

1.05 INSTALLATION QUALITY ASSURANCE

A. Work under this SECTION shall be performed by a carpet installation firm certified by the carpet manufacturer and qualified by experience and in a financial position to do the work specified hereunder.

B. Submit, with transmission of initial samples required, the following:

1. Experience record showing the carpet installation firm's training and experience in similar work.
2. List and give brief description of similar work, satisfactorily completed, with location, date of contracts, together with names and addresses of owners.
3. List of facilities and equipment available to do the work.
4. Letter from carpet manufacturer certifying the installation firm is an approved installer of the submitted product

C. The carpet installer shall be experienced in the supervision of carpet installation in this type of work. The actual work shall be done by qualified and experienced mechanics working under his supervision or under the supervision of an experienced workroom supervisor.

D. The Architect reserves the right to reject the carpet installation firm if (1) the required qualification data is not received, or (2) the data submitted indicates an unsatisfactory experience record.

E. In the event of conflicts between the Contract Drawings, the manufacturer's standards, and this specification SECTION, the more stringent requirements shall govern.

F. The carpet installer shall be certified by the Manufacturer.

G. Prepare new surfaces to properly receive the materials to be furnished and installed hereunder to ensure the specified level of tolerance and bonding of carpets.

1.06 GUARANTEES

A. In addition to the manufacturer's wear warranties specified herein, upon completion of the work, submit to the Architect, for transmission to the Owner, two (2) copies of a written guarantee, covering prompt and proper replacement and repair of any and all improper work and material that may become apparent within 12 months after the date of substantial completion under which the work is performed.

1.07 WARRANTY

A. Provide a standard, printed, non-prorated warranty from the Manufacturer. All warranty items to be full term, not pro-rated, for the indicated period. If the product fails to perform as warranted when properly installed and maintained, the affected area shall be repaired or replaced at the discretion of the Manufacturer. The term of the carpet warranty shall be fifteen (15) years and shall cover against:

1. Carpet Types 1 & 2 – 15 years
2. Coverage shall include:
    a. Excessive surface wear.
    Excessive wear means more than 15% loss of pile fiber weight measured before and after use.
    b. Edge ravel.
    c. Zippering.
    d. Backing delamination.
    e. Watermarking on any product not 100% loop construction.
    f. Excessive static electricity.
    g. Backing resiliency loss.

1.08 DELIVERY AND STORAGE

A. The Contractor shall verify the date of order, and number of days required for delivery of the carpeting and related items, and transmit such information to the Architect, in writing, within fifteen (15) days after Architect's approval of samples has been received.

B. The carpet installer shall be held responsible for the scheduling, receiving and placement on floors of goods from the manufacturer. Goods shall be delivered to the job site in the manufacturer's bundles and shall be clearly marked as to size, dye lot, and materials. A written record of receipt of goods shall be submitted to the Architect.

C. Store materials in a cool, dry condition (65°F to 75°F) in areas designated and carefully protect carpet from soiling and damage.

D. Carpet and adhesive shall be stored at a temperature of 72 degrees for 24 hours before installation.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Recycled Content. (See SECTION 018113-Sustainable Design Requirements for overall project recycled content requirements.) Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under SECTION 018113 shall govern.
2. Regional Content. (See Section 018113-Sustainable Design Requirements for overall project regional content requirements.) Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under SECTION 018113 shall govern.
3. For all adhesives and sealants, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION-SUSTAINABLE DESIGN REQUIREMENTS.
4. Furnish all carpeting and backing such that it is CRI Green Label Plus FloorScore or NSF/ANSI 332 certified and furnish all carpet adhesives such that they do not exceed 50 g/L. See SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

2.01 CARPET

A. Manufacture and Type – To establish quality, construction, and color blends, the carpet shall be based upon Interface, Inc. Other carpet as manufactured by Tandus Centiva Floor Coverings, Mohawk Group Commercial Carpet or an approved equal will be considered as an equal upon meeting or exceeding the specifications herein.

B. Field Carpet (Field Color) – “Main Line” (For use in offices, conference rooms and media center and where shown on the drawings.)

1. Product Specifications

Construction	Tufted Textured Loop
Yarn System	Post-Consumer Content Nylon
Yarn Manufacturer	Universal
Dye Method	100% Solution Dyed
Soil / Stain Protection	Protekt

Preservative Protection	Intersept
Tufted Yarn Weight	15 oz/yd^2
Machine Gauge	1/12 in.
Pile Height	0.15 in.
Pile Thickness	0.102 in.
Stitches	7 /in.
Pile Density	5,294 oz/yd^3
Size	19.69 in. x 19.69 in.
Backing	GlasBac

2. Performance Specifications

Flooring Radiant Panel	(ASTM E 648) Passes
Smoke Density	(ASTM E 662) ≤ 450
Flammability	Passes Methenamine Pill Test (DOC-FF1-70)
Lightfastness	(AATCC 16 – E) ≥ 4.0 @ 60 AFU's
Static	(AATCC – 134) < 3.0 KV
Dimensional Stability	AACHEN Din 54318 < .10%
Traffic Classification	Heavy
Fiber Modification Ratio	1.7 to 1.9
Preservative Efficacy	(AATC 174 Parts 2 & 3) 99% Reduction / No Mold 7 Days
	(ASTM E 2471) Complete Inhibition

3. Environmental Specifications

Total Recycled Content	69%
Recycled Content (Post Industrial)	68%
Recycled Content (Post Consumer)	2%
Indoor Air Quality	Green Label Plus #GLP0820 CDPH 01350
Material Composition	Free of Added Formaldehyde, Heavy Metals and Ortho Phthalates, Fluorinated Chemicals (PFAS), and Halogenated Flame Retardants
Ingredients and Life Cycle Impacts	Environmental Product Declaration
Environmental Certifications	Green Circle Certified Environmental Facts NSF/ANSI 140 Gold

End of Life	Carpet to Carpet Recycling through ReEntry

C. Accent Carpet (Accent Color 1 and Accent Color 2) – Interface "Monochrome" (See drawings for patterns)

1. Product Specifications

Construction	Tufted Textured Loop
Yarn System	100% Recycled Content Nylon
Yarn Manufacturer	Aquafil
Dye Method	100% Solution Dyed
Soil / Stain Protection	Protekt^2
Preservative Protection	Intersept
Tufted Yarn Weight	24 oz/yd^2
Machine Gauge	1/12 in.
Pile Height	0.18 in.
Pile Thickness	0.119 in.
Stitches	10.3 /in.
Pile Density	7,261 oz/yd^3
Size	19.69 in. x 19.69 in.
Backing	GlasBac RE

2. Performance Specifications

Flooring Radiant Panel	(ASTM E 648) Passes
Smoke Density	(ASTM E 662) ≤ 450
Lightfastness	(AATC 16 – E) ≥ 4.0 @ 60 AFU's
Static	(AATC – 134) < 3.0 KV
Dimensional Stability	AACHEN Din 54318 < .10%
Traffic Classification	Heavy
Fiber Modification Ratio	1.9 to 2.2
Preservative Efficacy	(AATCC 174 Parts 2 & 3) 99% Reduction / No Mold 7 Days
	(ASTM E 2471) Complete Inhibition

3. Environmental Specifications

Carbon Footprint	7.3 Kg CO_2/M^2
Carbon Offsets	Carbon Neutral Floors

Total Recycled Content	77%
Recycled Content (Post Industrial)	67%
Recycled Content (Post Consumer)	10%
Indoor Air Quality	Green Label Plus #GLP0820 CDPH 01350
Material Composition	Free of Added Formaldehyde, Heavy Metals and Orth Phthalates, Fluorinated Chemicals (PFAS) and Halogenated Flame Retardants
Disclosure of Environmental Impacts	Environmental Product Declaration
Disclosure of Product Ingredients	Health Product Declaration
Environmental Certifications	Green Circle Certified Environmental Facts NSF/ANSI 140 Gold
End of Life	Carpet to Carpet Recycling

4. Accent Color 1 and Accent Color 2: Two colors will be chosen by the Architect from the manufacturers full line.

D. Performance Assurance

1. Flammability Requirements: The carpet product when tested with its attached backing, as represented by averages of testing from random samplings of production lots, must meet flammability requirements as specified.
2. Face Fiber Characteristics: Continuous Filament Nylon (CFN) type 6,6.
3. Stain Inhibiting: Stain inhibitor applied to the product during manufacture to resist fiber staining and soiling.
4. Backing Characteristics
   a. Fully fused to provide for no delamination.
   b. Closed cell, vinyl cushion backing.
   c. Backing system to provide for a barrier to moisture penetration.
   d. Product to provide for a chemically welded seam.
5. Adhesive System Characteristics
   a. Carpet as installed to be securely attached to floor in compliance with Americans with Disabilities Act (ADA) and Massachusetts Architectural Access Board (MAAB).
   b. Product to be installed without the use of wet adhesives.
6. Environmental Impact Characteristics
   a. The product shall be third party certified SCS FloorScore, NSF-140-Platinum and/or CRI Green Label Plus.

b. The product, when tested as manufactured (no air-out period required) shall have the following characteristics:

1) Less than 0.05 ppm (part per million) of formaldehyde.

2) Less than 0.50 mg/cubic meter of total volatile organics.

3) Less than 50 ug/cubic meter of total particulates.

4) Less than 1.0 ppb (part per billion) 4-PC.

5) Test over a 96 hour time period.

6) Submit compliance table.

c. Carpet to be delivered with a recycle bag for recycling of the plastic film used to protect the Microencapsulated Tackifier.

d. Carpet to be a reduction barrier to radon flow.

e. Carpet to be installed without the use of wet adhesives.

2.02 PERFORMANCE ASSURANCE – TESTING

A. Test reports shall be submitted for all performance assurance specifications listed below.

B. Requirements listed below must be met by all products.

C. All submitted test numbers shall represent average results for production goods of the referenced style.

D. Required Test Reports

1. Flooring Radiant Panel
ASTM E-648 of NFPA 253: Class 1 (CRF greater than 0.45 Watts/Sq Cm)

2. Backing Cellular Make-up: Closed Cell
Microscopic - As manufactured.

3. Backing Cellular Make-up: Closed Cell
Microscopic - After 50,000 Phillips Chair Cycles

4. VOC Chamber Testing Results
ASTM D 5116: Passing 1994 State of Washington Protocol

5. University of Pittsburgh Protocol (LC-50) for toxicity: “no more toxic than wood” when burned under the same conditions

6. Radon Flow Barrier Testing - Certified Lab
Flow Reduction Barrier

7. Moisture Barrier
Moisture Penetration by Impact @ 10 psi: No penetration after 10,000 impacts.

8. Seam Integrity after Philips Chair Test:

Seam to remain intact after 50,000 cycles

9. Delamination of Secondary Backing of Pile Floor Coverings
   ASTM D-3936: No delamination

10. Lightfastness
    AATCC 16E: Min 4 after 100 AFU

11. Static Propensity
    AATCC 134: 3.0 KV or less

12. Static Coefficient of Friction
    ASTM C-1028: Passes ADA requirements

13. Backing Density
    ASTM D 1667: 18.5 lbs./cu ft +/-5%

14. Backing Compression Set
    ASTM D 1667: Max - 10%

15. Backing Compression Deflection
    ASTM D 1667: Min 7 lbs./sq. in at 25%

2.03 ADHESIVES

A. Adhesive

1. Grid Set Green Adhesive 2000 Plus by Interface or equal meeting the following requirements:

   a. CRI Green Label Plus approved, meeting CA 01350 requirements.

   b. Suitable on concrete substrates up to 90% RH (per ASTM F 2170) and pH of 8.0-10.0.

B. Manufacturers shall be compatible with products provided herein and be one of the following or an approved equal:

1. “Sustain 1299” adhesive (by Forbo International)

2. “Magellan XPA” adhesive (by LJM Technologies)

3. “AquaFlex” adhesive (by Formulators, Inc.)

4. Other manufacturers of similar moisture mitigation system / product / adhesives meeting SCAQMD, Rule 1168 for low VOC adhesives will be considered as an equal upon receipt of adequate supporting data and performance criteria.

2.04 ACCESSORIES

A. Compatibility

1. **Coordinate compatibility of Product to be used for concrete sealer with Contractor.**

B. Edging

1. Snap-down standard edge unit no. 33-1 as manufactured by Mercer Plastics Company or approved equal, in color as selected by the Architect.

2. Leveling Compound - As recommended by carpet and backer manufacturers for the various substrate conditions.

2.05 APPLICATION

A. It is the intent of this SECTION that the carpet and the additional backing be fabricated as a single system and delivered to the job site for installation. The carpet and backing as a system shall meet all requirements for CLASS I fire rating.

PART 3 EXECUTION

3.01 MOISTURE CONTENT OF SLABS

A. Monitor Moisture Content of Slabs

1. Monitor moisture content of new concrete floor slabs to receive floor finishes to verify that moisture control procedures are sufficient to dry slabs sufficiently to permit floor finishes to be installed.

2. Continuously monitor relative humidity and moisture content of floor slabs starting after curing of concrete is complete. Perform the following procedures at least once every two weeks, increase frequency o once per week for the month prior to floor finish installation.

   a. Perform a hydrous calcium chloride test, ASTM F 1869.

   b. Perform relative humidity test using in situ probes, ASTM F 2170.

3. Conduct minimum of one test for each 1,000 sq. ft. of carpeted floor area or more frequently when drying rate is slower than anticipated.

3.02 MEASUREMENTS

A. Dimensions indicated on the Contract Drawings are approximate. Carefully check all dimensions and other conditions affecting this work in the field, and be responsible for proper installation of carpet in areas designated.

B. If, after taking the field measurements, it is determined that special width carpet would decrease the number of seams and/or the total quantity of material, with Architect's approval, obtain special widths from the mill.

3.03 INSPECTION OF SUBFLOORS

A. Inspect the receiving surfaces before commencement of work. Notify the General Contractor in writing, with copies to the Architect, of any conditions which would prevent producing satisfactory finished work.

B. The installation of carpet shall be an indication of the carpet installer’s acceptance of the subfloors and he shall automatically assume the responsibility for any unacceptable finished work caused by subfloor conditions.

3.04 INSTALLATION OF CARPET

A. Sub floor preparation including installation of moisture mitigation system and leveling materials as recommended by the respective flooring material manufacturers.

1. The Carpeting Subcontractor shall be responsible for furnishing and installing leveling materials as recommended by respective manufacturers for the various substrate conditions resulting in smooth, feathered changes in plane.
2. Concrete subfloor preparation, including leveling to be performed under this SECTION, shall include but is not limited to the following:
    a. Filling of minor cracks and imperfections in new subfloors.

B. General:

1. Check moisture of concrete at several locations using a hydrous calcium chloride test kit prior to carpet installation.
2. Comply with manufacturer's instructions and recommendations.
3. Level substrate using leveling compound in accordance with the recommendation of the carpet manufacturers.
4. Maintain direction of pattern, texture, and lay of pile.
5. Extend carpet into closets and offsets, and under movable equipment of rooms and spaces shown or scheduled to receive carpet, including recessed covers within those spaces.
6. Provide cutouts for removable access covers in substrates except do not cut out for floor closer cover plates. Remove carpet backing at outlet boxes, reducer strips, and similar penetrating items required where those items cannot accommodate the thickness of the backing.
7. Bind edges neatly and secure to substrate.
8. Cut only 3 sides where feasible to provide carpet flap in lieu of fully removable cutout.
9. Cut openings in carpet for electrical outlets, piping, and other penetrations.
10. Maintain close tolerances so edges of carpet will be covered by plates and escutcheons.
11. Install edge strip at every location where edge of carpet is exposed to traffic, unless otherwise indicated.
12. Install carpet as specified herein:
    a. “Main Line”: Non-directional installation, with direction per Architect.
    b. “Monochrome”: Non-directional installation, with direction per Architect.
13. ~~Install using peel and stick method in strict accordance with manufacturer recommendation.~~

C. Restrict all traffic and movement of furniture and materials for twenty-four (24) hours after carpet has been installed.

3.05 REPAIRING

A. Remove bubbles and ripples, repair seams, joints and edges, if required, once after the original installation is completed. The exact time for this work shall be left to the discretion of the Architect but shall be within 12 months after final approval of finished installation. Fourteen-day notice for this re-stretch shall be given by the Architect, so that the necessary arrangements for same can be made.

3.06 CLEAN-UP

A. Upon completion of the installation, remove all waste and excess materials, tools and equipment, and vacuum clean all carpet surfaces.

B. Remove soil spots in accordance with manufacturer's recommendations.

C. Protect carpet from damage and soiling.

D. Use non-staining cover material for protection.

E. Tape joints in protective covering.

END OF SECTION

SECTION 098400

ACOUSTICAL PANEL TREATMENTS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following items required to complete the work of this SECTION, as shown on the Drawings and specified herein.

1. Fibrous wood panels ('FWP'), including all necessary attachment hardware and edging material.
2. Fabric covered acoustic panels and all necessary attachment hardware and edging material.
3. Smooth textured acoustical panels for direct mounting to GWB ceilings.

B. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. For all adhesives and sealants, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. For all composite wood and agrifiber products, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
4. For all wall coverings, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
5. Fibrous wood wall panels shall be FSC and shall contain no added urea-formaldehyde resins. Fabric wrapped panels shall contain no added urea-formaldehyde resins.

6. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Metal stud and gypsum board back up for acoustic wall panels: SECTION 092116-GYPSUM WALLBOARD.

2. Furring and blocking for attachment of wall hung items: SECTION 061000-ROUGH CARPENTRY.

3. Attachments to and penetrations of fibrous panels by trades requiring same.

4. Caulking between items furnished and installed under this SECTION and adjacent construction: SECTION 070001-DAMPPROOFING, WATERPROOFING AND CAULKING.

5. Painting of fibrous wood panels: SECTION 090007-PAINTING.

6. Clocks and speakers mounted on fabric covered panels and scoreboard mounted on fibrous wood panels: SECTION 260001-ELECTRICAL.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with SECTION 013300-SUBMITTALS.

B. Shop drawings shall include wall elevations and reflected ceiling plans of fibrous panel systems, including large scale details of attachment and adjacent construction. Include with shop drawings manufacturer's data sheets for all items specified herein.

1. Shop drawings shall include wall elevations of acoustic panel systems, including large scale details of attachment and adjacent construction. Include with shop drawings manufacturer's data sheets for all items specified herein.

2. Submit complete product literature for items specified herein.

C. Submit the following samples in accordance with the requirements of SECTION 013300-SUBMITTALS.

1. All panels – 12 inches by 12 inches section of each type, showing specified long edge and end treatments.

2. Edging materials – 12-inch length of each type specified or required by job conditions.

3. Fabric Samples – Complete standard manufacturer's selection for color.

D. LEED-S Submittals (Refer to SECTION 013300 – SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. Product substitution requests are subject to additional LEED-S submittal requirements. Refer to SECTION 012500-SUBSTITUTION PROCEDURES.

4. For all new wood, provide itemized invoices showing wood that is FSC certified and wood that is not. Invoices that include FSC certified wood shall show the vendor's Chain of Custody Certificate number on them. Provide Chain of Custody certificates for all vendors supplying FSC certified wood.

PART 2 PRODUCTS

2.00 LEEDv4-S PRODUCT REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) The General Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
3. Certified Wood (FSC). (See Section 018113 Sustainable Design Requirements for overall project FSC-Certified wood content requirements.) For the sum of all wood products in this section, a minimum of 50% FSC wood is required.
4. Furnish any adhesives and sealants meeting the requirements for IEQ Credit 2, Low-Emitting Materials as defined in Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS.
5. Furnish any ceiling and wall system components, including gypsum board products, insulation, acoustical ceiling systems and wall coverings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in Section 018113-SUSTAINABLE DESIGN REQUIREMENTS.
6. Furnish any composite wood and agrifiber products such that they do not contain any added urea-formaldehyde resins. Laminating adhesives used to fabricate on site AND shop applied composite wood and agrifiber assemblies must also not contain any added urea-formaldehyde resins.

2.01 FIBROUS WOOD PANEL SYSTEM

A. General – To establish a standard of quality, function and design, drawings and specifications for fibrous acoustic panels (“FAP”) are based on fibrous wood panels as manufactured by Tectum by Armstrong World Industries., Newark, Ohio. Other fibrous wood panels as manufactured by eNoise Control, Shanghai Colorbo Industrial Co., Foshan Lenbo Environmental Technology Co. or equal meeting the specified LEED requirements will be considered as an equal upon submission of adequate supporting data.

B. Fibrous Wood Panels - Panels shall be composed of aspen wood fibers bonded with an inorganic hydraulic cement, and formed by a continuous process under heat and pressure, as follows:

1. Wall Panels – 2 inches thick by 48 inches wide by lengths shown on the drawings. Panels shall have long edges both beveled, and tongue and grooved for interlocking of continuous paneling. Panel ends at top and bottom of panels shall have edges field beveled to match factory beveled long edges. Panels shall be factory primed white for field finish painting by SECTION 090007. Field painting shall comply with panel manufacturer's instructions to maintain sound absorption.
2. Sound absorption shall be at least NRC 0.60 with direct mounting Type A per ASTM E-795.

C. Fasteners, metal furring and related hardware – As recommended by a panel manufacturer for various installation conditions.

D. Fibrous wood wall panels shall be FSC and shall contain no urea-formaldehyde resins.

2.02 FABRIC COVERED PANEL SYSTEM

A. General – To establish a standard of quality, function and design, drawings and specifications for fabric wrapped acoustic wall panels are based on Armstrong "Soundsoak 85" Custom Acoustical Wall System. Similar panels by Kinetics Noise Control, US Gypsum or other manufacturers will be considered for approval as an equal by the architect upon receipt of adequate supporting data and samples.

B. General – System shall include the following components

1. Fabric covered panels as shown on the drawings.
2. Fasteners, adhesive, clips and hook and loop fasteners as recommended by the panel manufacturer for the installation conditions.

C. Panel Construction

1. Mineral fiber core with fabric or vinyl wall covering facing, to sizes and thickness as shown on the drawings. Panels shall be factory finished with fabric finish bonded to the panel face, edges, and one inch on the back. Fabric shall be flat and wrinkle free and fully tailored at the corners with no exposed darting.
2. Panel and material shall have a flame spread rate of 25 or less and smoke developed rate of 450 or less under ASTM E-84.
3. Panels shall have an NRC rating of .80 when tested in accordance with ASTM C-423 (type 'A' mounting per ASTM E-795).

4. Recycled Content – Mineral board core shall be 71% recycled content.

5. Fabric Material – Chosen from manufacturer's full range of standard and custom fabrics as manufactured by Guilford of Maine or similar products manufactured by Koroseal, Hytex, Maharam or approved equal.

6. Fabric wrapped panels shall contain no urea-formaldehyde resins.

2.03 SMOOTH TEXTURED CEILING DIRECT APPLICATION SYSTEM

A. General – To establish a standard of quality, function and design, drawings and specifications for panels are based on Armstrong "Invis Acoustic". Similar panels by Kinetics Noise Control, US Gypsum or other manufacturers will be considered for approval as an equal by the architect upon receipt of adequate supporting data and samples.

B. General – System shall include the following components:

1. Prefinish mineral fiber panels as shown on the drawings.

2. Fasteners or adhesive as recommended by the panel manufacturer for the installation conditions. Fasteners, if used, shall match panel color.

C. Panel Construction

1. Mineral fiber 2 ft. x4 ft. x ¾ in. thick square edge panels Armstrong 1212 WH or equal. Color: white.

2. Panel and material shall be class A and have a flame spread rate of 25 or less and smoke developed rate of 450 or less under ASTM E-84.

3. Panels shall have an NRC rating of .70 when tested in accordance with ASTM C-423 (type 'A' mounting per ASTM E-795).

4. Recycled Content – Mineral board core shall be a minimum of 50% recycled content.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install acoustic panels in strict accordance with manufacturer's requirements and the approved shop drawings.

B. Fibrous Wood Panels:

1. Secure to metal studs, furring and masonry substrates using “blind" mechanical fasteners wherever possible. When installation requirements necessitate face fastening, fastener heads shall be slightly depressed, with void filled with wood fibers (from panel) and white glue. Fasteners shall not be less than 16 inches on center.

2. Furnish and install fibrous wood panels in lengths to minimize end jointing, in accordance with the Contract Documents and approved shop drawings. Where required, field cut, fit and fill ends of panels for a tight butt joint.

3. Where shown on the drawings, field bevel ends of panels to match factory bevel on long edge.

C. Fabric Wallcovering Panels:

1. Panels shall be factory fabricated to sizes shown on the drawings and installed using mechanical, mechanical/Velcro and mechanical/adhesive combination in strict conformance to manufacturer’s recommendations. Install pre-painted trim over cut edges.

D. Mineral Fiber Panels:

1. Panels shall be directly adhered to GWB with manufacturer’s recommended adhesive.

2. Panels shall be installed long edge to long edge in a running bond pattern. Cut edges shall be limited to the perimeter of the field and shall be touched up in the field with matching finish.

3. Panels shall cover entire GWB substrate of coffers in cafeteria.

4. Joints shall be butted.

3.02 ADDITIONAL MATERIAL

A. Fabric covered panels: Provide to the Owner upon completion of work, maintenance stock of fabric finishes used in an identical dye lot. The minimum size to cover the largest acoustical panel.

B. Mineral Fiber Panels: Provide touch-up paint matching panel color. Minimum ½ pint in new sealed packaging.

END OF SECTION

SECTION 099737

DRY ERASE COATING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following, as shown on the Drawings and specified herein:

1. Dry erase coating system including primer at teaching walls in classrooms, project areas and where shown on the Drawings.

B. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. For all paints and coatings, meet the LEED requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. Meet the LEEDv4-S requirements for MR Credit 4, Building Product Disclosure and Optimization – Health Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having a Health Product Declaration (HPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Unpainted Level 5 finished GWB: SECTION 092116-GYPSUM WALLBOARD.
2. Painted GWB not intended for dry erase markers: SECTION 090007-PAINTING and SECTION 092116-GYPSUM WALLBOARD.
3. Aluminum framed markerboards: SECTION 101100-MARKERBOARDS & TACKBOARDS.

1.04 SUBMITTALS

A. Submit the following samples in accordance with the requirements of SECTION 01330-SUBMITTALS.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Maintenance Instructions: Provide precautions against cleaning materials and methods that may be detrimental to finish and performance.

D. Samples: Submit verification sample of specified color on manufacturer’s standard sample card.

E. Mock-ups: Prepare mock-ups for Architect's review and to establish requirements for substrate finish and final coating application, texture and color.

1. Install dry erase coatings mock-up in area designated by Architect.
2. Correct areas, modify method of application/installation, or adjust finish texture as directed by Architect to comply with specified requirements.
3. Maintain mock-ups accessible to serve as a standard of quality for this Section.
4. Accepted mock-ups may remain in place.

F. LEED for School Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. Product substitution requests are subject to additional LEEDv4-S submittal requirements. Refer to SECTION 012500-SUBSTITUTION PROCEDURES.

1.05 QUALITY ASSURANCE

A. Fire Performance Characteristics: Comply with fire performance characteristics indicated below. Identify components with markings from testing and inspection organization.

1. ASTM E-84 (Fuel Contribution) - Class A, flame spread 5, smoke developed 0.

B. Manufacturer Qualifications: Minimum 3 years manufacturing dry erase coatings.

C. Installer Qualifications: Approval by dry erase coating manufacturer and minimum 3 years experience installing dry erase coatings.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEED v4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Furnish any paints and coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 MATERIALS

A. Manufacture: To establish a standard of quality, design and function, manufacture has been based upon “Pro” by IdeaPaint, Boston, MA 02109, www.ideapaint.com.

B. Similar dry erase coatings by Benjamin Moore “Notable”, Rust-O-Leum “Specialty” or others will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

C. Color: White

D. Qualities:

1. VOC (EPA Method 24 or ASTM D3960): 325 g/L.
2. Coverage: 1 quart per 50 sf (4.6 sq. m).
3. Density (mixed) (ASTM D1475) 10.37 lbs/gal.
4. Opacity/Hiding Power (ASTM D2805): 96%.
5. Sag Resistance (ASTM D4400): 8.
6. Flow and Leveling (ASTM D2801): 10.
7. Crack Resistance (ASTM D522): 21%.
8. Finish/Gloss (ASTM D523) on drywall board:
   a. 20 degrees: 26.6
   b. 60 degrees: 71.0
   c. 85 degrees: 68.0
9. Scrub Resistance (ASTM D2486): Breakthrough at 15,600 Cycles.
10. Stain Removal / Washability (ASTM D3450): > 99.55%.
11. QUV (ASTM D4587) Status after 500 hours:
    a. White Board: Brightness for White Board QUV = 91.44, DE = 2.01. Observation: Not as blue, acceptable; performance acceptable.
12. Thermal: KCMA ANSI-A161.1-1995 Method 9.2, 26 cycle no cracking observed.
13. Flashpoint (open cup) (ASTM D92): 80°F (26.7°C).

14. Flammability Limit: ASTM E682, lower flammability limit 1.69 percent at 212°F (100°C); upper flammability limit greater than 9.44 percent at 212°F (100°C).

15. Fire Rating (ASTM E84): Flame 5, Smoke 0 or Class 1 or Class A.

E. Primer:

1. IdeaPaint PRIMER, Sherwin-Williams Multi-Purpose, PPF Seal Grip, Glidden Gripper or Kilz Premium.

F. Applicator:

1. Roller Covers (For IdeaPaint): 9-inch-wide FoamPro roller cover by FoamPro. No substitutions.

2. Per manufacturer's written recommendations (other manufacturers).

G. Material Delivery and Storage:

1. Deliver materials in original factory wrappings and containers, clearly labeled with manufacturer, product name and fire hazard classification.

2. Store materials in original undamaged packages and containers inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures and humidity. Store at temperatures above 40°F. Do not allow product to freeze.

PART 3 EXECUTION

3.01 ACCEPTANCE OF SURFACES

A. Inspect all Level 5 finished GWB surfaces and assure that they are in proper conditions to receive work to be performed under this SECTION. Any questions as to the proper performance of the various paint systems specified herein shall be brought to the Architect's attention no later than 15 calendar days prior to the date of commencing work, otherwise, the Painting Subcontractor shall assume the responsibility for providing the desired results.

B. The commencement of work in any space by the Dry Erase Coating Subcontractor shall be construed as acceptance of the surfaces as being satisfactory, any defects to his work resulting from such accepted surfaces shall be corrected by him at his own expense.

3.02 PREPARATION

A. Surface Preparation: Remove hardware, accessories, plates and similar items to allow dry erase coatings to be installed.

1. Plaster Surface: Remove surface chalk. In new work use moisture meter to determine moisture content. Do not begin installation when moisture content is greater than five percent.
2. Gypsum Board Surface: Provide Level 4 finish per ASTM C840 and GA-214. Recess nails and screws. Repair irregular tape joints, sand and remove dust.

B. Prime substrate using materials recommended by manufacturer. Prime surface until the color of the existing surface does not show through.

C. Ventilate area thoroughly to prevent the odor from permeating to other areas in the building. Provide 100 percent outside air ventilation of application areas.

3.03 PROJECT CONDITIONS

A. A. Maintain ambient temperature not less than 68°F minimum and 85°F maximum 72 hours prior to beginning of installation.

1. Do not install dry erase coatings until the space is enclosed and weatherproof.
2. Do not install dry erase coatings until temperature is stabilized and permanent lighting is in place.

3.04 APPLICATION

A. Comply with manufacturers printed installation instructions. Mix components in strict accordance with manufacturer’s instructions. Pot life is 1 hour maximum.

B. Apply dry erase coating with specified roller only. Comply with the following:

1. Apply heavy single coat ONLY. Do not recoat or touch up applied coating.

2. Paint surface by working from one end to the other.
3. Begin by cutting in the edges of an approximately 2 foot wide section.
4. Paint 2 foot wide section, maintaining a wet edge.
5. Roll new section into wet edge.
6. Continuously check for skips, holes, and holidays as application progresses.
7. Remove masking tape within 1 hour of painting.

C. Coating shall cure for a minimum of 7 days after application before use.

D. Application Rate: Maximum 50 square feet per quart.

3.05 CLEANING AND REPAIR

A. Daily erasing and cleaning should be done with a standard dry erase eraser, dry cotton cloth, or micro-fiber towel. Be sure to use clean erasers. For periodic and more thorough cleaning use a clean damp cloth or dry erase cleaner or wipes.

B. If damaged, the original surface should be deglossed by scuffing surface and priming before recoating with IdeaPaint.

3.06 PROTECTION

A. Protect installed product and finished surfaces from damage during construction.

END OF SECTION

Division 10
Specialties

SECTION 101100

MARKERBOARDS AND TACKBOARDS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following:

1. Fixed markerboards and tackboards (without marker trays) including maprails and all specified accessories and hardware.
2. Prefabricated sliding markerboard units, complete with all operating hardware.

B. LEEDv4-S Requirements:

1. The work of this Section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. For all adhesives and sealants, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. All necessary blocking required for attachment of tackboards and markerboards: SECTION 061000-ROUGH CARPENTRY.
2. Partition construction: SECTION 040001-MASONRY, and SECTION 092116-GYPSUM WALLBOARD.
3. Tack surfacing material for direct installation to wall surfaces and at display cases: SECTION 062000-FINISH CARPENTRY.

4. Marker wall paint: SECTION 099737-DRY ERASE COATING

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with the requirements of SECTION 013300-SUBMITTALS.

B. Include large-scale details of items specified herein, showing proposed methods of anchorage to each type of surrounding structure.

C. Submit markerboard, tackboard, and cork color samples:

1. Cork samples shall be not less than 1 in. x 2 in. in manufacturers full line of available cork colors.

2. Markerboard and tackboard samples shall be 12 in. x 12 in. with aluminum trim.

3. Hanger – Two sets of sliding board hanging hardware each minimum 12 in. including hanger and bottom guide channels. One set to be given to millwork subcontractor for coordination of cabinetry.

D. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS)

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in Section 018113-Sustainable Design Requirements.

2. A completed LEED MATERIALS REPORTING FORM, per Section 018113-Sustainable Design Requirements.

3. Product substitution requests are subject to additional LEED-S submittal requirements. Refer to SECTION 012500-SUBSTITUTION PROCEDURES.

4. For all new wood, provide itemized invoices showing wood that is FSC certified and wood that is not. Invoices that include FSC certified wood shall show the vendor's Chain of Custody Certificate number on them. Provide Chain of Custody Certificates for all vendors supplying FSC certified wood.

E. Markerboards and tackboards in final colors and configurations with all accessories required for Sample Classroom (Refer to SECTION 013300-SUBMIITALS, Article 1.10.)

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS:

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
3. Rapidly Renewable Content. (See Section 018113 Sustainable Design Requirements for overall project rapidly renewable content requirements.) Contractor shall examine each product or material specification below for a stated minimum rapidly renewable content requirement, and if none is stated, the requirements under 018113 shall govern.
4. Certified Wood (FSC). (See Section 018113 Sustainable Design Requirements for overall project FSC-Certified wood content requirements.) For the sum of all wood products in this section, a minimum of 50% FSC wood is required.
5. Furnish any adhesives and sealants meeting the requirements for IEQ Credit 2, Low-Emitting Materials as defined in Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

2.01 FIXED MARKERBOARDS, TACKBOARDS AND TRIM

A. Standard of Quality and Design - To establish a standard of quality, design, and function desired, fixed markerboards, tackboards, and trim are based upon **standard and custom sized products** as manufactured by Claridge Products and Equipment, Inc. Products by Best-Rite Manufacturing, Poly-Vision Corp. or other manufacturers of similar quality, design and function will be considered for approval as an equal upon submission of adequate supporting data.

B. Markerboards – Dry markerboards shall be of porcelain enameled steel with the following construction:

1. Face sheet – Vitreous porcelain enamel non-porous, stain resistant writing surface on 24-gauge LCS markerboard. Surface shall be “low gloss.”
2. Core material – 7/16-inch medium density fiber board.

3. Panel backing:

   a. .005-inch aluminum foil for boards up to and equal to **4 ft. and 8 ft. high**.

   b. 26-gauge galvanized steel for all boards over 4 ft. and longer than 8 ft.

4. Dimensions as indicated on the Drawings. Colors as selected by Architect.

5. Markerboards at Gym and Project Areas shall be provided without marker trays.

C. Tackboards – Tackboards shall be of with the following construction:

1. Tacksurface – Linoleum resilient tackable surface material "Claridge Cork" or "Bulletin Board" as manufactured by FORBO Linoleum, Inc. Hazeton, PA, or approved equal. Tacksurface material shall be of natural materials consisting of linseed oil, granulated cork, resin binders and dry pigments mixed and calendared onto a natural burlap backing. Color shall extend throughout the ¼ inch thickness of material.

2. Core Material – ¼-inch hardboard.

3. Dimensions as indicated on the Drawings. Colors as selected by Architect.

D. Trim – Markerboard and tackboard trim shall be satin anodized extruded aluminum with 1 ¼ in. face-Series 3 with the following accessories:

1. Markertray (only at markerboards), markerboard frame, tackboard frame, maprails with cork insert and provisions for accessories.

2. Flag holder: Provide one flag holder at the maprail in Conference 106, PT 155, SPED Conference 161, OT 153, EL 255, Title 1 222. Note: Flags and staffs are N.I.C. Flag holder shall be angled up at 45° from face of wall.

3. No map hooks are required.

2.02 ROLLING MARKER BOARD

A. To establish a level of quality, performance and design, rolling marker board and associated hardware shall be based on "Claridge Horizontal Sliding Unit." Two mounted panels **without** housing, but including hanging track and bottom channel in custom sizes and configurations as shown on Drawings.

1. Other manufacturers of full sliding door assemblies permitted if their product conforms to the details of the drawings Walker Products, Best-Rite or approved equal. Key features of approved assemblies are: narrow head and sill profiles and no jamb extrusion/frame.

2. Marker board shall hang on aluminum tracks, with nylon ball bearing rollers. Hangers shall be adjustable. Aluminum bottom guide channels shall prevent board from swinging perpendicular to direction of sliding operation.

3. Fascia shall include +/-3 in. wide tack surface. Forbo or equal as specified herein where called for on the Drawings.

4. Top and bottom tracks in custom length to match casework openings.

5. Galvanized steel backing sheet 26-gauge at all oversized boards greater than 4 ft. high and/or 6 ft. wide. Boards shall neither cup nor bind.

B. Marker boards shall conform to all provisions of specification specified in this SECTION.

C. Marker boards shall be custom sized as shown on the Drawings. Markerboards shall fit to millwork openings, including hardware.

D. Millwork cases shall not deflect or warp due to load of marker boards.

E. Operation shall be adjusted to be smooth and unimpeded. Doors shall be leveled and remain in the location where placed (both in open and closed positions).

PART 3 EXECUTION

3.01 MARKERBOARDS, TACKBOARDS AND TRIM

A. Install all panels in strict accordance with manufacturer's requirements and the approved shop drawings. Markerboards and tackboards shall be secured by mechanical fasteners only in accordance with paragraph B, below, such that the boards may be relocated at a future date without damaging the wall finish. No adhesives of any kind shall be used between the markerboards / tackboards and the various wall substrates, including but not limited to gypsum wallboard, tile, CMU and millwork.

B. Secure panels and cases to metal studs, furring and masonry substrates using "blind" mechanical fasteners wherever possible. Fasteners shall not exceed 16 inches on center spacing.

C. Furnish and install panels in lengths to minimize end jointing, in accordance with the Contract Documents and approved shop drawings. Where required, field cut and fit and fill ends of panels for a tight butt joint.

END OF SECTION

SECTION 101400

IDENTIFYING DEVICES

PART 1 GENERAL

1.01 GENERAL PROVISIONS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install custom fabricated signs including all accessories and mounting devices as shown on the Drawings and specified herein.

1. Exterior Signage
    a. Pin mounted letters at stone wall.
    b. Vinyl letters / numbers at exterior doors (both interior and exterior faces)
    c. Rigid polyurethane foam site signs and mounting hardware at entry drive.
2. Interior Signage
    a. Directional blade signs (ceiling and / or wall mounted) at corridors
    b. Room identification signage
    c. Evacuation signage
    d. Pin mounted and soffit hung “Free-standing” letters
    e. Silkscreen vinyl wall films with custom graphic images
    f. Decorative polyester window film
    g. Circular LED light boxes with custom graphic images
    h. Circular discs with custom graphic images
    i. Health sanitation signs in food service areas
    j. Projecting “V” fire extinguisher location signs.

B. Install the following furnished by the designated SECTIONS:

1. **Dedication plaques provided by Owner.**

C. LEEDv4-S General Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following work is to be performed under the designated SECTIONS:

1. Traffic and site signage: SECTION 101453 — TRAFFIC SIGNAGE.

2. Roof flashing at entry canopy sign: SECTION 070002-ROOFING AND FLASHING.

3. Blocking for the attachment to GWB walls and ceilings for the work of this SECTION: SECTION 061000-ROUGH CARPENTRY.

4. Painted stenciling above ceilings at fire rated partitions: SECTION 092116-GYPSUM WALLBOARD.

5. Level 5 finish as required for the work of this Section: SECTION 092116-GYPSUM WALLBOARD.

6. Priming at level 5 GWB finish as required for work of this Section: SECTION 090007-PAINTING.

7. Grid and tile to support the ceiling mounted work of this SECTION: SECTION 090003-ACOUSTICAL TILES.

8. Permanent signage on Elevator Control Room door and at the main floor elevator entrance head condition on the frame: SECTION 140001-ELEVATORS.

9. Signage associated with Rescue Assistance System: SECTION 260001-ELECTRICAL.

10. Stone and mortar at site wall supporting the work of this SECTION: SECTION 040001-MASONRY.

11. Granite sign posts: SECTION 323000-MISCELLANEOUS SITE IMPROVEMENTS.

12. Fire extinguishers and cabinets: SECTION 102600-PREFABRICATED SPECIALTIES.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with the requirements of SECTION 013300-SUBMITTALS.

B. Product Data: Submit manufacturer's product data on each type of sign including:

1. Standard mounting details
2. Supporting test data for flame spread index and smoke developed index
3. O&M care guidelines

C. Shop Drawings:

1. Shop drawings showing typical exterior and interior signs (one of each type), and signs with longest room names.
2. Shop drawings signage shall include large scale details showing sign construction and method of attachment.
3. Shop drawings shall show a scaled drawing of the entire wall for the signage with the size and type of lettering specified. Furnish color chips for selection of each type of letter and each type of sign.
4. Sign schedule including columns with headings: sign type, room number and room name, quantity, sign text and "notes" on special mounting instructions when applicable.

D. Samples:

1. Standard color selection chips and anodized aluminum finishes.
2. Vinyl samples of available colors for approval.
3. One interior sign of each type including one blade sign, one room identification sign, one evacuation map, one health sign and one fire extinguisher "V" sign.
4. One minimum 6 in. x 6 in. sample of painted polyurethane sign showing all chosen colors, example of incised lettering, ogee profile, trim and light wood grain texture on the field.
5. One exterior cut aluminum letter, in approved size, font and finish with mounting hardware.
6. One interior cut aluminum letter, in approved size, font and finish with mounting hardware.
7. Two minimum 24 in. x 24 in. examples of full color, scaled printed vinyl wallcovering showing art provided by the Architect.
8. Two samples numerals for exterior vinyl applied letters in each of two approved colors.

E. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. Product substitution requests are subject to additional LEEDv4-S submittal requirements, see SECTION 012500-SUBSTITUTION PROCEDURES.

PART 2 PRODUCTS

2.01 MANUFACTURE

A. Custom fabricated signs as manufactured by Batten Brothers, Inc., Wakefield, MA, Barlo Signs, Hudson, NH, Merrimack Engraving and Marking Co., Methuen, MA, or approved equal as specified herein.

2.02 EXTERIOR SIGNS

A. Sign types are as follows. Refer to drawings for dimensions, font type, font size, construction and mounting details.

1. Pin Mounted Sign at Stone Wall

   a. Cut aluminum letters, ½-in. thick

   b. Text: "SGT JORDAN SHAY MEMORIAL LOWER ELEMENTARY SCHOOL"

   c. Typeface and Size: Future Medium, 8 inches tall and 6 inches tall

   d. Mounting: Letters to be pin mounted on ½-inch standoffs to stone wall.

   e. Finish:

      1) Letters: Matte Bronze Anodized Aluminum with one satin clear coat.

      2) Pin-Mounting Support Hardware: Two satin acrylic polyurethane color coats, spray applied. One custom color chosen by the Architect.

2. Site Sign at Entry Drive

   a. High density closed cell polyurethane foam sign panel with formed ogee frame, incised letters and mounting hardware required to attach to granite posts.

   b. To establish a level of quality, design and function, specification is based on "SP4-18" by Sign-Arts Product Corp., Laguna Hills, CA. Similar polyurethane foam sign panels will be considered equal upon receipt of adequate supporting data and samples.

   c. HDC properties:

      1) Density: 18 pcf or greater

      2) Compressive Strength: 860 psi or greater

      3) Finish: Paint, in up to five colors as chosen by the Architect.

   d. Hardware: Black powder coated metal attachment clips and expansion bolts.

e. Location: 193 Lions Mouth Road, at entry driveway.

f. Text and Graphic: See attached Sign Type “A”.

g. Quantity: Two panels mounted back-to-back at one pair of granite posts.

3. Vinyl Applied Letters

a. Numerals at all exterior doors, two sets required at each door (one each facing inside and outside)

b. Block style letters to be minimum 4 in. high.

c. Mount to glass, aluminum and painted hollow metal doors.

d. Numbering of doors shall be approved by APD and AFD.

e. Up to two colors to provide contrast at transparent and opaque applications will be chosen by the Architect.

2.03 INTERIOR SIGNS

A. Sign types are as follows. Refer to drawings for dimensions, font type, font size, construction and mounting details.

1. Wall and Ceiling Mounted Blade Signs at Corridors

a. Text: Text, size of text and graphics as shown on the attached drawings.

b. Font: Helvetica

c. Location: As shown on the attached schedule.

d. Construction: Refer to the attached drawing for fabrication, finish and dimensions.

e. Mounting: Extruded aluminum wall and ceiling brackets.

f. Coordinate locations with wall blocking and ceiling supports.

2. Room Identification Signs

a. Text: Text, size of text and graphics as shown on the attached drawings.

Raised vinyl letters and numbers (1/32 inch) with integral Raster Braille. Vinyl lettering with removable insert.

b. Font: Helvetica

c. Location: As shown on the attached schedule.

d. Construction: Refer to the attached drawings for fabrication, finish and dimensions.

e. Mounting: Mounted to glass or wall surfaces utilizing heavy-duty double faced tape.

3. Evacuation Signs

   a. Text: As shown on the attached drawings. Artwork shall be provided by the Architect.

   b. Font: Helvetica

   c. Location: As shown on the attached schedule.

   d. Construction: Refer to the attached drawing for fabrication, finish and dimensions.

   e. Mounting: Mounted to glass or wall surfaces utilizing heavy-duty double-faced tape.

4. Cut Aluminum Letters

   a. Finish: Matte natural anodized aluminum with one satin clear coat, spray applied. Anodized color will be confirmed by the Architect from full line of anodized finishes.

   b. Typeface: Futura Medium

   c. Large, free-standing, pin mounted letters:

      1) Text: "GYMNASIUM"
         "MEDIA CENTER"

      2) Size: 12 inches tall, ½-inch thick

      3) Locations: One each of text noted above, as shown on the interior elevations.

      4) Mounting: Individual letters pin mounted to interior walls on 3/8-inch standoffs.

   d. Small, free-standing, pin mounted letters:

      1) Text: "WELCOME"

      2) Size: Six inches tall, ¼-inch thick

      3) Location: One at Main Entry Vestibule

      4) Mounting: Individual letters pin mounted to millwork on ¼-inch standoffs

   e. Soffit Hung Letters:

      1) Text: "MAIN OFFICE"
         "CAFETERIA"

      2) Size: Six inches tall, ¼-inch thick

      3) Location: One each of text noted above as shown on the interior elevations.

4) Mounting: "Free-standing" letters mounted to ¼-inch thick aluminum angle bracket with supports following the shape of the letters. Back leg of angle bracket 2 inches wide with countersunk flathead screws to attach through soffit as detailed on the Drawings.

5) Finish:

i. Letters: As specified above

ii. Mounting Bracket and Screws: Two satin acrylic polyurethane color coats, spray applied to match soffit color.

iii. Full Assembly: One satin clear coat, spray applied.

5. Printed Vinyl Wallcovering

a. As shown on Interior Elevation Drawing sheets 5.4.06-5.4.08 and Millwork Drawing 5.6.12.

b. Location: First floor main lobby (feature wall), ground floor (elevator alcove), second floor (media center entry).

c. See interior elevation drawings for approximate sizes.

d. Mount to primed level 5 finish GWB.

e. At the Media Center and where otherwise indicated on the Drawings, printed film wallcovering shall be magnetic: MagnaMedia VM-Polyeight UV or equal.

f. Graphics to be provided by the Architect in electronic format.

6. Pre-Manufactured Circular LED Lightboxes at Feature Wall

a. Approved manufacturer: Smart Frame, 347 W. 36th Street, Suite 300, New York, NY 10018, or approved equal.

b. Finish: Clear satin anodized.

c. Sizes: 18 inch, 24 inch and 30 inch – See Interior Elevations for quantity of each size.

d. Coordinate power and connectivity to control panel.

e. Provide and install custom full colored graphics at the face of all lightboxes. Graphics to be provided by the Architect in electronic format.

7. Feature Wall Control Panel

a. Location: First floor main lobby (feature wall)

b. Finish:

1) Panel to be satin stainless steel, size as noted on the Drawings.

2) Push buttons to be printed acrylic, size as noted on the Drawings. Graphics to be provided by the Architect in electronic format.

c. Provide low voltage connection from control panel to each circular LED lightbox.

8. Premanufactured Circular "Puck" Signs (Unlighted)

a. Match construction of circular light boxes in paragraph 2.03.A.6 including material, finish and graphics.

b. Size: 12-inch diameter, ¼-inch thick (no light box)

c. Mounting: Pin mounted on 1-inch standoffs

d. Finish: Clear satin anodized

e. Quantity: Seven

f. Location: East wall of Lobby at first and second floors as shown on the interior elevations.

9. Dusted / Frosted Decorative Polyester Window Film

a. Location: Mail-Duplicate-Records Room No. 102

b. Mounting: Self-adhered to glass surfaces.

c. Crystal Glass Finishes 7725SE-314 Dusted Crystal as manufactured by 3M or approved equal.

d. Locations as shown on the Drawings.

10. Health / Sanitary Signs

a. Location: Kitchen, Servery, Recycle Room, (Kitchen) Toilet

b. Signs shall be by Seton Identification Products, Inc., Safety Sign, Uline or other equals upon receipt of adequate supporting data and samples.

c. Materials: Acrylic, polyethylene or aluminum

d. Mounting: Mount to wall surfaces or food service equipment at all sinks in all food service areas using heavy duty, double-sided tape.

e. Text sizes and quantities:

1) "Handwash Sink Only", minimum 8 in. x 10 in., at handwash sinks (5 locations).

2) "Prep Sink Only", minimum 8 in. x 10 in. at prep sink (1 location).

3) "Employees Must Wash Hands Before Returning to Work", minimum 8 in. x 10 in. at Kitchen toilet (1 location).

4) "Wash Your Hands" instructional sign with graphics, min. 8 in. x 10 in., location: all handwash sinks in food service areas and Kitchen toilet (6 locations).

5) Two similar signs with messages to be determined by Owner. Size: Minimum 8 in. x 10 in. Locations to be determined.

f. Final selection of signs is subject to the approval of the Amesbury Board of Health.

11. Projecting "V" Fire Extinguisher Location Signs

a. Location: Wall mounted at 7'-0" AFF above all fire extinguishers both in cabinets and wall mounted.

b. Signs shall be by Brady, Emedco, MySafetySign or others upon receipt of adequate supporting data and samples.

c. Materials: Acrylic, red and white with extinguisher graphic, arrow point down and text reading "FIRE EXTINGUISHER".

d. Size: 6 in. H x 8 in. W.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Verify that items provided under other sections of Work are sized and located to accommodate signs. Coordinate locations of required blocking and other supports with the specified trades.

C. Examine supporting members to ensure that surfaces are at elevations indicated or required to comply with authorities having jurisdiction and are free from dirt and other deleterious matter.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. General: Locate signs and accessories where indicated, using mounting methods of types described and in compliance with manufacturer's written instructions.

1. Install signs level, plumb, and at heights indicated, with sign surfaces free from distortion and other defects in appearance.

3.03 CLEANING AND PROTECTION

A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by the Architect.

END OF SECTION

ATTACHMENT A

Signage Schedule

ROOM NO.	TYPE NO.	QUANTITY	SIGN TEXT	ROOM NAME - PLAN
Ground Floor				
002	5A	1	CAFETERIA	CAFETERIA
002	6	1	EMERGENCY EGRESS	CAFETERIA
002	12	1	OCCUPANCY	CAFETERIA
003	5A	1	STAGE	PLATFORM
004	7	1	STORAGE	STORAGE
005	6	1	EMERGENCY EGRESS	KITCHEN
005	5A	1	KITCHEN	KITCHEN
005A	6	2	EMERGENCY EGRESS	SERVERY
005A	5A	2	SERVERY	SERVERY
006	7	1	STORAGE	DRY STORAGE
009	7	1	RECYCLE ROOM	RECYCLE ROOM
009	6	1	EMERGENCY EGRESS	RECYCLE ROOM
010	5	1	OFFICE 010	OFFICE
010	6	1	EMERGENCY EGRESS	OFFICE
011	8A	1	TOILET	TOILET
012	7	1	MOP	MOP
012	6	1	EMERGENCY EGRESS	MOP
013	7	2	RECYCLING/TRASH	RECYCLING/TRASH
013	6	2	EMERGENCY EGRESS	RECYCLING/TRASH
014	7	1	MAIN ELECTRIC	MAIN ELECTRIC
014	6	1	EMERGENCY EGRESS	MAIN ELECTRIC
015	7	1	MECHANICAL ROOM	MECHANICAL
015	7A	1	ACCESS TO SPRINKLER ROOM 016	MECHANICAL
015	6	2	EMERGENCY EGRESS	MECHANICAL
016	7	1	SPRINKLER	SPRINKLER
017	7	1	RECEIVING/ STOREROOM	RECEIVING / STOREROOM
017	7A	1	ACCESS TO MAIN ELECTRIC, MECHANICAL, SPRINKLER ROOM 014, 015, 016	RECEIVING / STOREROOM

ROOM NO.	TYPE NO.	QUANTITY	SIGN TEXT	ROOM NAME - PLAN
017	6	1	EMERGENCY EGRESS	RECEIVING/ STOREROOM
018	7	1	OFFICE 018	CUST. OFFICE
018	6	1	EMERGENCY EGRESS	CUST. OFFICE
019	7	1	CUSTODIAN WORKSHOP 019	CUSTODIAN WORKSHOP
019	6	2	EMERGENCY EGRESS	CUSTODIAN WORKSHOP
	4	1		BOYS & GIRLS
020B	8	1	BOYS	BOYS
020G	8	1	GIRLS	GIRLS
021	7	1	ELEVATOR CONTROL ROOM	ECR
021A	4B	1	ELEVATOR	ELEVATOR
022	7	1	EMERGENCY ELECTRIC	EE
023	8A	1	STAFF	STAFF
024	5A	1	TEACHER DINING / WORKROOM 024	TEACHER DINING / WORKROOM
024	6	1	EMERGENCY EGRESS	TEACHER DINING / WORKROOM
030	5A	1	SMALL GROUP 030	RISE - SMALL GROUP
030	6	1	EMERGENCY EGRESS	RISE - SMALL GROUP
031	5	1	MOTOR ROOM 031	RISE MOTOR ROOM
031	6	1	EMERGENCY EGRESS	RISE MOTOR ROOM
032	7	1	NETWORK	NETWORK
033	5	1	CLASSROOM 033	PRE-K
033	6	1	EMERGENCY EGRESS	PRE-K
033A	8A	1	TOILET	TOILET
034	5	1	CLASSROOM 034	PRE-K
034	6	1	EMERGENCY EGRESS	PRE-K
034A	8A	1	TOILET	TOILET
035	5	1	CLASSROOM 035	PRE-K
035	6	1	EMERGENCY EGRESS	PRE-K
035A	8A	1	TOILET	TOILET
036	7	1	STORAGE	STORAGE
	4			TOILET
037	8A	1	TOILET	TOILET
038A	8A	1	STAFF	STAFF

ROOM NO.	TYPE NO.	QUANTITY	SIGN TEXT	ROOM NAME - PLAN
038B	8A	1	STAFF	STAFF
039	5	1	CLASSROOM 039	KINDERGARTEN
039	6	1	EMERGENCY EGRESS	KINDERGARTEN
039A	8A	1	TOILET	TOILET
040	5	1	CLASSROOM 040	KINDERGARTEN
040	6	1	EMERGENCY EGRESS	KINDERGARTEN
040A	8A	1	TOILET	TOILET
041	5	1	CLASSROOM 041	KINDERGARTEN
041	6	1	EMERGENCY EGRESS	KINDERGARTEN
041A	8A	1	TOILET	TOILET
044	5	1	CLASSROOM 044	KINDERGARTEN
044	6	1	EMERGENCY EGRESS	KINDERGARTEN
044A	8A	1	TOILET	TOILET
046	5	1	CLASSROOM 046	KINDERGARTEN
046	6	1	EMERGENCY EGRESS	KINDERGARTEN
046A	8A	1	TOILET	TOILET
047	5	1	CLASSROOM 047	KINDERGARTEN
047	6	1	EMERGENCY EGRESS	KINDERGARTEN
047A	8A	1	TOILET	TOILET
048	7	1	ELECTRIC	ELEC
049	5A	1	SMALL GROUP	SMALL GROUP
049	6	1	EMERGENCY EGRESS	SMALL GROUP
050	7	1	CUSTODIAL	CUST
052	5	1	CLASSROOM 052	KINDERGARTEN
052	6	1	EMERGENCY EGRESS	KINDERGARTEN
052A	8A	1	TOILET	TOILET
053	7	1	STORAGE	STORAGE
054	5	1	CLASSROOM 054	RISE JR.
054	6	1	EMERGENCY EGRESS	RISE JR.
054A	8A	1	TOILET	TOILET
055	5	1	CLASSROOM 055	RISE
055	6	1	EMERGENCY EGRESS	RISE
055A	8A	1	TOILET	TOILET
056	5A	1	QUIET ROOM	QUIET ROOM

ROOM NO.	TYPE NO.	QUANTITY	SIGN TEXT	ROOM NAME - PLAN
056	6	2	EMERGENCY EGRESS	QUIET ROOM

First Floor

---	1	1	PUSH FOR HELP	Elevator Adjacent
---	2	1	AREA OF RESCUE	Elevator Adjacent
---	4B	1	ELEVATOR	Elevator Adjacent
102	5A	2	MAIN OFFICE 103	MAIL - DUPLICATE - RECORDS
102	6	1	EMERGENCY EGRESS	MAIL - DUPLICATE - RECORDS
103	5A	1	MAIN OFFICE 103	GENERAL OFFICE
103	6	1	EMERGENCY EGRESS	GENERAL OFFICE
104	5	1	PRINCIPAL 104	PRINCIPAL
104	6	1	EMERGENCY EGRESS	PRINCIPAL
105	5A	1	OFFICE 105	OFFICE
105	6	1	EMERGENCY EGRESS	OFFICE
106	5A	1	CONFERENCE ROOM 106	CONFERENCE ROOM
106	6	1	EMERGENCY EGRESS	CONFERENCE ROOM
107	5	1	NURSE	NURSE
107	4C	1	NURSE	NURSE
107	6	1	EMERGENCY EGRESS	NURSE
107A	5A	1	NURSE OFFICE 107A	NURSE OFFICE
107A	6	1	EMERGENCY EGRESS	NURSE OFFICE
107B	8A	1	TOILET	NURSE TOILET
108	5A	1	KITCHENETTE 108	KITCHENETTE
108	6	1	EMERGENCY EGRESS	KITCHENETTE
108A	7	1	CLOSET	CLOSET
	4	1		TOILET
109	8A	1	TOILET	TOILET
110	5	1	OFFICE 110	SW/GUID
110	6	1	EMERGENCY EGRESS	SW/GUID
111	8A	1	TOILET	TOILET
112	7	1	DATA	DATA
114	5A	2	GYMNASIUM	GYMNASIUM

ROOM NO.	TYPE NO.	QUANTITY	SIGN TEXT	ROOM NAME - PLAN
114	6	2	EMERGENCY EGRESS	GYMNASIUM
114	12	2	OCCUPANCY	GYMNASIUM
115	5	1	P.E. OFFICE 115	PE OFFICE
115	6	1	EMERGENCY EGRESS	PE OFFICE
116	7	1	STORAGE	GYM STORAGE
116	6	1	EMERGENCY EGRESS	GYM STORAGE
117	7	1	CUSTODIAL	CUST
	4	1		BOYS & GIRLS
120B	8	1	BOYS	BOYS
120G	8	1	GIRLS	GIRLS
124	5A	1	PRACTICE 124	PRACTICE
124	6	1	EMERGENCY EGRESS	PRACTICE
130	5	2	MUSIC CLASSROOM 130	MUSIC
130	6	2	EMERGENCY EGRESS	MUSIC
130A	5A	1	PRACTICE 130A	PRACTICE
130A	6	1	EMERGENCY EGRESS	PRACTICE
131	5	2	CLASSROOM 131	ISN
131	6	2	EMERGENCY EGRESS	ISN
131A	8A	1	TOILET	TOILET
	4	1		TOILET
133	8	1	STAFF	STAFF
134	5	1	CLASSROOM 134	CLASSROOM
134	6	1	EMERGENCY EGRESS	CLASSROOM
135	5	1	CLASSROOM 135	CLASSROOM
135	6	1	EMERGENCY EGRESS	CLASSROOM
	4	1		BOYS & GIRLS
136B	8	1	BOYS	BOYS
136G	8	1	GIRLS	GIRLS
137	8A	1	TOILET	TOILET
138	5A	2	QUIET ROOM	QUIET ROOM
138	6	2	EMERGENCY EGRESS	QUIET ROOM
139	5	2	CLASSROOM 139	CUBS

ROOM NO.	TYPE NO.	QUANTITY	SIGN TEXT	ROOM NAME - PLAN
139	6	1	EMERGENCY EGRESS	CUBS
140	5	1	CLASSROOM 140	CLASSROOM
140	6	1	EMERGENCY EGRESS	CLASSROOM
141	5	1	CLASSROOM 141	CLASSROOM
141	6	1	EMERGENCY EGRESS	CLASSROOM
142	7	1	CUSTODIAL	CUST
143	5A	1	SMALL GROUP 143	SMALL GROUP
143	6	1	EMERGENCY EGRESS	SMALL GROUP
144	5	1	CLASSROOM 144	RESOURCE ROOM
144	6	1	EMERGENCY EGRESS	RESOURCE ROOM
145	5	1	CLASSROOM 145	STUDENT SUPPORT
145	6	1	EMERGENCY EGRESS	STUDENT SUPPORT
146	5	1	CLASSROOM 146	CLASSROOM
146	6	1	EMERGENCY EGRESS	CLASSROOM
147	5A	1	LITERACY LIBRARY 147	LITERACY LIBRARY
147	6	1	EMERGENCY EGRESS	LITERACY LIBRARY
148D	7	1	DATA	DATA
148E	7	1	ELECTRIC	ELEC
148E	7A	1	ACCESS TO DATA 148D	ELEC
148E	6	1	EMERGENCY EGRESS	ELEC
149	5	1	CLASSROOM 149	SLP
149	6	1	EMERGENCY EGRESS	SLP
150	8A	1	STAFF	STAFF
151	5	1	CLASSROOM 151	CLASSROOM
151	6	1	EMERGENCY EGRESS	CLASSROOM
152	5	1	CLASSROOM 152	CLASSROOM
152	6	1	EMERGENCY EGRESS	CLASSROOM
153	5	1	CLASSROOM 153	OT
153	6	1	EMERGENCY EGRESS	OT
154	7	2	STORAGE	OT/PT STRG

ROOM NO.	TYPE NO.	QUANTITY	SIGN TEXT	ROOM NAME - PLAN
155	5	1	CLASSROOM 155	PT
155	6	1	EMERGENCY EGRESS	PT
156	7	1	STORAGE	STORAGE
157	5	1	OFFICE 157	ADJ COUN
157	6	1	EMERGENCY EGRESS	ADJ COUN
158	5	1	OFFICE 158	PSYCH
158	6	1	EMERGENCY EGRESS	PSYCH
159	5	1	OFFICE 159	BCBA
159	6	1	EMERGENCY EGRESS	BCBA
160	5	1	OFFICE 160	SPED FACIL
160	6	1	EMERGENCY EGRESS	SPED FACIL
161	5A	2	CONFERENCE ROOM 161	SPED CONF
161	6	2	EMERGENCY EGRESS	SPED CONF

Second Floor

---	1	1	PUSH FOR HELP	Elevator Adjacent
---	2	1	AREA OF RESCUE	Elevator Adjacent
---	4B	1	ELEVATOR	Elevator Adjacent
201	5	2	MEDIA CENTER 201	MEDIA CENTER
201	6	2	EMERGENCY EGRESS	MEDIA CENTER
202	5A	1	WORKROOM	WORKROOM
202	6	1	EMERGENCY EGRESS	WORK ROOM
221	7	1	MECHANICAL	MECH
221	6	1	EMERGENCY EGRESS	MECH
	4	1		BOYS & GIRLS
220B	8	1	BOYS	BOYS
220G	8	1	GIRLS	GIRLS
222	5	1	CLASSROOM 222	TITLE 1
222	6	1	EMERGENCY EGRESS	TITLE 1
223	7	1	BDA	BDA
224	7	1	CUSTODIAL	CUST
230	5A	1	TEACHER DINING / WORKROOM	TEACHER DINING / WORKROOM

ROOM NO.	TYPE NO.	QUANTITY	SIGN TEXT	ROOM NAME - PLAN
230	6	1	EMERGENCY EGRESS	TEACHER DINING / WORKROOM
232	8A	1	STAFF	STAFF
233	5	1	ART ROOM 233	ART
233	6	1	EMERGENCY EGRESS	ART
233A	7	1	STORAGE	ART STOR
233A	6	1	EMERGENCY EGRESS	ART STOR
234	5	1	CLASSROOM 234	STE / ENGINEERING
234	6	1	EMERGENCY EGRESS	STE / ENGINEERING
235	5	1	CLASSROOM 235	CLASSROOM
235	6	1	EMERGENCY EGRESS	CLASSROOM
	4	1		BOYS & GIRLS
236B	8	1	BOYS	BOYS
236G	8	1	GIRLS	GIRLS
237	8A	1	TOILET	TOILET
238	7	1	STORAGE	STOR
239	5	1	CLASSROOM 239	LANGUAGE BASED PROGRAM
239	6	1	EMERGENCY EGRESS	LANGUAGE BASED PROGRAM
240	5	1	CLASSROOM 240	CLASSROOM
240	6	1	EMERGENCY EGRESS	CLASSROOM
241	5	1	CLASSROOM 241	CLASSROOM
241	6	1	EMERGENCY EGRESS	CLASSROOM
242	7	1	CUSTODIAL	CUST
243	5A	1	SMALL GROUP 243	SMALL GROUP
243	6	1	EMERGENCY EGRESS	SMALL GROUP
244	5	1	CLASSROOM 244	RESOURCE ROOM
244	6	1	EMERGENCY EGRESS	RESOURCE ROOM
245	5	1	CLASSROOM 245	STUDENT SUPPORT
245	6	1	EMERGENCY EGRESS	STUDENT SUPPORT
246	5	1	CLASSROOM 246	CLASSROOM
246	6	1	EMERGENCY EGRESS	CLASSROOM
247	5	1	CLASSROOM 247	CLASSROOM
247	6	1	EMERGENCY EGRESS	CLASSROOM

ROOM NO.	TYPE NO.	QUANTITY	SIGN TEXT	ROOM NAME - PLAN
248D	7	1	DATA	DATA
248E	7	1	ELECTRIC	ELEC
248E	7A	1	ACCESS TO DATA 248D	ELEC
248E	6	1	EMERGENCY EGRESS	ELEC
249	5	1	CLASSROOM 249	SLP
249	6	1	EMERGENCY EGRESS	SLP
250	8A	1	STAFF	STAFF
251	5	1	CLASSROOM 251	CLASSROOM
251	6	1	EMERGENCY EGRESS	CLASSROOM
252	5	1	CLASSROOM 252	CLASSROOM
252	6	1	EMERGENCY EGRESS	CLASSROOM
253	5	1	CLASSROOM 253	NAS
253	6	1	EMERGENCY EGRESS	NAS
253A	8A	1	TOILET	TOILET
254	5A	1	SMALL GROUP 254	SMALL GROUP
254	6	1	EMERGENCY EGRESS	SMALL GROUP
255	5	1	CLASSROOM 255	EL
255	6	1	EMERGENCY EGRESS	EL

Corridors & Stairs

SA01	9A	1	STAIR A NO ROOF ACCESS SA01	STAIR A
SA01	10A	1	STAIR A FIRST FLOOR FIRST FLOOR TO SECOND FLOOR NO ROOF ACCESS SA01 EXIT FIRST FLOOR	STAIR A
SA02	9A	1	STAIR A NO ROOF ACCESS SA02	STAIR A

ROOM NO.	TYPE NO.	QUANTITY	SIGN TEXT	ROOM NAME - PLAN
SA02	10A	1	STAIR A SECOND FLOOR FIRST FLOOR TO SECOND FLOOR NO ROOF ACCESS SA02 EXIT FIRST FLOOR	STAIR A
SB00	9A	1	STAIR B NO ROOF ACCESS SB00	STAIR B
SB00	10A	1	STAIR B GROUND FLOOR GROUND FLOOR TO SECOND FLOOR NO ROOF ACCESS EXIT GROUND FLOOR	STAIR B
SB01	9A	1	STAIR B NO ROOF ACCESS SB01	STAIR B
SB01	10A	1	STAIR B FIRST FLOOR GROUND FLOOR TO SECOND FLOOR NO ROOF ACCESS SB01 EXIT GROUND FLOOR	STAIR B
SB02	9A	1	STAIR B NO ROOF ACCESS SB02	STAIR B
SB02	10A	1	STAIR B SECOND FLOOR GROUND FLOOR TO SECOND FLOOR NO ROOF ACCESS SB02 EXIT GROUND FLOOR	
SB02	3	1	EVAC CHAIR	STAIR B
SC00	9A	1	STAIR C NO ROOF ACCESS SC00	STAIR C

ROOM NO.	TYPE NO.	QUANTITY	SIGN TEXT	ROOM NAME - PLAN
SC00	10A	1	STAIR C GROUND FLOOR GROUND FLOOR TO SECOND FLOOR NO ROOF ACCESS SC00 EXIT GROUND FLOOR	STAIR C
SC01	9A	1	STAIR C NO ROOF ACCESS SC01	STAIR C
SC01	10A	1	STAIR C FIRST FLOOR GROUND FLOOR TO SECOND FLOOR NO ROOF ACCESS SC01 EXIT GROUND FLOOR	STAIR C
SC02	9A	1	STAIR C NO ROOF ACCESS SC02	STAIR C
SC02	10A	1	STAIR C SECOND FLOOR GROUND FLOOR TO SECOND FLOOR NO ROOF ACCESS SC02 EXIT GROUND FLOOR	STAIR C
SD02	9	1	ROOF ACCESS STAIR ROOF ACCESS SD02	ROOF ACCESS STAIR
SD02	10	1	ROOF ACCESS STAIR SECOND FLOOR SECOND FLOOR TO ROOF ROOF ACCESS EXIT SECOND FLOOR	ROOF ACCESS STAIR
SD03	9	1	ROOF ACCESS STAIR ROOF ACCESS SD03	ROOF ACCESS STAIR
SD03	10	1	ROOF ACCESS STAIR ROOF SECOND FLOOR TO ROOF ROOF ACCESS EXIT SECOND FLOOR	ROOF ACCESS STAIR

ROOM NO.	TYPE NO.	QUANTITY	SIGN TEXT	ROOM NAME - PLAN
SD03	11	1	SNOW REMOVAL GUIDELINES	ROOF ACCESS STAIR

Exterior

Location	Type	Quantity	Text	Notes
193 Lions Mouth Road	A	1	See Detail	Two sided- (2) identical panels mounted back to back

ATTACHMENT B

Sign Types

NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS. ARCHITECT TO PROVIDE GRAPHIC IMAGE



1/16" THICK PLEXIGLASS OR LEXAN SIGN BACKER PLATE w/GE LEXAN FILM P/N 8B35, .015" THICK w/SUB-SURFACE PRINTED BACKGROUND COLOR(S) BONDED TO BACKER PLATE

SIGN PLATE TO BE SET IN 1/2" THICK VANDAL RESISTANT FRAME ADHERED W/ 3M DUAL LOCK OR EQUAL

1/32" RAISED PHOTOPOLYMER LETTERS AND GRAPHICS, TYP

INTEGRAL RASTER BRAILLE (RAISED), GRADE 2 MUST HAVE DOMED TOPS. ENGRAVED BRAILLE NOT ACCEPTABLE

Sign Type 1

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2021
Drawn By:	MEH
Scale:	6" = 1'-0"

Sheet No.
SIGN TYPE 1

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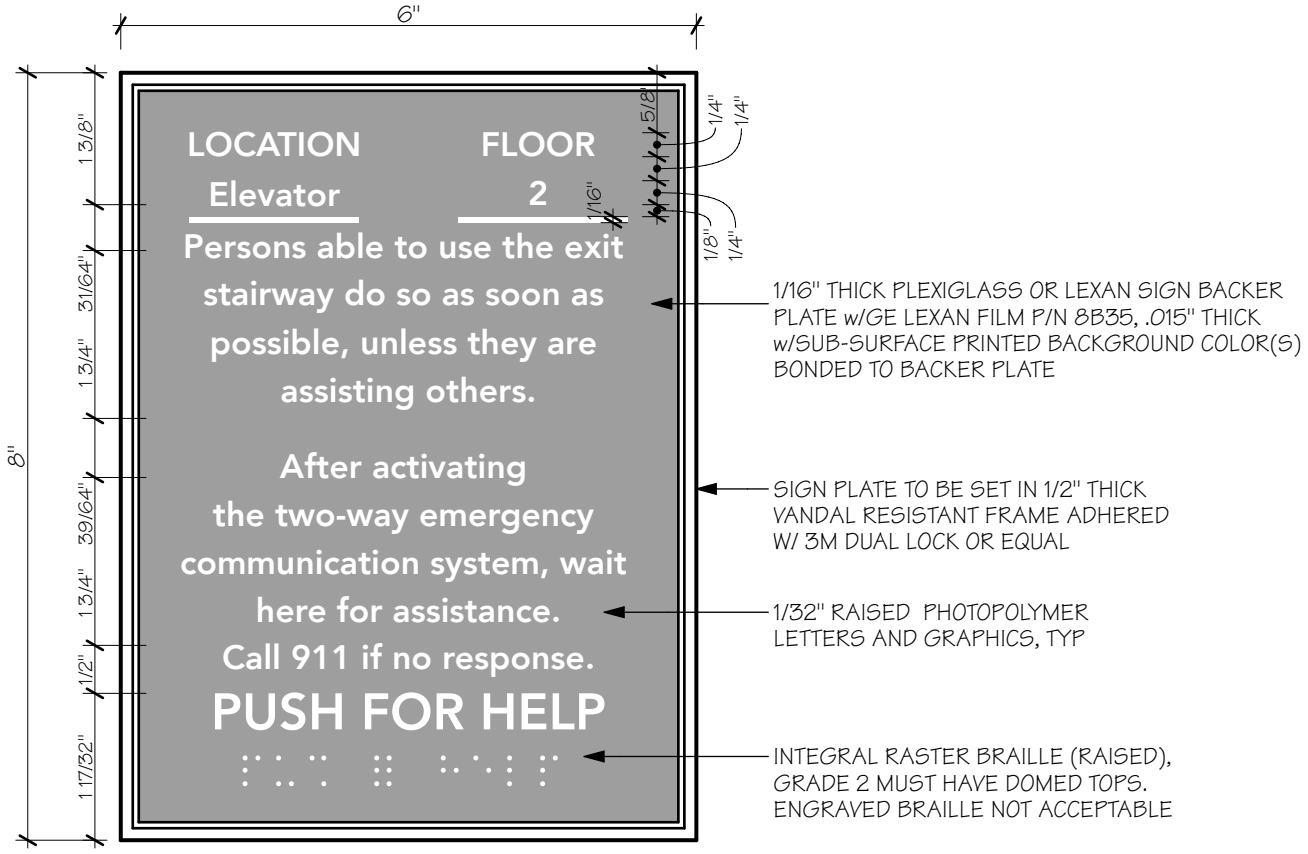
architects + planners

NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS. ARCHITECT TO PROVIDE GRAPHIC IMAGE



Sign Type 2

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2021
Drawn By:	MEH
Scale:	6" = 1'-0"

Sheet No.
SIGN TYPE 2

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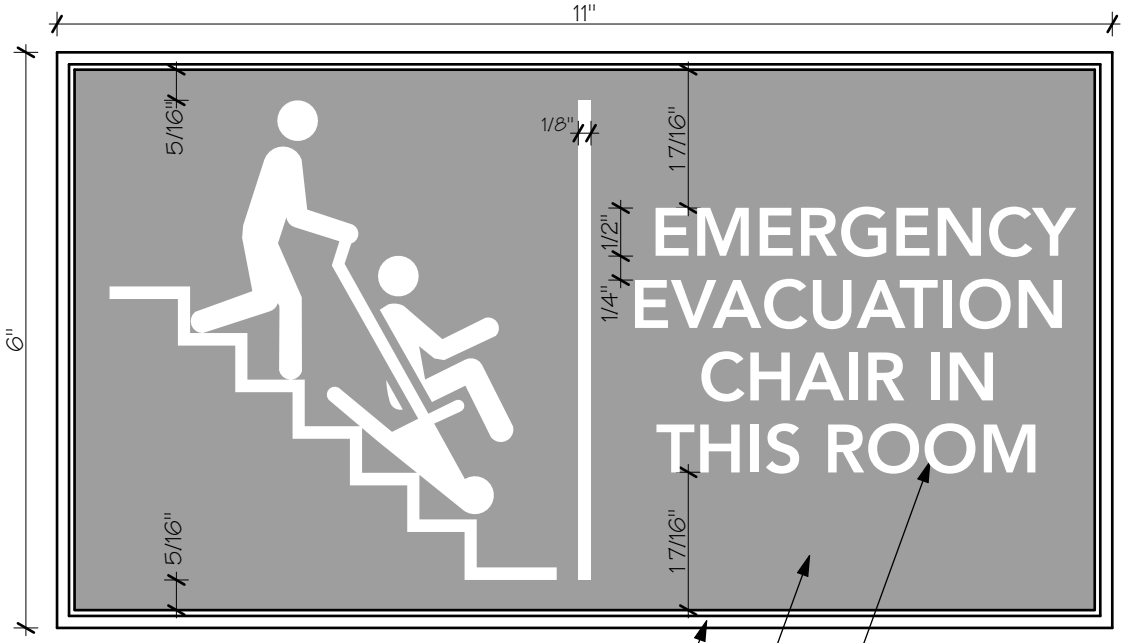
NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS. ARCHITECT TO PROVIDE GRAPHIC IMAGE



1/16" THICK PLEXIGLASS OR LEXAN SIGN BACKER PLATE w/GE LEXAN FILM P/N 8B35, .015" THICK w/SUB-SURFACE PRINTED BACKGROUND COLOR(S) BONDED TO BACKER PLATE

SIGN PLATE TO BE SET IN 1/2" THICK VANDAL RESISTANT FRAME ADHERED W/ 3M DUAL LOCK OR EQUAL

1/32" RAISED PHOTOPOLYMER LETTERS AND GRAPHICS, TYP

Sign Type 3

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2021
Drawn By:	MEH
Scale:	6" = 1'-0"

Sheet No.
SIGN TYPE 3

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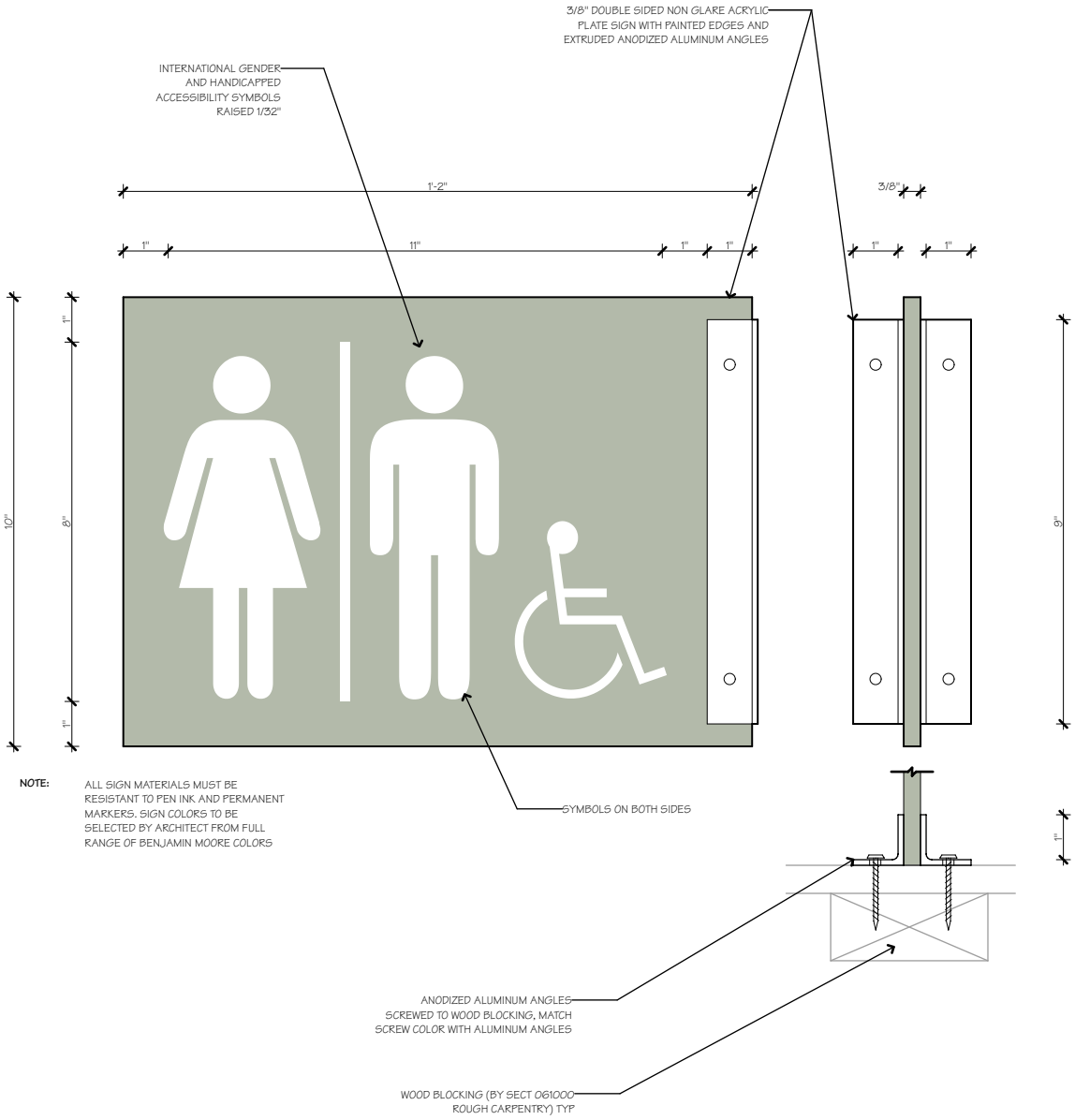

Sign Type 4

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2021
Drawn By:	MEH
Scale:	3" = 1'-0"

Sheet No.
SIGN TYPE 4

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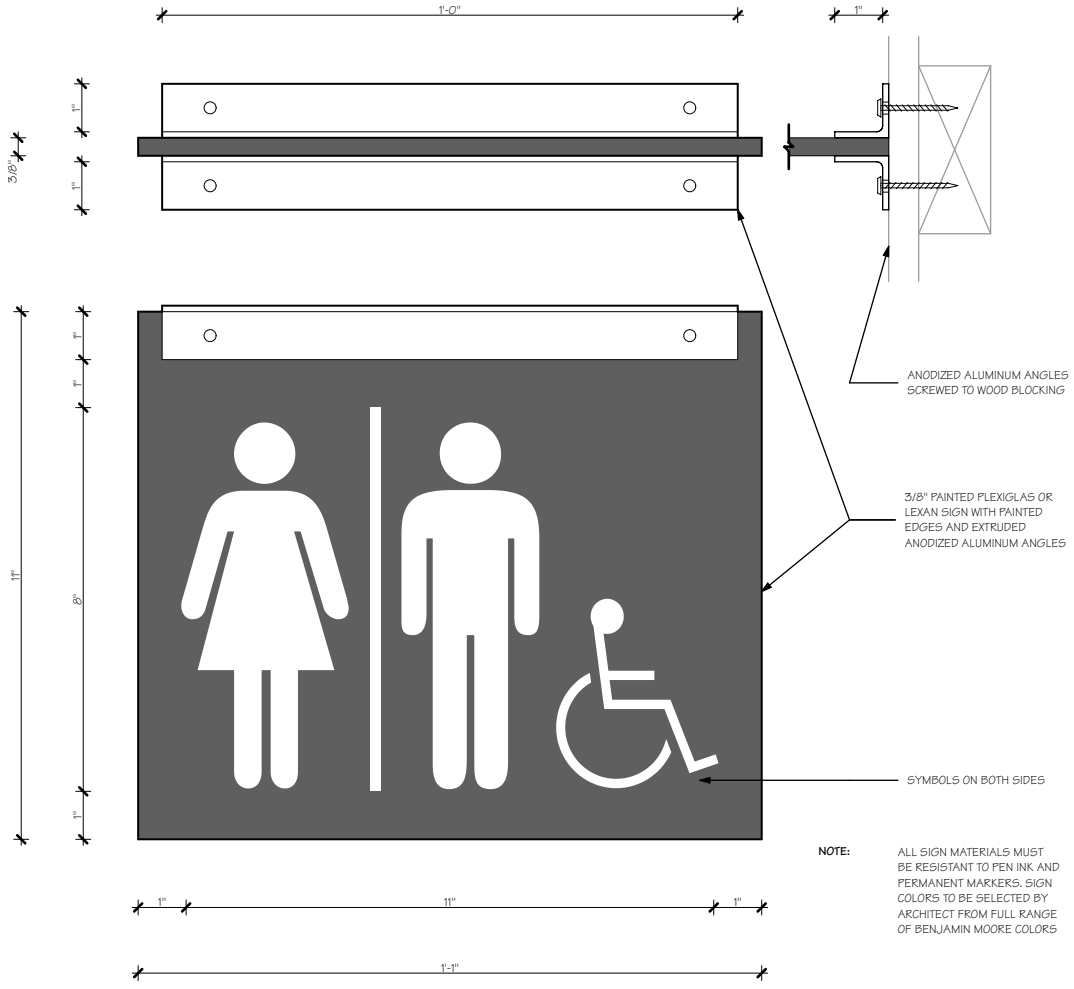

Sign Type 4A

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2021
Drawn By:	MEH
Scale:	3" = 1'-0"

Sheet No.
SIGN TYPE 4A

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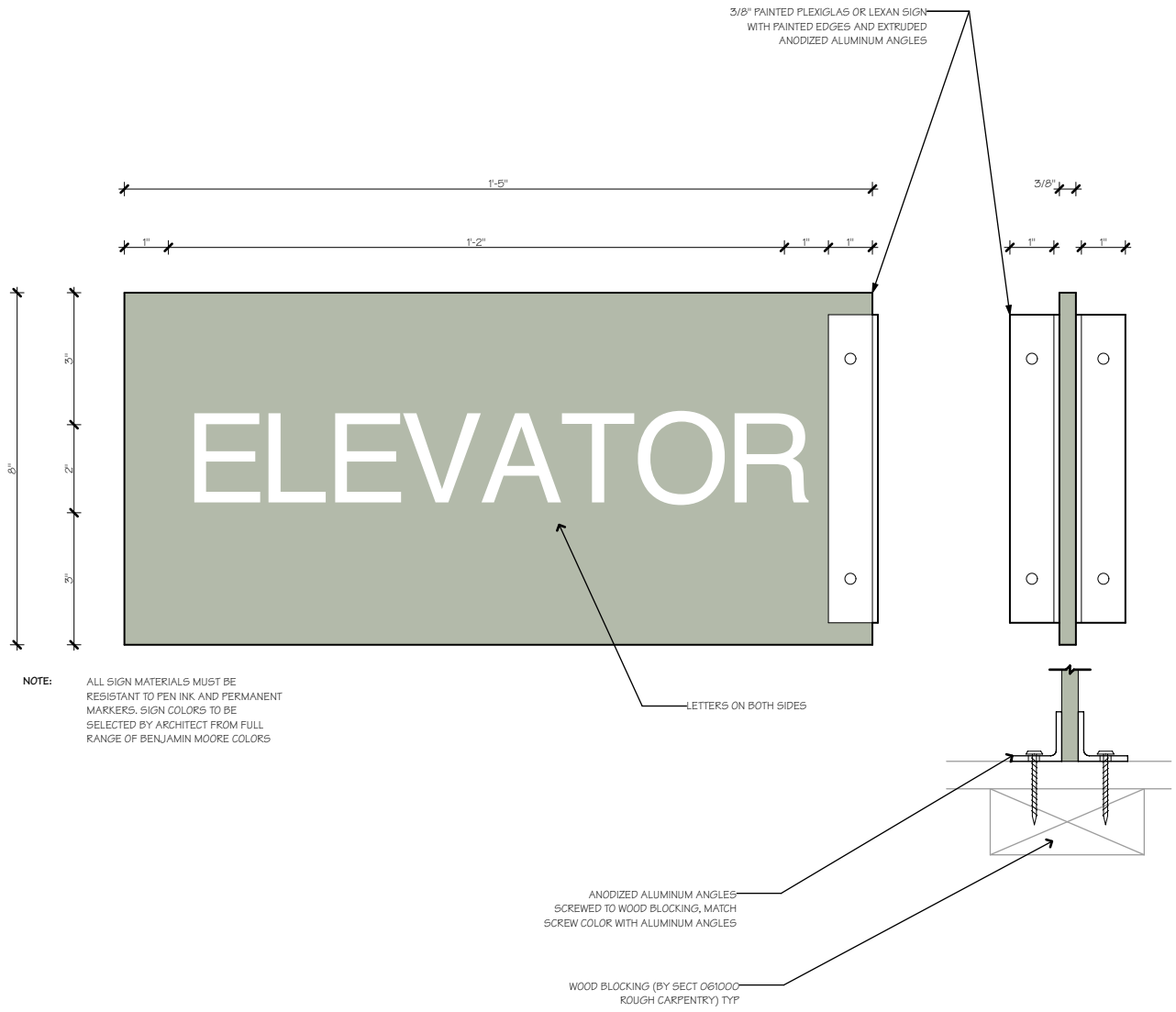

NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS

Sign Type 4B

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	MEH
Scale:	3" = 1'-0"

Sheet No.
SIGN TYPE 4B

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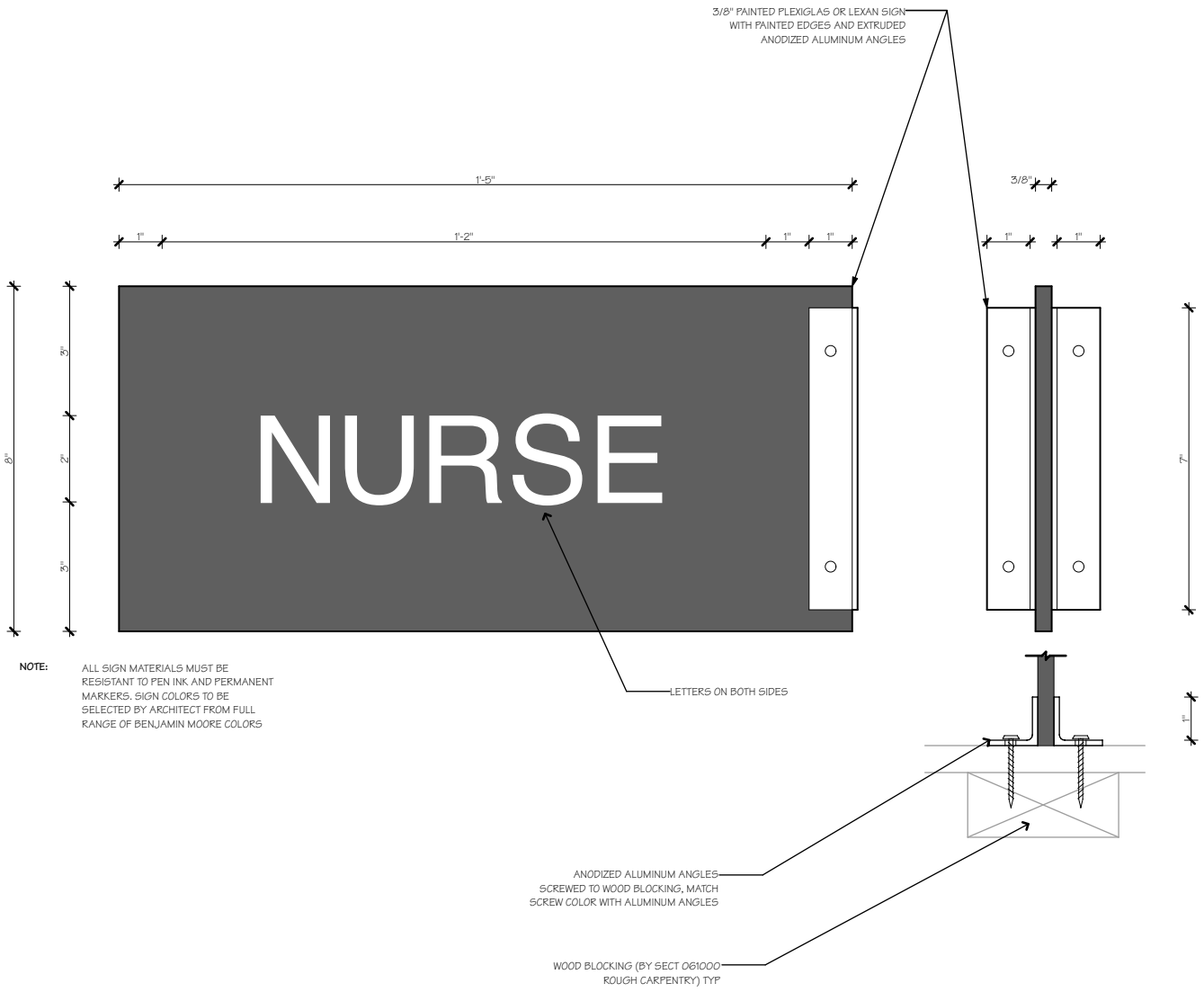

NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS

Sign Type 4C

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	MEH
Scale:	3" = 1'-0"

Sheet No.
SIGN TYPE 4C

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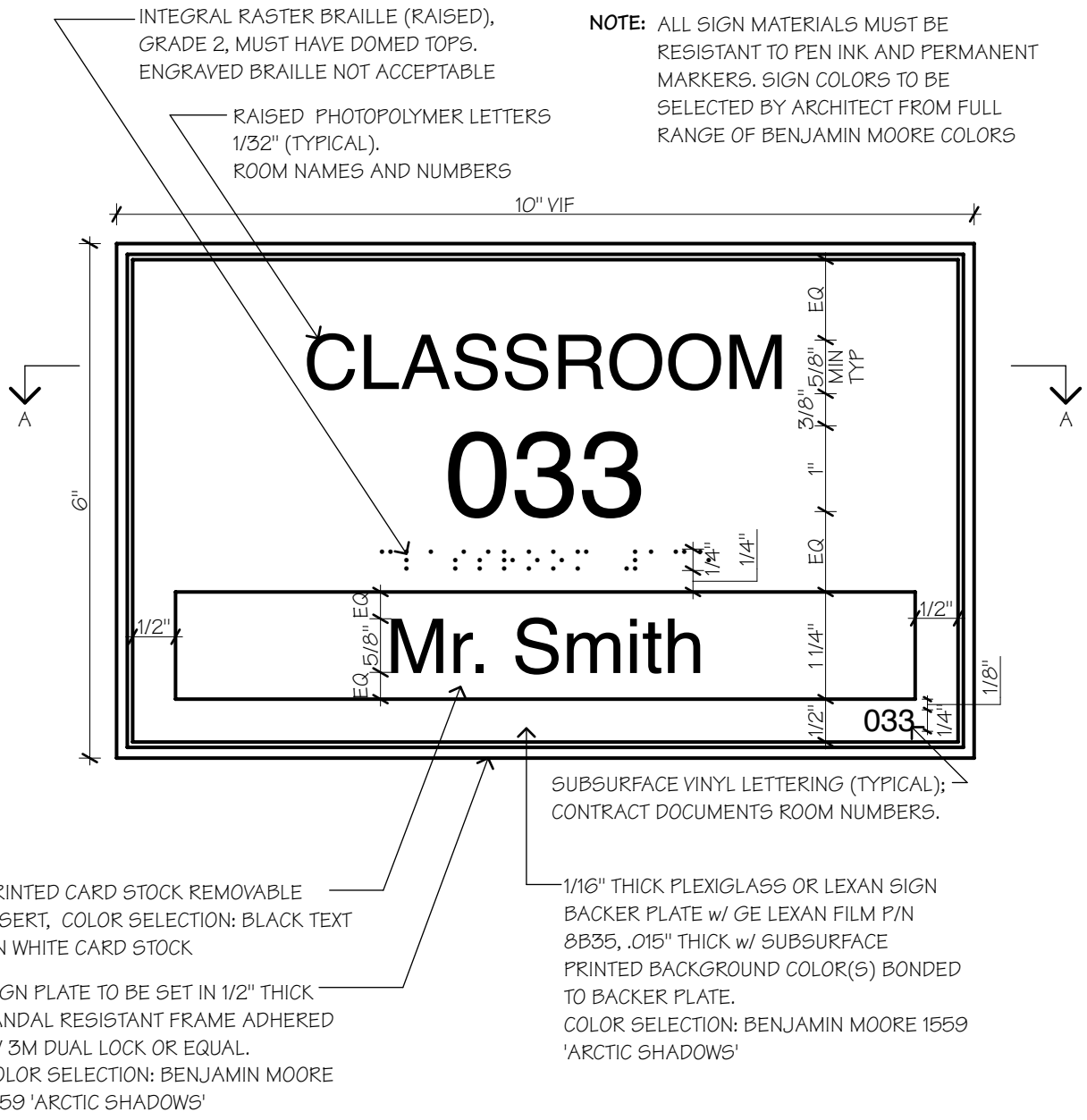

Sign Type 5

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	MEH
Scale:	6" = 1'-0"

Sheet No.
SIGN TYPE 5

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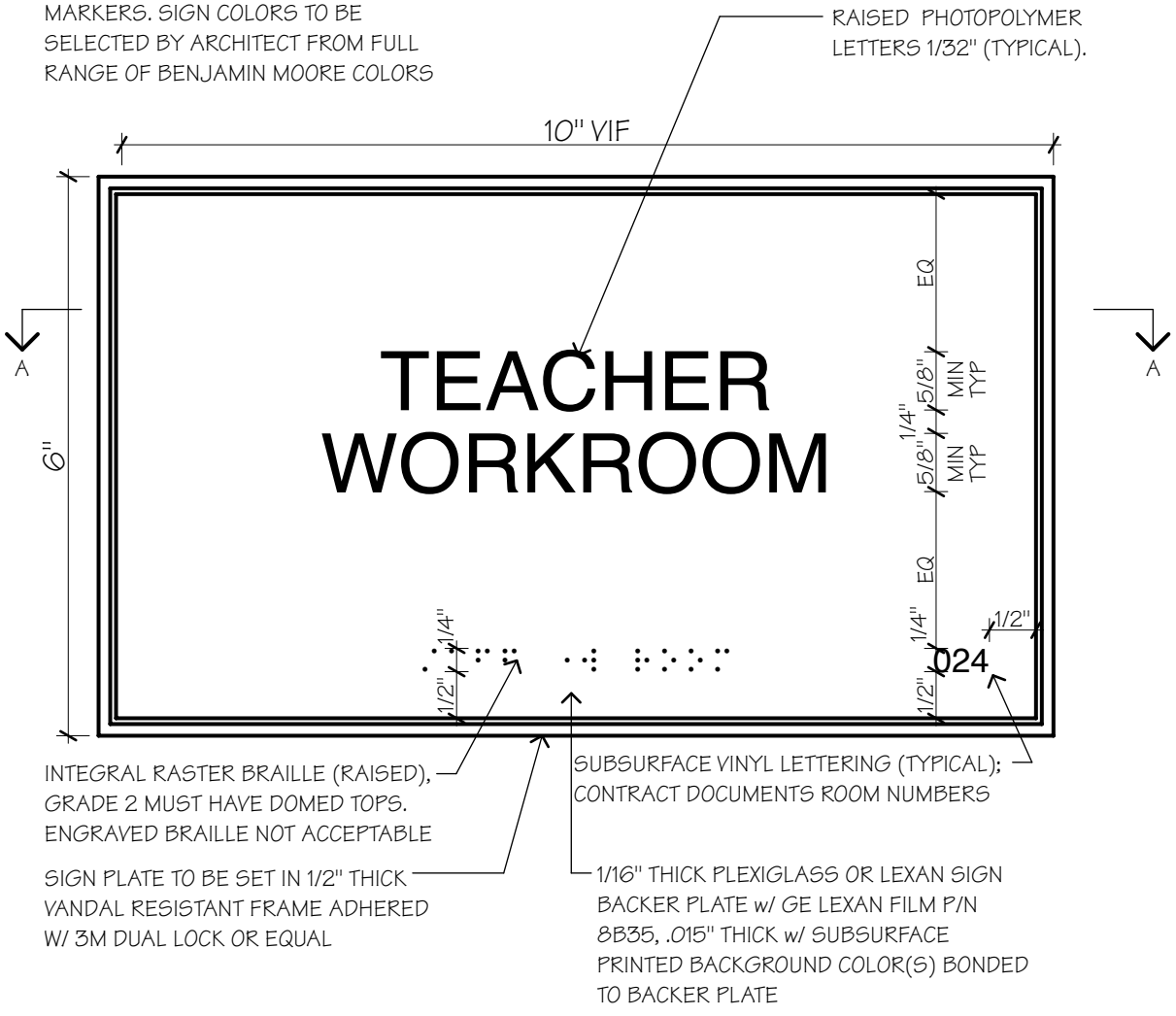
NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS



Sign Type 5A

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	MEH
Scale:	6" = 1'-0"

Sheet No.
SIGN TYPE 5A

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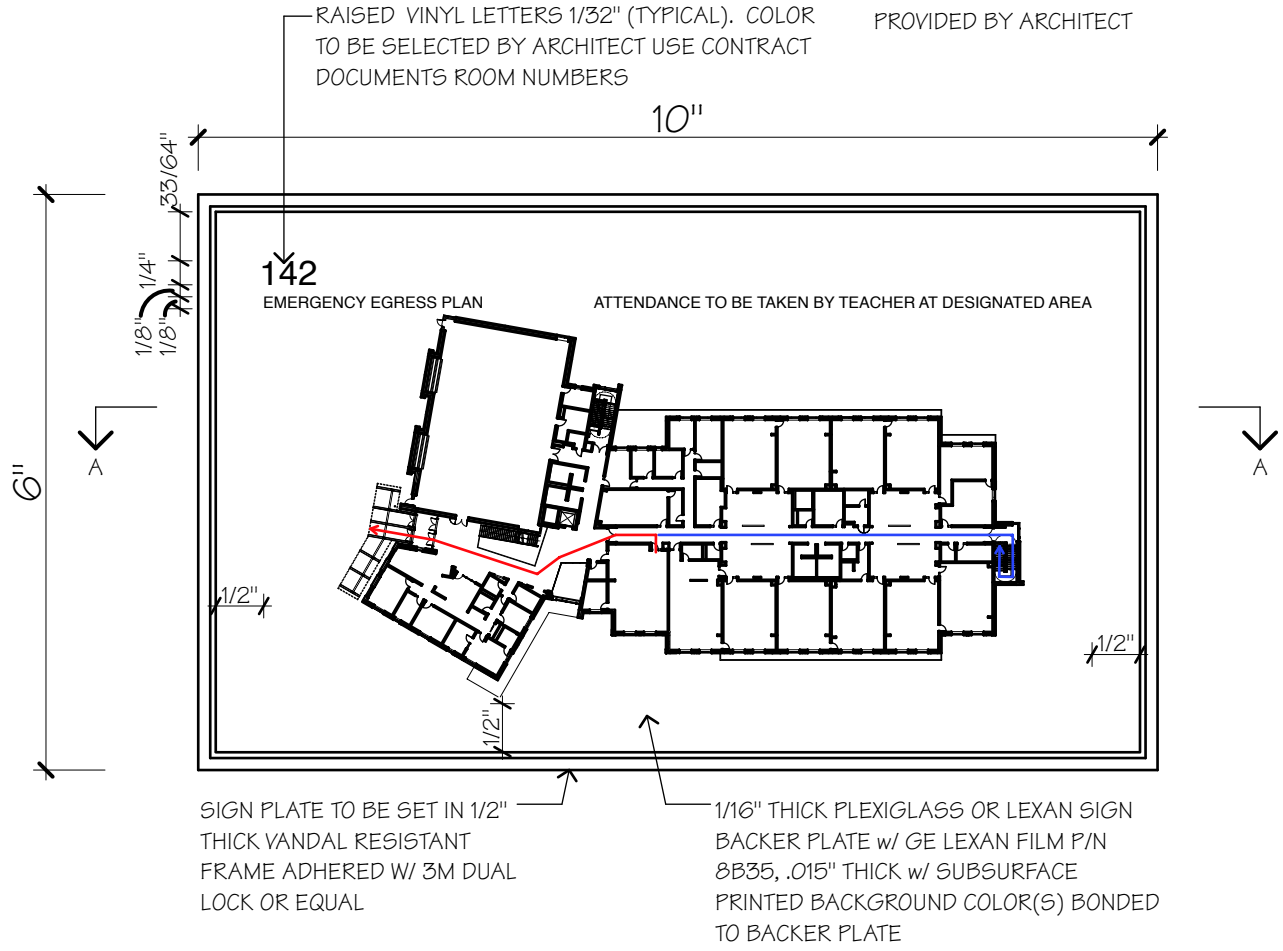
NOTE: MAP SHALL BE ORIENTED TO MATCH VIEWER LOCATION AT EACH LOCATION

NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS. IMAGE FOR EACH ROOM SIGN SHALL BE PROVIDED BY ARCHITECT



Sign Type 6

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	MEH
Scale:	6" = 1'-0"

Sheet No.
SIGN TYPE 6

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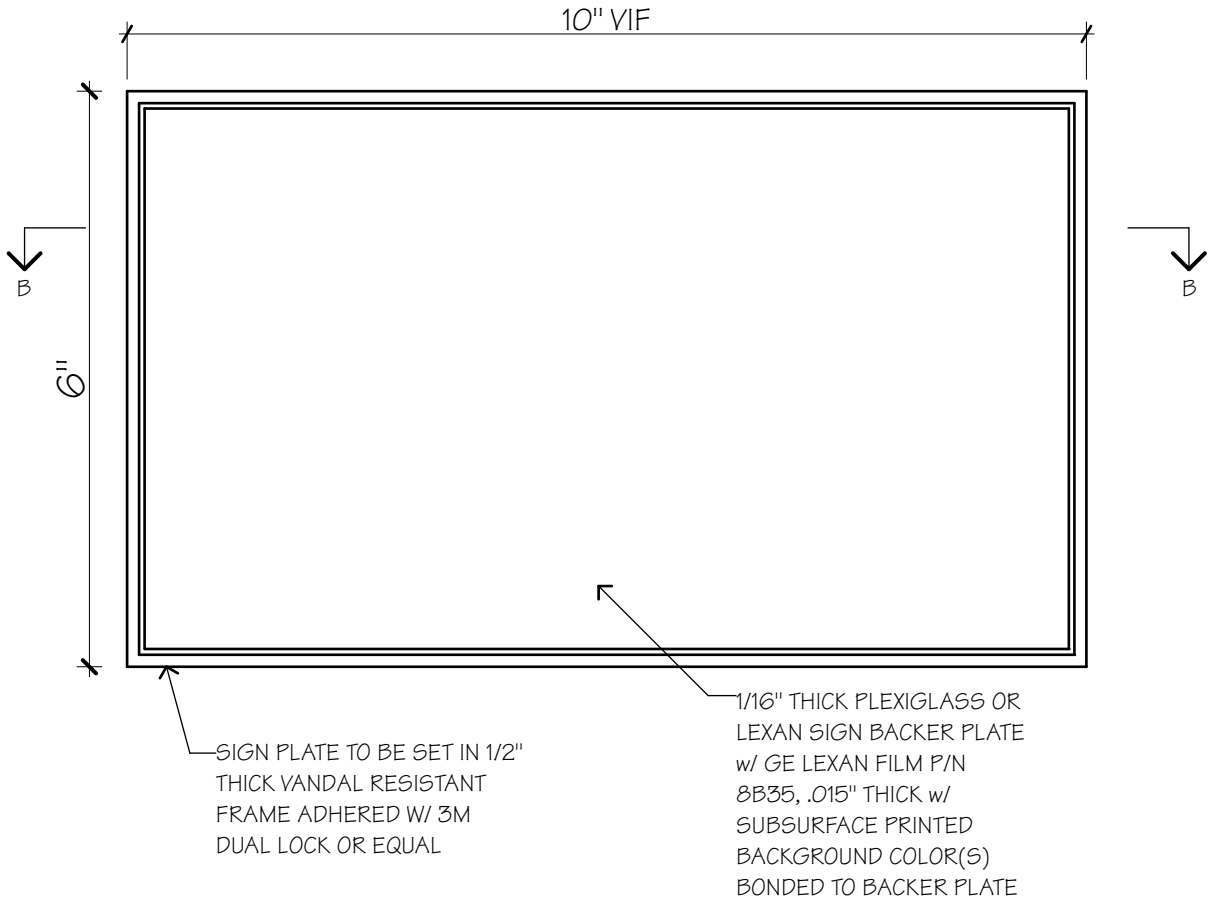
NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS



Sign Type 6A

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	MEH
Scale:	6" = 1'-0"

Sheet No.
SIGN TYPE 6A

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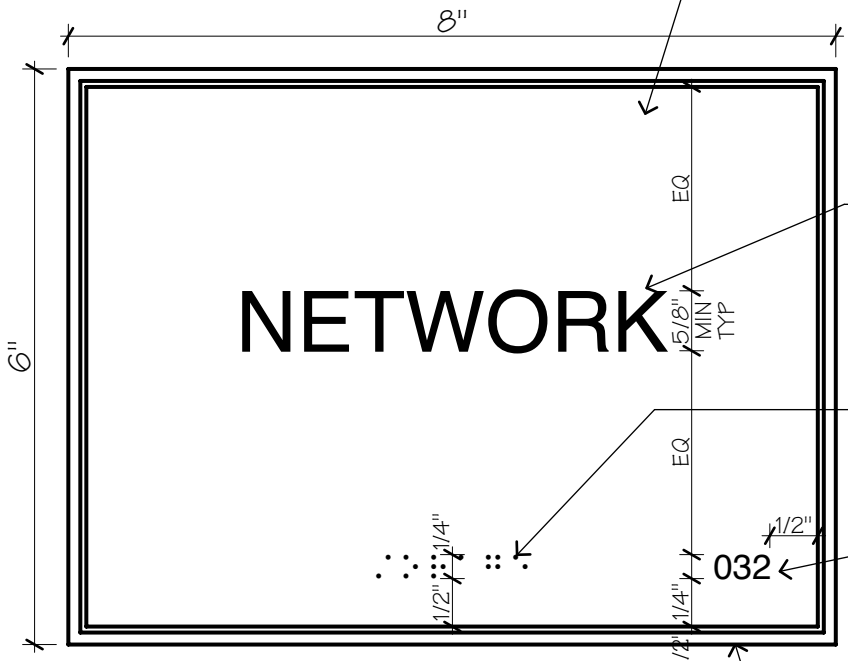
ELEVATOR
CONTROL
ROOM

021

NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS



1/16" THICK PLEXIGLASS OR LEXAN SIGN BACKER PLATE w/ GE LEXAN FILM P/N 8B35, .015" THICK w/ SUBSURFACE PRINTED BACKGROUND COLOR(S) BONDED TO BACKER PLATE

RAISED PHOTOPOLYMER LETTERS 1/32" (TYPICAL)

INTEGRAL RASTER BRAILLE (RAISED), GRADE 2 MUST HAVE DOMED TOPS. ENGRAVED BRAILLE NOT ACCEPTABLE

SUBSURFACE VINYL LETTERING (TYPICAL); CONTRACT DOCUMENTS ROOM NUMBERS

SIGN PLATE TO BE SET IN 1/2" THICK BY 1/8" WIDE VANDAL RESISTANT FRAME ADHERED W/ 3M DUAL LOCK OR EQUAL

Sign Type 7

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	MEH
Scale:	6" = 1'-0"

Sheet No.
SIGN TYPE 7

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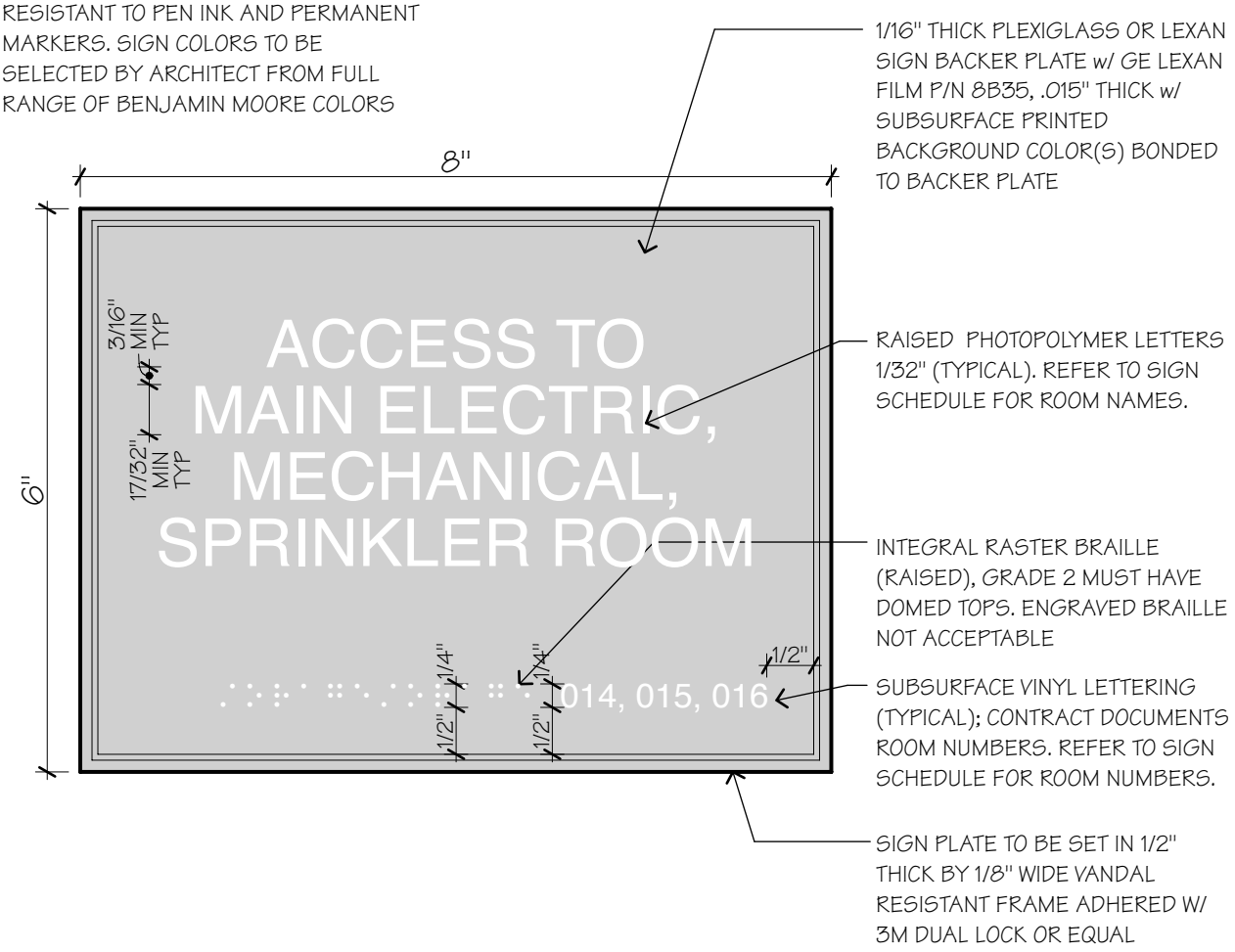
NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS



Sign Type 7A

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	MEH
Scale:	6" = 1'-0"

Sheet No.
SIGN TYPE 7A

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NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS



SIGN PLATE TO BE SET IN 1/2" THICK BY 1/8" WIDE VANDAL RESISTANT FRAME ADHERED W/ 3M DUAL LOCK OR EQUAL

1/16" THICK PLEXIGLASS OR LEXAN SIGN BACKER PLATE w/ GE LEXAN FILM P/N 8B35, .015" THICK w/ SUBSURFACE PRINTED BACKGROUND COLOR(S) BONDED TO BACKER PLATE

INTERNATIONAL GENDER AND HANDICAPPED ACCESSIBILITY SYMBOLS RAISED 1/32"

RAISED PHOTOPOLYMER LETTERS 1/32" (TYPICAL)

SUBSURFACE VINYL LETTERING- CONTRACT DOCUMENTS ROOM NUMBERS

INTEGRAL RASTER BRAILLE (RAISED), GRADE 2 MUST HAVE DOMED TOPS, ENGRAVED BRAILLE NOT ACCEPTABLE

Sign Type 8

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	MEH
Scale:	6" = 1'-0"

Sheet No.
SIGN TYPE 8

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NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS



SIGN PLATE TO BE SET IN 1/2" THICK BY 1/8" WIDE VANDAL RESISTANT FRAME ADHERED W/ 3M DUAL LOCK OR EQUAL

1/16" THICK PLEXIGLASS OR LEXAN SIGN BACKER PLATE w/ GE LEXAN FILM P/N 8B35, .015" THICK w/ SUBSURFACE PRINTED BACKGROUND COLOR(S) BONDED TO BACKER PLATE

INTERNATIONAL GENDER AND HANDICAPPED ACCESSIBILITY SYMBOLS RAISED 1/32"

RAISED PHOTOPOLYMER LETTERS 1/32" (TYPICAL)

SUBSURFACE VINYL LETTERING- CONTRACT DOCUMENTS ROOM NUMBERS

INTEGRAL RASTER BRAILLE (RAISED), GRADE 2 MUST HAVE DOMED TOPS, ENGRAVED BRAILLE NOT ACCEPTABLE

Sign Type 8A

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	MEH
Scale:	6" = 1'-0"

Sheet No.
SIGN TYPE 8A

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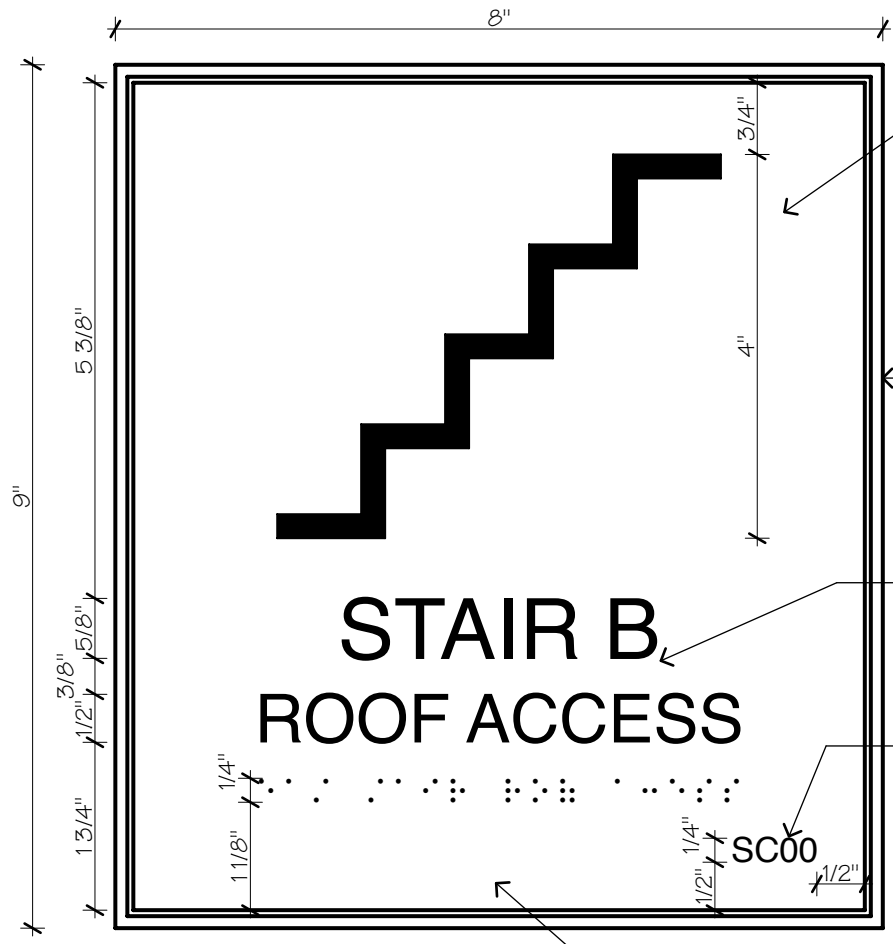
NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS



1/16" THICK PLEXIGLASS OR LEXAN SIGN BACKER PLATE w/ GE LEXAN FILM P/N 8B35, .015" THICK w/ SUBSURFACE PRINTED BACKGROUND COLOR(S) BONDED TO BACKER PLATE

SIGN PLATE TO BE SET IN 1/2" THICK BY 1/8" WIDE VANDAL RESISTANT FRAME ADHERED W/ 3M DUAL LOCK OR EQUAL

RAISED PHOTOPOLYMER LETTERS 1/32" (TYPICAL)

SUBSURFACE VINYL LETTERING- CONTRACT DOCUMENTS ROOM NUMBERS

INTEGRAL RASTER BRAILLE (RAISED), GRADE 2 MUST HAVE DOMED TOPS. ENGRAVED BRAILLE NOT ACCEPTABLE.

Sign Type 9

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	MEH
Scale:	6" = 1'-0"

Sheet No.
SIGN TYPE 9

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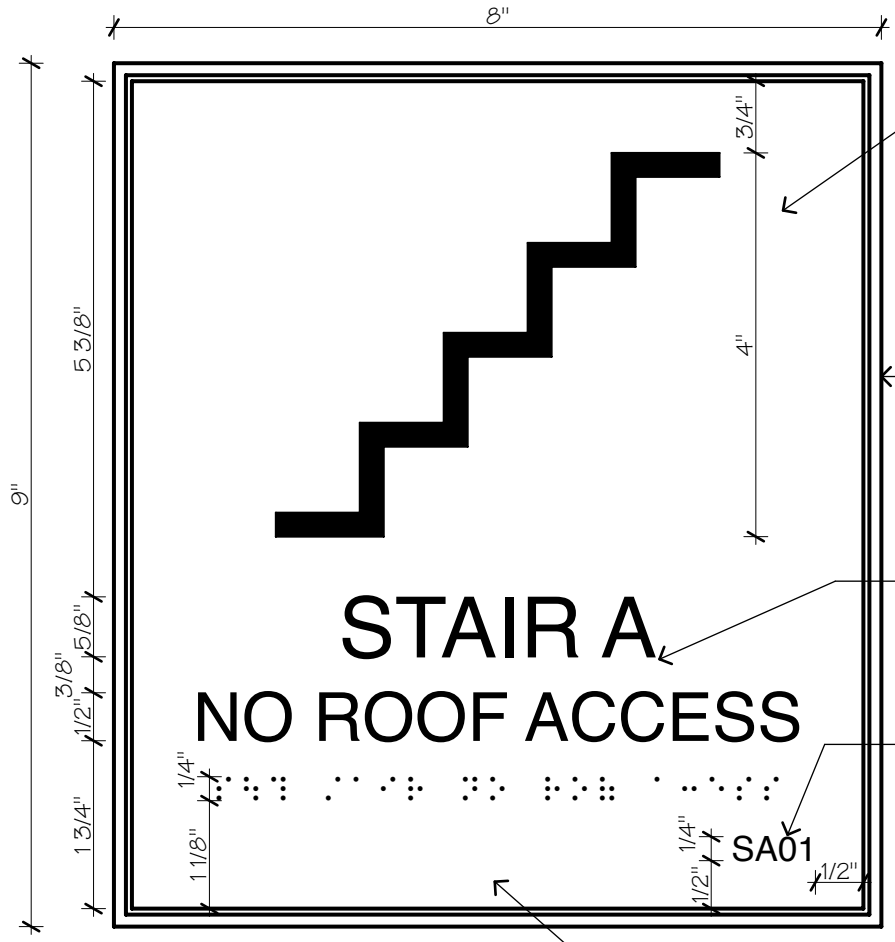
NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS



1/16" THICK PLEXIGLASS OR LEXAN SIGN BACKER PLATE w/ GE LEXAN FILM P/N 8B35, .015" THICK w/ SUBSURFACE PRINTED BACKGROUND COLOR(S) BONDED TO BACKER PLATE

SIGN PLATE TO BE SET IN 1/2" THICK BY 1/8" WIDE VANDAL RESISTANT FRAME ADHERED W/ 3M DUAL LOCK OR EQUAL

RAISED PHOTOPOLYMER LETTERS 1/32" (TYPICAL)

SUBSURFACE VINYL LETTERING- CONTRACT DOCUMENTS ROOM NUMBERS

INTEGRAL RASTER BRAILLE (RAISED), GRADE 2 MUST HAVE DOMED TOPS. ENGRAVED BRAILLE NOT ACCEPTABLE.

Sign Type 9A

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	MEH
Scale:	6" = 1'-0"

Sheet No.
SIGN TYPE 9A

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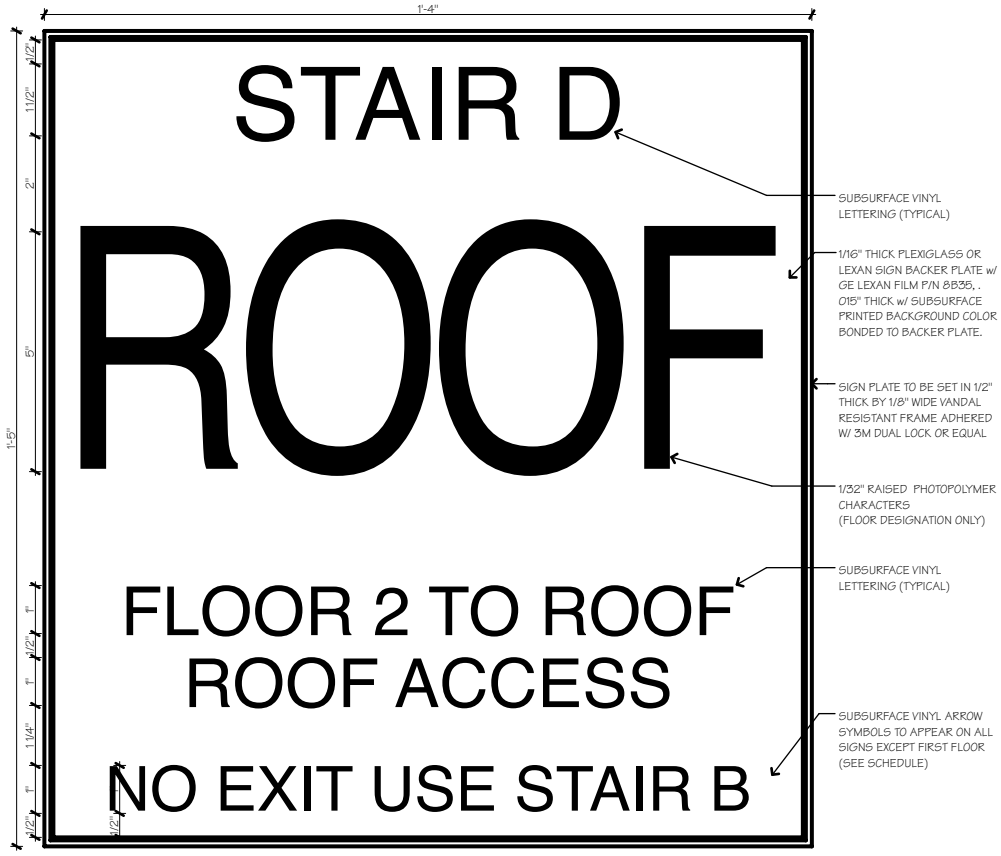

NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS

Sign Type 10

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	MEH
Scale:	3" = 1'-0"

Sheet No.
SIGN TYPE 10

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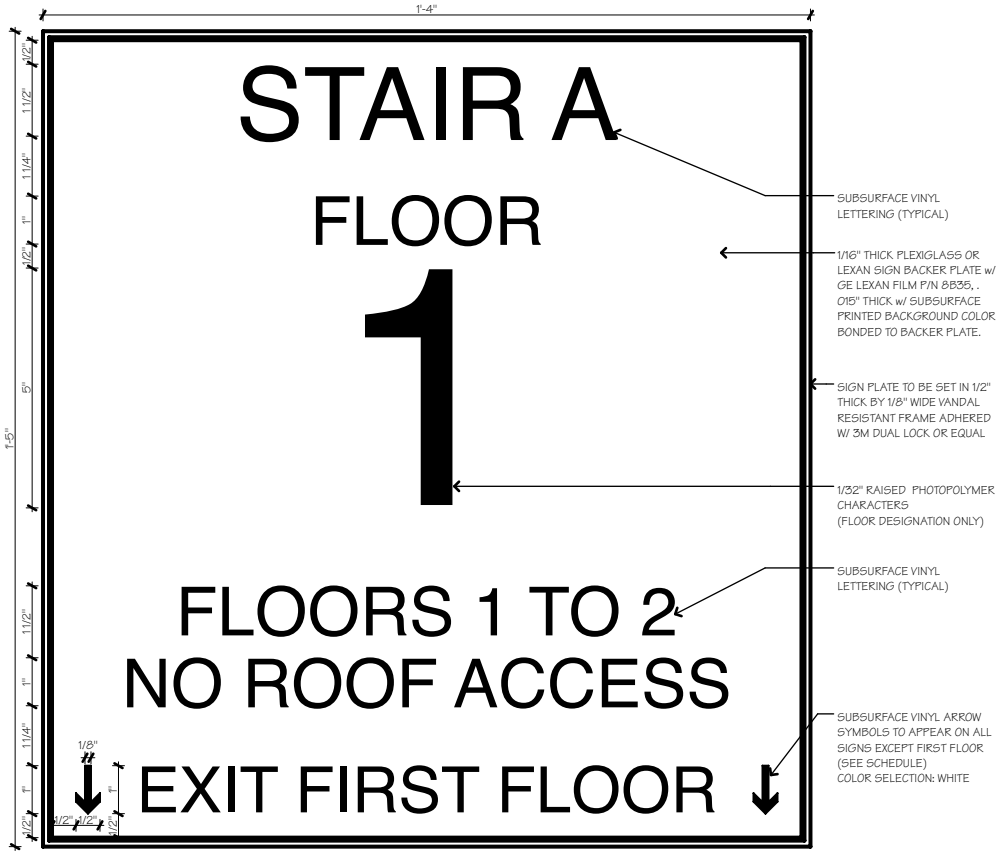

NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS

Sign Type 10A

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	MEH
Scale:	3" = 1'-0"

Sheet No.
SIGN TYPE 10A

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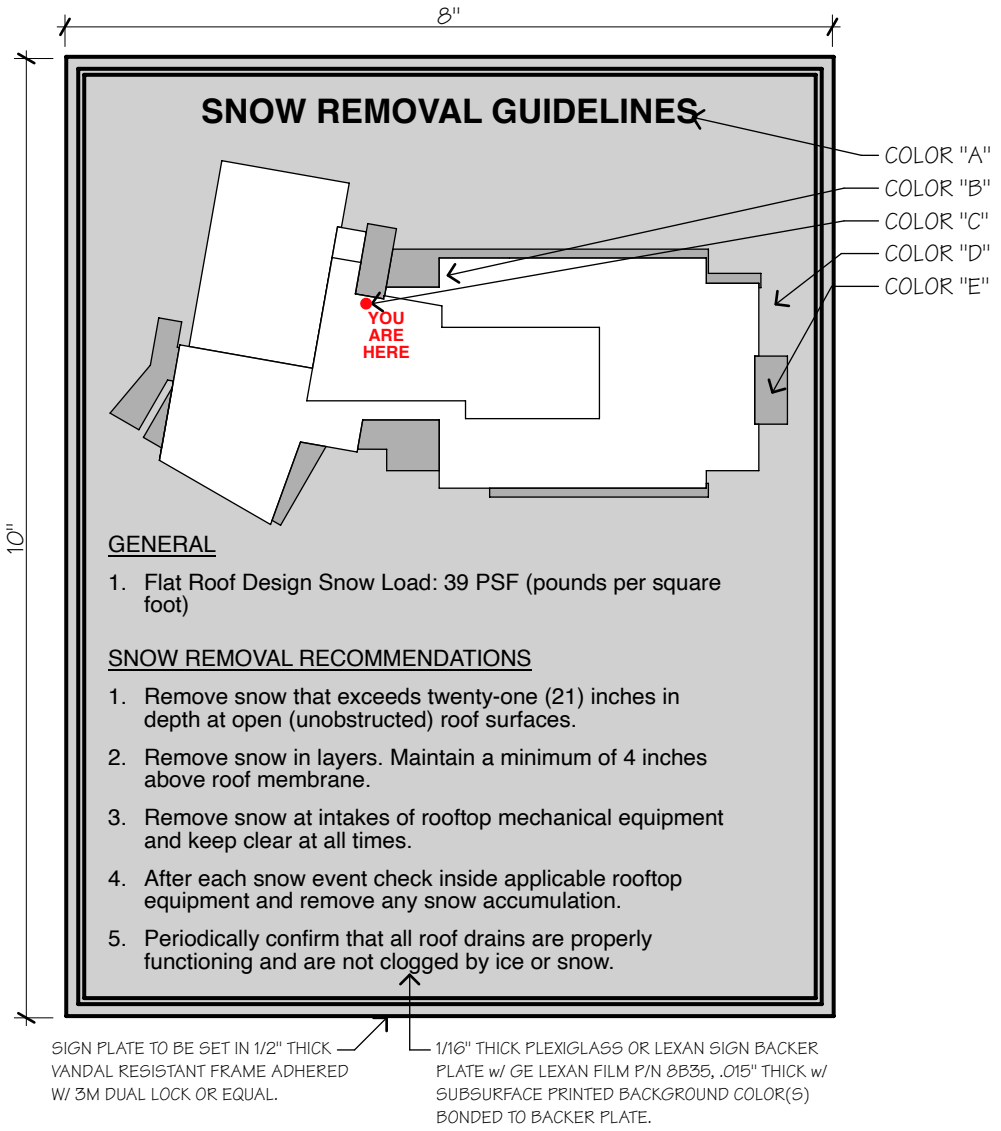
NOTE: ALL SIGN MATERIALS MUST BE RESISTANT TO PEN INK AND PERMANENT MARKERS. SIGN COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS. ARCHITECT TO PROVIDE GRAPHIC IMAGE



Sign Type 11

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	MEH
Scale:	6" = 1'-0"

Sheet No.
SIGN TYPE 11

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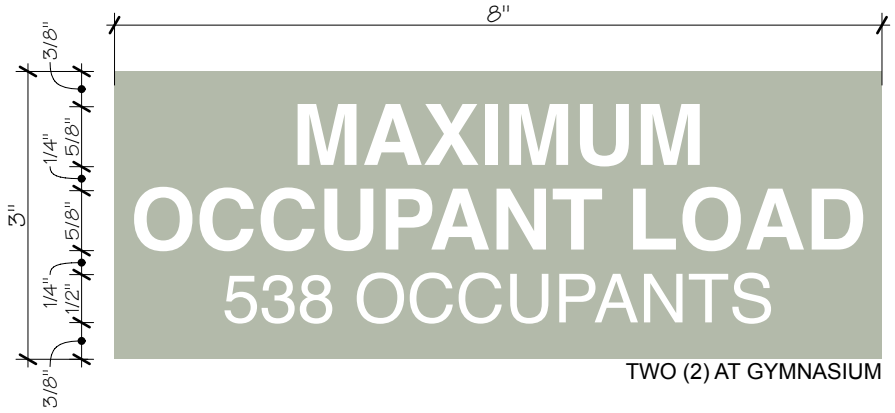
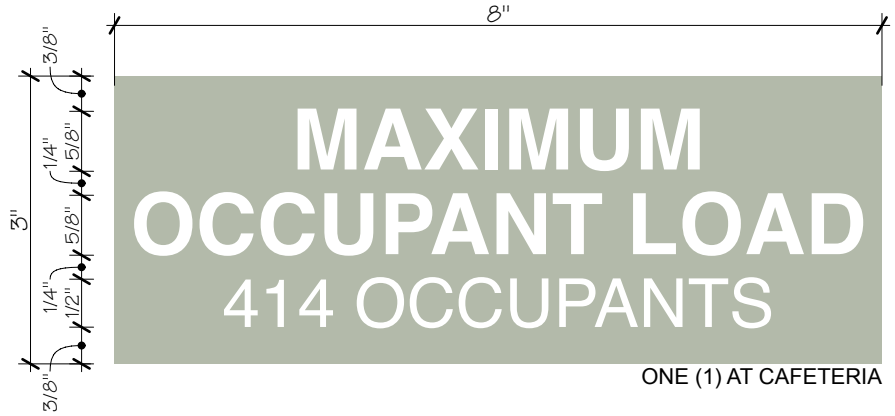


TWO (2) AT GYMNASIUM

ENGRAVED LAMINATE SIGN TO BE WALL MOUNTED
FONT: HELVETICA, TYP
COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS.



ONE (1) AT CAFETERIA

ENGRAVED LAMINATE SIGN TO BE WALL MOUNTED
FONT: HELVETICA, TYP
COLORS TO BE SELECTED BY ARCHITECT FROM FULL RANGE OF BENJAMIN MOORE COLORS.

Sign Type 12

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	MEH
Scale:	6" = 1'-0"

Sheet No.
SIGN TYPE 12

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NOTE: TWO SUCH PANELS REQUIRED, MOUNTED BACK-TO-BACK AT ENTRY DRIVE MEDIAN STRIP

A

Site Entry Sign Panel

SCALE: 3/4" = 1'-0"

Sign Type A: Entry Sign

AMESBURY ELEMENTARY SCHOOL
AMESBURY MA

Job No.	18543
Date:	10 MAR 2020
Drawn By:	TM
Scale:	3/4" = 1'-0"

Sheet No.
SIGN TYPE A

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SECTION 101453

TRAFFIC SIGNAGE

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following, as shown on the drawings and specified herein:

1. Parking, traffic and miscellaneous site signs.
2. Electronic school zone signals (solar powered)

B. Install and remove temporary signs on posts as shown on the Phasing Drawings.

C. LEEDv4-S General Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Concrete bases for signs: SECTION 033000-CAST-IN-PLACE CONCRETE.
2. Excavation and backfill: SECTION 312000-EARTHWORK.
3. Handicap accessibility parking signage: SECTION 321700-PAVING SPECIALTIES.
4. Painted pavement markings: SECTION 321700-PAVING SPECIALTIES.

5. Interior signage, building mounted and other exterior signs: SECTION 101400-IDENTIFYING DEVICES.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with the provisions of SECTION 013300-SUBMITTALS for the following:

1. Parking, traffic and miscellaneous site signs, including scaled drawings of each sign indicating size, text and colors.
2. Sign layout plan shall include orientation to road, curb or sidewalks, expressed as parallel, perpendicular or at a specified angle.
3. Flashing school speed limit assembly including foundation and post details and dimensions.

B. Manufacturers literature for the following:

1. Parking, traffic and miscellaneous site signs.
2. Flashing school speed limit assembly including flashers and solar power equipment.

C. LEEDv4-S Submittal Requirements

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTIOM 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. Product substitution requests are subject to additional LEED-S submittal requirements, see SECTION 012500-SUBSTITUTION PROCEDURES.

1.05 REFERENCES

A. Section 800 of the MassDOT Standard Specifications

B. Manual on Uniform Traffic Control Devices (MUTCD)

C. Equipment and Materials Standards of the Institute of Transportation Engineers (ITE).

PART 2 PRODUCTS

2.00 LEEDv4-S PRODUCT REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113-Sustainable Design Requirements for overall project recycled content requirements.) Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.

2. Regional Content. (See Section 018113-Sustainable Design Requirements for overall project regional content requirements.) Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.

2.01 TRAFFIC, PARKING AND MISCELLANEOUS SITE SIGNS

A. Signs shall conform to the requirements of Section 828 Traffic Signs of the Standard Specification and include the following materials:

1. Aluminum street sign and steel poles will be fabricated as specified herein.

2. Pole shall be hot-dipped galvanized, 2 in. x 2 in., min. 14 ga., pre-punched post conforming to ASTM-A1011 Grade 50. Provide break-away fittings at base of posts equal to Snap 'N Safe #S200.

3. Hardware for mounting sign panels shall be galvanized 5/16 in. x 2-1/2 in. bolts, locknuts and washers.

4. Painted sign finish will be series 59,000 alkyd enamel silkscreen ink as manufactured by Nazdar Co., Chicago, IL, or approved equal. The topcoat protective finish will be Matte Hard Gard catalyzed urethane coating as manufactured by Duncan Galvanizing Corp., Everett, MA, or approved equal. The white text and border for the sign will be 3M reflective, engineering-grade adhesive backed polyester that is precut for application.

5. Concrete for footings shall be air entrained concrete conforming to the requirements and applicable provisions of Section M4.02 of the Standard Specifications. Minimum 28-day compressive strength shall be 4,000 psi/3-Mpa. Concrete shall be air-entrained 7% minimum +/- 1%, with a two (2) inch to four (4) inch slump. Aggregate size shall be a maximum of three quarter (3/4) inch. Forms for footings shall be sonotubes with the required diameter for the footings as shown on the drawings.

2.02 TYPES AND QUANTITIES

A. Refer to the Drawings for sign types and quantities of parking, traffic and miscellaneous site signs:

1. Permanent site signs as shown on traffic and striping plan and detail sheets: 3.9.16-3.9.19, inclusive.

2. Temporary signs required during construction for the continuing operation of the Cashman Elementary School as shown on the Phasing Drawings: G.0.04-G.0.08, inclusive.

3. Ten additional pole mounted signs, including poles, each no greater than 30 in. x 30 in., as required by the School Department or Amesbury Regulatory Agencies. Text, type, size and location to be determined.

2.03 SOLAR POWERED ELECTRONIC SCHOOL ZONE SIGNS

A. All equipment including the aluminum signal pole and signal base, signal housings, amber LED flashing signals, solar panel, arm assemblies used to mount the signals and solar panel to the pole, cabinet, including control panel, timer, solar charge controller and battery, all cable and wiring, ground rods, equipment grounding and bonding, and all other equipment and materials necessary to provide a fully operational high visibility school zone system.

B. To establish a standard of quality, design and function, specifications are based on “Traditional Beacon” as manufactured by Solar Light International; “Solar TC-18” by ELTEC, “R829-G” by Carmanah. Similar assemblies by others will be accepted by the Architect upon submittal of adequate supporting data.

C. Aluminum Signal Pole:

1. Signal posts and bases shall be aluminum shafts with cast aluminum bases.

2. Signal base foundations shall not obstruct a sidewalk or crosswalk in any way that passage by physically-challenged persons is impaired.

3. Signal pole shall be a minimum 14 foot tapered aluminum pedestal pole with an internally lockable (Type II police lock).

4. Pole assembly shall be grounded.

D. Solar Panels:

1. Panel shall be self-cleaning, impact resistant, with a highly transmissive tempered glass cover and aluminum alloy extruded frame or similar approved construction.

2. Photovoltaic panel shall be rated as required for specified performance, minimum 20 watts.

3. Approximate size of panel: 15 in x 20 in x 2 in.

4. Aluminum mounting arm to mount panel to the pole engineered to withstand up to 90 mph wind speeds.

E. Cabinet:

1. Minimum 10 ga. aluminum cabinet with single gasketed door, with rain proof louvers on sides with insect screens.
2. Nominal Dimensions: 24 in x12 in x8 in
3. Door shall have standard police lock, two keys included.

F. Controls: All controls shall be rated to function in full range of extreme temperatures recorded in Amesbury MA:-30C to +40C.

1. Solar Charge Controller to modulate battery charging and indicate charge level.
2. Programmable Time Clock: annual program, programmable via keypad or software from a PC via cable. Programming must include leap year and daylight savings adjustment functions.
3. Flasher: Solid state, capable of producing 35-70 flashes per minute as programmed.

G. Battery:

1. Sealed maintenance free, deep cycle, AGM lead acid type 12 volt battery.
2. Capacity: as required for specified performance, minimum 35 ampere hour (ah).
3. Valve regulation with a discharge rate of less than 1% per month, at 68°F.

H. Signals:

1. Traffic signal lenses shall be 12 inches in diameter and equipped with light emitting diode (LED) modules and aluminum or polycarbonate cut-a-way visors.
2. Bracket mounted 12-inch amber LED flashing top signal above the sign and bracket mounted 12-inch amber LED flashing signal below the sign.
3. Mounting hardware as required to mount to the pole

I. Amber LED Vehicle Signal Module:

1. Any equipment that has been type-tested and approved according to section 815.21 of the Standard Specifications.

2. Modules shall meet Minimum Luminous Intensity values of Table 1, Section 4 of the ITE specification of compliant signal modules at 25 degrees Celsius at provided voltage, throughout the useful life based on normal use in traffic signal operation over the operating temperature range. The LED sources shall be AlInGap type or equal.

3. Optical and Light Output Requirement: The minimum luminous intensity values and light output shall be maintained within the rated input voltage provided by the solar panels and battery pack.

4. The LED signal module shall be a single, self-contained device, not requiring on-site assembly for installation.

5. An independent laboratory shall certify that the LED signal module complies with Section 6: Quality Assurance of the ITE LED Specification.

6. On the backside of the LED signal module there shall be a permanently marked “up” arrow to aid in the proper orientation of the module during installation.

7. The manufacturer’s name, trademark, serial number and other necessary identification shall be permanently marked on the backside of the LED signal module.

J. Sign Panels:

1. The sign panels shall conform to MUTCD sign types S4-3P, R2-1 and S4-4P.

2. The signs shall be mounted on the pedestal pole immediately below the top LED signal head and immediately above the bracket mounted LED signal head.

3. Refer to drawings for dimensions and positions of the three sign panels.

K. Finishes:

1. All traffic signal posts and bases, signal housings, visors, controller cabinets, service meter socket boxes, mounting brackets and hardware shall be clear anodized aluminum to match existing electronic school zone assembly located on Lions Mouth Road at the intersection with Baker Street.

PART 3 EXECUTION

3.01 TRAFFIC, PARKING AND MISCELLANEOUS SITE SIGNS

A. Signs shall be located as shown on Drawings.

B. Galvanized all steel before fabrication.

C. Construct posts and signs true to grade with plumb vertical alignment.

D. Signs shall be oriented as shown on the approved shop drawings: Traffic signs generally perpendicular to curbs or as required for traffic management; parking signs generally parallel to curbs and walks.

E. Concrete footings shall be installed per the Drawings using a sonotube for the form. Concrete footing placement, protection and formwork shall be as specified.

F. Multiple signs shall be combined on single poles where practicable. At **no** time shall the lowest panel be less than 6'-8" above grade along any accessible route to comply with provisions of MAAB.

3.02 SOLAR POWERED ELECTRONIC SCHOOL ZONE SIGNS

A. Optical and Light Output Requirement:

1. The minimum luminous intensity values and light output shall be maintained within the rated input voltage of 12volts DC.
2. LED signal modules shall not be allowed to fall short of the minimum intensity values at any of the 44 measuring points of the standard when lamp is turned on cold for measurements and after a 30 minute warm-up time period at 100% duty cycle.

B. Flashing Operation:

1. The flashing operation required for the beacon shall occur as set forth in Section 4L of the MUTCD. Proposed beacons shall flash in an alternating fashion.
2. School zones signs shall flash on the schedule provided by the School Department, which may include the school noon hour, school recess, and during those periods when children are going to or leaving school during opening and closing hours.

END OF SECTION

SECTION 102113

COMPARTMENTS AND CUBICLES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following items required to complete the work of this SECTION as shown on the Drawings and specified herein:

1. Headrail-braced high-density polymer toilet compartments, complete with doors, hardware, and specified accessories.
2. Floor-mounted headrail-braced high-density polymer urinal screens and hardware.
3. All attachments and reinforcing and additional bracing required for the proper installation of the work of this SECTION and factory drilling for items to be attached to partitions as specified.

B. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. Materials Credits: Materials costs and documentation that partitions are manufactured using a minimum 33% post-consumer recycled content.
3. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers’ product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Plywood backing up gypsum board and cement backer board in toilet room stud walls for the attachment of cubicles and toilet accessories: SECTION 061000-ROUGH CARPENTRY.

2. Furnishing templates for accessories which shall be attached to partitions: SECTION 102813-TOILET AND BATH ACCESSORIES and SECTION 220001 - PLUMBING.

3. Field painting continuous shims where wall brackets span ceramic tile wainscot and upper wall material: SECTION 090007-PAINTING.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with the provisions of SECTION 013300-SUBMITTALS.

B. Shop drawings shall include a completely dimensioned layout of all toilet partitions and screens, and large scaled details of all items to be furnished hereunder. Details shall include all sizes and gauges, type of construction, and methods of installation to the surrounding construction.

C. Submit the following samples in accordance with the provisions of SECTION 013300-SUBMITTALS.

1. Manufacturer's standard color chips for all available colors for finishing of metal partitions and related items for selection by the Architect.

D. LEED for Schools Submittals (Refer to SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. Product substitution requests are subject to additional LEEDv4-S submittal requirements. Refer to SECTION 012500-SUBSTITUTION PROCEDURES.

PART 2 PRODUCTS

2.00 LEEDv4-S PRODUCT REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.

2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.

2.01 TOILET COMPARTMENTS

A. General - Refer to the Drawings for locations and sizes of toilet compartments.

B. Manufacturer - To establish a standard of quality and design desired, specifications have been based on toilet compartments, urinal and shower screens as manufactured by General Partitions Manufacturing Corporation. Similar compartments, urinal screens, and shower screens as manufactured by Ampco Products, Santana Products or equal will be considered for approval by the Architect upon receipt of adequate supporting data.

C. Construction

1. Type - Partitions shall be headrail braced.

2. Doors, Screens, and Partitions - Shall be 1-inch thick solid high-density polyethylene formed under pressure. Solid color throughout. All edges to be machined radius and all sharp edges removed.

3. Pilasters - Shall be same construction as doors and panels. Pilasters are to be anchored to the floor with heavy gauge angle. Top of pilasters to be securely braced with chrome plated headrail with integral crown loafer rail.

4. Hardware - Compartment is to be complete with all hardware and fastenings for a complete installation. Hardware to include wrap around self-closing door hinges, latch, bumper/coat hook and keeper. Latch to be concealed type with emergency access features. All hardware to be aluminum.

5. Fittings - Wall and U brackets to be continuous aluminum extrusions. Door strikes and hinges to be fastened by means of 'one-way' head tamper-proof chrome plated sex bolts. All other screws to be Phillips Head chrome plated. All pilasters to have a 3-inch high stainless steel shoe. Headrails to be manufacturer's standard 'anti grip' extrusion.

   a. Wall Bracket Shims – Where continuous wall bracket spans across ceramic wall tile dado, furnish and install a continuous poplar shim between the wall bracket and the upper non-tiled wall surface. The poplar shim shall be two inches wider than the wall bracket. The poplar shim shall be field painted to match the wall by SECTION 090007-PAINTING.

6. Finish - Doors, partitions, and screens shall be cleaned and finish shall consist of solid high-density polymer, solid color throughout from manufacturer's standard colors.

7. Factory Drilling - Perform all required drilling of holes in toilet partitions as per templates provided by the manufacturer of the items to be attached.

8. Recycled Content: Partitions shall be manufactured using a minimum 33% post-consumer recycled content.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install toilet compartments and urinal screens in strict accordance with the approved shop drawings and the recommendations of the manufacturer.

B. Where compartments and screens are mounted on a wall having a ceramic tile wainscot, install a continuous shim the entire width and length of the upper wall portion of the wall bracket extrusion, to provide constant bearing for attachment.

END OF SECTION

SECTION 102600

PREFABRICATED SPECIALTIES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following items as shown on the Drawings and specified herein:

1. Fire extinguishers, semi-recessed and fully recessed, stainless steel cabinets and wall brackets with necessary hardware.
2. Cubical curtain and track in Exam/Resting.
3. Stainless steel corner guards in Kitchen.
4. Semi-recessed automated external defibrillator (AED) cabinets, stainless steel with fire department alarm activation and associated signage.

B. Furnish the following for installation under the designated sections:

1. Abrasive nosings for exterior concrete steps: SECTION 321313-SITE CONCRETE.

C. LEEDv4-S General Requirements

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers’ product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Ceiling construction in Exam/Resting: SECTION 090003-ACOUSTICAL TILE and SECTION 092116-GYPSUM WALLBOARD.

2. Partition construction: SECTION 040001-MASONRY, SECTION 062000-FINISH CARPENTRY, SECTION 092116-GYPSUM WALLBOARD, SECTION 090002-TILE.

3. Kitchen hood fire extinguishing system: SECTION 114000-FOODSERVICE EQUIPMENT.

4. Prefabricated elevator penthouse vents: SECTION 230001-HEATING, VENTILATING AND AIR CONDITIONING.

5. Connection of AED cabinet to fire alarm system: SECTION 260001-ELECTRICAL.

5. Room signage and designated stairway signage: SECTION 10400-IDENTIFYING DEVICES.

6. Defibrillator unit: By Owner.

1.04 SUBMITTALS

A. Submit complete shop drawings and product data in accordance with the requirements of SECTION 013300-SUBMITTALS.

B. Include large-scale details of items specified herein, showing proposed methods of anchorage to each type of surrounding structure.

C. LEEDv4-S Submittal Requirements

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. Product substitution requests are subject to additional LEEDv4-S submittal requirements. Refer to SECTION 012500-SUBSTITUTION PROCEDURES.

D. Submit the following samples in accordance with the provisions of SECTION 013300-SUBMITTALS.

1. Track section 12 inches long with sample carrier.

2. Samples of curtain 12 inch by 12 inch.

3. Sample of corner guard, 12 inches long.

PART 2 PRODUCTS

2.00 LEEDv4-S PRODUCT REQUIREMENTS:

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.

2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.

2.01 FIRE EXTINGUISHERS AND CABINETS

A. Multipurpose Dry Chemical: 5 lb. UL 2A-10BC and 3A-40BC by Larsen's Mfg. Co., Minneapolis, MN, JL Industries, Inc., Potter Roemer Division of Smith Industries or approved equal. Overall height and width 15 1/4 inches x 7 ¼-inches, with a 4 ¼-inch cylinder diameter.

B. Pressurized Water: 2 ½-gallon UL 2A by Larson's Mfg. Co., Minneapolis, MN or approved equal. Overall height at width 24 1/2 inches x 9 inches, with a 7-inch cylinder diameter.

C. Wet Chemical: 6 liter capacity, 2A:K in stainless steel container with pressure indicating gauge.

D. Cabinets: Semi-recessed and fully recessed architectural series (with squared edge trim) as scheduled for partition thickness. Finish to be stainless steel with vertical red die cut lettering. Door style to be "Vertical Duo" with clear tempered safety glass door with cylinder lock, having 'Larsen Loc' feature as manufactured by Larsen's Mfg. Co., Minneapolis, MN, or approved equal. Cabinet shall be sized to contain one extinguisher of the type scheduled for that location. Depth of semi-recessed trim to be as necessary by partition type. Fully recessed shall be used at the Gym.

1. Brackets – Where so scheduled, extinguishers shall be surface bracket mounted.

E. Fire extinguisher schedule – Furnish and install the following, locations referenced hereunder and as shown on the Drawings.

FIRE EXTINGUISHER SCHEDULE

Room	Number	Quantity	Type	Mounting
Ground Floor				
Corridor		4	2A	Semi (4)
Platform		1	2A	Bracket
Cafeteria		2	2ABC	Semi (2)
Kitchen		1	2AK	Bracket (1)
Mechanical Room		1	2ABC	Bracket
Custodial Workshop		1	2ABC	Bracket
Servery		1	2AK	Bracket
Teacher Dining		1	2AK	Bracket
First Floor				
Corridor		4	2A	Semi (4)
Main Lobby		1	2A	Semi
Gym		4	2A	Recessed (4)
General Office Kitchenette		1	2A	Semi
Second Floor				
Corridor		4	2A	Semi (4)
Art Storage		1	2ABC	Bracket
Teacher Dining		1	2AK	Bracket
Upper Lobby		1	2A	Semi

2.02 CURTAIN TRACK ASSEMBLY

A. Manufacturer

1. To establish a basis of quality, design and function desired, track and curtain system are based upon Construction Specialties, Inc., Lebanon, NJ.

2. Other products from Imperial Fastener Company, AR Nelson of similar quality design may be considered for approval as an equal.

B. Track

1. Model No. 6062 surface-mounted tracks with a white powder coat finish, slotted to receive roller carriers, complete with accessories and components required for a complete and secured installation including:

a. Cast aluminum ceiling brackets and 3/4 in. square or ¾ in. diameter seamless aluminum tubing at minimum 24 in. o.c. for suspending track from plane of ceiling.

b. Coordinate with metal stud suspension system supporting ceiling brackets through ATC ceiling to structure above by SECTION 092116-GYPSUM WALLBOARD.

2. Track section shall be 1-3/8 inches by 3/4 inches custom fabricated from 6063-T4 aluminum alloy.

3. Carriers: No. 1062N, virgin nylon axle with nylon wheels complete with nickel-plates brass bead-chain and hook assembly.

4. Provide end stops and removable snap outs at track.

C. Curtain

1. Curtain shall be opaque, 100% polyester, flame resistant, washable with nylon mesh No. 40 (open) sewn into top.

2. Coordinate curtain dimensions with installation conditions.

3. Antimicrobial Treatment: Nanotex + BioAM spill and stain resistant treatment combined with an antimicrobial agent.

2.03 CORNER GUARDS

A. Guards shall be 16 gauge type 304 non-magnetic stainless steel with #4 sating finish, as manufactured by Pauling Corporation, Pauling NY, Construction Specialties, Wallguard or approved equal.

B. Guards shall be 48 inches in length, 3 ½ inches x 3 ½ inches x 90 degree angle section, with 1/8 inch radius. Guards shall include stainless steel screws for mounting to concrete masonry unit construction.

C. Guards shall be located in kitchen. Refer to drawings for locations.

2.04 AED RECESSED CABINETS

A. Cabinets: Recessed (with flat trim) scheduled for partition thickness. Finish to be stainless steel with red graphic lettering/symbols with audible local 85dB alarm and door contact for connection to fire alarm system. Door to be tempered glass door type with cylinder lock, Model No. C1435F12, as manufactured by J.L. Industries, Bloomington, MN, or by Larson Manufacturing, or Phillips. Other manufacturers will be considered as an equal by the Architect upon receipt of adequate supporting data and samples.

B. SCHEDULE

Room	Quantity	Location
Ground Floor Corridor C002	1	
First Floor Corridor C102	1	
Second Floor Corridor C202	1	
Nurse's Suite, Nurse 107	1	

2.05 SAFETY TREAD NOSINGS

A. Safety tread nosings shall be cast iron with abrasive cross hatched surface of four inches wide, with concealed anchors, as manufactured by American Safety Tread, Co., Inc. Helena AL. Style 801 or approved equal.

B. Tread nosings shall be located at all site concrete stairs.

PART 3 EXECUTION

3.01 INSTALLATION OF FIRE EXTINGUISHER CABINETS, AED CABINETS AND BRACKETS

A. Install cabinets with necessary hardware in accordance with manufacturer's recommendations. The bottom of the bracket shall be installed 3 ft.-8 in. above the finish floor. Locate cabinets where shown on drawings.

3.02 CURTAIN TRACK ASSEMBLY

A. Suspend the track through suspended ceiling to structure above. Spacing shall be in strict accordance with manufacturer requirements.

B. Coordinate track suspension with pendant lighting fixtures.

3.03 KITCHEN CORNER GUARDS

A. Install to all outside partition corners in the kitchen per the manufacturer's recommendation for the respective partition construction.

3.04 SAFETY TREAD NOSINGS

A. Install safety tread nosings at concrete site steps into new concrete in strict requirements of manufacturer's recommendation and in compliance with applicable codes.

END OF SECTION

SECTION 102813

TOILET AND BATH ACCESSORIES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish the following items for installation under the designated SECTION:

1. All toilet accessories listed under paragraph 2.02 - ACCESSORIES SCHEDULE and installed by SECTION 062000-FINISH CARPENTRY.

B. LEEDv4-S General Requirements

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be prepared under the designated SECTION:

1. Installation of wood blocking and plywood sheathing in toilet room walls: SECTION 061000-ROUGH CARPENTRY.
2. Wall construction: SECTION 040001-MASONRY and SECTION 092116-GYPSUM WALLBOARD.
3. Toilet partitions: SECTION 102113-COMPARTMENTS AND CUBICLES.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with requirements of SECTION 013300-SUBMITTALS.

B. Shop drawings shall consist of cuts of all items required hereunder with all descriptive data accompanying.

C. LEEDv4-S Submittal Requirements

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. Product substitution requests are subject to additional LEED-S submittal requirements, see SECTION 012500 – SUBSTITUTION PROCEDURES.

PART 2 PRODUCTS

2.00 LEEDv4-S PRODUCT REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.

2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.

2.01 MANUFACTURE

A. To establish a standard of quality, design and function desired, manufacture has been based upon BOBRICK, North Hollywood, CA. Grab bars in Pre-Kindergarten Classroom toilets are based upon BRADLEY, Menomonee Falls, WI. Baby changing tables are based upon American Specialties, Yonkers, NY, and child changing tables are based upon Smirthwaite, New York, NY.

B. Similar toilet and bath accessories by BRADLEY, Mt. Laurel, NJ, American Specialties or other manufacturers of similar hand dryers by Speedflow, Xlerator or other manufacturers with a low dB rating will be considered for approval by the Architect upon receipt of adequate supporting data.

2.02 ACCESSORIES SCHEDULE

A. Refer to the Contract Drawings for quantities, locations, and type listed hereunder.

B.

	Types	Model No.
1.	Grab bars, Bobrick 1-1/4 inch diameter, peened finish stainless steel, for surface mounting.	B-5806.99X42 B-5806.99X36
2.	Pre-K grab bars, Bradley 1 inch diameter stainless steel for surface mounting.	8522-001420 8522-001360
3.	Liquid soap dispenser at all sinks for surface mounting on walls.	Furnished by Owner for installation under SECTION 062000

4.	Bobrick stainless steel framed mirror above sinks with ½ inch bright polished finish channel frame.	B-165 1836 (at sinks mounted 34 inches AFF) B-165 1846 (at sinks mounted 30 inches AFF)
5.	Toilet tissue dispensers, multi roll, for surface mounting.	Furnished by Owner for installation under SECTION 062000
6.	Bobrick surface mounted Feminine Napkin Disposal (at all staff toilet rooms)	B-270
7.	Towel dispenser, for surface mounting on wall (at each hand wash sink in kitchen)	Furnished by Owner for installation under SECTION 062000
8.	Towel dispenser, for surface mounting on wall (at classrooms with sinks).	Furnished by Owner for installation under SECTION 062000
9.	Bobrick custodian's Utility Shelf with mop and broom holder, stainless steel, satin finish, for surface mounting. (Provide one at each mop sink)	B-224.36
10.	ASI baby changing table, nominally 38 in. l x 18 in. w, heavy duty, 400 lb. capacity stainless steel, folding / recess wall mounted (Pre-kindergarten toilets)	ASI-9013
11.	Adjustable electric child changing bench, nominally 48 in. L x 22 in. D (bench surface); Smirthwaite: "High Riser", size 1 (Nurse toilet, ISN toilet)	SW-3081 – Powder Coated Steel
12.	Bobrick coat and hat hook, bright polished stainless steel for installation on room side of all office and classroom doors and all privacy toilet room doors.	B-682
13.	Bobrick stainless steel framed tempered mirror with ½ inch bright polished finish channel frame, custom size.	B-1658-4872 (at PT 155)

PART 3 EXECUTION

3.01 APPLICATION OF ACCESSORIES

A. Installation of toilet accessories, including towel dispensers furnished by Owner, will be performed under SECTION 062000-FINISH CARPENTRY, using fastenings concealed from view as far as practicable, in locations indicated on the Contract Drawings, and in accordance with the approved shop drawings.

END OF SECTION

SECTION 105113

LOCKERS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following items required to complete the work of this SECTION as shown on the Drawings and specified herein:

1. Lockers and associated accessories to be located in the following areas:
   a. Kitchen staff (Mop 012 at Kitchen)
   b. Custodial staff (Custodian Office 019)
   c. Students (Student Project Areas)
2. All attachments, reinforcing, fillers, and recessed trim required for a complete locker installation.

B. LEEDv4-S General Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Millwork cabinetry and wood framed base for project area student lockers: SECTION 062000-FINISH CARPENTRY
2. Wall construction at staff lockers: SECTION 040001-MASONRY and SECTION 092116-GYPSUM WALLBOARD.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with the requirements of SECTION 013300-SUBMITTALS.

B. Include a completely dimensioned layout of all lockers with large-scale details of all items to be furnished hereunder. Include, on details, all sizes and gauges, type of instruction, and methods of installation to the surrounding construction.

C. Submit the following samples in accordance with the requirements of SECTION 013300-SUBMITTALS.

1. Manufacturer's color chips for lockers and related items for selection by the Architect.

D. LEEDv4-S Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. Product substitution requests are subject to additional LEEDv4-S submittal requirements, see SECTION 012500-SUBSTITUTION PROCEDURES.

PART 2 PRODUCTS

2.00 LEEDv4-S PRODUCT REQUIREMENTS:

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Recycled Content. (See Section 018113 Sustainable Design Requirements for overall project recycled content requirements.) Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.

2. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.

3. Furnish any paints and coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in Section 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 LOCKERS

A. General – Refer to the Drawings for locations and quantities of lockers.

B. Manufacturer – To establish a standard of quality and design desired, specifications have been based on standard metal series lockers as manufactured by Lyons Metal Products, Inc. Similar lockers as manufactured by Penco Products, Inc. and Republic will be considered for approval by the Architect upon receipt of adequate supporting data.

C. Construction: Standard Lockers

1. Materials – Parts to be made from mild cold-rolled sheet steel free from surface imperfections and capable of taking a high grade enamel finish.

2. Doors – To be formed from one sheet of 16-gauge steel. Bottom and top edges to be flanged, and vertical side edges to be formed channel shape. Single tier doors to be hinged at a minimum of three points. Louvers shall be provided at tops and bottoms of doors in groups of six.

3. Hinges – To be .050-inch steel, five knuckle type, projection, welded to the door frame and riveted to the side flange of the door.

4. Handles – Recessed, plated zinc die cast handle with silencer and provisions for separate padlock and a plate allowing retrofit of integral combination lock.

5. Latching Device – To be positive automatic, by means of a spring actuated steel locking channel enclosed by a formation on the door, engaging with the door jamb opposite hinges. Device shall be pre-locking permitting self-latching without manipulation of the door handle.

6. Frame – Shall be sheet steel, formed channel shape. Uprights and cross members shall be 16 gauge and electrically projected welded. Backs, sides, shelves, tops and bottoms to be 24-gauge sheet steel.

7. Tops – Individual flat tops fabricated of 24-gauge sheet steel. Sloping continuous hoods of 20-gauge sheet steel are to be furnished in addition to flat tops at kitchen and custodial lockers only.

8. Bases – Furnish and install lockers with legs at free standing kitchen and custodial lockers only. Project Area lockers shall be installed on wood framed base.

9. Trim – Furnish and install enameled steel fillers and recessed trim as shown on the drawings and required by installation conditions.

10. Finish – All steel parts shall be thoroughly cleaned and coated in a five (5) stage zinc/iron phosphatizing process and then finished with a heavy, drip-free coat of finest grade enamel and thoroughly cured in a baking oven at proper temperature.

    a. Project area lockers shall be painted a custom color to be selected by the Architect.

11. Locker sizes and types as follows (refer to drawings for quantities and location):

    a. Kitchen (Minimum 5 required. See Floor Plan – RM 012): Single tier, 12 inches wide x 15 inches deep x 72 inches high, (not including base) with hat and coat hooks, hat shelf, numbers, base and sloped tops.

    b. Custodial (Minimum 6 required. See Floor Plan – RM 018): Single tier, 12 inches wide x 15 inches deep x 72 inches high, (not including base) with hat and coat hooks, hat shelf, numbers, base and sloped tops.

    c. Project Areas (400 Students, 200 double-tier units required): Double tier, 15 inches wide x 15 inches deep x 48 inches high (each student unit 24 in. high) with hat and coat hooks, hat/book shelf and numbers for recessed installation in millwork.

12. **Lockers shall comply with Massachusetts Architectural Access Board (MAAB) requirements as follows:**

    a. At a <u>minimum</u> there shall be one accessible locker in each grouping or location and at least 5% of the total grouping.

    b. At least 5% of <u>all</u> lockers shall be accessible and distributed as directed by Architect.

PART 3 EXECUTION

3.01 INSTALLATION – LOCKERS

A. Install lockers in strict accordance with the approved shop drawings and the recommendations of the manufacturer.

B. Coordinate locker layout and installation with adjacent construction.

END OF SECTION

Division 11
Equipment

SECTION 113100

APPLIANCES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following appliances required to complete the work of this SECTION, as shown on the Drawings per the schedule of appliances specified herein.

1. Full-height refrigerator/freezers
2. Undercounter refrigerators
3. Countertop microwaves
4. Undercounter icemakers with drain pump
5. Stacked washer/dryer

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Blocking in conjunction with wall cabinets: SECTION 061000-ROUGH CARPENTRY.
2. Plumbing Connections: SECTION: 220001-PLUMBING.
3. Electrical connections: SECTION 260001-ELECTRICAL.
4. Food service equipment: SECTION 114000-FOOD SERVICE EQUIPMENT.
5. Millwork: SECTION 062000-FINSH CARPENTRY.

1.04 SUBMITTALS

A. Submit product data sheets for appliances in accordance with the provisions of SECTION 013300-SUBMITTALS.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. To establish a standard of quality, design and function, appliances are based on the following: Countertop microwaves are based on KitchenAid; washer/dryers are based on UniMac; refrigerators are based on General Electric; ice maker is based on Scotsman.

B. Other manufacturers will be considered as an equal by the Architect upon receipt of adequate supporting data.

2.02 FULL HEIGHT REFRIGERATOR / FREEZER

A. Basis of Design – Model GTE19JSNRSS as manufactured by General Electric. Frigidaire FTR 202ITS; Whirlpool WTR318FZDM or equal will be considered for approval by the Architect upon receipt of adequate supporting data.

1. Size: 19.1 cu. ft. capacity, 29-3/4 in. wide x 32-3/8 in. deep (without handle) x 66-3/8 in. high.
2. Top mounted frost-free freezer section.
3. Door design for tall bottle storage, stainless steel finish, reversible doors.
4. Electrical Rating: 120V, 60Hz, 15 amp.
5. Energy Star qualified.
6. ADA compliant.

2.03 UNDERCOUNTER REFRIGERATOR

A. Basis of Design – Model GCE06GSHSB as manufactured by General Electric. Uline UCO1224FS00B or equal will be considered for approval by the Architect upon receipt of adequate supporting data.

1. Size: 5.6 cu. ft. capacity, 23-5/8 in. wide x 23-1/4 in. deep without handle x 34-1/8 in. high.
2. Freezer section.
3. Stainless steel door.
4. Electrical Rating: 120v, 60Hz, 15 amp.
5. Energy Star qualified.
6. ADA compliant.

2.04 MICROWAVE (COUNTERTOP)

A. Basis of Design – Model KMCS1016GSS microwave as manufactured by KitchenAid; Frigidaire: FFM01611LS; LG: LMC157SST or an approved equal upon receipt of adequate supporting data.

1. Size: 21-3/4 in. wide x 17-1/4 in. deep x 13 in. high.
2. Capacity: 1.6 cu. ft.
3. 13-1/2 inch turntable recessed into the microwave.
4. Electrical Rating: 120v, 60Hz, 15 amp, 1200 watts.
5. Stainless steel exterior, powder coat interior finishes.
6. ADA compliant.

2.05 UNDERCOUNTER ICEMAKER

A. Basis of Design – Model CU50GA-1 with A39462-021 drain pump conversion kit as manufactured by Scotsman or approved equal manufactured by Sub-Zero, ACME, MARVEL or other manufacturers upon receipt of adequate supporting data.

1. Produces 65 lbs. ice/24 hours with 26 lbs. ice storage capacity.
2. Built-in drain pump or drain pump conversion kit.
3. Stainless steel front door panel, black kick plate extension.
4. Size: 34.375 in. high (without legs) x 14.875 in. wide x 22 in. deep.
5. Electrical Rating: 115V, 15 Amp (power cord).
6. Energy Star qualified.

2.06 STACKED WASHER/DRYER

A. Basis of Design – Shall be of the same manufacturer and shall include all necessary stacking accessories for a complete installation. Model LTUA7A by UniMac or an approved equal by General Electric, Frigidaire or others upon receipt of adequate supporting data.

1. Size: 27 in. x 28 in. x 75 ¼ in. high
2. Power: 30 amps circuit – 120/280/60/1 – cord and plug; 20 amps circuit – 120/60/1 – cord and plug.
3. Water Factor: Less than 7.5 gallons/ft^3/cycle
4. Certification: Unit shall be Energy Star compliant and CEE qualified.

5. Description: Washer shall be all standard construction with white exterior, see-thru door with heavy-duty stainless steel hinge, 2.84 cubic foot front loading basket, detergent dispensers, rotary controls, four wash/rinse temperatures, three spin speeds and five selectable wash cycles. Dryer shall be all standard construction with white exterior, stainless steel drum, rotary type controls, lint filter and interior light.

2.07 SCHEDULE OF APPLIANCES

Room	Room Number	Appliance	Quantity
Teacher Dining	024	Full Height Refrigerator/Freezer	2
		Countertop Microwave	2
Mop (Kitchen)	012	Stacking Washer	1
		Stacking Dryer	1
Nurse	107	Undercounter Refrigerator	1
		Microwave	1
		Icemaker	1
Kitchenette (Admin)	108	Undercounter Refrigerator	1
		Microwave	1
Teacher Dining	230	Full Height Refrigerator/Freezer	2
		Countertop Microwave	2

PART 3 EXECUTION

3.01 INSTALLATION

A. Install all equipment in strict accordance with manufacturers' recommendations.

B. Remove all packing materials, boxes, and other protective coverings and leave all equipment in a clean, ready-to-use condition.

END OF SECTION

SECTION 114000

FOODSERVICE EQUIPMENT

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION

1.02 SCOPE OF WORK

A. The bidder's attention is directed to the detailed Item Specifications which provide for minimum acceptable products. These paragraphs may indicate materials or components that exceed the manufacturer's standards and are required for this project.

B. Cooperate and coordinate with others engaged on the project in order that work will progress on schedule.

C. Work to be performed under this Section is shown on Foodservice Equipment Drawings.

D. Install materials furnished under this Section, other than materials that are expressly noted for installation under other Sections. Installation work shall be performed by workmen compatible with those existent on the project site. Equipment shall be of the latest design; new and unused, complete with all standard parts for normal operation finds and including such accessories or materials as may be required to comply with these Specifications.

E. This Specification is to further describe and supplement the applicable Drawings. What is called for by either the Drawings and/or these Specifications shall be furnished and installed as part of this work. Any questions relative to discrepancies or omissions shall be submitted to the Architect.

F. Provide neatly punched openings or cutouts required to permit passage of plumbing and electrical services by related trades and to accommodate mounted switches and receptacles in the equipment.

G. Work in this Section shall include but shall not be limited to the following:

1. Catalog items of equipment.
2. Fabricated equipment other than catalog items.
3. Plumbing trim consisting of mechanical system components required for standard operation of equipment items such as faucets and waste outlets. Vacuum breakers shall be furnished for equipment where water is introduced less than 2 in. above flood level.

4. Electrical equipment forming an integral part of equipment items such as electric motors, heating elements, controls, switches, starters, temperature regulators and internal wiring to a control panel or switch, if mounted on the equipment.

H. LEEDv4-S Requirements

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Finished floor and walls, structural supports for all ceiling supported equipment, acoustical ceilings and related building work as set forth in the Contract Documents for General Contract.

B. Connecting piping, waste lines, traps and vent piping, complete with shut-off valves to all the equipment, and the rough-in for sanitary waste, domestic water, floor drains and plumbing fixtures except those provided under this Section, and related mechanical work: SECTION 220001 - PLUMBING

C. Exhaust ventilating systems complete with blowers, ductwork, hangers, access panels, and insulation between the exhaust collars and the exhaust blowers: SECTION 230001 - HEATING VENTILATING AND AIR CONDITIONING.

D. External wiring; the mounting and wiring of motor starters, solenoid valves, switches and receptacles not integral with the equipment; mounting and wiring of walk-in refrigerated room ceiling mount light fixtures; wiring of walk-in refrigerated room interior evaporator coils; connecting conduit, and external connections to equipment to the building electrical distribution system: SECTION 260001 - ELECTRICAL.

E. Flooring in walk-in cooler and freezer: SECTION 090002 - TILE.

F. Appliances in Faculty Workroom/Dining, Nurse's Exam/Resting, Admin kitchenette and stacked washer/dryer in kitchen: SECTION 113100 - APPLIANCES.

1.04 SUBMITTALS

A. Submit the following in accordance with the provisions of SECTION 013300 - SUBMITTALS.

B. Stub-in drawings shall indicate the layout of equipment and dimensioned locations of all services to the equipment.

1. Hand drawn scale: 1/2 in. = 1 ft., 0 in.

2. CAD drawn scale: 3/8 in. = 1 ft., 0 in.

3. Stubbed services shall include electrical, hot and cold water, floor drains or floor sinks, solid wastes and exhaust collar connections. Point of connection services shall include steam supply, condensate return, gas connection and indirect waste connections. Service dimensions shall include height measured from finish floor.

4. Electrical and plumbing services shall be indicated and coordinated on the same drawing.

5. Call-outs for each stub point indicated at the point, or clearly keyed to a schedule on the same drawing.

6. Special conditions plan shall include all floor recesses, curbs and special wall construction indicated and dimensioned

C. Fabrication drawings shall be furnished for non-catalog items, showing plans, elevations and full construction details with gauges, components, fasteners, erection and connections. Drawings shall be to the minimum scale of 3/4 in. = 1 ft., 0 in.

D. Standard items of equipment, not built-in or part of other assemblies shall be submitted for approval in the form of bound catalog cuts. Each cut shall include a clearly marked item number, a listing of all optional accessories and finishes, and connection data.

E. Catalog Cuts shall include letters of approval indicating compliance with M.G.L. c. 142 and 248 CMR. Only products and materials that have been listed by the Board as Product-approved shall be used for plumbing and gas fitting work performed in the Commonwealth of Massachusetts.

F. Mechanical refrigeration system submittal shall include the firm name and address of the installation contractor and name of the qualified installer.

G. Energy Star - Specified Energy Star rated equipment and appliances shall serve as the standard for all types of equipment and appliances whenever possible. Kitchen Equipment Contractor shall clearly indicate that items are Energy Star rated both on the submittal cover sheet and manufacturer cut sheets.

H. Failure to comply with approved shop drawings shall be cause for rejection of an improperly built assembly.

I. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation, as required by LEED for Schools v4 and as detailed in Section 018113-Sustainable Design Requirements.

2. A completed LEED MATERIALS REPORTING FORM, per Section 018113-Sustainable Design Requirements.

3. Product substitution requests are subject to additional LEEDv4-S submittal requirements, see SECTION 012500-SUBSTITUTION PROCEDURES.

1.05 SAMPLES

A. If the bidder's proposed equipment fabricator is unknown to the Consultant's office, immediately after award of contract, submit the following samples for selection and approval:

1. Section of table showing edge, bullnose, framing, fasteners, gusset, leg, and foot, all assembled.

2. Drawer assembly (will be returned for use on this project).

B. Work delivered to the job shall match approved samples.

1.06 GUARANTEES AND WARRANTEES

A. New equipment furnished for this facility shall be guaranteed for a period of not less than one calendar year beginning on the date of final acceptance of the work of this Section. In the case of a manufacturer whose standard warranty exceeds this period the longer period shall apply. Self-contained refrigeration units for reach-in refrigerators, freezers, ice cream chests and ice machines shall carry a five-year replacement warranty for the sealed unit. The guarantee shall protect against defective material, design and workmanship.

B. In addition to the guarantee called for under the General Conditions, this Contractor shall further agree that in the event of failure of any system or item of equipment or improper functioning of specified work during the guarantee period, he shall have "on call" competent service personnel available to make the necessary repairs or replacements of specified work promptly at no cost to the Owner. In the event that replacement of an entire item is required, the Owner will have the option of full use of the defective equipment until a replacement has been delivered and completely installed.

C. Furnish manufacturer's warrantees for each item of standard equipment and a warranty on fabricated equipment. Submit guarantees and warrantees to the Architect in accordance with conditions found in "Demonstration and Operating Instructions" paragraphs, contained in Part 3, this Section.

1.07 REGULATORY AGENCIES

A. Work shall be in accordance with the governing health, building and safety, and fire protection codes and regulations.

B. Standards of the National Sanitation Foundation (NSF) shall serve as guidelines for the work of this Section.

C. Electric equipment and accessories shall conform to the standards of the National Electric Manufacturers Association (NEMA), Underwriters Laboratories, Inc. (UL) or Electrical Testing Station (ETS).

D. Steam generating equipment and accessories shall conform to the standards of the American Society of Mechanical Engineers (ASME).

E. Energy Star - Specified Energy Star rated equipment and appliances shall serve as the standard for all types of equipment and appliances whenever possible.

F. BOARD OF STATE EXAMINERS OF PLUMBERS AND GAS FITTERS

Board Required Product-approval. Only products and materials that have been listed by the Board as Product-approved shall be used for plumbing and gas-fitting work performed in the Commonwealth and governed by M.G.L. c. 142 and 248 CMR.

1.08 EQUALITY OF MATERIALS AND EQUIPMENT

A. The words "or equal" are understood to follow the name of any maker, vendor, or proprietary product, any trade name, plate or catalog number, and any detailed description used in the plans or specifications to define the material, article, assembly or system required. An item shall be considered equal to an item named or described in the plans or specifications if in the opinion of the Architect, it is at least equal in quality, durability, appearance, strength and design, it will perform at least equally the function imposed by the general design for the work, it conforms substantially, even with deviations, to the detailed requirements for the item in the plans and specifications, and it does not result in increased cost to the Owner. The words "or equal" shall not be construed to permit substantial departure from the detailed requirements of the plans and specifications for any material, article, assembly or system, or of any component parts hereof.

PART 2 - PRODUCTS

2.01 MATERIALS AND FINISHES

A. General

1. Metals shall be free from defects impairing strength, durability or appearance, made of new materials with structural properties to withstand strains and stresses to which normally subject.
2. Stock materials, patterns, products and methods of fabrication shall be approved provided that they conform to the requirements specified under Item Specifications.

B. Stainless Steel

1. Stainless steel shall be non-magnetic corrosion resistant chromium-nickel steel, Type 302 or 304 (18-8 Alloy), polished to a Number 4 finish where exposed, unless otherwise noted. Minimum gauges shall be as specified under Item Specifications.

C. Galvanized (Galvannealed) Steel

1. Galvannealed steel shall be commercial quality with tight coat of zinc galvanizing metal applied to a soft steel sheet, subsequently passed through a 1200 degree F. oven, resulting in a spangle free paintable surface. Minimum gauges shall be as specified under Item Specifications.

D. Plastic Laminate Materials

1. The laminate facing shall be GP-50, .050 in. thick, general purpose, high pressure, decorative plastic laminate that meets or exceeds the requirements of NEMA Publication LD3-1985, and NSF Standard 35. The plastic laminate exposed surfaces shall be provided in accordance with the specified manufacturer, finish and color. Balancing sheet shall be backing grade GP-28 in matching color at semi-exposed and BK-20 unfinished where hidden.
2. Plastic laminate covered surfaces shall be factory fabricated with 3/4 in. thick core having plastic laminate facing on both faces and all edges, laminated with waterproof glue under pressure in accordance with the plastic laminate manufacturer's specifications.
3. The core shall be medium density phenolic resin particleboard conforming to ANSI A208.1, Type 2-M-2, 45 pound per cubic foot density minimum.
4. Provide veneer core plywood or solid hardwood edge banding for doors and vertical dividers or panels where hardware is attached to casework.
5. Hinges shall be articulated, spring loaded type equal to Grass 1200 or Stanley, with quantity adequate to support the door without deformation. Do not provide handles on plastic laminate clad doors.

2.02 CONSTRUCTION

A. General

1. Flat metal work items of equipment, such as tables, sinks, or counter tops, and other non-catalog items described under Item Specifications, shall be manufactured by a food service equipment fabricator who has the plant, personnel and engineering facilities to properly design, detail and manufacture high quality food service equipment.

2. The equipment fabricator shall be subject to the approval of the Architect, Owner and Consultant. Refer to Paragraph 1.05, Samples.

3. Fabricated foodservice equipment shall be manufactured by one manufacturer, of uniform design, material and finish.

4. Equipment shall conform to the applicable requirements of current Federal, State, and Local Codes and Regulations.

B. Welding

1. The words "weld", "welded" or "welding" as used in this Section of the Specification shall mean that metal joints shall be continuously welded and the exposed parts ground smooth and polished to match adjoining surfaces. Welding electrodes shall match the material being welded.

2. Where spot welding is specified, the welds shall be a maximum spacing of 3 in. on center.

3. Where tack welding is specified, the pieces welded shall have 1/2 in. minimum lengths of welding material at 4 in. on center maximum spacing.

C. Grinding, Polishing and Finishing

1. Exposed welding joints shall be ground flush with the adjoining material and neatly finished to harmonize therewith. Wherever material has been depressed or sunken by a welding operation, such depressions shall be suitably hammered and peened flush with the adjoining surfaces and, if necessary, again welded and ground to eliminate low spots. Ground surfaces shall be polished or buffed to a degree consistent with good workmanship. Coves shall be ground and polished to match adjoining material.

2. Care shall be exercised in grinding operations to avoid excessive heating of metal and discoloration. Abrasives, wheels, and belts used in grinding stainless steel shall be iron free and shall have not been used on carbon steel. The texture of the final polishing operation shall be uniform and smooth. Grain direction shall be uniform, uni-directional for a total length of material. Cross grains and random polishing are not acceptable.

3. The general finish of equipment shall be consistent throughout the job. Brake ends shall be free of open texture or orange peel appearance, and where brake work mars the uniform finish of the material, the marks shall be removed by grinding and polishing, and finishing. Sheared edges shall be free of burrs, projections or fins to eliminate all danger of laceration. Mitered or bullnosed corners shall be neatly finished with the underedge of the material neatly ground to a uniform condition and in no case will overlapping material be acceptable. The equipment surfaces, where exposed, shall be finished to a grained Number 4 (satin) finish unless otherwise specified. An exposed surface shall include an inside surface, which is exposed to view when a swinging or sliding door is opened. Underside of shelves need not be satin finish unless otherwise specified.

4. Excessive distortion caused by welding shall be cause for rejection for that item of equipment.

2.03 BUY-OUT COMPONENTS

A. CASTERS: 5 in. diameter polyurethane tired, swivel, plate or stem mount to suit application, 300 pound capacity, brakes only if specified, NSF approved; Component Hardware C-21-3050 (plate/no brake), C21-3051 (plate/brake) C23-3350 (stem/no brake) or C23-3351 (stem/brake), or equal by Kason, or PDI Atlanta.

B. COUNTER LEGS: Stainless steel, 6 in. to 7-3/4 in. height adjustment; Component Hardware A72-0811, or A77-5048, or equal by Kason, or PDI Atlanta.

C. DOOR AND DRAWER PULLS: Stainless steel, full grip type with beveled edge, NSF approved for stud mounting in device, in horizontal attitude to meet NSF requirements; Component Hardware P63-1012, or equal by Kason, or PDI Atlanta.

D. DOOR HINGES: Stainless steel, lift off type, swedged knuckle for minimum clearance, nylon bearings; Component Hardware M75-1002 or equal by Kason, or PDI Atlanta.

E. DRAWER PANS: Molded plastic or fiberglass, 20 in. by 20 in. by 5 in. deep, NSF approved; Component Hardware S80-2020, or equal by Kason, or PDI Atlanta.

F. DRAWER SLIDES: Stainless steel, NSF approved, full extension, 200 pound capacity with stainless steel ball bearing wheels; Component Hardware S-52 series, or equal by Kason, or PDI Atlanta.

G. FAUCET SETS, DECK MOUNTED: Chrome plated cast bronze with 1/2 in. IPS eccentric flanged female inlets on 8 in. centers, removable cartridges, lever handles, and aerator tip on swivel nozzle or swivel gooseneck to suit the application; T&S Brass B-0221 or B-0321, or equal by Component Hardware, Chicago, or Fisher.

H. FAUCET SETS, POTWASHING SINK: Chrome plated cast bronze with removable cartridges, 3/4 in. passages, eccentric flanged female inlets on 8 in. centers with LL street EL inlets with locknuts, four prong handles, 12 in. swing spout; T&S Brass B-0290 or equal by Component Hardware, Chicago, or Fisher.

I. FAUCET SETS, SPLASH MOUNTED: Chrome plated cast bronze with 1/2 in. IPS eccentric flanged female inlets on 8 in. centers, removable cartridges, lever handles, and aerator tip on 12 in. swing spout; T&S Brass, B-0231 or equal by Component Hardware, Chicago, or Fisher. Provide each with a mounting kit.

J. GUSSETS: Stainless steel, stepped side, fully closed, NSF approved, mild steel interior reinforcement, wide flange for welding to framing, set screw anchor for leg; Component Hardware A20-0206C, or equal by Kason, or PDI Atlanta.

K. LEG AND BULLET FOOT ASSEMBLIES: Stainless steel tubing, 16 gauge, number 4 finish, adjustable bullet foot with minimum of 3 in. vertical travel, 2,000 pound capacity, top designed for mounting in gusset, length to suit application; Component Hardware A46-6272-C, or equal by Kason, or PDI Atlanta.

L. LEG AND FLANGED FOOT ASSEMBLIES: Stainless steel tubing, 16 gauge, number 4 finish, adjustable bullet foot with 3-1/2 in. diameter flange and two holes for securing to floor, minimum of 3 in. vertical travel, 2,000 pound capacity, top designed for mounting in gusset, length to suit application; Component Hardware A46-4272-C, or equal by Kason, or PDI Atlanta.

M. NUTS: Zinc plated "Pal Nuts" with integral cap and lockwasher; Component Hardware Q-34-1024 or equal by Kason, or PDI Atlanta.

N. SEALANT: Sealant for sealing equipment to walls or filling crevices between components. All materials listed below that are used in the building interior must not exceed the following requirements:

1. South Coast Air Quality Management District (SCAQMD) Rule #1168
2. For interior adhesives and sealants applied within the weatherproof barrier, submit a printed statement of VOC content.

O. SOUND DEADENING BASINS: Component Hardware Q75-1366 or equal by Kason, or PDI Atlanta.

P. SOUND DEADENING TOPS AND SHELVES: Component Hardware Q85-5225, or equal by Kason, or PDI Atlanta, "Tacky Tape" installed between all channel or angle reinforced tops, drainboards or undershelves.

Q. WASTE OUTLETS, CRUMB CUP: Stainless steel body, removable crumb cup stopper, gasket, coupling nut and sealing washer, 1-1/2 in. IPS, and optional 4 in. long nickel plated brass tailpiece with gasket; Component Hardware E38-1010, or equal by Kason, or PDI Atlanta.

R. WASTE OUTLETS, LEVER OPERATED: Cast stainless steel rotary type with 1-1/2 in. NPS and 2 in. NPS threads, and removable beehive crumb-cup; Component Hardware DSS-8000 or equal by Component Hardware, Chicago, or Fisher.

S. WELD STUDS: Copper flashed steel with 10-24 threads, length to suit; Component Hardware Q-36, or equal by Kason, or PDI Atlanta.

T. GFCI RECEPTACLES: Pass & Seymour 2095-W, 115 volt, 20 amp GFCI Duplex Receptacle or equal.

2.04 FABRICATED COMPONENTS

A. Box Type Cabinet Construction

1. Sheet metal cabinet bases of box type construction shall be fabricated without general interior framing. Structural strength shall be achieved by the gauge of the metal and the formed angle and channel edges and corners. Vertical sections shall be closed. Cabinet base shall be fabricated of 18 gauge minimum of material specified at Item Specifications. Mount on counter legs or base as specified.

2. Intermediate shelf shall be fabricated of 16 gauge stainless steel with rear and sides turned up 1-1/2 in. tight to the cabinet sides. The front edge of shelf shall be turned down 1-1/2 in. and in 1/2 in. at 45 degrees and shelf spot welded in place. Reinforce underside with longitudinal 14 gauge channel on the centerline.

3. Bottom shelf shall be fabricated of 16 gauge stainless steel similar to the intermediate shelf except that the front edge shall be formed into a full width 1-1/2 in. by 4 in. welded in boxed channel. Rear edge shall be fitted with a full width channel. Underside shall be reinforced.

B. Counters and Drainboards

1. Counters, table tops and drainboards shall be 14 gauge stainless steel, of NSF construction, with edges per Item Specifications. Metal tops shall be made of the largest pieces available and shall appear as one piece with all field and shop joints reinforced and welded, ground and polished. Short pieces of metal will not be acceptable. Counter bends shall be not less than 1/8 in. radius. Wherever a fixture has a waste or drain outlet, the surface shall pitch toward the outlet.

2. Counters, table tops and drainboards shall be reinforced with channel or angle frame as specified in the Item Specifications. Framing shall be secured to the underside with sound deadening material sandwiched between the surfaces, weld studs, and nuts.

3. Wherever bolts or screws are welded to the underside of trim or tops, neatly finish the reverse side of the weld uniform with the adjoining surface of the trim or top. Depressions at these points will not be acceptable. Raise dimples and depressions by peening, or heating and shrinking, and grind and polish to present a flat surface.

C. Crossrails

1. Crossrails shall be not less than 1-1/4 in. outside diameter 16 gauge stainless steel tubing welded, ground and polished to a Number 4 finish. Crossrails shall be welded to legs at a height of 10 in. above finished floor, and shall extend from left to right between front legs, unless otherwise specified, and from front to back between all legs.

D. Drawer Assembly

1. Drawer assemblies shall consist of a removable drawer pan set in a removable 16 gauge stainless steel channel shaped drawer support frame with gusset plate reinforced corners.
2. Support frame shall have double pan front cover consisting of boxed 18 gauge stainless steel outer shell with welded corners, flush mounted recessed stainless steel pull, 20 gauge stainless steel back shell tack welded to outer shell with fiberglass sound deadening between. Drawer shall be provided with rubber bumpers to quiet closing. Support drawer frame on full extension drawer slides.
3. Drawer shall be suspended from table in a three-sided, 16 gauge stainless steel enclosure with flanged-in bottom edges, banded lower front, flanged-out front side and top edges. All sharp corners shall be broken and any exposed exterior threads of slide mounting bolts shall be provided with solid metal acorn nuts.
4. Component Hardware S91-0020 with thermoplastic pan is considered as equivalent to the above specified construction.

E. Edges

1. Marine: Bumped up 1/2 in. at 45 degrees and turned down 1-1/2 in. and in 1/2 in. at 45 degrees; corners welded and square.
2. Raised roll: Coved up and rolled 180 degrees on a 1-1/2 in. diameter with 3 in. height; corners welded and rounded or coved.
3. Rolled: Rolled 180 degrees on a 1-1/2 in. diameter; corners welded and bullnosed.
4. Short (6 in.) splash on counters: Coved up 6 in., turned back to wall or equipment 1 in. and down 1/2 in.; ends welded closed. Secure tight to face of wall with clips unless specified otherwise and seal joint.
5. Tall (10 in.) splash on preparation sinks, dishtables,: Coved up 8-1/2 in., turned back to wall or equipment 1-1/2 in. at 45 degrees and down 1/2 in.; ends welded closed. Secure 3 in. off face of wall with brackets unless specified otherwise.
6. Turn down: Turn down 2 in. and in 1/2 in. at 45 degrees; corners welded and square.

F. Framing of Tops, Drainboards, Undershelves

1. Channel: Reinforce with 1 in. by 4 in. by 1 in. 14 gauge galvannnealed steel channels; stainless steel if exposed to view. Channels shall run front-to-back at all legs and longitudinally on the centerline. Cross and longitudinal members shall be welded into a single assembly at intersections and sharp corners shall be broken. Framing shall be secured to underside of tops with pairs of weld studs. Framing shall be installed maintaining NSF required clearance to adjacent vertical surfaces and edges of top. The following specified angle framing is considered superior to channel framing and may be used in its place.

2. Angle: 1-1/2 in. by 1-1/2 in. by 1/8 in. perimeter angle frame with crossmembers not over 30 in. on center. Framing shall be secured to top with weld studs, 18 in. on center maximum with three minimum studs on any single face of a table. Perimeter angle frame that is exposed to normal view, shall be stainless steel. Crossmembers and framing not unexposed to normal view shall be iron. Corners of angle frame shall be mitered, or notched and brake formed to form a closed corner. Corner gusset plates used for mounting of leg gussets shall be 1/8 in. thick and sealed to underside of the top. Iron framework joints shall be ground smooth, and shall be painted with a minimum of two coats of aluminum lacquer after degreasing. Framing shall be installed maintaining NSF required clearance to adjacent vertical surfaces and edges of top. Channel framing shall not be considered equal to specified angle framing.

3. Sound deaden all horizontal framed surfaces with material sandwiched between the framing and the bottom of the surface.

G. Hinged Doors

1. Hinged doors shall be double pan type stainless steel construction with 18 gauge exterior and 20 gauge interior, welded corners, and 1/2 in. fiberglass insulation for sound deadening. Each door shall be provided with a stainless steel recessed handle, and an adjustable tension door catch equal to Component Hardware M22-2430. Doors shall close against the bottom shelf and flush with body of equipment.

2. Louvered hinged doors for ventilation shall be fabricated of the same components and provided with a full perimeter 3 in. wide channel reinforcing frame on the interior face. Remaining face shall be die punched with drip-proof louvers fully utilizing the remaining flat metal or a stainless steel flattened expanded metal grille per Item Specifications.

H. Sinks and Sink Inserts

1. Unless otherwise specified, sinks including sink inserts built into tops of fixtures, shall be made of 14 gauge stainless steel with all vertical and horizontal corners rounded to a radius of approximately 3/4 in. with the intersections meeting in a spherical section. Sinks shall be integrally welded to fixture tops.

2. Sinks with two or more compartments shall have full height, 1 in. thick double wall partitions consisting of two pieces of stainless steel back-to-back so fabricated that each compartment will be a deep bowl with coved corners. Partitions shall be welded in place to the bottom, front and back of the sink with smooth rounded coved corners. Top edges of the partitions shall be continuously welded. The front of the sinks shall consist of a stainless steel smooth, flush apron, same gauge as the sinks. Bottom and rear of partitions shall be closed. Sink dimensions contained in Item Specifications are inside dimensions.

3. Sinks shall be provided with integral 14 gauge stainless steel drainboards when specified. Drainboards and sink basins shall be pitched toward waste outlets and shall be self draining. The underside of all sink basins shall sound deadened. Sink units shall be provided with an integral splash at walls. Provide the necessary holes for the mounting of faucet sets.

I. Sliding Doors

1. Sliding doors shall be double pan type stainless steel construction with 18 gauge exterior and 20 gauge interior, welded corners, and 1/2 in. fiberglass insulation for sound deadening. Each door shall be provided with a stainless steel recessed handle. Provide sliding doors with nylon roller bearing sheaves and overhead track components equal to Component Hardware B58-5523 and 5513 sheaves, B57 track, B62-1093 nylon door guides and B60-1086 door stops.

J. Undershelves

1. Undershelf in an open type table shall be 16 gauge stainless steel unless otherwise noted. Edges shall be turned down 1-1/2 in. and in 1/2 in. at 45 degrees with corners notched out to fit legs to which shelf shall be welded from underside. Line up all edges of shelf with centerline of legs. Reinforce underside with longitudinal 14 gauge channel on the centerline.

K. Wall Brackets

1. Dish tables, sinks and counters with sinks shall be securely anchored 3 in. off the face of the wall unless specified otherwise. Brackets shall be "Z" shaped and fabricated of 3 in. wide, 14 gauge stainless steel. Brackets shall be secured in a vertical attitude to the rear of equipment backsplash with weld studs, and to the wall with appropriate fasteners.

2. Counters that are specified tight-to-wall shall be secured in a hidden manner with steel clips, and the wall/fixture joint shall be sealed.

L. Wall Shelves

1. Wall shelves shall be fabricated of 16 gauge stainless steel, size per Item Specifications, with back and ends raised 1-1/2 in., front edges of ends angled back, all corners broken, and front turned down 1-1/2 in., and in 1/2 in. at 45 degrees. Shelf corners shall be welded, ground and polished. Mount shelf 1 in. off face of wall with suitable fasteners on 14 gauge stainless steel flag brackets, 48 in. on center maximum. Flag brackets shall have a web angle of 30 degrees, measured from horizontal.

2.05 ELECTRICAL EQUIPMENT AND WIRING

A. Under this Section, items of equipment having mounted electrical motors, electrical heating units, lighting fixtures, controllers, control stations, switches, receptacles and the like shall be internally wired as specified herein, terminating at a junction box mounted on the equipment and left ready for connection to the building electrical distribution system by the Electrical Contractor. Extra ceiling mount light fixtures for refrigerated rooms shall be delivered to Electrical Contractor for field installation and wiring. Connections to evaporator coils mounted inside refrigerated rooms shall be wired by the Electrical Contractor.

B. Provide openings or cutouts required to accommodate the switches and receptacles in the specified work, and the wiring in conduit from terminal blocks in junction boxes.

C. Electrically operated equipment and fabricator wiring shall conform to the requirements of Underwriter's Laboratories, Inc. Motors over one horsepower shall be equipped with overload protection.

D. Furnish wiring diagrams for equipment as requested by the Architect or Contractor.

2.06 ITEM SPECIFICATIONS

Item 1
MOP SINK AND FAUCET
No work in the Section. Item to be provided and installed by Section 22 00 01.

Item 2
MOP RACK/SHELF
Make - Advance Tabco K-245 or equal by Eagle or Aero
Size - 24 in. by 8 in. by 7-1/2 in. high
Description - Unit shall be all standard construction of welded 18 gauge stainless steel type 430 polished satin finish, back and sides turned up 1-1/2 in., mounted on two die formed wall brackets and furnished with two mop hangers and three rag hooks.

Item 3
MOP BUCKET
No work in this Section. Item to be provided by Owner.

Item 4
STACKED CLOTHES WASHER DRYER
No work in the Section. Item to be provided and installed by Section 11 31 00.

Item 5
STAFF LOCKERS
Quantity - Five
No work in the Section. Item to be provided and installed by Section 10 51 13.

Item 6
DETERGENT STORAGE CABINET
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 36 in. by 18 in. by 72 in. high
Construction - 16 gauge stainless steel top with edges turned down, 18 gauge stainless steel cabinet body, fixed bottom shelf, three adjustable intermediate shelves, and 63 in. high double pan hinged doors at front. Mount on 6 in. high stainless steel adjustable legs.
Accessories - Provide unit with two (2) three point "T" handles, one locking and barrel bolts mounted to inside top and bottom of door. Provide slotted "L" bracket a top rear for securing to wall.

Item 7
Spare number

Item 8
STORAGE SHELVING
Quantity - Nine
Make - Metro Super Adjustable Super Erecta or equal by ISS or Cambro
Size - (1) 54 in. by 21 in., (4) 48 in. by 21 in., (1) 42 in. by 21 in., and (4) 36 in. by 21 in., all 74-5/8 in. high; five tier with bottom shelf up 14 in. clear above floor
Description - Unit shall be all standard construction with Super Adjustable Chrome plated wire shelves and tubular steel uprights with capped tops, adjustable feet, and 1 in. shelf height adjustment capability with Corner Release System. Each unit shall include four legs.

Item 9
DUNNAGE PLATFORM
Quantity - Three
Make - New Age 2000 Series or equal by Channel or Kelmax
Size - (1) 60 in. by 20 in., (1) 42 in. by 20 in., and (1) 36 in. by 20 in., all 12 in. high
Description - Dunnage platforms shall be all standard construction with 1-1/2 in. by 1-3/4 in. by .070 in. thick wall extruded Type 6063-T5 aluminum tubing with four horizontal tubes and four legs welded together, and each unit capable of supporting 3,000 pounds.

Item 10
WALK-IN COOLER
Make - American Panel, Bally, or Imperial Brown
Size - 7 ft., 2-1/2 in. by 11 ft., 11 in. by 7 ft., 10 in. high minimum inside dimensions; 7 ft., 8 in. high after finished floor is installed by the General Contractor
Power - 20 amps circuit - 120/60/1 to light fixtures, temperature monitor/alarm, and door defrost heater strip
Installation, Construction, Materials and Accessories - See Item 11
Guarantee - See Item 11

Item 11
WALK-IN FREEZER
Make - American Panel, Bally, or Imperial Brown
Size - 8 ft., 2 in. by 11 ft., 11 in. by 7 ft., 10 in. high minimum inside dimensions; 7 ft., 8 in. high after finished floor is installed by the General Contractor.
Power - 20 amps circuit - 120/60/1 to light fixtures, temperature monitor/alarm, door defrost heater strip, and pressure relief port
Installation - The walk-in refrigerated room shall be installed in a 7 in. deep ID recess (below finished floor). Recess depth allows 1 in. for use of leveling sand; 4 in. for the insulated floor panels; 2 in. for finished floor and setting bed that shall be carried in from the adjacent room and level to same. The finished floor and setting bed shall be furnished and installed by the General Contractor, and shall have coved joints at all walls, turned up a minimum of 4 in. inside and out. The unit shall be set level on a bed of clean, dry mason's sand. Shims are not acceptable for leveling material.
Construction - All standard construction per the manufacturer, modified to meet the specific following points:

- Walls to be 4 in. thick with CFC free urethane foam insulation, UL Class 1 rated
- Cam type locking devices
- 34 in. by 76 in. minimum door clearance
- Polished hardware (hinges and latch to match)
- Three hinges on doors (to include one Kason 1248 spring assist hinge per door)
- Leveraged pull handle (mechanical advantage type, Kason 1236 or equal)
- Quarter turn inside safety release lever handle mechanism (not screw type)
- Prewired door sections with heater wires and light fixtures and switches
- Kason 1806 LED light fixtures or Kason 1808 LED light fixtures
- Dial type thermometers at doors
- Model IC+ (with dry contacts) or Modularm 75LC temperature and HACCP monitoring system at doors. Cooler and freezer alarms to interconnect with access control system for alert monitoring. Kitchen Equipment Contractor to provide each system with a pair of 22 gauge low voltage wires. Wires shall be installed by the Controls Contractor. Wires shall run from the dry contacts to the access control panel. Kitchen Equipment Contractor to verify length prior to purchasing. To avoid false triggering, provide a shielded two-conductor cable with the shield connected to the receiving equipment.
- NSF construction throughout with exception of buried floor panels

- Interior and exterior faces of doors and exposed exterior walls shall be provided with aluminum diamond tread plate protective material to a height of 48 in. above finished floor. Hold diamond plating up 6 in. from the finish floor to accommodate the coved base.

Minimum materials - Interior and exterior wall surfaces shall be clad with .038 in. pebble finished aluminum. The ceiling shall be finished in white polyester over 24 gauge galvanized steel. Interior floor shall be 14 gauge galvanized steel.

Accessories - Freezer shall be provided with an electrically heated pressure relief port. Each door shall be provided with a heated vision panel, 14 in. by 14 in., constructed of three panels of tempered unbreakable glass, electrically heated, with sealed air spaces between. Provide matching trim strips and closure panels to adjoining surfaces, fabricated per details, made of largest pieces available to minimize number of joints, and installed in accordance with NSF Brochure 770202, Installation Manual for Walk-in Refrigerators and Freezers. Provide eight total extra Kason 1806 LED OR Kason 1808 LED light fixtures for mounting in the rooms and deliver to Electrical Contractor for field installation.

Guarantee - The walk-in refrigerated room panels shall be guaranteed for a period of ten (10) years from the date of approved installation for defects in materials and workmanship when subjected to normal use and service; remainder of rooms for one year.

Item 12
REMOTE REFRIGERATION SYSTEM
Quantity - Two
Make - Bally, Keeprite, Trenton, Heatcraft, Bohn, Larkin, Chandler, or Climate Control

Scope - Furnish and install complete refrigeration systems for the walk-in refrigerated rooms in accordance with the plans. The systems shall include condensing units, evaporator coils, piping, all specified accessories, and those components required to provide complete and satisfactory systems in accordance with accepted refrigeration practice.

Important: The installation work shall be performed by a fully qualified refrigeration contractor employing a certified mechanic fully trained in the installation of commercial refrigeration systems. Submittal shall list the installing company and the qualified system installer.

Piping - Furnish and install the interconnecting piping between the condensing units and their respective unit coolers. Piping shall be installed in a neat and workmanlike manner with adjustable hangers spaced at no more than ten foot intervals on horizontal runs; six foot intervals, vertical runs.

Line sizes shall be in accordance with ASHRAE standards and best refrigeration practice to assure proper feed to evaporator, avoid excessive pressure drop, and prevent excessive amounts of lubricating oil from being trapped in any part of the system. Line sizing shall be such that it will protect the compressor from loss of lubrication at all times, prevent liquid refrigerant from entering the compressor during operating or idle time, and maintain a clean and dry system.

Refrigeration piping shall be Type L, ACR grade, hard drawn seamless copper tubing, wrought type copper fittings, and silver soldered joints. Precharged lines are not acceptable.

Furnish and install sleeves for refrigerant and evaporator drain piping wherever piping passes through a wall or ceiling. Sleeves shall be non-conductive gray plastic tubing, with interior dimension sized at least 1/4 in. larger than piping, and shall be neatly packed with brine putty after installation.

Furnish and install condensate drain piping from the unit cooler to an open drain. Piping shall consist of not less than 7/8 in. Type L copper tubing, supported 36 in. on center maximum, in such a way that there will be 1 in. clearance between the wall and the tubing. Provide a union or slip fitting at the connection to the evaporator drain pan to allow easy disassembly for service and cleaning. Drain piping shall be pitched 4 in. to the foot and carried through the wall of the refrigerated area. It shall be trapped to prevent entry of warm air and insects to the refrigerated rooms and discharged to a floor drain with the code required air gap. The exposed drain piping shall be spray painted.

Provide an electric drainline heater tape in the freezer, with a length equal to five wraps per foot of length of the drainline located within the freezer compartment. Wrap and secure in accordance with manufacturer's recommendations.

Provide chrome plated escutcheon plates at all exposed points where piping penetrates the wall or ceilings.

Insulation - Suction lines for refrigerated rooms having a temperature above freezing shall be covered with 3/4 in. wall thickness closed cell HT Armaflex insulation with ultra violet radiation protection.

Suction lines for refrigerated rooms having a temperature below freezing shall be covered with 1 in. wall thickness closed cell HT Armaflex insulation with ultra violet radiation protection.

The insulation shall be applied to these lines in accordance with manufacturer's recommendations, and as they are being installed so that insulation will not be split. All joints shall be completely sealed with overlapping, cemented material to prevent the formation of frost on the lines.

Controls - Each evaporator shall be provided with mounted electronic controller with digital display. The time clock and heater contactor shall be removed from the condensing unit. No control wiring will be required from evaporator to the condensing unit.

Refrigerant Testing - The entire system shall be pressure and leak tested at no less than 100 PSIG, cleaned and dehydrated by maintaining a vacuum of 500 microns or lower for a period of five hours. The required operating charge of refrigerant and oil, if necessary, shall be added and the entire system tested for performance. Each system shall be clearly marked as to the type refrigerant required.

Guarantee - The equipment shall be guaranteed to maintain the specified temperatures. All mechanical refrigeration equipment shall be mechanically guaranteed for a period of one year after date of acceptance by the Owner. The emergency service shall be provided free of charge, whenever necessary on a 24 hour, seven day-per-week basis during the guarantee period.

Any leaks that occur during the first year of operation after acceptance by the Owner, shall be repaired and the necessary refrigerant added at no expense to the Owner.

The year's service shall be provided by the installing company, and under no circumstances will the service policy be sublet to another refrigeration contractor. The name of the installer/service agency for the guarantee period shall be located at a prominent place on the condensing units.

The condensing units shall be provided with an additional four year parts warranty to commence upon the completion of the aforementioned guarantee, bringing the total parts warranty to five years.

Condensing Units - The condensing units shall consist of an EC energy saving motor with variable speed controller, compressor, refrigerant condenser, liquid receiver, compressor service valves, and a dual high-low pressure control.

The condensing units shall be outdoor type. The compressor shall be serviceable semi-hermetic or scroll type per schedule, and fitted with anti-corrosion coated aluminum fin or micro-channel condenser, suction service valve, discharge service valve, compressor contactor, high and low pressure controls, receiver with fusible plug, liquid shut-off valve and charging port, mounted non-fused disconnect switch, waterproof electrical control box, discharge line vibration eliminator, weather resistant enameled galvanized steel cabinet, access guard, liquid line assembly, suction line filter and vibration eliminator, crankcase heater, and 1-1/2 in. high raised steel base.

Mount on building wall per plan with manufacturer provided brackets and suitable anchors with bottom 80" minimum above floor.

Evaporator Coils - Each evaporator shall be provided with mounted electronic controller with digital display, thermostatic expansion valve, and solenoid valve. The time clock and heater contactor shall be removed from the condensing unit. No control wiring will be required from evaporator to the condensing unit.

The freezer shall be provided with an automatic electric defrost system consisting of one evaporator coil as indicated in the schedule. Evaporator shall be low profile type six fins per inch complete with EC energy saving fan motors. Coil shall be NSF and UL Listed.

The cooler shall be provided with one evaporator coil as indicated in the schedule. Evaporator shall be low profile type six fins per inch complete with EC energy saving fan motors. Coil shall be NSF and UL Listed.

Furnish and install 1/4 in. minimum diameter stainless steel threaded mounting rods for the hanging of the evaporator coils, with stainless steel washers and nuts on the interior ends, and reinforcing angle at the exterior top of the room. Plated steel running thread is not acceptable.

Refrigeration Equipment Schedule

Cooler Room Temp: +35 degrees F		TD: 10 degrees F			
Condensing unit (12a)	Amps	Ref	BTU/hour	Evap Temp	Cond Temp
BQZA007H8-HT3A	6.5 - 208/3	448A	7,875	+25 degrees F	+95 degrees F
Evaporator coil (12b)	BTU/hour	CFM	Fan amps	Defrost amps	Defrost type
BLP209MA-S1B-T	7,879	2,020	2 - 120/1	NA	Timed ambient

Freezer Room Temp: -10 degrees F		TD: 10 degrees F			
Condensing unit (12c)	Amps	Ref	BTU/hour	Evap Temp	Cond Temp
BQZA025L8-HT3A	11.3 - 208/3	448A	8,829	-20 degrees F	+95 degrees F
Evaporator coil (12d)	BTU/hour	CFM	Fan amps	Defrost amps	Defrost type
BLP209LE-S2B-T	8,829	1,910	1.2 - 208/1	8.2 - 208/1	Timed electric

Item 12a
COOLER CONDENSING UNIT
Specified as part of Item 12

Item 12b
COOLER EVAPORATOR COIL
Specified as part of Item 12

Item 12c
FREEZER CONDENSING UNIT
Specified as part of Item 12

Item 12d
FREEZER EVAPORATOR COIL
Specified as part of Item 12

Item 13
MOBILE SHELVING
Quantity - 10
Make - MetroMax Q*C166 or equal by Eagle or Cambro
Size - (6) 48 in. by 21 in., (4) 36 in. by 21 in., all 69 in. high on casters; four tier
Description - Shelving unit shall be all standard construction and shall consist of four shelves with removable injection molded polypropylene mats with antimicrobial product protection, supported on epoxy coated steel shelf frames and similar uprights with capped tops, and mounted on 5 in. diameter polyurethane tired swivel casters with donut bumpers.
Accessories - Provide with polymer posts in lieu of standard.

Item 14
MOBILE DUNNAGE PLATFORM
Quantity - Four
Make - New Age 1200 Series or equal by Channel or Kelmax
Size - (2) 48 in. by 20 in., (4) 42 in. by 20 in. and (1) 36 in. by 20 in.
Description - Dunnage platform shall be all standard construction with 1-1/2 in. by 1-3/4 in. by .070 in. thick wall extruded Type 6063-T5 aluminum tubing with four horizontal tubes and plate mounted casters with unit capable of supporting 1200 pounds.
Accessories - Provide three total 1208 handles. All casters to swivel.

Item 15
Spare number

Item 16
TRASH BARREL
Quantity - Two
No work in this Section. Item to be provided by Owner.

Item 17
WALL SHELF
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 9 ft., 0 in. by 10 in. mounted 1 in. off face of wall up 54 in. above finished floor

Item 18
UTILITY CART
Quantity - Two
Make - Lakeside 521, Kelmax, Channel, or an approved equal
Size - 32-5/8 in. by 19-3/8 in. by 34-1/2 in.
Description - Cart shall be all standard NSF construction, stainless steel throughout, with top and bottom shelves supported by an angle frame, and mounted on two 8 in. fixed and two 5 in. swivel casters. Capacity of cart to be 650 pounds.

Item 19
MANUAL CAN OPENER
Make - Edlund S-11 or equal by Garde or Nemco
Description - Opener shall be all standard construction with cast stainless steel body, base and blade. Install on table per plan.

Item 20
COOK'S TABLE WITH SINK
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 9 ft., 0 in. by 30 in. by 36 in. high plus 10 in. high splash at wall; 18 in. by 20 in. by 10 in. deep integral sink basin
Construction - 14 gauge stainless steel top, basin, and splash over angle frame, front and ends formed in turndown, rear formed in tall splash, six legs with gussets and adjustable feet, partial undershelf, two crossrails, secured 3 in. off face of wall.
Accessories - Drawer assembly, splash mounted faucet set, and a 2 in. lever waste outlet.

Item 21
MOBILE EQUIPMENT STAND
Quantity - Two
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 30 in. by 30 in. by 32 in. high
Construction - 14 gauge stainless steel top over channel frame, edges formed in turn down, mounted on four legs with gussets, undershelf, and 5 in. diameter casters, two with brakes.

Item 22
AUTOMATIC SLICER
Make - Hobart HS9 or equal by Bizerba or Globe
Power - 5 amps - 1/2 HP - 120/60/1 - cord and plug
Description - Slicer shall be all standard construction, automatic type with anodized cast aluminum housing and base, removable 13 in. diameter 304L stainless steel knife with removable ring guard cover, totally enclosed, permanently lubricated PSC knife motor, with poly-v belt drive, zero knife exposure, linear automatic carriage drive system with speeds of 28, 38, 48 and 58 strokes per minute, manual assist mode, and provided with thermoplastic coated steel feed grip, glass bead finished gauge plate and knife cover, tilting carriage, water protected push-button switches, top mounted and removable knife sharpener with two borazon stones, adjustable gauge plate from "0" to 1 in., lift lever system and rubber feet. Unit to be provided with mechanical and electrical interlocks to include home position start, close gauge plate to stop, carriage will not tilt away or remove if gauge plate is not closed, locked gauge plate when carriage is removed, no-volt release, and 30 second automatic shut-off without carriage motion. Slicer shall be NSF 8 compliant.
Accessories - Provide unit with knife removal tool

Item 23
HAND SINK
Quantity - Five
Make - Advance 7-PS-70-CM*C166 or equal by IMC Teddy or Krowne
Description - Units shall be all standard stainless steel construction with mounting bracket. Mount on wall with rim at 36 in. above floor
Accessories - Provide with a splash mounted faucet set with wrist handles (Item 23a), 3 in. flat strainer type (non-basket, non-lever) open type waste, chrome plated tailpiece, "P" trap and clean-out cap. Provide 8 in. high welded stainless steel splash on right end of two units adjacent to Items 22 and 52. Provide 8 in. high welded stainless steel splash on both sides of one unit between Items 20 and 26.

Item 23a
FAUCETS
Quantity - Five
Make - T&S Brass B-0330-04 modified or Fisher 1953 modified, or Encore
Description - Units shall be all standard construction with mixing body, 8 in. center inlets, and wrist blade handles. Modified unit shall be provided with 119X gooseneck with B-0199-02-F10 aerator tip in lieu of the standard.

Item 24
WASTE BIN
Quantity - Five
No work in this Section. Item to be provided by Owner.

Item 25
MOBILE WORK TABLE
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 60 in. by 30 in. by 36 in. high
Construction - 14 gauge stainless steel top over angle frame with edges formed in turndown and mounted on four legs with gussets, 5 in. diameter swivel casters, two with brakes, and full undershelf.
Accessories - Drawer assembly.

Item 26
PREP COUNTER WITH SINK
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 8 ft., 8 in. by 30 in. by 36 in. high plus 10 in. high splash at wall; two 18 in. by 20 in. by 10 in. deep integral sink basins
Construction - 14 gauge stainless steel top, basin, and splash over angle frame, marine edge front and ends, rear formed in tall splash, six legs with gussets and adjustable feet, partial undershelf, two crossrails, secured 3 in. off face of wall.
Accessories - Drawer assembly, splash mounted faucet set, and two 2 in. lever waste outlets.

Item 27
FOOD PROCESSOR
Make - Robot Coupe R301 Ultra, Berkel, Kitchen Aid, or an approved equal
Power - 12 amps - 120/60/1 - cord and plug
Description - Combination food cutter shall be all standard construction with 1-1/2 HP direct drive fan cooled capacitor start motor with brake, magnetic interlocks, stainless steel cutter bowl with handle and see-thru lid, continuous feed top unit with attached large feed pusher and two standard discs.

Item 28
MIXER
Make - Hobart HL-200 or equal by Globe or Univex
Power - 8 amps - 1/2HP - 120/60/1 - cord and plug
Description - Mixer frame and body shall be fabricated of welded heavy gauge steel finished in Hybrid Powder coat finish, and provided with a stainless steel splash guard at the column, stainless steel bowl guard with electrical interlock, single point bowl installation with swing-out bowl support, manual bowl lift and an attachment hub with No. 12 taper. Transmission shall be gear driven constant mesh heat treated and hardened gears on similar shafts be mounted in ball bearings with recirculating oil and grease to all gears and shafts. Mixing action shall be planetary and shall have speeds of 59 (stir), 107, 198, 365, agitator RPM speeds as selected by an external dial. Speeds to be selectable on-the-fly and include a soft start and stir speed while lifting the bowl into place and controlled with a 15 minute timer with automatic time recall
Accessories - Provide mixer with a 20 quart stainless steel bowl, one flat "B" beater and one "D" wire loop whip with stainless steel wires.

Item 29
WALL SHELF
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 6 ft., 0 in. by 10 in. mounted 1 in. off face of wall up 54 in. above finished floor

Item 30
Spare number

Item 31
Spare number

Item 32
FOUR-BURNER RANGE WITH OVEN
Make - Vulcan 24S-4BN or equal by Southbend or Montague
Size - 24 in. by 32 in. by 37 in. high to work surface; 47 in. high overall
Rating - 3/4 in. gas inlet at 143,000 BTU/hour
Description - Range shall be all standard construction with fully welded aluminized steel frame, four 30,000 BTU/hour open burners with one pilot lights for every two burners, level cast iron removable grates, stainless steel front, sides, and back riser, 20-1/4 in. by 26 in. by 14-1/2 in. high thermostatically controlled 23,000 BTU/hour oven with two racks and safety pilot, full width pull-out crumb tray below burners, and provided with pressure regulator.

Accessories - Mount unit on 5 in. diameter heavy duty swivel casters, two with brakes. Provide with Flame Safety device with manual spark ignition for all open top burners, and oven pilot. Provide a 10 in. high stainless steel flue riser, and four stainless steel legs.

Item 33
FLOOR PAN AND GRATE
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 20 in. by 36 in. by 4 in. deep inside dimensions; 23 in. by 39 in. overall
Construction - Pan shall be fabricated of 14 gauge stainless steel, all welded construction, pitched to a 4 in. ID drain fitting with stainless steel removable, perforated basket and perforated dome strainer. Long sides shall be fitted with integral grate support ledges. Provide a model CGF molded fiberglass grate (Chemgrate) with 1 in. by 4 in. pattern, 3/4 in. clear slots and ends finished in accordance with manufacturer's instructions. Grate shall be cut in a manner that closed pockets will not be formed where they rest on the pan ledges.

Item 34
FORTY-GALLON BRAISING PAN
Make - Groen BPP-40GC*C166 or equal by Market Forge or Fire-x
Size - 35-3/4 in. by 28-1/4 in. by 10 in. deep inside pan dimensions
Power - 5 amps - 120/60/1
Rating - 1/2 in. gas inlet at 144,000 BTU/Hour
Description - Unit shall be all standard stainless steel construction, with tubular support frame, adjustable feet, flanged feet at rear, electric motorized crank tilt mechanism with manual override and three position control switch, torsion bar counterbalanced hinged cover with vent, and a 40 gallon pan. The cooking surface shall be constructed with 5/8 in. thick stainless steel and bonded clad plate with integral heat transfer fins, and a multi-tube gas burner. Pan shall be polished to a 100 emery grit finish and provided with electronic ignition, 7 degrees off level cooking capable, power on switch and indicator light, heat on indicating light, thermostatically controlled and provided with a high limit cut-off.
Accessories - Provide unit with a faucet mounting bracket with a double pantry water fill faucet and aerator tip, and BPC pan carrier.

Item 35
CONVEYOR OVEN WITH MOBILE STAND
Make - Middleby Marshall PS520-1
Accessories - Stainless steel mobile stand

Item 36
Spare number

Item 37
Spare number

Item 38
Spare number

Item 39
WATER FILTER
Make - 3M ScaleGard HT SF165 Modified, Everpure, Selecto, or an approved equal
Description - Unit shall be all standard construction designed for wall mounting on the utility distribution system per plan, and consisting of a mounting bracket, quarter-turn cartridge release mechanism, manifold with integral pressure gauge, integral quarter turn shut-off valve, outlet check valve, filter cartridge with internal prefilter membrane and external scale feeder cartridge. Provide with HF95-CL chloramine reduction filter cartridge in lieu of standard HF65 cartridge.
Accessories - Provide four spare HF95-CL filter cartridges and four spare HF8-S cartridges.

Item 40
TWELVE PAN STEAMER
Make - Market Forge Sirius II-12*C166 or equal by Accutemp or Groen
Size - 24 in. by 28-1/2 in. by 63-1/2 in. high on legs
Power - (2) 2 amps - 120/60/1 - cords and plugs
Rating - Two 1/2 in. gas connections @ 27,000 BTU/hour each
Maximum Water Use - Less than 2 gallons per hour
Certification - Unit shall be Energy Star compliant
Description - Two compartment pressureless steamer with six pan capacity cavities capable of holding 12 in. by 20 in. by 2-1/2 in. deep pans shall be all standard construction with stainless steel body, boilerless, insulated coved corner cast aluminum cooking compartments with Teflon coated lining and reservoir, removable stainless steel racks and sloped walls and domed ceiling with heating elements, automatic water fill, gas burners below the reservoir, controls mounted in a drawer and consisting of illuminated on-off switch, standby, steam and super steam cook mode selector switch, indicator lights, dual direction circulation fan, low water and high limit switches, 60 minute mechanical timer with buzzer, and temperature probe failure shut down. Doors shall be field reversible with a flush paddle latch, insulated and provided with a silicone rubber gasket and magnetic door safety switch. Provide unit with two year parts and labor warranty and drain connections.
Accessories - Provide each unit with reservoir cover and mount on casters, two with brakes

Item 41
DOUBLE CONVECTION OVEN
Quantity - Two
Make - Blodgett DFG-200-ES or equal by Southbend or Montague
Size - 38-1/4 in. by 42-7/8 to include fan motor by 70-5/8 in. high
Power - (2) 8 amps - 1/3 HP - 120/60/1 - cords and plugs
Rating - 3/4 in. gas inlet at 100,000 BTU/Hour
Certification - Unit shall be Energy Star compliant

Description - Units shall be all standard construction with stainless steel front, sides and top, porcelain enameled steel interior with 29 in. by 28-1/4 in. by 20 in. high inside dimensions, 1 in. thick mineral fiber sheet insulation on top, back and sides, dual pane thermal glass windows in coupled doors, removable rack supports capable of holding eleven racks and five chrome plated steel wire racks, electronic ignition with fail-safe controls, solid state digital controls with separate temperature and time settings, timer with buzzer, cook and hold and fan pulse modes, manual gas service cut-off switch, removable dual tube burners, pressure regulators, two speed blowers with thermal overload protection and door interlock, and interior lighting with two 50 watt commercial bake oven lamps. Provide standard three year parts and labor warranty on the total oven and additional five year warranty on the door assembly exclusive of glass, parts only.

Accessories - Mount on heavy duty swivel casters. Manifold the two ovens for a single gas connection.

Item 42
Spare number

Item 43
FIRE SUPPRESSION SYSTEM

Make - Ansul R-102 "Overlapping" or equal by Kiddie or Pyrochem

Design - Provide an automatic liquid fire suppressant system sized to meet all local codes, UL 300 and NFPA Codes. System shall provide surface protection for cooking equipment, hood and the exhaust duct work, if required. Tanks shall be mounted in the hood manufacturer provided utility cabinet and piping shall run hidden wherever possible. All pipes and fittings used to convey the chemical shall be scale free steel, 40 weight. Exposed piping located within the ventilator shall be stainless steel or chrome and limited to vertical drops only. Horizontal piping shall be run over the ventilator's top. Nozzles shall be swivel type with metal caps. Detection shall be fusible links rated per codes, and system shall rely on no outside source of power. The system shall be provided with a control box with indicator to indicate system status. Control head shall also include integral micro switch offering "normally open" and "normally closed" terminals for use by the Electrical Contractor for the shut-down of equipment and the sounding of alarms. Suppressant tanks shall be stainless steel. Provide and install a remote pull station per codes, complete with cables, conduit and pulleys. Coordinate installation of remote pull station with General Contractor to provide a recessed junction box mounted for installing the pull box with cable conduit concealed within walls. Provide system with class-K extinguisher. **Delete standard gas valve. Gas valve shall be provided as part of Item 46**

Workmanship - Exposed stainless steel fittings and piping shall be assembled with special care to avoid marring or damaging the surfaces. Any pieces showing marks shall be removed and replaced with new materials. Chrome sleeves are not acceptable.

Test - Perform a puff test on the completed system and obtain the written approval of the local Fire Inspector.

Accessories - Provide metal blow-off caps on the nozzles.

Item 44
EXHAUST VENTILATOR
Make - AquaMatic AM-ND-2 or equal by Gaylord or Halton
Size - 24 ft., 0 in. plus 12 in. utility cabinet by 60 in. plus 10 in. extended rear stand-off by 24 in. high plus 4 in. high collars, consisting of 13 ft., 9 in. and 10 ft., 3 in. long canopies joined end-to-end, mounted up 6 ft., 8 in. above finished floor; flat bottom; two make-up air plenums each 25 ft., 0 in. by 12 in. by 6 in. high plus five 2-3/4 in. high collars; perforated bottom of make-up air plenums mounted flush with the ceiling grid.
Power - 1.4 KW - 120/60/1 to lights from Item 20
Exhaust Left - 4,469 total CFM through (2) 10 in. by 21 in. collars @ -0.983 in. static pressure.
Exhaust Right - 2,819 total CFM through a 10 in. by 27 in. collar @ -0.887 in. static pressure. Blower and ductwork provided and installed by Ventilation Contractor.
Supply Left - 1,678 total CFM through (3) 10 in. by 24 in. collars @ 0.145 in. static pressure
Supply Right - 1,373 total CFM through (2) 10 in. by 24 in. collars @ 0.173 in. static pressure. Air unit and ductwork provided and installed by Ventilation Contractor.
Description - Ventilator shall be of all standard construction, built of not less than 18 gauge 304 stainless steel throughout with welded joints and seams in accordance with NFPA-96, with reinforced front bottom edges with integral front baffle, double wall insulated fronts, and NSF Listed. Units shall have grease collection troughs, storage containers, and hanger brackets. Provide with 430 stainless steel Captrate Grease-Stop Solo Filter UL classified S-baffle extractors that shall remove at least 75 percent of grease particles five microns in size, and 90 percent of grease particles seven microns in size and larger, with a corresponding pressure drop not to exceed 1.0 inches of water gauge. Provide all materials necessary for the hanging of the ventilator. Make-up air plenum box shall be standard construction fabricated in accordance with NFPA Pamphlet 96 and shall be NSF and UL approved and/or listed. All exposed surfaces of the body shall be 18 gauge 304 type stainless steel with a number 4 finish. The box will have a bottom discharge through removable perforated stainless steel panels and will include internal baffling to provide even air distribution. Mount with the bottom of the plenum box flush with the ceiling grid
Accessories - Provide unit with fourteen recessed UL Listed LED light fixtures, factory prewired and left ready for final connection by the Electrical Contractor. Provide utility cabinet on right end, and closure trim per detail to a point 3 in. above finished ceiling to close to adjacent surfaces on four sides. Provide one filter removal tool, quarter end panels, and balancing dampers.

Item 45
VENTILATOR DEMAND CONTROL SYSTEM
Make - CaptiveAire DCV or equal by Gaylord or Halton
Power - 20 amps circuit - 120/60/1 to logic controller
Scope - Furnish and install complete exhaust control system for the exhaust canopy in accordance with the plans and Manufacturers shop drawings. The system shall include programmable logic controller (PLC), variable frequency drive (VFD), stainless steel control enclosure, exhaust duct temperature sensors, room temperature sensor, LCD screen interface with cable, all specified accessories, and those components required to provide complete and satisfactory systems in accordance with accepted HVAC practice. System shall control Item 44. Mount LCD screen control in UDS riser.
Mount system processor in the cabinet mounted on the left end of exhaust ventilator.
Important: The installation work shall be performed by a fully qualified contractor employing a certified mechanic fully trained in the installation of the DCV hood system. Submittal shall list the installing company and the qualified system installer. Provide wiring diagrams and guidance to related trades to achieve correct operation of the system.
Accessories - Service Design Verification: Factory Services and on site coordination to be performed by the Manufacturers service technician (not a sales representative). On site supervision shall include two site visits: One visit to coordinate preparations for installation, and a second visit at startup and calibration.
Accessories - Provide BacNet monitoring system.

Item 45a
VENTILATOR CONTROL INTERFACE
Specified as part of Item 45

Item 45b
ROOM TEMPERATURE SENSOR
Specified as part of Item 45

Item 46
UTILITY DISTRIBUTION SYSTEM
Make - AquaMatic AM-UDI or equal by Gaylord or Halton
Size - 25 ft., 0 in. by 12 in. by 6 ft., 8 in. high
Power - 50 amps circuit - 120/208/60/3
Rating - 2 in. gas manifold at 581 MBTU/Hour (1,175 MBTU/Hour capacity)
Description - Utility distribution system shall be all standard construction of 300 series stainless steel with primary service riser, secondary riser and a horizontal raceway with separate compartments for plumbing and electrical services. Plumbing compartment shall include a gas manifold with electric gas valve, service drops with shut-off valves, Dormont quick disconnect gas hoses and flexible water connectors. Electrical compartment shall include bus bar with individually sized breakers along raceway. Primary riser shall include breaker panel with main shunt trip breaker, emergency kill switch with status lights, two GFI convenience outlets, pre-plumbed 2 in. electric gas valve, and gas delay reset. Mount demand control system interface screen in riser. Provide bumper strips on back side of assembly.

Item 47
Spare number

Item 48
Spare number

Item 49
Spare number

Item 50
MOBILE PAN RACK
Quantity - Two
Make - New Age 1332, Channel, Piper, or an approved equal
Size - 20-1/2 in. by 26 in. by 69 in. high
Capacity - Fifteen 18 in. by 26 in. pans on 4 in. centers
Description - Rack shall be fabricated of welded extruded aluminum 1 in. by 1 in. by .070 in. tubular uprights and framing, and 1-1/4 in. by 1-5/8 in. by .100 in. angle pan slides with corners chamfered and deburred. Gussets of 1-1/2 in. by 1-1/2 in. by 5/8 in. angle aluminum shall be welded to the bottom inside angles where horizontal bracing meets vertical uprights. Mount on platform type, 5 in. polyurethane tired swivel casters.

Item 51
MOBILE UTENSIL STORAGE RACK
Quantity - Two
Make - MetroMax Q*C166 or equal by Eagle or Cambro
Size - 42 in. by 21 in. by 69 in. high on casters; four tier
Description - Shelving unit shall be all standard construction and shall consist of four shelves with removable injection molded polypropylene mats with antimicrobial product protection, supported on epoxy coated steel shelf frames and similar uprights with capped tops, and mounted on 5 in. diameter polyurethane tired swivel casters with donut bumpers.
Accessories - Provide with polymer posts in lieu of standard.

Item 52
CLEAN WARE TABLE
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 45 in. by 30 in. by 34 in. high plus 10 in. splash at wall; 3 in. high raised roll at front and end
Construction - 14 gauge stainless steel top and splash over channel frame with raised roll front and end, tall splash at rear, turned down into dishwasher and secured with stainless steel machine screws, and mounted on two legs with gussets, and adjustable feet. Provide a 36 in. long undershelf welded to table legs at one end and mounted at opposing end on two 10 in. high legs with gussets, and adjustable feet. Secure table 3 in. off face of wall.

Item 53
WAREWASHER, VENTLESS
Make - Hobart AM-15VLT (Hot Water Sanitizing) or equal by Champion or Stero
Power - 45.4 amps - 208/60/3
Maximum Water Use - 0.74 Gallons per Rack
Certification - Unit shall be Energy Star compliant
Description - Dishwasher shall be door type with extended hood of all standard construction with 40 rack per hour capacity, 16 gauge stainless steel drawn tank, 18 gauge stainless steel chamber, and 12 gauge stainless steel frame and stainless steel feet, microcomputer controls with digital status indicators and LED cycle display and temperature readings, 1, 2, 4 and 6 minute timed cycles, thermostatically controlled electric tank heat with low-water cut-off, internal condensing system with 1/2 HP condenser blower motor, corrosion resistant tube and fin condenser coil, and heat energy recovery from condensation chamber, interchangeable upper and lower revolving wash arms, door actuated drain closer, self flushing stainless steel strainer pans with removable scrap basket, snap-in front panel and front access door. Tank doors shall be coupled with a chrome plated lift handle and counter balanced and fitted with a cycle starting switch. Pump shall be stainless steel with stainless steel impeller and shaft, fitted with a stainless steel and carbon ceramic seal, capable of 160 gallon per minute flow and self draining. Motor shall be 2 HP, three phase, squirrel cage, induction-run type with inherent thermal protection, grease packed ball bearings, splashproof design, and ventilated.
Accessories - Provide machine with Sense-A-Temp 70 degree F rise electric booster heater, single point electrical connection, and four plastic racks; two peg, two flat. Provide drain water tempering kit.

Item 54
THREE-COMPARTMENT SINK
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 12 ft., 0 in. by 30 in. by 34 in. high plus 10 in. high splash at rear; 3 in. high raised open roll on front and end, three 21 in. by 27 in. by 12 in. deep integral sink basins.
Construction - 14 gauge stainless steel top, basins and splash, stainless steel channel reinforced, six legs with gussets, adjustable feet, and five lengths of crossrail. Secure 3 in. off face of wall. Top of splash shall be fitted with integral flat spot for mounting of the hose reel assembly fixture. Turn end down into dishwasher and secure with stainless steel machine screws and nuts. Provide each sink basin with a lift out, 16 gauge stainless steel cover with all edges flanged down 1 in., corners rounded and welded, provided with two neatly punched thumb holes, and designed to rest on 1/4 in. rod stock supports welded across the basin corners at proper height to provide a flush surface. Provide a hook under the drainboard for hanging the lids when not in use. Weld disposer cone integral and provide a rigid stainless steel bracket for mounting of the disposer control switch in a set back position below the drainboard.
Accessories - Provide two splash mounted pot sink fill faucet sets and three 2 in. lever waste outlets.

Item 55
DETERGENT SYSTEM
No work in this Section. Item to be provided by Owner's Vendor.

Item 56
WALL SHELF
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 60 in. by 10 in. mounted 1 in. off face of wall up 54 in. above finished floor

Item 57
DISPOSER
Make - In-Sink-Erator SS-200-18A*C166, Salvajor, Red Goat, or an approved equal
Power - 3.3 amps - 2 HP - 208/60/3
Description - Disposer shall be all standard construction with stainless steel grinding chamber, Hycar resilient mounting with chrome plated exterior, and grinding chamber water inlet. Motor shall be clad with a stainless steel cover and shall be totally enclosed, fan cooled, induction type with built-in manual reset inherent thermal overload protection, double tapered Timkin roller bearings, centrifugal moisture shield, pressure relief vent, timed or continuous run operation options, and provided with two 24 volt solenoid valves and two flow control valves (1 GPM & 7 GPM). Weld cone integral with the drainboard.
Accessories - Provide unit with a No. 18A cone assembly integral with the drainboard, complete with safety baffle and stopper, bowl cover, water inlet for mounting in sink basin, a solenoid valve, vacuum breaker, and an AS-101 AquaSaver control center for mounting on fabricator provided bracket below the dish table.

Item 58
HOSE REEL ASSEMBLY
Make - T&S Brass B-1457-7102-01C, Fisher, Reel Craft, or an approved equal
Size - 12 foot hose, 3/8 in. ID
Maximum Water Use - 1.07 gallons per minute
Description - Unit shall be all standard construction with stainless steel open type reel, adjustable bumper, blue hose, B-107-J low flow spray valve, heat resistant spray valve handle, chrome risers, two wall brackets, continuous pressure vacuum breaker, 36 in. flexible water hose, control valve, and deck type base faucet, designed for wall mounting per plan up 7 ft., 6 in. measured at the inlet.
Accessories - Provide with stainless steel pivoting wall bracket.
Installation - The hose reel bracket for wall mounted units shall be rotated 90 degrees downward and installed such that it allows the hose to hang straight down and parallel to the wall. Refer to T&S Brass instructions manual page four figure one for further details.

Item 59
Spare number

Item 60
Spare number

Item 61
MOBILE WORK TABLE
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 60 in. by 30 in. by 36 in. high
Construction - 14 gauge stainless steel top over angle frame with edges formed in turndown and mounted on four legs with gussets, 5 in. diameter swivel casters, two with brakes, and full undershelf.
Accessories - Drawer assembly.

Item 62
Spare number

Item 63
MOBILE WORK TABLE
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 60 in. by 30 in. by 36 in. high
Construction - 14 gauge stainless steel top over angle frame with edges formed in turndown and mounted on four legs with gussets, 5 in. diameter swivel casters, two with brakes, and full undershelf.
Accessories - Drawer assembly.

Item 64
REFRIGERATOR, REACH-IN
Make - Victory RS-2D-S1-HD-HC, or equal by Continental or Utility
Size - 52-1/8 in. by 35 in. by 84-1/4in. high overall
Power - 6.5 amps - 120/60/1 - cord and plug
Doors - Half height, standard hinging
Certification - Unit shall be Energy Star compliant
Description - Refrigerator shall be all standard construction with stainless steel exterior, aluminum interior, self-closing door hardware with a hold-open at 120 degrees, Humidity control wires around the door jamb, automatic LED interior lighting, exterior digital thermometer, heavy duty epoxy plated wire shelves adjustable in one inch increments, self-contained top mounted refrigeration system capable of maintaining a 33 degree to 38 degree temperature range with Secure-Temp 1.0 temperature monitoring technology, condensate evaporator, and R-290 Refrigerant.
Accessories - Provide adjustable tray slide kit in the top half, and two shelves in the bottom half. Provide with stainless steel kick plate.

Item 65
PASS-THROUGH HOT FOOD CABINET
Make - Victory HS-1D-PT-HD, or equal by Continental, Utility or an approved equal
Size - 26-1/2 in. by 35-1/4 in. by 84-1/4 in. high overall
Power - 6.3 amps - 208/60/1 - cord and plug (NEMA 6-20P)
Doors - Half height, hinged on left (both sides)
Description - Heated cabinet shall be all standard construction with stainless steel exterior, stainless steel coved interior floor and ceiling, stainless steel interior walls and door liner, foamed-in-place polyurethane insulation, self-closing door hardware with a hold-open at 120 degrees, automatic interior lighting, exterior digital thermometer, heavy duty epoxy plated wire shelves adjustable in one inch increments, built-in adjustable humidity control vent, externally mounted blower, safety shielded strip type heating elements, adjustable electronic temperature control from 80 degrees to 180 degrees Fahrenheit with Secure-Temp 1.0 temperature monitoring technology. Mount on 6 in. high stainless steel legs.
Accessories - Provide adjustable tray slide kit in the top and bottom sections. Provide with stainless steel kick plate.

Item 66
Spare number

Item 67
PASS-THROUGH HOT FOOD CABINET
Make - Victory HS-1D-PT-HD, or equal by Continental, Utility or an approved equal
Size - 26-1/2 in. by 35-1/4 in. by 84-1/4 in. high overall
Power - 6.3 amps - 208/60/1 - cord and plug (NEMA 6-20P)
Doors - Half height, hinged on right (both sides)
Description - Heated cabinet shall be all standard construction with stainless steel exterior, stainless steel coved interior floor and ceiling, stainless steel interior walls and door liner, foamed-in-place polyurethane insulation, self-closing door hardware with a hold-open at 120 degrees, automatic interior lighting, exterior digital thermometer, heavy duty epoxy plated wire shelves adjustable in one inch increments, built-in adjustable humidity control vent, externally mounted blower, safety shielded strip type heating elements, adjustable electronic temperature control from 80 degrees to 180 degrees Fahrenheit with Secure-Temp 1.0 temperature monitoring technology. Mount on 6 in. high stainless steel legs.
Accessories - Provide adjustable tray slide kit in the top and bottom sections. Provide with stainless steel kick plate.

Item 68
Spare number

Item 69
Spare number

Item 70
FILL FAUCET
Quantity - Two
Make - T&S Brass B-0208, Fisher, Encore, or an approved equal
Description - Unit shall be all standard construction with a B-199-02F-12 aerator tip.

Item 71
DROP-IN HOT FOOD WELL
Quantity - Eight
Make - Piper CCF-D-A-I-L-20-10, Hatco, Wells, or an approved equal
Power - 1.0 KW - 208/60/1 each
Description - Hot food wells to be all standard construction, top mount type with one-piece, coved corner stainless steel interior, galvanized steel outer wrap, insulated on five sides, lead wires encased in Fabricator provided flexible armored conduit, drain outlet, infinite heat switch controls with off position, and mounting hardware. Groups of wells shall be Fabricator wired to a single point with disconnect switch in accordance with UL Requirements.
Accessories - Mount in two groups of four and provide a quarter turn ball type shut-off valve and Fabricator installed 3/4 in. copper manifold connecting the wells, complete with cleanout, left ready for extending to the floor drain by the Plumbing Contractor.

Item 72
DROP-IN COLD PAN
Quantity - Two
Make - Hatco CWB-2 or equal by Atlas or Wells
Size - 32 in. by 27 in. by 25-1/2 in. high
Power - 6.7 amps - 1/4 HP - 120/60/1 - cord and plug
Description - The NSF 7 approved refrigerated drop-in well shall be standard construction per the manufacturer's standard details with an angled interior wall design. Unit shall utilize R-404A refrigerant and consist of aluminized steel housing with a stainless bezel, mounted electronic temperature control, pan support bars for full-size pans, condenser unit (can be rotated), compressor with flexible refrigerant lines, sight glass, service valves, receiver, and dryer/filter.
Accessories - Provide optional five year warranty on the compressor. Provide with 20 in. pan support bar and perforated false bottom.

Item 73
SERVING COUNTER
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 12 ft., 6 in. by 33 in. plus 10 in. deep trayslide by 36 in. high; 32 in. high to top of trayslide; mitered trayslide corners per plan
Power - 4.0 KW - 208/60/1 to disconnect for four hot food wells
20 amps circuit - 120/60/1 to apron mounted GFI outlet
20 amps circuit - 120/60/1 to body mounted GFI outlet at cold pan
Construction - Same as Item 74
Accessories - Provide with a 69 in. long (between end supports on center) Versa-Gard VG6S-CT protector case with brushed stainless steel finished uprights, surface mount flanges, and mounted over hot wells. Provide with a 42 in. long (between end supports on center) Versa-Gard VG9 self-serve food protector with 3/8 in. top glass, brushed stainless steel finished uprights, surface mount flanges, and mounted over cold pan.

Item 73a
FOOD PROTECTOR CASE
Specified as part of Item 73

Item 73b
FOOD PROTECTOR DISPLAY CASE
Specified as part of Item 73.

Item 74
SERVING COUNTER
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 12 ft., 6 in. by 33 in. plus 10 in. deep trayslide by 36 in. high; 32 in. high to top of trayslide; mitered trayslide corners per plan
Power - 4.0 KW - 208/60/1 to disconnect for four hot food wells
20 amps circuit - 120/60/1 to each of two apron mounted GFI outlets
20 amps circuit - 120/60/1 to body mounted GFI outlet at cold pan

Construction - 14 gauge stainless steel top over angle frame with all edges turned down 2 in. and corners welded. Provide raw openings for the hot food wells and a flanged opening for the refrigerated pan with all edges flanged down 1 in. and corners filled and welded.

Mount on eight 2 in. square 16 gauge stainless steel tubular legs with Component Hardware A15-0851 adjustable feet. Reinforce between all front and end legs with 2 in. square stainless steel tubing welded in place 6-1/4 in. clear above floor. Provide similar reinforcement between rear legs where an undershelf does not exist.

Undershelves shall be fabricated of 16 gauge stainless steel with reinforcing and sound deadening as specified for open base table undershelves. Front face shall be turned down 1-1/2 in. and in 1/2 in. at 45 degrees. Rear and ends shall be turned up 1-1/2 in. and corners welded. Weld to legs at a point 10 in. above floor. Shelf shall be mounted on the inside face of legs, not cut-out at each leg. Leave 2 in. clearance between the shelf edge and the counter front and end panels for passing of services by Related Trades.

Trayslide shall be fabricated of 14 gauge stainless steel with front and ends turned down and corners welded. Rear shall be turned up under the counter front edge Mount on Component Hardware J19-4966 brackets bolted through the front panels to reinforced area.

Front and ends of counter shall be provided with plastic laminate clad panels. Plastic laminate manufacturer shall be as selected by the Architect. Plastic laminate color shall be as selected by the Architect from Wilsonart's full range of colors. Panels shall be mounted with a minimum of joints. All joints to be hairline type. Joint between a front and end panel shall appear on the end panel face. Panels shall be secured to counter legs and crossrails with welded stainless steel clips and stainless steel wood screws. Do NOT secure THROUGH the legs or crossrails. Provide a continuous 14 gauge support-protector strip at the lower edge of all finish panels, extending 1/16 in. past front face.

Apron shall be provided per elevations, fabricated of 18 gauge stainless steel, and shall be used for the mounting of switches, outlets, and controls. Apron shall include a formed reinforced bottom edge and shall be set in 1 in. from leg face.

Accessories - Provide with a 69 in. long (between end supports on center) Versa-Gard VG6S-CT protector case with brushed stainless steel finished uprights, surface mount flanges, and mounted over hot wells. Provide with a 42 in. long (between end supports on center) Versa-Gard VG9 self-serve food protector with 3/8 in. top glass, brushed stainless steel finished uprights, surface mount flanges, and mounted over cold pan.

Item 74a
FOOD PROTECTOR CASE
Specified as part of Item 73

Item 74b
FOOD PROTECTOR DISPLAY CASE
Specified as part of Item 73

Item 75
MILK COOLER
Make - Beverage-Air STF58HC-1-S*C166, Continental, True, or an approved equal
Size - 58 in. by 34 in. by 47-3/4 in. high; sixteen 13 in. by 13 in. by 11 in. milk crate capacity
Power - 3.3 amps - 1/3 HP - 120/60/1 - cord and plug
Description - Dual access milk cooler shall be all standard construction with stainless steel interior and exterior fronts and ends, self-contained refrigeration system with thermostatic controls and blower, urethane foam insulation, exterior dial thermometer, and hinged and lockable drop-front covers. Interior shall be fitted with a vinyl coated wire rack. Mount on 4 in. diameter swivel casters and provide with R-290 refrigerant.
Accessories - Provide unit with optional five year compressor warranty

Item 76
MOBILE CONDIMENT COUNTER
Quantity - Two
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 48 in. by 27 in. by 32 in. high
Construction - 14 gauge stainless steel top over angle frame with all edges turned down 2 in. and corners welded. Mount on four 2 in. square legs with undershelf and plastic laminate clad panels on four sides all of similar construction to the serving counter. Rear face shall be provided with a pair of hinged doors in a 36 in. wide opening. Provide 5 in. diameter swivel casters; two with brakes.

Item 77
MOBILE CASHIER STAND
Quantity - Two (one left, one right)
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 30 in. by 30 in. by 36 in. high main section with 42 in. by 12 in. trayslide set at 32 in. above floor; mitered trayslide corner per plan
Construction - 14 gauge stainless steel top over angle frame with all edges turned down 2 in. and corners welded. Provide a 3 in. diameter grommeted hole in top behind the cashier terminal for cable passage. Mount on four 2 in. square legs with crossrails on three sides, footrest set in 8 in., undershelf and plastic laminate clad panels on three sides and solid mounted trayslide all of similar construction to the serving counter. Mount trayslide on fold down brackets. Provide 5 in. diameter swivel casters; two with brakes.
Accessories - Provide unit with a Component Hardware S95-1000 locking cashier drawer.

Item 78
CASHIER TERMINAL
Quantity - Two
No work in this Section. Item to be provided by Owner.

Item 79
Spare number

Item 80
CLEAN WARE TABLE
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 63 in. by 28 in. by 34 in. high plus 10 in. splash at walls; 3 in. high raised roll at front
Construction - 14 gauge stainless steel top and splash over channel frame with raised roll front, tall splash at rear and end, turned down into dishwasher and secured with stainless steel machine screws, and mounted on four legs with gussets, adjustable feet and undershelf. Secure table 3 in. off face of wall.

Item 81
WAREWASHER, CONVEYOR, VENTLESS (ADD ALTERNATE)
Make - Champion 44 PRO VHR*C166, Hobart, Stero, or an approved equal
Size - 60 in. by 35-3/4 in. by 64-1/4 in. high to top of machine; 89 in. high over top mount heat recovery system
Power - 78 amps - 208/60/3 (machine); 58 amps - 208/60/3 (booster heater)
Conveyor speed - 5.8 feet per minute; 209 racks per hour
Maximum Water Use - 0.48 gallon per rack
Certification - Unit shall be Energy Star compliant
Description - Dishwasher shall be all standard stainless steel construction throughout, single tank machine having hood with integral tank, top mount ventless heat recovery system, mounted on a frame with adjustable feet and removable closure panels on the front and ends. Vertical clearance shall be 20-3/4 in. to accept standard sheet pans. Hood to have full 180 degree opening leak proof insulatedhinged access doors. All interior surfaces to be stainless steel including easily removable scrap basket, two-piece scrap screens and one-piece cast stainless steel upper and lower spray assemblies. Stainless steel pump shall be self draining type with cast stainless steel impeller and designed to be non-clogging with standard NEMA frame, drip-proof pump motor and with grease packed ball bearing shaft. Provide a pre-wired top mounted control panel having an approved magnetic motor starter with overload heaters and low voltage protection for each motor, energy saver idle pump shut-down, touch screen user interface with self-diagnostics, problem recognition, and repair recommendation, and 120 volt control circuit. Tank heater shall consist of a 15.0 KW element in the wash tank with thermostatic control and low-water cut-off. Furnish standard temperature thermometers for tank and final rinse line, vacuum breaker and air gap, fill valve, door operated drain valve, splash curtains, door safety switch, automatic tank fill, common hot water connection and final rinse saver.

Accessories - Provide machine with built-in 21.0 KW electric hot water booster, ION scale prevention device, table limit switch, drain water tempering kit, and standard assortment of three plastic dish racks; two peg, one flat. Provide with 30 in. cantilever sideloader.

Item 82
Spare number

Item 83
SOILED WARE TABLE WITH PASS-THROUGH FRAME
Make - Fabricate per General Construction this Section by Custom Metals of Massachusetts, Carbone Metal Fabricators, or SML Stainless Steel Group
Size - 10 ft., 3 in. by 27 in. plus 7 ft., 6 in. by 27 in. return to dishwasher, plus pass-thru by 34 in. high plus 10 in. high splash at walls; 3 in. high raised open roll on working faces and end; 54 in. by 48 in. pass thru with 35 in. sill height; 18 in. by 18 in. by 8 in. deep integral sink; approximately 10 ft., 0 in. long by 5 in. by 5-1/2 in. to 3 in. deep sloped trough from pass-window to sink, shaped per plan.
Construction - 14 gauge stainless steel top, sink basin, trough and splash, channel frame, twelve legs with gussets, adjustable feet, and eleven crossrails. Secure 3 in. off wall. Turn end down into sideloader and secure with stainless steel machine screws. Prepare end for integration with dishwasher sideloader. Top of splash shall be fitted with integral flat spot for mounting of the pre-rinse fixture. Top shall pass through the wall and be an integral part of the pass window. Pass-thru ledge shall extend through the wall and be secured to the frame. Provide a 16 gauge stainless steel telescoping window frame at the opening with front edges turned out 2 in. and returned 1/2 in.. Rear edges to be turned out 2-1/2 in. flat to wall. Integral scrapping sink shall be provided with a 2 in. by 1/4 in. bar stock rack guide attached to the reinforced splash with stainless steel through bolts. Sink shall be provided with two 16 gauge perforated stainless steel scrapping baskets, 6 in. deep, on 1/2 in. high angle legs set back to clear the basin cove, and integral tubular handles flush with counter tops.
Accessories - Provide unit with a 2 in. free flow waste outlet Component Hardware D36-2080

Item 84
HOSE REEL ASSEMBLY
Make - T&S Brass B-1457-7102-01C, Fisher, Reel Craft, or an approved equal
Size - 12 foot hose, 3/8 in. ID
Maximum Water Use - 1.07 gallons per minute
Description - Unit shall be all standard construction with stainless steel open type reel, adjustable bumper, blue hose, B-107-J low flow spray valve, heat resistant spray valve handle, chrome risers, two wall brackets, continuous pressure vacuum breaker, 36 in. flexible water hose, control valve, and deck type base faucet, designed for wall mounting per plan up 7 ft., 6 in. measured at the inlet.
Accessories - Provide with stainless steel pivoting wall bracket.
Installation - The hose reel bracket for wall mounted units shall be rotated 90 degrees downward and installed such that it allows the hose to hang straight down and parallel to the wall. Refer to T&S Brass instructions manual page four figure one for further details.

Item 85
ROLL-DOWN SHUTTER
Make - Raynor DuraShutter Select/surface mount or equal by Alpine or Cornell
Size - Opening approximately 54 in. wide by 50 in. high; verify
Description - Assembly shall be all standard construction and shall consist of a self-coiling rolling counter shutter, all anodized aluminum construction with interlocking extruded slats, extruded aluminum bottom bar with rubber astragal, designed for surface type mounting with extruded guides with wool pile inserts, and complete with recessed inside lifting handles and thumb-turn locks, and complete covers.
Installation - Install with tracks located 1 in. clear above table surface to permit proper cleaning.

Item 86
Spare number

PART 3 EXECUTION

3.01 SANITATION REQUIREMENTS

A. Equipment specified herein shall be fabricated to conform to the "Food Service Equipment Standards" of the National Sanitation Foundation prepared by the Committee on Food Service Standards, and published by the National Sanitation Foundation, Ann Arbor, Michigan. Any differences of opinion on sanitation will be referred to the State Department of Health for a ruling.

B. Equipment shall be installed in accordance with the manufacturer's instructions and the best practices of the food service industry, with careful attention to eliminating all cracks, crevices and concealed spaces in wet areas that would be difficult to clean or keep free of vermin and soil.

3.02 EXAMINATION AND ACCEPTANCE

A. Determine whether the General Contractor shall furnish and provide temporary power and light, openings and storage space to permit scheduled delivery of equipment. Verify water pressure and provide necessary reducing valves.

B. Examine space in which specified work is to be installed to assure that conditions are satisfactory for the installation of specified work. Report in writing to the Architect, any deficiency in the work of other contractors affecting specified work. Commencement of specified work will be construed as acceptance of space conditions.

C. Obtain and verify all measurements and conditions on the job, and assume responsibility in respect to same.

D. Inspect flooring, wall finishes, painting, ceiling installation and all related work for readiness to commence installation of foodservice equipment. Verify the existence of required mechanical and electrical rough-ins.

3.03 CLEANING UP

A. Debris and surplus materials resulting from installation work shall be removed promptly as work progresses, to a location indicated by the General Contractor.

B. Following completion, and before final acceptance by the Owner, clean finished surfaces in accordance with the manufacturer's instructions, and leave specified work free of imperfections.

3.04 DEMONSTRATION AND OPERATING INSTRUCTIONS

A. Before final acceptance, and by appointment with the Owner and his representatives, completely demonstrate with power, the correct operation of each new item of operating equipment.

B. Prior to the demonstration, turn on all mechanical and electrical foodservice equipment. Test for leaks, poor connections, and inadequate or faulty performance and correct if necessary. Adjust for proper operation. Thermostatically controlled equipment and equipment with automatic features shall be operated for a sufficient length of time with proper testing equipment to prove controls are functioning as intended. Recalibrate thermostats if necessary.

C. Provide Architect or Consultant with a loose leaf bound manual of operating data and maintenance instructions (three copies) containing complete description, wiring diagrams, operating data, maintenance requirements and other information pertaining to the proper operation and upkeep of the various items of electrical or mechanical equipment. Include names, addresses and telephone numbers of authorized service agencies for all items. Arrange all material in alphabetical order by Manufacturer. Book shall be turned over to Owner after review and approval.

D. Submit guarantees and warrantees to the Architect in the above specified manuals with all warranty cards completed and becoming effective at the time the equipment was satisfactorily demonstrated.

3.05 PROTECTION OF WORK

A. Protect specified work from damage during transportation to the project site, storage at the site, during installation, and after completion until acceptance by the Owner.

B. Protect adjacent work under other contracts during installation until completion of specified work. After completion, the contractor for other work shall be responsible for the protection of his work until acceptance by the Owner.

C. Damaged work as determined by the Architect, shall be repaired or replaced as determined by the Architect.

END OF SECTION

SECTION 115213

PROJECTION SCREENS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following items for installation under the designated SECTION:

1. Above ceiling mounted, electrically operated automatic rear projection screen above Cafeteria stage.
2. Electrically operated automatic projection screen at Gymnasium.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be prepared under the designated SECTION:

1. Power wiring for motorized screens: SECTION 260001-ELECTRICAL.
2. Blocking for mounting platform / cafeteria screen (SECTION 061000-ROUGH CARPENTRY) and wood panel wall finish (SECTION 062000-FINISH CARPENTRY).
3. Bent plate mounting brackets for gymnasium screen: SECTION 050001-MISCELLANEOUS AND ORNAMENTAL IRON.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with requirements of SECTION 013300-SUBMITTALS.

B. Shop drawings shall include large scale mounting details showing surrounding construction, manufacturers specifications, and electrical characteristics and wiring diagrams for electrically operating screens.

PART 2 PRODUCTS

2.01 MANUFACTURE

A. To establish a standard of quality, design and function desired, drawings and specifications are based on projection screens manufactured by Da-Lite Filmscreen. Similar projection screens by Stewart and Draper will be considered for approval by the Architect upon receipt of adequate supporting data and samples.

2.02 AUTOMATIC ELECTRIC REAR PROJECTION SCREEN (CAFETERIA)

A. Tensioned Advantage Deluxe (34623C) electrically operated dual vision rear projection screen as follows:

1. Motor and Controls – Electrically operated 120 volt (60Hz), 1 amp. Motor shall be quick reversing, oiled for life, with automatic thermal overload cut-out, integral gears, capacitor and an electric brake to prevent coasting. Motor controls shall be low voltage with three button (up/stop/down) switch and coverplate in standard 1-gang flush wall box. Screen to be listed by Underwriters' Laboratories and CSA.
2. Screen Construction – Screen shall be tab-tensioned with tensioning cable system to prevent curl and wrinkles. Screen fabric shall be flame retardant and mildew resistant. Screen image surface shall be seamless, 1.3 gain. Image size as follows:
   a. Size: Wide format (16:10): 139 in. wide x 87 in. high, with 12 in. of black drop
   b. Case Construction: Designed with wall trim and white powder coated case. No closure doors required at case opening.
3. Mounting – Include all brackets, suspension members and fasteners required by job conditions to wall mount to the inside face of the proscenium wall as shown on the drawings.

2.03 AUTOMATIC ELECTRIC PROJECTION SCREENS (GYMNASIUM)

A. Tensioned Contour Electrol electrically operated projection screen as follows:

1. Motor and Controls – Electrically operated 120 volt (60Hz), 1 amp. Motor shall be quick reversing, oiled for life, with automatic thermal overload cut-out, integral gears, capacitor and an electric brake to prevent coating. Motor controls shall be low voltage with three button (up/stop/down) switch and coverplate in standard 1-gang flush wall box. Screen to be listed by Underwriters' Laboratories and CSA.

2. Screen Construction – White aluminum screen housing screen shall be tab-tensioned to prevent curl and wrinkles. Screen fabric shall be flame retardant and mildew resistant. Screen image surface shall be seamless, 1.3 gain. Image size as follows:

   a. Size: Wide format (16:10): 160 in. wide x 100 in. high with 12 in. of black drop, surface mounted on face of soffit.

   b. Case Construction: Designed with ceiling mount trim to attach to bent plate bracket arms. Case shall be white powder coat finish. No closure doors required at case opening.

3. Mounting – Include all brackets, suspension members and fasteners required by job conditions.

PART 3 EXECUTION

3.01 INSTALLATION

A. Screens shall be mounted as shown in the drawings, in accordance with the approved shop drawings.

B. Wiring of electrically operated screen will be performed under SECTION 260001 -ELECTRICAL.

END OF SECTION

SECTION 116143

STAGE DRAPERY

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following, as shown on the drawings and specified herein:

1. Electrically operated draw and manual (walk) stage drapery and traveler tracks at Cafeteria platform.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Overhead Structure: SECTION 051200-STRUCTURAL STEEL.
2. Cubical curtains at Nurse's suite: SECTION 102600-MISCELLANEOUS SPECIALTIES.
3. Gymnasium divider curtain: SECTION 116600-ATHLETIC AND SPORTS EQUIPMENT.
4. Power for draw curtains: SECTION 260001-ELECTRICAL

1.04 SUBMITTALS

A. Submit the following in accordance with the provisions of SECTION 013300 – SUBMITTALS:

1. Bill of Materials: Bidders shall supply a complete bill of materials with their bids, clearly indicating the equipment the bidder shall furnish, including quantities, sizes, manufacturers' sample cards for fabric, cut sheets for track, and installation drawings. Colors and fabric shall be approved by the owner before fabrication or installation, as noted to describe the work.
2. Drawings: Submit component drawings and cut sheets, project specific installation drawings, and schedules showing all information necessary to explain the design features, appearance, function, fabrication, installation, and use of system components. This submission shall also include a copy of the bill of material listed above. They shall be approved by the Architect before beginning any fabrication, installation, or erection.

PART 2 PRODUCTS

2.01 GENERAL

A. Refer to Drawings for locations and sizes of openings at curtains.

2.02 MANUFACTURE

A. To establish a standard of quality, construction and design, specifications are based on curtains manufactured by KM and tracks manufactured by H&H.

B. Similar curtains and tracks by other manufacturers will be considered for approval by the Architect, upon receipt of adequate supporting data and samples.

C. Stage Curtain Scope:

1. Main Stage Curtain: Electrically operated, independent draw curtains manufactured by KM, Majestic Velour, color as selected by Architect from full range, complete with H & H 500 heavy duty cord operated track. Main curtain shall be visible through exterior windows and shall have velour fabric on both sides. Curtain machines shall be H & H Model 462 or equal, top mounted motors. Controls shall be synchronized to same speed of opening. Provide controls allowing for various curtain set up configurations. Curtains shall be controlled from the same location allowing simultaneous operation.
2. Rear Stage Curtain: Bi-parting walk curtain, manufactured by KM, Majestic Velour, color as selected by Architect from full range, complete with H&H 500 track.

D. All curtains to be manufactured with 50% fullness to form box pleats 12 in. on center. Heavy-duty jute webbing shall be double stitched into the header to accept grommets and S hooks for fastening to the curtain tracks. Bottom hem shall contain #10 jack chain, sewn in to a separate interior hem pocket that shall ride 2 in. above the finished curtain. All side hems and leading edges to be 12 in.

E. For all soft goods, provide a Certificate of Flame Resistance. Tag each piece with a permanent label providing flame retardancy information. Strictly comply with the manufacturer's instructions and recommendations except where more restrictive requirements are specified in this section.

PART 3 EXECUTION

3.01 INSTALLATION

A. Deliver materials and products in unopened factory packages. Store and handle all materials in strict compliance with manufacturer's instructions and recommendations. Protect all materials from damage. Sequence deliveries to avoid delays, but minimize on-site storage.

B The Drapery Subcontractor shall be responsible for storage of stage equipment, tools, and equipment during the period of the installation.

C. All specified equipment and drapery shall be installed by fully trained superintendents and workmen who are fully responsible to, and fully represent the stage drapery company.

D. Equipment shall be installed in a workman like manner, per plans, specifications and approved shop drawings.

E. Equipment shall be aligned, adjusted, and trimmed for the most efficient operation, the greatest safety and for the best visual appearance.

F. Installation practices shall be in accordance with OSHA safety and health standards and all local codes.

G. All operating parts shall be adjusted to work easily, smoothly and correctly.

H. All curtain panels should be clean and free of dust, lint, threads and dirt upon final installation and inspection by the owner.

3.02 CLEAN UP

A. The Drapery Subcontractor shall be responsible for clean-up, including removal of packing materials and the protection of surfaces or equipment provided by other contractors.

END OF SECTION

SECTION 116600

ATHLETIC AND SPORTS EQUIPMENT

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following items required to complete the work of this SECTION as shown on the drawings and specified herein:

1. Full and Side Court Backstops – Ceiling mounted, front braced, forward folding basketball backstops with backboard, goal, height adjuster feature, electronic winch, and all necessary hardware and components for a complete installation.
2. Gym divider curtains, electric fold up operation.
3. Volleyball standard systems.
4. Wall pads.
5. Traverse climbing wall with floor mats and mounting accessories.
6. Folding bleachers, manual operation, complete with accessories.
7. Refer to structural drawings for roof framing and furnish and install all supplemental members required to install ceiling and wall hung athletic equipment. **Structural calculations prepared by a Massachusetts registered structural engineer for all specified equipment hung from or supported by the building structure**.

B. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. For all paints and coatings, meet the requirements for IEQ Credit 2, Low-Emitting Materials and as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

3. For all composite wood and agrifiber products installed inside the weatherproofing, meet the requirements for IEQ Credit 2 as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

4. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Slab on deck subfloor and athletic flooring systems at recessed volleyball equipment: SECTION 033000 - CAST-IN-PLACE CONCRETE, SECTION 096566 – WOOD AND ATHLETIC FLOORING.

2. Wall and partition construction at wall mounted athletic equipment: SECTION 040001-MASONRY, SECTION 092116-GYPSUM WALLBOARD, and SECTION 098400-ACOUSTICAL WALL TREATMENT.

3. Overhead structure at ceiling supported equipment: SECTION 051200-STRUCTURAL STEEL.

4. Concealed wood blocking at wall mounted athletic equipment: SECTION 061000-ROUGH CARPENTRY.

5. Power for backstops and curtains: SECTION 260001-ELECTRICAL.

6. Electronic gymnasium scoreboard and shot clocks and associated consoles and accessories: SECTION 260001-ELECTRICAL.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with the provisions of SECTION 013300-SUBMITTALS.

B. Shop drawings shall include manufacturers specifications, and large scaled details of connection of equipment specified herein with adjacent construction accurately drawn with all pertinent dimensions provided. Include with shop drawings flame spread test results prepared by independent testing laboratory for wall padding and divider curtain.

1. Submit all structural calculations prepared by a Massachusetts registered **structural** engineer for all items proposed to be hung or supported by the building structure.

C. Submit the following samples in accordance with requirements of SECTION 013300-SUBMITTALS.

1. Mesh and solid divider curtain samples – 12 inches x 12 inches each type.
2. Color samples of divider curtains and wall pads, for full range of available colors, for selection by Architect.
3. Samples of plastic seat material for bleathers.

D. LEEDv4-S Submittals (Refer to SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per Section 018113-Sustainable Design Requirements.
3. Product substitution requests are subject to additional LEEDv4-S submittal requirements. Refer to SECTION 012500-SUBSTITUTION PROCEDURES.

1.05 QUALITY ASSURANCE

A. Source limitation: All components including suspension system, frame assembly, backboards, goals, electric winches, and controls for backstops shell be of a single manufacturer.

B. All welding to be performed by personnel having passed Welder Qualification testing in accordance with American Welding Society (AWS) code D1.1 or higher. Manufacturer to provide certification and test results upon request.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Provide volleyball floor sleeves, covers and floor inserts in accordance with requirements of related trades that are responsible for installation. Do not deliver balance of athletic equipment until building is enclosed and other construction within gymnasium is substantially complete.

1.07 WARRANTY

A. All Basketball Backstop support structures including clamps, fittings and tube to have a minimum warranty of 25 years from date of substantial installation. Warranty for other items to be as indicated in product specifications.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4 Materials Reporting Form shall be submitted for all materials in this SECTION:

1. Furnish any composite wood and agrifiber products such that they meet the formaldehyde emissions requirements for CARB ATCM for ultra-low-emitting formaldehyde (ULEF) or no-added formaldehyde (NAF) resins. Laminating adhesives used to fabricate on-site and shop applied composite wood and agrifiber assemblies must also meet this requirement. Refer to the requirements for IEQ Credit 2 as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2. Furnish ceiling and wall systems, including gypsum board products, insulation products, acoustical ceiling systems and wall coverings installed in the building interior (e.g., tackable surfaces), such that they meet the requirements for IEQ Credit 2 as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 MANUFACTURE – BASKETBALL BACKSTOPS, GYM DIVIDER CURTAINS, VOLLEYBALL EQUIPMENT AND WALL PADDING

A. To establish a standard of quality, design and function, drawings and specifications are based on athletic equipment by Jaypro Sports, LLC, Waterford, CT. Similar equipment by Porter Athletic Equipment, Draper and other manufacturers will be considered for approval by the Architect upon receipt of adequate supporting data.

2.02 FULL AND SIDE COURT BACKSTOPS WITH GLASS BACKBOARDS (6 REQUIRED)

A. Jaypro Model 849-FFFB ceiling mount, front braced, forward folding backstops as follows:

1. Ceiling Suspended Backstop shall be a welded together main frame constructed from steel mechanical tubing to form a rigid tetrahedral "T" design of back-to-back right triangles. The main stem shall be 6 inch OD 11-ga. steel tubing, the top of the "T" shall be 4 inch OD 11-ga. steel tubing and the side braces shall be 2-1/4 inch OD 14-ga. steel tubing. Side braces shall join stem no higher than 4 feet 6 inch above goal (18 inch above top of backboard). The main stem shall be long enough to allow ± 6-inch height adjustment of either fan or rectangular banks. The folding front brace shall be jackknife type, fully adjustable, self-locking in the down position and constructed of 2-1/2-inch OD 13-gauge (outer) steel tubing and 2-1/4 inch OD 14-gauge (inner) steel tubing.

2. Pivot or hinge joint for folding of backstop shall not exceed 15 inches from roof structure except when required by architectural conditions for coordination with other trades or equipment. Pivot or hinge point to be designed in a manner to provide a minimum structural capacity of 25,000 Lbs. and a safety factor of 55:1. The main backstop frame shall pivot on 1-1/4-inch minimum solid steel shaft secured in a milled bearing hole in ½-inch minimum steel plate hangers to insure accurate positioning of bank.

3. Bank attached to the 6-inch OD main stem by heavy-duty bank hangers. Hangers constructed of 1-inch x 2 inch 11-ga. steel tubing and formed ¼-inch steel plate with slotted holes for lateral adjustment. All banks shall have one upper bank hanger and include a goal brace, which attaches directly to the goal mounting plate and directly to the 6inch main stem of the backstop to eliminate any strain on the bank and help prevent glass breakage. This direct mount feature shall conform to NCAA recommendation No. 5-F.

4. Backstop shall be supported from 4 inch OD 11-ga. steel mechanical tubing anchored to roof structure by means of heavy steel support hangers. Attachment to building structure to be with clamps capable of supporting a minimum of 20,000 Lbs. each. Superstructure shall be designed with a minimum of four attachment clamps to produce a combined minimum attachment point safety factor of 75 to 1 and manufacture must be able to present independent testing data to substantiate safety factor. Superstructure tubes shall be reinforced with bridging and/or bracing when truss centers exceed 10 feet.

5. Finish: All metal parts shall have a gloss white powder coat finish.

2.03 BACKBOARDS, GOALS AND RELATED ACCESSORIES

A. Backboards – Provide backboard Model 503136 rectangular backboard 72 inches x 42 inches) tempered plate glass cushioned with shock absorbing vinyl gasket. Constructed of high strength clear anodized aluminum channel outer frame with engineered lower reinforced steel member. Standard white borders and target area shall be fired permanently into the glass. Provide Limited Lifetime Warranty against breakage. Backboard shall have MBBP-6 Bolt-on Safety Padding installed according to manufacturer's specifications.

1. ½-inch thick, fully tempered glass section with uniform load and impact strength. Official white border and target area is permanently fired into front side of glass section so that it cannot wear away.

2. Goal mount structure provided with two holes (7/16 inch) and two studs (3/8 inch-16) to secure backboard and goal to a direct mount "goal brace" feature which relieves all stress and shock on the backboard conforming to the latest NCAA Rules (BR-73, D-5). Goal mounting holes (4) to be standard 5 inch (horizontal) x 4 inch (vertical) mounting centers.

3. Backboard shall be covered by a Lifetime Limited Warranty when installed on a Jaypro basketball backstop with Goal Brace or Direct Mount Height Adjuster.

B. Backboard Safety Padding – Backboard Edge Padding shall be the Jaypro 5032XX. Provide pre-molded square corners. Padding shall meet or exceed all NCAA and High School Federation specifications.

C. Goals – Goal shall be the Jaypro Model 503576. Goal shall be designed to withstand shock loads. The rim shall deflect down when a static load of 230 pounds is applied. The rim shall return to the playing position once the load is removed.

1. Rim shall be fabricated from a 5/8-inch diameter steel rod formed into an 18 inch inside diameter ring. Inside of ring shall be positioned 6-inch from the face of backboard by a heavy-duty mounting plate with mounting holes centered to match 5 inches x 5 inches or 5 inch x 4 inch backboard mounting holes.

D. Controls – Flush wall mounted dual key switches shall be furnished complete with a stainless-steel cover plate. For safety, key switch to be located so that the operator has full view of all backstops while being operated. Switch shall be identical to that used for gym divider curtain. Wiring of all electrical components shall be in accordance with local codes and in accordance with manufacturer's instructions. All conduit, wiring, junction boxes and components not specified herein shall be furnished and installed by the electrical subcontractor.

E. Height Adjuster – 8 feet to 10 feet Height Adjuster shall be the Jaypro Model 503092 mount manual height adjuster with gloss white powder coat finish.

F. Safety Straps – Safety Strap shall be the Jaypro Model 503029.

1. Posilok safety strap shall be directly speed sensitive to automatically lock a basketball backstop in position at any time whether in storage or during the raising/lowering cycle. In the event of an over-speed situation caused by a malfunction of the hoisting apparatus, such as winch, cable, pulley, support fitting problems and similar issues, any increase in cycle speed or tension, whether sudden or gradual, immediately activates the locking device. The locking mechanism shall react to the actual speed of the reel and prevent it from exceeding a strap speed of 1.5 feet per second.

2. The Posilok shall incorporate a 2 in. wide belt rated at 7,300 lbs., maximum breaking strength. The entire unit must be capable of withstanding a test using a 1,750 lb. falling weight, without strap failure or structural damage. The locking mechanism must be fail-safe, so that any sticking, jamming or breakage of any of the components of the arresting mechanism results in immediate, positive locking of the reel. The locking mechanism to be self-checking and shall actively and positively confirm, six times per revolution, that the reel is traveling at a safe speed.

3. The strap shall extend a maximum of 38 feet and shall have a safety alert patch stitched to the strap to indicate the maximum safe extension. The strap shall also incorporate a breakaway loop stitched into its lower end to indicate if the unit has been subjected to a heavy load. A bright colored warning label will be exposed if the loop stitching has been broken.

4. The strap shall be automatically retracted and stored on a reel equipped with a special negator type constant force spring. The strap anchoring system must bear on the full width of the strap and be capable of taking the full breaking strength of the strap. The unit shall incorporate a fully automatic reset requiring no poles, ropes, levers or buttons to be used. The unit shall have an interlocking all-steel frame for strength and be powder coated for corrosion resistance and a modern, aesthetically pleasing appearance.

2.04 GYM DIVIDER CURTAIN

A. Roll-up curtain, Jaypro SC-680 Fold up Curtain, as follows:

1. Curtain shall be 51 ft.-3 in. wide by approximately 24 ft. high and shall be in one continuous section. When fully raised, the lowest portion of the curtain shall be at or above the level of the bottom of trusses – approximately 23 ft.-3 in. – above finish floor at the main basketball court, refer to the Drawings. Curtain manufacturer shall be the same as the basketball backstops to assure similar operation, safety, routine maintenance and service.

2. Gym Divider curtain shall be designed to fold compactly to the contour of the roof structure in order to allow maximum clearance for basketball or volleyball courts.

3. Curtain shall be hoisted by 1/8 in. dia. vandal proof, galvanized aircraft cable 2,100 lb. breaking strength each cable, spacing not to exceed 12 ft.-0 in.) passing thru D-ring type cable guides secured to the solid and mesh sections of the divider on approximate 18 in. centers. Bottom end of cables to terminate around 1-5/8 in. O.D. tube in bottom pocket and hinged in middle to form to roof contour in up position. Hinge to have torsion spring to assist bottom tube to lay flat in down position. Each end of bottom pocket shall be weighted for proper curtain operation.

4. Each hoist cable shall terminate in individual hoist spools on remote electric operator. Each hoist drum shall be sized with a variable diameter ratio system to allow divider curtain to raise and store into sloped ceilings, peaked or arched structure to conform to existing building conditions to all maximum clearance for all sports.

5. Hoist system shall be powered by means of a heavy duty 3/4 H.P., 115 V., single phase reversible capacitor start motor furnished with automatic overload protection.

6. Flush wall mounted dual key switch shall be furnished complete with a stainless steel cover plate. For safety, key switch to be located so that the operator has full view of the curtain while being operated. Switch shall be identical to that used for the basketball backstops. Wiring of all electrical components shall be in accordance with local codes and in accordance with manufacturer's instructions. All conduit, wiring, junction boxes and components not specified herein shall be furnished and installed by the electrical contractor.

7. Upper net section shall be designed for air breathing and light transfer. Net material to be an open polyester raschel knit with an approximate 80% open area. Color: To be selected by the Architect from manufactures standard colors. Materials shall be fire retardant (NFPA-701). Lower section of curtain shall be 8 ft.-0 in. high solid vinyl, polyester reinforced fabric 18 oz. per square yard containing anti-bacterial and flame retardant chemicals and shall meet NFPA-701 large and small scale test requirements. Color to be selected by Architect from manufacturers standard swatches. Curtain material shall be electronically welded. All hems and pockets on curtain shall be double needle lock stitched seams.

8. All metal components shall have gloss white powder coat finish.

9. Refer to drawings for locations of divider curtains and for roof structure for attachment conditions. Furnish and install all supplemental framing required to support curtains.

2.05 VOLLEYBALL EQUIPMENT

A. Rollaway System – Jaypro PVBC-270 Second Floor Competition Net Center Package (Infinite):

1. Standards shall be telescoping type that does not exceed above the net and impede the official's vision. Standards shall be constructed of 3-1/2 inch diameter 6063T6 type aluminum extrusion and finished with plastic molded foot to protect against gym floor damage. Upper end of the standard shall be equipped with an integral 2-1/3 inch diameter steel pulley to reduce cable drag and unnecessary tension. Upper telescoping portion of the standard shall be micro-adjustable for net heights from 6 feet-1 inch to 7 feet-11-5/8 inch by means of integral winch with removable handle.

2. Standards shall be equipped with a tensioning winch self-locking ratchet mechanism with a compression, disc-brake type release mechanism to eliminate the danger of suddenly released cable tension when removing a net. Standards shall include height-markings for ease in set-up. This system shall meet USAV, NCAA, NFSHSA and NAGWS requirements.

3. Net shall be 32 feet x 39 inch Jaypro PVBN-6 Flex Net International with heavy duty woven nylon top and bottom bands.

4. Furnish for one volleyball court.

2.06 WALL PADDING

A. JayPro plywood backed pads for interior use for application to masonry walls using “Z” clip attachment. Pads shall be installed on all wall surfaces in gym, as shown on the drawings. Provide custom dimensions shown on drawings.

1. Vinyl Cover: 14 oz. Vinyl with leather grain appearance, anti-fungal, Class A Fire Rated as a complete assembly Tear strength 92 x 83, strip tensile strength 365 x 348. Cover shall be wrapped around the backside of the plywood and stapled every 3 inches with galvanized steel staples. Color as selected by the Architect

2. Plywood: 7/16 in.: OSB (Oriented Strand Board), exterior exposure durability rating.

3. Attachment: One Pair of 18 ga. metal “Z” Clips are used to mount the pads to the wall at the top and 1-inch nailing margins at the bottom. “Z” Clips are mounted by ¼-inch bolts screwed into threaded washer inserts. The wall “Z” Clips are fastened with an appropriate anchor (provided by installer) for each wall type.

4. Foam Core: Glued to the plywood backing 2-inch prime polyurethane foam 10

2.07 TRAVERSE CLIMBING WALL SYSTEM

A. Manufacturer – To establish a standard of quality, design and function, Drawings and Specifications are based on traverse climbing wall system “Ultraverse” as manufactured by Gopher Sport, Owatonna, MN. Similar traverse climbing wall systems by Everlast Climbing, Minneapolis, MN, Entre-prises, Bend, OR and other manufacturers will be considered for approval by the Architect upon receipt of adequate supporting data.

B. Traverse Climbing Wall System – Traverse climbing wall system shall consist of the following:

1. One 20 ft. long by 8 ft. high and one 8 ft. x 4 ft. high installation made up of neoprene covered panels measuring 4 ft. wide by 8 ft. high. Each panel shall accommodate a variety of positions with fifty (50) t-nuts, pre-installed. Panels shall be predrilled to mount to gym masonry wall, including all mounting anchors and bolts hardware.

2. Floor Mats – Provide five floor mats measuring 6 ft. long by 4 ft. wide for the full length of the 20-foot climbing wall at the gymnasium and four (4) floor mats measuring 6 ft. long x 4 ft. wide at PT Room 155.

2.08 FOLDING BLEACHERS

A. To establish a standard of quality, design and function, drawings and specifications are based upon Maxam 26 with Courtside XC10 seat module manually operated folding bleachers by Hussey Seating Co., North Berwick, ME. Similar equipment by Irwin Seating Co., Interkal Polaris, CSM or other manufacturers will be considered for approval by the Architect, upon receipt of adequate supporting data.

1. Type: Manually operated telescoping bleachers.

B. Bleacher Components:

1. Enclosed deck.
2. Plastic Bleacher Seats – Bleacher seats shall be curved on the forward edge, 18 in. long (side to side) and 10 in. deep (front to back).
3. Accessible seating positions per Massachusetts's Architectural Access Board and ADA requirements. Accessible seats shall be recoverable with "Flex-row" or equal.
4. Handrails and Guardrails: Powder coated steel

C. Description:

1. The bleacher system shall be comprised of tiered, closed deck seating rows.
2. Bleachers shall be operable on the telescopic principle, stacking vertically in minimum floor area when not in use.
3. Each bleacher row shall be comprised of risers and seat components, and a complete set of supportive columns and braces.
4. The first moving row shall be secured by both mechanical and key locks. All other rows shall be mechanically locked, operable only upon unlocking and releasing the first row.

D. Wall Attached, Front Access Bleacher Units

1. Seating Area – Two banks, nominal 16 ft.-6 in. long banks, three rows high, wall attached, manually operated. Manual operation: User operates system by manually pulling / pushing each bank with operating handles.
2. Nominal Dimensions – Overall height: 3 ft.-1 in., open depth: 5 ft.-3 in. (6 ft.-2 in. including front step), closed depth: 3 ft.-5 in.
3. Row Spacing – 24 inches. Row rise: 9-5/8 inches.
4. Aisle Width – 3 ft.

5. Accessories:

   a. End Rails (where required): Self storing type, at the open ends of each group.

   b. End panels and extended rear deck walkway.

E. Design Criteria

1. Folding and telescopic seating shall be designed to support, in addition to its own weight, and the weight of added accessories, a uniformly distributed live load of not less than 100 lbs. per sq. ft. (488 kg. per sq. m.) of gross horizontal projection.

   a. Seat boards and footrest shall be designed for a live load of not less than 120 lbs. per linear foot (179 kg. per linear m).

   b. A sway force applied to seats shall be 24 lbs. per linear ft. (36 kg. per linear m.) parallel to the seats and 10 lbs. per linear ft. (15 kg. per linear m.) perpendicular to the seats. Sway forces shall not be considered simultaneously applied.

   c. Static point load (bleachers loaded with spectators) shall be no greater than 200 psi. Rolling load shall be no greater that 337 psi. Compliance with these load requirements shall be in the form of a certified engineers report.

2. Railings, posts and sockets designed to withstand the following forces applied separately:

   a. Handrails shall be designed and constructed for

      - A concentrated load of 200 lbs. (91 kg.) applied at any point and in any direction

      - A uniform load of 50 lbs. per ft. (74 kg/m) applied in any direction. The concentrated and uniform loading conditions shall not be required to be applied simultaneously. The concentrated and uniform loading conditions shall not be required to be applied simultaneously

   b. Guards shall be designed and constructed for:

      - A concentrated load of 200 lbs. per ft. (91 kg/m) applied at any point and in any direction along the top railing member and

      - A uniform load of 50 lbs. per ft. (74 kg/m) applied horizontally at the required guardrail height and simultaneous uniform load of 100 lbs. per ft. (149 kg/m) applied vertically downward at the top of the guardrail. The concentrated and uniform loading conditions shall not be required to be applied simultaneously.

3. American Institute of Steel Construction (AISC), American Iron and Steel Institute (AISI) and Aluminum Association (AA) design criteria shall be the basis for calculation of member sizes and connections.

F. Accessories

1. Aisles shall be footrest level. Aisle covers shall be steel and extend down to provide automatic closure panels to eliminate the "ladder effect" when the gym seats are closed. Aisles at the footrest level shall have non-slip treads on the top front edge.

2. End panels of plywood and supports shall be provided to enclose the open ends of the group in the closed position. End panels shall enclose the space between the wall and the back of the self-storing end rails. Finish to match deck panels.

3. End rails, if required, of the self-storing type, finished with textured epoxy powder-coated enamel, color to be selected by the architect from manufacturer's full line of standard colors, shall be provided at the open ends of the group. Rails shall meet all national building codes. End rails shall start at row two.

4. Rear filler panels located at the deck level used to close openings between top row and wall. Closure panel to match panelam deck surface.

5. Handicap seating areas shall be supplied according to codes that apply. Front rails and closure panels shall be provided behind these areas if required by system. Basis of design does not require rails.

6. Intermediate aisle steps shall be provided. Steps are permanently attached closed design. Steps shall be designed to eliminate any possible toe catch between the top of the intermediate step and the bottom of the nose beam per ADA or other applicable codes. Front step shall be hinged for storage on first row deck without the need for removal. Walking surface to match deck panels. Provide non-slip tread identification strip on leading edge of all stair nosing.

7. Aisle Handrails – Non-Removable folding aisle handrails shall be provided. Aisle railings shall be permanently attached to the mounting pocket and allow railings to pivot and fold within the deck without the need for removal. Aisle railing shall be an individual rail design, located on every other row starting at row two (2). Railing to be constructed of 1-1/2 in. 11 ga. round steel tubing, finished in a textured powder coated epoxy. Color will be selected by the Architect from manufacturer's full line of standard colors. Aisle rails that require removal, rails made of square tubing or rails systems spanning several rows will not be acceptable. For safety, rail pockets that protrude beyond the face of the bleacher while in the closed position shall not be allowed.

G. Fabrication

1. Understructure System:

   a. Steel supports and rolling frames shall be constructed of formed steel shapes of the size and shape necessary to support the design loads. All support bracing shall begin at Row 2 and be of diagonal “slant” or "knee" type for rigidity. Diagonal bracing to be a "U" shaped formed steel channel. Angle iron or "X" type bracing is unacceptable. Finish shall be rust-inhibiting black finish.

   b. Wheels shall not be less than 4" diameter x 1" non-marring soft rubber face to protect wood or synthetic floor surfaces. Each operating row shall have a minimum of 8 wheels.

   c. Provide lower frame interlocking to provide frame reliability.

   d. Each fully skirted wheel channel shall be continuously in contact with adjacent channels by nylon guides. Eliminate metal to metal contact. Non-binding guide rods to provide alignment when opening and closing. Lubrication shall not be required either at time of installation or periodically.

   e. Each cantilever arm shall be securely welded to the post assembly and contain non-binding interlocks with each row post assembly. Lubrication shall not be required either at time of installation or periodically.

   f. Columns and other supports shall be high tensile steel structural tube to meet design criteria.

   g. Deck stiffeners shall be bolted to both the rear beam and the nose with locking hardware.

2. Deck system:

   a. Lower rear riser shall be a continuous formed steel member recessed to provide full heel room and provide a continuous envelope for the deck and longitudinal support of the deck surface.

   b. Front nose beam to be a continuous structural member to support design loads and provide continuous longitudinal support of the deck surface.

   c. Panelam decking shall have a 0.030 (30 thousandths) high density polyethylene overlay, permanently bonded to structural western fir plywood in strict compliance with U.S. Product Standard PS 195. Finished thickness to be 5/8". Polyethylene finish to be textured grey or beige. Plywood shall be supported along the front and back edge for maximum rigidity. An "H" type aluminum splice beam shall be provided between all decks. Plywood with clear or painted finish is unacceptable.

d. Decking shall be through bolted to steel supports with locking hardware. Decking attached by the use of self-tapping fasteners is unacceptable.

3. Polymer Seat System:

   a. Plastic seat shall be provided in a monochromatic color, injection molded high density, 100% recyclable HDPE, 10 inches deep seat surface with ½ inch minimum interlock on seat and face. Tested to 600 lbs. occupant load.

   b. Module Size: 18 in. long x 10 in. deep.

   c. Seat height from deck to top of seat: Nominal 16 in.

   d. Color: As selected by the Architect from full range of manufacturer's standard colors.

   e. Integrally molded end caps, aisles and rear closure panel at back of seat to facilitate deck sweeping.

4. ADA Accessible Seating: Provide wheelchair accessible seating at locations indicated on the Drawings, or a minimum of one per bank of bleachers.

   a. Provide first row modular recoverable seating units that can be closed to accommodate persons requiring ADA spaces (Hussey "Flex-Row" or equal). Each Flex-Row unit shall have a handle for operation.

   b. Provide signage to mark the location of each recoverable Flex-Row module.

5. Finish

   a. For rust resistance in standard conditions all painted surfaces shall be finished in textured epoxy powder coated Semi-Gloss Black.

   b. Steel rear riser, steel nose and diagonal knee bracing shall be pre-galvanized with a minimum of G-90 zinc plating.

   c. Panel at decking shall have a textured polyethylene grey or beige finish.

PART 3 EXECUTION

3.01 GENERAL

A. Install equipment specified herein in accordance with approved shop drawings, and manufacturer's recommendations.

B. Cooperate fully with General Contractor and respective subcontractors to ensure that required back-up work is in place for mounting and installation of athletic equipment.

END OF SECTION

Division 12
Furnishings

SECTION 122413

ROLLER SHADES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following, as shown on the drawings and specified herein:

1. Roller shades for manual operation at all windows in classrooms, offices, and as otherwise scheduled herein. Roller shades at interior borrowed lites in hollow metal and curtainwall frames.
2. Roller shades for electronic operation in Cafeteria and Media Center.
3. Spring roller shades at interior door lites as noted herein.

B. LEED v4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-s Certification. LEEDv4-S Certification at “Silver” Level is an Owner requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated Sections:

1. Wood blocking and grounds for mounting roller shades and accessories SECTION 061000-ROUGH CARPENTRY.
2. Electrical power for electronic operating shades: SECTION 260001-ELECTRICAL.
3. Acoustic tile and grid at ceiling pocket box: SECTION 090003-ACOUSTICAL TILE.
4. Hollow metal door and borrowed lite frames: SECTION 081113-HOLLOW METALWORK

5. Aluminum windows, storefront and curtainwall: SECTION 080001-METAL WINDOWS

1.04 SUBMITTALS

A. Submit the following in accordance with the requirements of SECTION 013300 - SUBMITTALS.

B. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components, electrical requirements and profiles, features, finishes, and operating instructions.

C. Shop Drawings: Show location and extent of roller shades. Include elevations, sections, details, and dimensions not shown in Product Data. Show installation details, mountings, attachments to other work, operational clearances, and relationship to adjoining work.

D. Provide tabular schedule of all shades. Schedule shall include the following information: Window / frame / door type, room number, shade type, mounting, sizes of shade (to be field verified, number of shades, control type, control position, roll orientation, fabric, notes for special mounting instructions.

E. Samples for Initial Selection: For each colored component of each type of shade indicated.

1. Include similar Samples of accessories involving color selection.

F. Samples for Verification:

1. Complete, full-size operating unit not less than 16 inches wide for each type of roller shade indicated.

2. For the following products:

a. Shade Material: Not less than 12-inch- square section of fabric, from dye lot used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of material.

G. Product Certificates: For each type of roller shade, signed by product manufacturer.

H. Qualification Data: For Installer.

I. Product Test Reports: For each type of roller shade.

J. Maintenance Data: For roller shades to include in maintenance manuals. Include the following:

1. Methods for maintaining roller shades and finishes.

2. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.

3. Operating hardware.

K. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS)

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

3. Product substitution requests are subject to additional LEED-S submittal requirements. Refer to SECTION 012500-SUBSTITUTION PROCEDURES.

4. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. Source Limitations: Obtain roller shades through one source from a single manufacturer.

C. Fire-Test-Response Characteristics: Provide roller shade band materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. Flame-Resistance Ratings: Passes NFPA 701.

D. Electrical Components: NFPA Article 100 listed and labeled by either UL or ETL or other testing agency acceptable to authorities having jurisdiction, marked for intended use, and tested as a system. Individual testing of components will not be acceptable in lieu of system testing. Where applicable, system components shall be FCC compliant.

E. Requirements for Electronic Hardware, Controls, and Switches:

1. Roller shade hardware, shade fabric, and all related controls shall be furnished and installed as a complete system and assembly.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in factory packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same designations indicated on Drawings and in a window treatment schedule.

1.07 PROJECT CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Power and control wiring shall be complete and certified, fully operational with uninterrupted communication on the lines and minimal noise.

C. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.08 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Rollers Shades: Before installation begins, for each size, color, texture, and pattern indicated, full-size units equal to 5 percent of amount installed.

1.09 WARRANTY

A. Warranty: Provide manufacturer’s standard warranties, including the following:

1. Roller Shade Hardware, and Shade cloth: Manufacturer’s standard non-depreciating twenty-five year limited warranty.

a. EcoVeil standard non-depreciating 10-year limited warranty.

2. Electronic Roller Shade Control Systems: Manufacturer’s standard non-depreciating five-year warranty.

PART 2 PRODUCTS

2.00 LEED v4-S PRODUCT REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Furnish any adhesives and sealants meeting the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. Furnish any ceiling and wall system components, including gypsum board products, insulation, acoustical ceiling systems and wall coverings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113-SUSTIANABLE DESIGN REQUIREMENTS.

2.01 CLUTCH ROLLER SHADES

A. Manufacture: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

1. Mecho Shade Systems, Inc.
2. Walker Specialties, Inc., Boston, MA
3. Hunter Douglas Nysan Solar Control.

B. Shade Band Material: PVC-coated fiberglass or polyester, “shearweave” style 2500 (1% openness factor) as manufactured by Phifer Wire Products, Inc. or an approved equal:

1. Pattern: Basket weave, woven into a 45 x 45 mesh
2. Colors: As selected by Architect
3. Weight: 14.26 ounces per sq. yd.
4. Material openness factor: 1% at all locations.

C. Rollers: Electro-galvanized or epoxy primed steel or extruded-aluminum tube of diameter and wall thickness required to support and fit internal components of operating system and the weight and width of shade band material without sagging; designed to be easily removable from support brackets; with removable spline fitting integral channel in tube for attaching shade material.

D. Direction of Roll: Regular, from back of roller. “Regular roll” as a default. Reverse roll as indicated on drawings confirmed in field and noted on Shop Drawings, at locations where reverse roll is required to clear hardware.

E. Mounting Brackets: Galvanized or zinc-plated steel.

F. Bottom Bar: Steel or extruded aluminum. Provide concealed, by pocket of shade material, internal type bottom bar with concealed weight bar required for smooth, properly balanced shade operation.

G. Mounting Enclosures:

1. Full-head box for use at all reverse roll wall or window frame mounted shades, head box shall fully enclose reverse roll except necessary at bottom for shade. Reverse roll shall be provided where required for shade fabric to pass freely in front of operable window hardware.
2. Ceiling pocket box: (Draper: Type D Pocket; Armstrong: Axiom Perimeter Shade Pocket, or equal) shall be extruded aluminum pocket. Box shall enclose roller with bottom closure extrusions set for regular or reverse roll necessary at given applications. Provide ceiling box as indicated in schedule herein and as shown on the Drawings. Provide matching aluminum covers at corners as shown on the Drawings to cover gaps in pocket; covers shall be mitered.
3. Fascia: Where jamb to jamb mounting is used at regular roll.
4. Head box, ceiling pocket box or fascia panel shall be installed to conceal the roller tube and mounting hardware, providing a clean, finished look. Head box, ceiling pocket box and fascia panel shall be made of approximately .062 in. extruded aluminum, painted with a high-quality baked enamel finish. Color to be selected by the Architect.
5. Mounting brackets shall support both the roller tube and must be capable of inside mounting, outside mounting or to the ceiling, or to the vertical window mullions, with the clutch on either end of the roller. All brackets shall be made of .060 in. steel, painted with a high-quality finish to match the full-head box, ceiling pocket box or fascia panel.
6. Head box and ceiling pocket shall support the roller tube.
7. Fascia shall hook onto the top of the bracket and snap in place, remaining firmly attached.

H. Hold-Down Brackets and Hooks or Pins: Manufacturer's standard for anchoring roller shade bottom in place and keeping shade band material taut.

I. Valence: Double fascia (front and back), manufacturer’s standard, color as selected by the Architect.

J. Ceiling pocket box with 3 in. closure panel for all motorized shades,

2.02 MOTORIZED CLUTCH ROLLER SHADES – CAFETERIA & MEDIA CENTER

A. General: Provide factory-assembled motorized shade operation systems designed for lifting shades of type, size, weight, construction, use and operation frequency indicated. Provide operation systems of size and capacity and with features, characteristics and accessories suitable for Project conditions and recommended by shade manufacturer, complete with electric motors and factory-prewired motor controls, remote-control stations, remote-control devices, power disconnect switches, enclosures protecting controls and all operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with the building electrical system.

1. Shade manufacturer, rollers, bottom bar, mounting enclosure and shade material: as specified under Article 2.01.B.

2. Mounting enclosure at all motorized shades shall be ceiling pocket box, with custom covers at corners to cover gap in shades.

B. Comply with NFPA 70.

C. Control Equipment: Comply with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6 with NFPA 70, Class 2 control circuit, maximum 24-V ac or dc.

D. Electric Motors: UL-approved or recognized, totally enclosed, insulated motor, complying with NEMA MG 1, with thermal-overload protection, brake, permanently lubricated bearings, and limit switches; sized by shade manufacturer to start and operate size and weight of shade considering service factor or considering Project's service conditions without exceeding nameplate ratings.

1. Service Factor: According to NEMA MG 1, unless otherwise indicated.

2. Motor Characteristics: Single phase, 220 V, 60 Hz.

3. Motor Mounting: Within manufacturers standard roller enclosure.

E. Position of Motor and Electrical Connection: Right side of roller, as determined by hand of user facing shade from inside, unless otherwise indicated on Drawings.

F. Remote Controls: Electric controls with NEMA ICS 6, Type 1 enclosure for recessed mounting. Provide the following devices for remote-control activation of shades:

1. Control Stations: Keyed, maintained-contact, three-position, switch-operated control station with open, close and off functions. Provide two keys per station:

a. Color: White.

2. Group Control Stations: Maintained-contact, three-position, rocker-style, wall switch-operated control station with open, close and center off functions for single-switch group control.

3. Microprocessor Controls: Electronic programmable means for setting, changing, and adjusting control features. Provide unit isolated from voltage spikes and surges.

G. Limit Switches: Adjustable switches, interlocked with motor controls and set to automatically stop shade at fully raised and fully lowered positions.

H. Operating Function: Stop and hold shade at any position.

I. Operating Features: Include the following:

1. Group switching with integrated switch control; single face plate for multiple switch cut-outs.

2. Capable of interface with audiovisual control system.

3. Capable of accepting input from building automation control system.

4. Override switch.

5. Backup gear and crank operator for manual operation during power failures with detachable handle, length required to make operation convenient from floor level.

2.03 CLUTCH ROLLER SHADE FABRICATION

A. Product Description: Roller shade consisting of a roller, a means of supporting the roller, a flexible sheet or band of material carried by the roller, a means of attaching the material to the roller, a bottom bar, and an operating mechanism that lifts and lowers the shade.

B. Concealed Components: Non-corrodible or corrosion-resistant-coated materials.

1. Lifting Mechanism: With permanently lubricated moving parts.

C. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 degrees F:

1. Shade Units Installed Outside Jambs: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

D. Installation Brackets: Designed for easy removal and reinstallation of shade, for supporting fascia, roller, and operating hardware and for hardware position and shade mounting method indicated.

E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to shade hardware and adjoining construction; type designed for securing to supporting substrate; and supporting shades and accessories under conditions of normal use.

F. Color-Coated Finish: For metal components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

2.04 CLUTCH ROLLER SHADE COMPONENTS

A. Access and Material Requirements:

1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.

2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.

B. Motorized Shade Hardware and Shade Brackets:

1. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel, or heavier, thicker, necessary to support 150 percent of the full weight of each shade. Plastic components without use of steel angle construction do not meet the intent of this specification and shall not be accepted.

2. Provide shade hardware system that allows for field adjustment of EDU or replacement of any operable hardware component without requiring removal of brackets, regardless of mounting position (inside, or outside mount).

C. Manual Operated Chain Drive Hardware and Brackets:

1. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.

2. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.

3. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.

4. Provide shade hardware system that allows for operation of multiple shade bands (multi-banded shades) by a single chain operator, subject to manufacturer's design criteria. Connectors shall be offset to assure alignment from the first to the last shade band.

5. Provide shade hardware system that allows multi-banded manually operated shades to be capable of smooth operation when the axis is offset a maximum of 6 degrees on each side of the plane perpendicular to the radial line of the curve, for a 12 degrees total offset.

6. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable.

7. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as necessary to support 150 percent of the full weight of each shade.

8. Drive Bracket / Brake Assembly:

    a. MechoShade Drive Bracket model M5 shall be fully integrated with all MechoShade accessories, including, but not limited to: SnapLoc fascia, room darkening side / sill channels, center supports and connectors for multi-banded shades.

    b. M5 drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch (9.525 mm) steel pin.

    c. The brake shall be an over running clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. (22 kg) in the stopped position.

    d. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.

    e. The entire M5 assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.

9. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. Nickel plate chain shall not be accepted.

2.05 SCHEDULE OF CLUTCH ROLLER SHADES

A. Furnish and install manual roller shades at all window openings, curtainwall systems and corridor sidelights adjacent to door frames. Refer to Contract Drawings for windows, curtainwall and hollow metal sidelight frame opening sizes and installation conditions:

1. Exterior windows and curtainwall:
Types A, A1, A2, A3, B, B1, C, C1, D, E, E1, F

B. Furnish and install electrically operated roller shades:

1. Curtainwall: Types CWA.1, CWA.2, CWA.3, CWC.3 (portion at Cafeteria only), CWE (portion at Cafeteria only).

2.06 SPRING ROLLER SHADES

A. Manufacture: To establish a basis of design, quality and function, drawings and specifications are based on spring roller shades by Walker Specialties. Shades by other manufacturers will be considered by the Architect as an equal upon receipt of adequate supporting data and samples.

B. Shade Cloth: High quality 12 oz. 100% polyester with acrylic backing opaque room darkening shade cloth, Sierra Sol “Tempe” by Roll Ease or approved equal, as follows:

1. Cloth shall show no streaks and no evidence of bleeding.
2. There shall be no evidence of holes, cracking or breaking.
3. Material shall be washable and non-tearable.
4. Breaking Strength: 160 x 140 lb.
5. Thread Count: 64 threads per square inch.
6. The finish length of each single hung shade after hemming should be 12” longer than the portion of the sash covered by the shade.
7. The finish width of shades shall be 2 in. wider than the sash width. Sash width as determined by glazing width plus stops.

C. Rollers: All shades to be mounted on 1-¼ in. wood rollers with springs; suitable for shade size and meeting Fed. Standards.

D. Hem Bar: Bottom hem bar shall be 1-¼ in. straight grained pine with stainless steel eyelet and rayon pull.

E. Brackets: Brackets shall be heavy duty cadmium plated steel. Suitable size and type to fit based on the size of the shades. Bracket is capable of mounting into head, side or back of windows.

F. Fascia: Furnish and install fascia and fascia end cap covers for concealed appearance. Fascia color as selected by Architect.

2.07 SCHEDULE OF SPRING ROLLER SHADES

A. Furnish and install spring roller shades in the following interior hollow metal borrowed lites openings. Refer to Contract Documents for quantities, window opening sizes and installation conditions:

B. Interior Borrowed Lites:

1. Interior borrowed lites at hollow metal and wood frames:
Frame Types 3, 3A, 4, 4A, 5, 5A, 6, 6A
(Note: No shade required at transom lites).

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 ROLLER SHADE AND SPRING ROLLER SHADE INSTALLATION

A. Install shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions, and located so shade band is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.

3.03 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.04 CLEANING AND PROTECTION

A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by the Architect, before time of Substantial Completion.

3.05 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner’s maintenance personnel to adjust, operate, and maintain roller shades. Refer to SECTION 017700-PROJECT CLOSEOUT.

END OF SECTION

SECTION 124813

MATS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Furnish and install the following, as shown on the drawings and specified herein:

1. Entrance grilles and related accessories.
2. Mats and related accessories.

B. Prepare new surfaces to properly receive the materials to be furnished and installed hereunder. Include sanding, cleaning, and installing mastic underlayment, as necessary, to ensure the specified level of tolerance and bonding of tile and base.

C. Test moisture content/relative humidity (RH) and alkalinity (pH) level of concrete slabs to receive finishes specified herein.

D. Furnish and install adhesives complying with minimum relative humidity of 99% and a level of alkalinity (pH) not less 7 nor greater than 11.

E. LEEDv4-S Requirements:

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at “Silver” Level is an Owner Requirement that is critical to secure project funding from the Massachusetts School Building Authority. LEEDv4-S requirements for the work of this Section are detailed herein, and additionally in DIVISION 1 of this Project Manual.
2. For all adhesives and sealants, meet the requirements for IEQ Credit 2, Low-Emitting Materials and as defined in Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS.
3. For all flooring systems, meet the requirements for IEQ Credit 2, Low-Emitting Materials and as defined in Subparagraph 2.04 of Section 018113-SUSTAINABLE DESIGN REQUIREMENTS.

4. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. Recesses for mats and grilles, where shown on the drawings: SECTION 033000-CAST-IN-PLACE CONCRETE.
2. Adjacent floor finishes: SECTION 090005-RESILIENT FLOORING and SECTION 096816-CARPETING.
3. Moisture mitigation for resilient flooring and carpeting: SECTION 090005 - RESILIENT FLOORING and SECTION 096816 - CARPETING, respectively.
4. New concrete slabs including floor leveling to comply with specified floor flatness and floor levelness criteria: SECTION 033000-CAST-IN-PLACE CONCRETE.

1.04 SUBMITTALS

A. Submit complete shop drawings in accordance with the provisions of SECTION 013300-SUBMITTALS.

B. Show dimensions and details of mats and grilles, indicating installation details showing proposed anchorage to surrounding materials.

C. Submit product and color samples of entrance mat, grilles and edging.

D. Qualifications:

1. The Flooring Subcontractor shall have a master mechanic or associate mechanic on his staff. As part of the submittal process, submit master mechanic or associate mechanics credentials.

E. LEED for Schools Submittals (Refer to SECTION 013300-SUBMITTALS):

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.
3. Product substitution requests are subject to additional LEED-S submittal requirements, see SECTION 012500-SUBSTITUTION PROCEDURES.

1.05 ADDITIONAL MATERIALS

A. Upon completion of the mat flooring work, furnish to maintenance representative of the Owner, the following materials for future maintenance replacement:

1. Twenty (20) lineal feet of each grille insert material, in each color used.

B. Additional materials shall be taken from the same manufacturer's run used on the project, to avoid possible deviation in colors.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All materials shall be delivered in their original unopened packages and protected from exposure to the elements.

B. Damaged or deteriorated materials shall be removed from the premises.

C. Liquid materials shall be stored at a temperature not less than 45 degrees F.

PART 2 PRODUCTS

2.00 LEEDv4-S PRODUCT REQUIREMENTS:

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Furnish any adhesives and sealants, meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

2. Furnish all flooring materials and all associated adhesives/sealants and paints/coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.

2.01 GENERAL

A. Refer to Drawings for locations and sizes of mats.

2.02 MANUFACTURE

A. To establish a standard of quality, construction and design, manufacture has been based upon products by Forbo Flooring Systems, Hazelton, PA. Similar mats and grilles by other manufacturers will be considered for approval by the Architect, upon receipt of adequate supporting data and samples.

B. Interior Grilles – Grilles shall have steel linkage and scraper bars with wiper strip inserts and metal perimeter edging. Grilles are based upon “Nuway Tuftguard” by Forbo.

1. Assembly: aluminum (100% recycled) brass scraper bars and buffed prime rubber and polyamide fiber composite wiper strips. Wiper strips ad scraper bar assembled in a closed construction with high tensile electro galvanized steel wire linkages running through the components.

2. Size: Refer to edge of slab drawings (series 3.4) and V.I.F. extent of slab depression.

3. Style: Classic; 17mm.

C. Interior Mats – Mats shall be reinforced with resilient monofilament fiber strips composed of capillary, heavy-duty textured yarn.

1. Coral Brush by Forbo mats incorporate three types of 100% polyamide cut-pile forms and vinyl backing. Two colors shall be used. Color Type 1 and Color Type 2.

a. Physical Characteristics: (dimensions are approximate)

Gouge	(0.354 in.) 9mm
Backing	EVERFORT vinyl
Width	Approx. 79 in. (2 meters)

Length 90.22 ft. (27.5 meters)
Roll Size 65.78 yards^2 (55 meters^2)
Mat Sizes: Refer to Drawings

b. Slip Resistance: Meets or exceeds A.D.A. recommendation of 0.6 for flat surfaces when tested in accordance with ASTM D 2047, Standard Test Method for Static Coefficient of Friction.

c. Durability: Wear Classification of 33 when tested in accordance to EN 1307.

d. Castor Resistance: Suitable for office chairs with castors when tested in accordance with EN 985, Castor Chair Test.

e. Impact Sound Reduction: 32db when tested in accordance with ISO 140-8, Measurement of sound insulation in buildings and of building elements. aW 0.25 when tested in accordance with ISO 354, Measurement of sound absorption in a reverberation room.

f. Fire Testing: Class 1 when tested in accordance with ASTM E 648/NFPA 253, Standard Test Method for Critical Radiant Flux. Meets 450 or less when tested in accordance with ASTM E 662/NFPA 258, Standard Test Method for Smoke Density. Passes when tested in accordance to ASTM D 2859, Standard Test Method for ignition Characteristics of Finished Textile Floor Covering Materials/Pill Test.

g. Color Fastness: Rated 5.0 when tested in accordance to AATCC 129-01, Colorfastness to Ozone in Atmosphere Under High Humidity. Rated 5.0 when tested in accordance to AATCC 129-01, Colorfastness to Oxide of Nitrogen in Atmosphere Under High Humidity.

2.03 FABRICATION

A. General: Where possible, verify sizes by field measurement before shop fabrication.

B. Grilles: Shop fabricate units to greatest extent possible in sizes as indicated. If not otherwise indicated, provide single unit for each mat installation; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Miter corner joints in framing elements with hairline joints or provide prefabricated corner units without joints.

C. Recessed Metal Mat Frames: Extruded aluminum of size and style to fit floor mat type specified, for permanent recessed installation, complete with corner pins or reinforcement and anchorage devices.

1. Fabricate edge-frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced and pieces spliced together by straight connecting pins.

D. With manufacturer's standard protective coating, coat surfaces of aluminum frames that will contact cementitious material.

2.04 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.05 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: non-specular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.

2.06 APPLICATION

A. It is the intent of this SECTION that the carpet and the additional backing be fabricated as a single system and delivered to the job site for installation. The carpet and backing as a system shall meet all requirements for CLASS I fire rating.

2.07 ADHESIVES (MOISTURE MITIGATION)

A. Adhesives – as recommended by the respective Mat Manufacturers and in compliance with:

1. Relative humidity (RH) up to 99%.
2. Alkalinity (pH) range not less than 7 and/or not greater than 11.

B. Manufacturers shall be compatible with products provided herein and be one of the following or an approved equal:

1. “Sustain 1299” adhesive (by Forbo International)
2. “Magellan XPA” adhesive (by LJM Technologies)
3. “AquaFlex” adhesive (by Formulators, Inc.)

4. Other manufacturers of similar moisture mitigation system / product / adhesives meeting SCAQMD, Rule 1168 for low VOC adhesives will be considered as an equal upon receipt of adequate supporting data and performance criteria.

PART 3 EXECUTION

3.01 MOISTURE CONTENT OF CONCRETE SLABS

A. Monitor Moisture Content of Concrete Slabs

1. Monitor moisture content of new concrete floor slabs to receive floor finishes to verify that moisture control procedures are sufficient to dry slabs sufficiently to permit floor finishes to be installed.
2. Continuously monitor relative humidity and moisture content of floor slabs starting after curing of concrete is complete. Perform the following procedures at least once every two weeks, increase frequency to once per week for the month prior to floor finish installation.
    a) Perform a hydrous calcium chloride test, ASTM F 1869.
    b) Perform relative humidity test using in situ probes, ASTM F 2170.
3. ***Conduct minimum of one test for each 150 sq. ft.*** of floor area or more frequently when drying rate is slower than anticipated.

3.02 SUBSTRATE

A. Sub floor preparation, including installation of moisture mitigation system and leveling materials as recommended by the respective resilient flooring material manufacturers.

1. The resilient flooring subcontractor shall be responsible for furnishing and installing leveling materials as recommended by respective manufacturers for the various substrate conditions resulting in smooth, feathered changes in plane.
2. Concrete subfloor preparation, including leveling to be performed under this SECTION, shall include but is not limited to the following:
    a. Filling of minor cracks and imperfections in new subfloors.

3.03 INSTALLATION

A. Install recessed mat frames to comply with manufacturer's written instructions. Set mat tops at height recommended by manufacturer for most effective cleaning action; coordinate top of mat surfaces with bottom of doors that swing across mats to provide clearance between door and mat.

1. Install necessary shims, spacers, and anchorages for proper location and secure attachment of frames.
2. Install grout and fill around frames and, if required to set mat tops at proper elevations, in recesses under mats. Finish grout and fill smooth and level.

3.04 PROTECTION

A. After completing frame installation and concrete work, provide temporary filler of plywood or fiberboard in recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

B. Defer installation of floor mats until Project is near Substantial Completion.

3.05 CLEANING

A. General Cleaning: Refer to Manufacturer's Cleaning and Maintenance Instructions.

B. Owner's Personnel: Instruct Owner's personnel in proper maintenance procedures.

END OF SECTION

Division 14
Conveying Systems

SECTION 140001

ELEVATORS

*(Filed Sub-Bid Required)

PART 1 GENERAL

1.00 TIME, MANNER AND REQUIREMENTS FOR SUBMITTING TRADE SUB-BIDS

A. Trade Sub-bids shall be submitted in accordance with provisions of the General Laws (Ter. Ed.), Chapter 149, Section 44A to 44L, inclusive, as amended. The time and place for submission to Sub-Bids shall be set forth under INSTRUCTIONS TO BIDDERS.

B. Each Trade Sub-Bid filed with the Awarding Authority must be accompanied by BID BOND, or CERTIFIED CHECK, or a TREASURER'S CHECK or CASHIER'S CHECK issued by a responsible bank or trust company, payable to the **City of Amesbury**, in the amount stipulated in the INSTRUCTIONS TO BIDDERS. A Trade Sub-Bid accompanied by any other form of bid deposit than those specified will be rejected.

C. Each Trade Sub-Bid submitted for the work, under this SECTION, shall be on a form furnished by the Awarding Authority, and required by SECTION 44F of Chapter 149 of the General Laws, as amended.

D. Work to be performed under this SECTION is shown on Contract Drawings numbered:

G.0.01, G.0.02, G.0.04-G.0.08, inclusive; 2.1.00-2.8.03, inclusive; 3.4.01-3.5.01, inclusive; 5.2.01-5.2.07, inclusive; 5.4.01-5.5.03, inclusive; 7.4.01; 9.4.01-9.8.07, inclusive; 9.7.01-9.7.07, inclusive; and 10.0.01-10.3.13, inclusive.

Remaining Contract Drawings are included for reference and coordination.

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a sub-bid for the work of this SECTION.

1.02 SCOPE OF WORK

A. Provide all materials, labor and equipment required for the complete installation of the work of this Section including but not limited to:

1. One three-stop machine room-less (MRL) elevator system.
2. Emergency battery back-up for lowering of cab and opening of doors during power outage for a period of one hour.

B. Provide all labor, engineering, tools, transportation, services, supervision, materials, and equipment necessary for and incidental to satisfactory completion of required work as indicated in Contract Documents.

C. Provide all required staging, hoisting, and movement of new equipment.

D. Furnish and install sill support angles as necessary.

E. Elevator subcontractor shall provide empty conduit and a back box in elevator cab for a card reader access control system.

F. All code mandated signage: elevator certificate frame, no smoking and serial numbers; code compliant signage on Elevator Control Room door; code compliant signage on head of frame at main elevator entrance level.

G. Furnish and install an emergency battery back-up for lowering cab and opening doors during a power outage.

H. Elevator subcontractor's duties include, but are not limited to, the following:

1. Coordination, scheduling, and management of work of component suppliers and subcontractors.
2. Furnish and install equipment as specified utilizing newly constructed hoistway and control room.
3. Coordinating with and assisting electrical subcontractor with running LAN cabling in hoistway duct to the monitoring equipment compartment in each machine room. Elevator contractor to coordinate with electrical contractor to install all required wiring/cabling for a complete system. Include in the base bid the required time to assist with LAN cable installation. No additional fees will be accepted for coordination and assisting with cable installation by the electrical contractor.
4. Provide and pay for labor, materials and equipment, tools, construction equipment and machinery, and other facilities and services necessary for proper execution and completion of required work.
5. Give required notices.
6. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities which bear on performance of required work.
7. Promptly submit written notice to Architect of observed variance of Contract Documents from legal requirements.
8. Enforce strict discipline and good order among employees. Do not employ persons unskilled in assigned task.

I. Furnish the following items for installation under the designated SECTIONS:

1. All inserts including elevator shaft angles and rail supports to be installed/secured to masonry: by SECTION 040001-MASONRY.
2. All inserts required to be installed in concrete: SECTION 033000-CAST-IN-PLACE CONCRETE.

3. All inserts required to be attached to structural steel: SECTION 051200-STRUCTURAL STEEL.

J. LEEDv4-S Requirements (Refer to SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS):

1. The work of this section includes material and submittal requirements for fulfillment of Project LEEDv4-S Certification. LEEDv4-S Certification at "Silver" Level is an Owner Requirement that is critical to secure project funding from Massachusetts School Building Authority. LEEDv4-S requirements for the work of this section are detailed herein, and additionally in DIVISION 1 of this Project Manual.

2. Meet the LEEDv4-S requirements for MR Credit 2, Building Product Disclosure and Optimization – Environmental Product Declarations as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS. Provide manufacturers' product documentation for each product having an Environmental Product Declaration (EPD).

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is to be performed under the designated SECTIONS:

1. The following shall be provided under SECTION 015000-TEMPORARY FACILITIES AND CONTROLS.

a. Temporary electrical power for erection requirements and testing purposes.

b. Protection for hoistway during installation of elevator equipment.

2. Concrete, in conjunction with the elevator equipment: SECTION 033000-CAST-IN-PLACE CONCRETE.

3. Hoistway and grouting solid masonry at sill support angles and other attachments: SECTION 040001-MASONRY.

4. Ladder for elevator pit and bar grate cover for sump: SECTION 050001-MISCELLANEOUS AND ORNAMENTAL IRON.

5. Waterproofing, for elevator pit: SECTION 070001-WATERPROOFING, DAMPPROOFING AND CAULKING.

6. Finish flooring for cab: SECTION 090005-RESILIENT FLOORING.

7. Voice station cabling to phone connection to police department and fire department: SECTION 275000-DISTRIBUTED COMMUNICATION SYSTEM.

8. The following shall be provided under SECTION 260001-ELECTRICAL.

a. Lighting and GFCI convenience outlets in pit, machine room, and overhead machinery spaces. (Provide one additional non-GFCI convenience outlet in pit for sump pump –

b. Three-phase mainline copper power feeder with true earthen grounding to terminals of each elevator controller in the machine room with protected, lockable "open"

c. Single-phase copper power feeder to each elevator controller for car lighting and exhaust blower with individual protected, lockable "open" disconnecting means located in machine room.

d. Emergency telephone line to each individual elevator control panel in elevator machine room.

e. Fire alarm initiating devices in each elevator lobby for each group of elevators or single elevator and each machine room to initiate firefighters' return feature. Provide alarm initiating signal wiring or machine room connection point to elevator controller terminals. Device in machine room to provide signal for general alarm and discrete signal for Phase II firefighters' operation.

f. Conduit from the closest hoistway of each elevator group or single elevator to the firefighters' control room or lobby panel if present. Coordinate size, number, and location of conduits with Elevator Contractor.

9. Card / Proximity Reader Security System provided and installed (including reader control units, mounting brackets, wiring materials, logic circuits): SECTION 281000-INTEGRATED SECURITY SYSTEM.

10. Area of Rescue Assistance system and signage: SECTION 260001-ELECTRICAL.

1.04 SUBMITTALS

A. Submit shop drawings in accordance with the provisions of SECTION 013300-SUBMITTALS.

B. Shop Drawings shall include general arrangements of elevator equipment, installation details dimensioned with relation to structural conditions, and all electrical characteristics and requirements for the equipment. Indicate the following information on the shop drawings.

1. Provide large scale (minimum ½ inch) shop drawings for fabrication, installation and erection. These drawings shall include plan view of hoistway, pit, section through pit, hoistway; detailed scaled drawings of all accessories, fixtures, anchorages and connections. Include rail reactions and load reactions in elevator pit. Provide scaled plan elevations and details of car enclosures and hoistway entrances.

2. Elevator diagrams showing service to each level. Show layout, access, and ventilating requirements for hoistway.

3. Seismic design data in accordance with A17.1 Part XXIV for Seismic Risk Zone 2 or greater. Only steel "T" rails are to be used and rail connections shall comply with seismic requirements of the Massachusetts Building Code, certified by a Professional Structural Engineer who is registered in the Commonwealth of Massachusetts.

4. Elevator control functions and operational description.

C. Submit scaled shop drawing layouts for all code required signage for Elevator Control Room door and at main level elevator head frame.

D. Product Data: Provide data on the following items:

1. Signal and operating fixtures, operating panels, indicators.
2. Cab design, dimensions, layout and components.
3. Cab and hoistway door and frame details.

E. The elevator subcontractor shall submit the following certificate, signed by an officer of the company with the shop drawings: “I certify that all materials and equipment shown on the attached shop drawings, to be installed at **New Amesbury Elementary School, Amesbury, MA**, comply with the specifications in all respects.”

F. Schematic: Provide legible schematic of electric wiring diagrams describing installed equipment. Provide one copy of master schematic, mounted in plastic glazed metal frame, mounted in elevator pit next to access pit loader.

G. All equipment included in the elevator installation shall have repair or replacement parts readily accessible to the general elevator trade. Without limitation, this shall include diagnostic tools, solid state boards, and controller components required for the complete maintenance of the installed equipment. See section G1. i-k below.

H. In accordance with SECTION 017823-OPERATIONS AND MAINTENANCE DATA, upon completion of the installation, the elevator contractor shall submit to the Architect for transmittal to the Owner the items listed herein.

1. Maintainable Equipment Design: OEM equipment is acceptable if this section can be adhered too in every detail.
    a. Provide three sets of neatly bound written information necessary for proper maintenance and adjustment of equipment within 30 days following final acceptance. Final retention will be withheld until data is received by Owner and reviewed by Consultant. Include the following as minimums:
    b. Straight-line wiring diagrams of “as-installed” elevator circuits with index of location and function of components. Mount one set wiring diagrams on panels, racked, or similarly protected, in elevator machine room. Provide remaining set rolled and in a protective drawing tube. Maintain all drawing sets with addition of all subsequent changes. These diagrams are Owner’s property. A legend sheet shall be furnished with each set of drawings to provide the following information:
        1) Name and symbol of each relay, switch, or other apparatus.
        2) Location on drawings, drawing sheet number and area, and location of all contacts.
        3) Location of apparatus, whether on controller or on car.

c. Written Maintenance Control Program (MCP) specifically designed for the equipment included under this contract. Include any unique or product specific procedures or methods required to inspect or test the equipment. In addition, identify weekly, bi-weekly, monthly, quarterly, and annual maintenance procedures, including statutory and other required equipment tests.

d. Printed instructions explaining all operating features.

e. Complete software documentation for all installed equipment.

f. Lubrication instructions, including recommended grade of lubricants.

g. Parts catalogs listing all replaceable parts including Contractor's identifying numbers and ordering instructions.

h. Four sets of keys for all switches and control features properly tagged and marked.

i. Diagnostic test devices together with all supporting information necessary for interpretation of test data, troubleshooting of elevator system, and performance of routine safety tests.

j. The elevator installation shall be a design which can be maintained by any licensed elevator maintenance company employing journeymen mechanics, without the need to purchase or lease additional diagnostic devices, special tools, or instructions from the original equipment Contractor.

1) Provide onsite capability to diagnose faults to the level of individual circuit boards and individual discrete components for the solid-state elevator controller.

2) Provide a separate, detachable device to the Owner as part of this installation if the equipment for fault diagnosis is not completely self-contained within the controller. Such device shall be in possession of and become property of the Owner.

3) Installed equipment not meeting this requirement shall be removed and replaced with conforming equipment at no cost to the Owner.

k. Provide upgrades and/or revisions of software during the progress of the work and a period of 10 years.

2. Acceptance of such records by Owner and/or Consultant shall not be a waiver of any Contractor deviation from Contract Documents or shop drawings or in any way relieve Contractor from his responsibility to perform work in accordance with Contract Documents.

l. Maintenance Instruction – In accordance with the provisions of SECTION 017700-PROJECT CLOSEOUT, provide the Owner's maintenance staff with up to eight hours of operation and maintenance instruction for the installed elevator systems.

J. Submit the following samples in accordance with the provision of SECTION 013300-SUBMITTALS.

1. Manufacturer's standard samples of plastic laminate proposed for use in cars, for color and pattern selection by the Architect.
2. Samples chips of all paints and finishes proposed for use, for selection by the Architect.

K. LEEDv4-S Submittal Requirements (See SECTION 013300-SUBMITTALS)

1. Relevant supporting documentation required by LEED for Schools v4 and as detailed in Section 018113-Sustainable Design Requirements.
2. A completed LEED MATERIALS REPORTING FORM, per SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

1.05 QUALITY ASSURANCE

A. Consultant’s final observation and review requirements:

1. Review procedure shall apply for individual elevators, portions of groups of elevators and completed groups of elevators accepted on an interim basis, or elevators and groups of elevators completed, accepted, and placed in operation.
2. Contractor shall perform review and evaluation of all aspects of its work prior to requesting Consultant’s final review. Work shall be considered ready for Consultant’s final contract compliance review when all Contractor’s tests are complete and all elements of work or a designated portion thereof are in place and elevator or group of elevators are deemed ready for service as intended.
3. Furnish labor, materials, and equipment necessary for Consultant’s review. Notify Consultant five working days in advance when ready for final review of elevator or group of elevators.
4. Consultant’s written list of observed deficiencies of materials, equipment, and operating systems shall be submitted to Contractor for corrective action. Consultant’s review the following.
    a. Workmanship and equipment compliance with Contract Documents.
    b. Contract speed, capacity, floor-to-floor, and door performance comply with Contract Documents.
    c. Performance of following is satisfactory:
        1) Starting, accelerating, running
        2) Decelerating and stopping accuracy
        3) Door operation and closing force
        4) Equipment noise levels
        5) Signal fixture utility
        6) Overall ride quality

7) Performance of door control devices

8) Operations of emergency two-way communication device

9) Operations of firefighters' service

10) Operations of seismic devices if installed

11) Operations of special security features and floor lock-off provisions

12) Operations of remote monitoring devices

d. Test Results:

1) In all test conditions, obtain specified contract speed, performance times, stopping accuracy without re-leveling, and ride quality to satisfaction of Owner and Consultant. Tests shall be conducted under both no load and full load condition.

2) Temperature rise in motor windings limited to 50° Celsius above ambient. A full-capacity one-hour running test, stopping at each floor for ten seconds in up and down directions, may be required.

5. Performance Guarantee: Should Consultant's review identify defects, poor workmanship, variance or noncompliance with requirements of specified codes and/or ordinances, or variance or noncompliance with the requirements of Contract Documents, Contractor shall complete corrective work in an expedient manner to satisfaction of Owner and Consultant at no cost as follows:

a. Replace equipment that does not meet code or Contract Document requirements.

b. Perform work and furnish labor, materials, and equipment necessary to meet specified operation and performance.

c. Perform retesting required by Governing Code Authority, Owner, and Consultant.

6. A follow-up final contract compliance review shall be performed by Consultant after notification by Contractor that all deficiencies have been corrected. Provide Consultant with copies of the initial deficiency report marked to indicate items which Contractor considers complete.

1.06 ELEVATOR ACCEPTANCE

A. The elevator installation shall be fully operational, with all necessary permits, tests and inspections obtained, prior to acceptance by the Architect. All equipment shall be test operated, and adjusted by the elevator subcontractor and the proper operation of the elevator and its various component systems shall be demonstrated to the Owner.

1.07 SERVICE AND GUARANTEE

A. Provide preventive maintenance and emergency callback service for one year commencing on date of final acceptance by Owner. Systematically examine, adjust, clean, and lubricate all equipment. Repair or replace defective parts using parts produced by the Contractor of installed equipment. Maintain elevator machine room, hoistway and pit in clean condition.

B. Maintenance shall be performed on regular time. Included overtime callbacks and any repairs necessary to restore the elevator to operation as necessary.

C. Annual test permit and labor to perform the annual test before the end of the warranty period shall be included. Apply for permit 90 days prior to the end of the warranty period.

D. Use competent personnel, acceptable to the Owner, supervised and employed by Contractor.

E. The warranty maintenance period shall be extended one month for each three-month period in which equipment related failures average more than 1 per unit per month.

1.08 DEFINITIONS

A. All terms in this Specification shall have the meaning defined in the Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks A17.1, as approved by the United States of America Standards Institute, including all revisions and authorized changes to date. In all cases where a device or part of the equipment is herein referred to in the singular number, it is intended that such reference shall apply to as many such devices as are required to complete the installation.

1.09 CODES

A. Compliance with Regulatory Agencies: Comply with most stringent applicable provisions of following codes, laws, and/or authorities, including revisions and changes in effect:

1. Safety Code for Elevators and Escalators, ASME A17.1 and Massachusetts 524 CMR
2. Guide for Inspection of Elevators, Escalators, and Moving Walks, ASME A17.2
3. Elevator and Escalator Electrical Equipment, ASME A17.5
4. National Electrical Code, NFPA 70
5. Americans with Disabilities Act, ADA
6. Local Fire Authority
7. Requirements of IBC, DSA, and all other Codes, Ordinances and Laws applicable within the governing jurisdiction
8. Life Safety Code, NFPA 101
9. Uniform Federal Accessibility Standard, UFAS

1.10 PERMITS, TESTS AND INSPECTIONS

A. Obtain and pay for necessary Municipal or State Elevator Inspections and permits; also, make such tests as called for by the regulations of such authorities. The capacity and operational performance tests shall be conducted in the presence of the code enforcement officer after completion of the installation.

1.11 INSERTS

A. Provide all items which require insertion into the concrete and masonry or be secured to the structural steel in sufficient time as not to delay the progress of the respective trades. Should such items not be delivered in time to be built in, the Elevator Subcontractor shall pay all costs for the cutting and installation of same.

1.12 POWER REQUIREMENTS

A. Elevator power supply: 480 Volts, 3-phase, 3 wire, 60 hertz with reduced voltage starting. Feeders and breakers furnished and installed under SECTION 260001 have been engineered based upon the following elevator apparatus power requirements:

1. Tractor Drive Rating: 15 HP

   Full Load Amps

   Running: 24 Amps

   Accelerating: 36 Amps

B. Lighting supply: 120 Volts, 15 AMP capacity, 60 hertz.

C. Starters shall be solid state type.

1.13 CHANGES IN THE WORK

A. The Elevator Subcontractor shall bear all costs incurred for changes in the work from that shown on the Contract Drawings, due to the requirements of this equipment.

B. Hoistway Coordination, Spatial Coordination, Building Coordination: Provide a complete, fully functional, Code complying elevator system and assembly which fits the hoistway and spaces indicated and which is coordinated with the adjacent and related work indicated.

1. Do not assume the hoistway or any other space will be resized or reconfigured to accommodate the proposed or submitted elevator. Make the elevator fit the hoistway and spaces indicated.

2. Do not assume any other building modifications will be made to accommodate the elevator installation. The total cost of all modifications required to install the submitted elevator system including, without limitation, modifications to run by space, doors, access panels, structural members, walls, ceilings, floors, stairs, steps, platforms, ladders, guards, louvers, vents, power, services, utilities, fire alarms and any other item or work shall be included in the base bid elevator cost.

PART 2 PRODUCTS

2.00 LEEDv4-S REQUIREMENTS

A. Products and materials used for this section of the work are required to meet the following criteria for LEEDv4-S materials Credits, and a completed LEEDv4-S MATERIALS REPORTING FORM shall be submitted for all materials in this SECTION:

1. Furnish any adhesives, sealants, paints and coatings such that they meet the requirements for IEQ Credit 2, Low-Emitting Materials as defined in SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS.
2. Recycled Content. (See SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS for overall project recycled content requirements.) General Contractor shall examine each product or material specification below for a stated minimum recycled content requirement, and if none is stated, the requirements under 018113 shall govern.
3. Regional Content. (See Section 018113 Sustainable Design Requirements for overall project regional content requirements.) General Contractor shall examine each product or material specification below for a stated minimum regional content requirement, and if none is stated, the requirements under 018113 shall govern.
4. Furnish any composite wood and agrifiber products such that they meet the formaldehyde emissions requirement for CARB ATCM for ultra-low-emitting formaldehyde (ULEF) or no-added formaldehyde (NAF). Laminating adhesives used to fabricate on-site and shop applied composite wood and agrifiber assemblies must also meet this requirement. Refer to the requirements for IEQ Credit 2 as defined in SECTION 018113-SUSTAINABLE DESIGN REQUIREMENTS.

2.01 ELEVATOR MATERIALS AND EQUIPMENT

A. Manufacturer: To establish a standard of quality, design and function, drawings and specifications are based on the following manufacturers or client approved equal:

1. Controllers: KONE, Otis, Schindler, ThyssenKrupp, Motion Control (MCE), Vertitron Midwest (VMI) Elevator Controls, (EC), SmartRise,
2. Door Operators: KONE, GAL, Otis, Schindler, ThyssenKrupp, AMD
3. Traction Elevator, KONE, Otis, Schindler, ThyssenKrupp, Imperial
4. Car Enclosure: Eklund's Inc., Gunderlin, Ltd., Hauenstein & Burmeister, KONE, Otis, Schindler, ThyssenKrupp, Tyler
5. Hoistway Entrance: Hauenstein & Burmeister, KONE, Otis, Schindler, ThyssenKrupp, Tyler,

B. Elevators and elevator equipment manufactured by other manufacturers will be considered as an equal by the Architect upon receipt of adequate supporting data.

C. Description of Elevator Equipment and Car

Quantity	One
Type of Elevator	Gearless, Machine Room-Less (MRL) Passenger Elevator
Operation	Microprocessor based simplex collective
Drive	AC, VVVF
Capacity, Class A	3,500 lbs.
Car Speed (FPM)	200 FPM
Travel in Feet	30 feet 0 inches
Number of landings	3
Number of Openings	3
Front	3
Rear	0
Machine Location	In hoistway overhead, rail mounted
Car Doors	3 ft.-6 in. wide x 7 ft. high, single speed side opening
Hoistway Doors	3 ft.-6 in. wide x 7 ft. high, single speed side opening
Cab Interior (clear inside must meet stretcher code)	6 ft.-8 in. wide x 5 ft.-5 in. deep
Door Operation	Automatic Medium Speed, 2.0 fps. Power-Operated for Car and Hoistway Doors
Seismic	Install elevator in accordance with A17.1 Part XXIV for Seismic Risk Zone 2 or greater and Seismic requirements of the Massachusetts Building Code.

D. Furnish and install, including necessary hardware and software to the elevator controllers, emergency battery back-up for lowering cabs and opening doors during power outage.

E. Materials – General

1. Steel:

   a. Sheet Steel (for Unexposed Work): Hot-rolled, commercial quality carbon steel, pickled and oiled, complying with ASTM A568/A568M-03.

   b. Structural Steel Shapes and Plates: ASTM A36.

2. Stainless Steel (**All Exposed Work**): Type 302 or 304 complying with ASTM A240, or equal with standard tempers and hardness required for fabrication, strength and durability. Apply mechanical finish on fabricated work in the locations shown or specified, Federal Standard and NAAMM nomenclature, with texture and reflectivity required to match Architect's sample. Protect with adhesive paper covering.

   a. No. 4 Satin: Directional polish finish. Graining directions as shown or, if not shown, in longest dimension.

3. Aluminum: Extrusions per ASTM B221; sheet and plate per ASTM B209.

4. Plastic Laminate: ASTM E84 Class A and NEMA LD3.1, Fire-Rated Grade (GP-50), Type 7, 0.050 in. ±.005 in. thick, color and texture as follows:

   a. Exposed Surfaces: Color and texture selected by Architect.

   b. Concealed Surfaces: Contractor's standard color and finish.

5. Fire-Retardant Treated Particle Board Panels: Minimum 3/4" thick backup for natural finished wood and plastic laminate veneered panels, edged and faced as shown, provided with suitable anti-warp backing; meet ASTM E84 Class "I" rating with a flame-spread rating of 25 or less, registered with local authorities for elevator finish materials.

6. Paint: Clean exposed metal parts and assemblies of oil, grease, scale, and other foreign matter and factory paint one shop coat of standard rust-resistant primer. After erection, provide one finish coat of industrial enamel paint. Galvanized metal need not be painted.

7. Prime Finish: Clean all metal surfaces receiving a baked enamel paint finish of oil, grease, and scale. Apply one coat of rust-resistant primer followed by a filler coat over uneven surfaces. Sand smooth and apply final coat of primer.

8. Baked Enamel Finish: Prime finish per above. Unless specified "prime finish" only, apply and bake three additional coats of enamel in the selected solid color.

9. Entrance Support Equipment within Hoistway: Include strut angles, headers, sill support angles, fascia, hanger covers, and similar items. Clean, remove, and check for corrosive activity. Replace components that exhibit severe deterioration. Tighten all fastenings. Repaint exposed surfaces with two coats of rust preventive primer.

2.02 CAR AND GROUP PERFORMANCE

A. Car Speed: ± 3% of contract speed under any loading condition.

B. Car Capacity: Safely lower, stop and hold 125% of rated load.

C. Car Stopping Zone: ±1/4 in. under any loading condition.

D. Door Opening Time: 2.5 Seconds from start of opening to fully open. (typical 42 in. x 84 in. SSSO doors)

E. Door Closing Time: 4.0 Seconds from start of opening to fully closed. (typical 42 in. x 84 in. SSSO doors)

F. Car Ride Quality:

1. Acceleration and Deceleration: Smooth constant and not more than 3 feet/second^2 with an initial ramp between 0.5 and 0.75 second.
2. Sustained Jerk: Not more than 6 feet/second^3.
3. Measurement Standards: Measure and evaluate ride quality consistent with ISO 18738, using low pass cutoff frequency of 10 Hz and A95 peak-to-peak average calculations.

G. Noise and Vibration Control:

1. Airborne Noise: Measured noise level of elevator equipment and its operation shall not exceed 55 dBA inside car under any condition including door operation and car ventilation exhaust blower on its highest speed. Limit noise level in the machine room relating to elevator equipment and its operation to no more than 80 dBA. All dBA readings to be taken 3 ft. off the floor and 3 ft. from the equipment using the "A" weighted scale.
2. Vibration Control: All elevator equipment provided under this contract, including power unit, controller, oil supply lines, and their support shall be mechanically isolated from the building structure and electrically isolated from the building power supply and to each other to minimize the possibility of objectionable noise and vibrations being transmitted to occupied areas of the building.

2.03 OPERATION

A. Selective Collective Microprocessor-Based.

1. Operate car without attendant from pushbuttons in car and located at each floor. When car is available, automatically start car and dispatch it to floor corresponding to registered car or hall call. Once car starts, respond to registered calls in direction of travel and in the order the floors are reached.
2. Do not reverse car direction until all car calls have been answered, or until all hall calls ahead of car and corresponding to the direction of car travel have been answered.
3. Slow car and stop automatically at floors corresponding to registered calls, in the order in which they are approached in either direction of travel. As slowdown is initiated for a hall call, automatically cancel hall call. Cancel car calls in the same manner. Hold car at arrival floor an adjustable time interval to allow passenger transfer.

4. Answer calls corresponding to direction in which car is traveling unless call in the opposite direction is highest (or lowest) call registered.

5. Illuminate appropriate pushbutton to indicate call registration. Extinguish light when call is answered.

B. Elevator Security:

1. Controls and fixtures including, but not limited to, car button, position, indicator, control panels, fans, lights, emergency call buttons, placards and access panels shall be of vandal resistance construction. All exposed fasteners shall be tamperproof.

2. In the car station install an on/off key switch adjacent to each floor landing push button. The key switch is to be removeable in both the on/off position and is to control that individual push button.

3. Install an on/off key switch in the ground floor hall station. The key is to removeable in both positions. When in the off position, the elevator shall shut down with the doors closed.

C. Other Items:

1. Load Weighing: Provide means for weighing car passenger load. Control system to provide dispatching at main floor in advance of normal intervals when car fills to capacity

2. Independent Service: Provide controls for operation of each car from its pushbuttons only. Close doors by constant pressure on desired destination floor button or door close button. Open doors automatically upon arrival at selected floor.

3. Car-to-Lobby Feature: Provide the means for automatic return to the floor. Return car nonstop after answering pre-registered car calls, and park with doors open for an adjustable time period of 60-90 seconds. Upon expiration of time period, car shall automatically revert to normal operation and close its doors until assigned as next car or until the car is placed on manual control via in-car attendant or out-of-service switch.

D. Firefighters' Service: Provide equipment and operation in accordance with code requirements.

E. Automatic Car Stopping Zone: Stop car within 1/4" above or below the landing sill. Maintain stopping zone regardless of load in car, direction of travel, distance between landing.

F. Remote Monitoring and Diagnostics: Equip each controller and the group dispatch logic controller, with standard ports, interface boards, and drivers to accept maintenance, data logging, fault finding diagnostic, and monitoring computers, keyboards, modems, and programming tools.

G. Motion Control: AC type with unit valve suitable for operation specified and capable of providing smooth, comfortable car acceleration and retardation. Limit the difference in car speed between full load and no load to not more than ±10% of the contract speed in either direction of travel.

H. Door Operation: Automatically open doors when car arrives at main floor. At expiration of normal dwell time, close doors. Reopen doors when car is designated for loading. Provide front or rear selective door operation if dual entrances are present. Provide "heavy door/variable air pressure" feature for consistent specified door operation within appropriate speed and inertia limits.

1. Elevator shall be programmed so that the cab control panel only responds after the card reader has been utilized from each floor landing upon which the cab floor buttons in the cabs will be activated.

I. Standby Lighting and Alarm: Car mounted battery unit with solid-state charger to operate alarm bell and car emergency lighting. Battery to be rechargeable with minimum five-year life expectancy. Include required transformer. Provide constant pressure test button in service compartment of car operating panel. Coordinate location of light fixture with Owner/Architect.

1. Emergency Battery Back-up - Furnish and install all necessary hardware and software to each elevator controller and provide emergency battery back-up. The battery lowering unit shall automatically lower the elevator cabs to the first floor and open the doors upon loss of power to the building. When normal power has been restored the elevator system shall return to normal operation.

J. Card/Proximity Reader Security System: Provide wiring provisions to interface with security devices provided by SECTION 281000-INTEGRATED SECURITY SYSTEMS for reader unit. Mount reader units as described below and cross connect from car pushbuttons to control module in machine room. Reader control units mounting brackets, wiring materials, logic circuits, and similar items by Security Subcontractor. Provide a filler plate to match card slot size and car return panel finish.

1. Install one (1) card reader at corridor call buttons at each floor level (total of 3).
2. Integrate with the elevator control system so that a positive card read at a card reader allows the elevator call button associated with a specific floor to be activated and respond. The call button shall not respond without first initiating a positive card read.
3. Installation and integration with the elevator control system shall be coordinated and performed in conjunction with the elevator subcontractor.

4. Install one (1) card reader inside each elevator cab (total of 1). Integrate with elevator control system so that a positive card read at a card reader allows the elevator cab call buttons to respond. The cab call buttons shall not respond without first initiating a positive card read.

5. Installation and integration with the elevator control system shall be coordinated and performed in conjunction with the security subcontractor.

2.04 HOISTWAY COMPONENTS

A. Guides for the elevator car shall be planed steel elevator "T" guide rails, 15 lbs./ft. properly fastened to the building structure with steel brackets. The car stile shall be fitted at top and bottom with roller type guide shoes.

B. Machine: AC gearless machine, rail mounted, with permanent magnet synchronous motor, direct current electro-mechanical disc brakes and integral traction drive sheave, mounted to the Gearless Traction Hoist Machine:

C. Governor: Friction type over-speed governor rated for the duty of the elevator specified.

D. Buffers, Car and Counterweight: Polyurethane buffer.

E. Hoistway Operating Devices:

1. Emergency stop switch in the pit
2. Terminal stopping switches.
3. Emergency stop switch on the machine

F. Positioning System: System consisting of magnets and proximity switches.

G. Buffers, Car, and Counterweight: Spring type with blocking and support channels.

H. Sheaves: Machined grooves and sealed bearings. Provide mounting means to machine beams, machine bedplate, car and counterweight structural members, or building structure.

I. Counterweight: Steel frame with metal filler weights.

J. Counterweight Guide Shoes: Spring dampened roller guide shoes.

K. Governor Rope and Encoder Tape Tensioning Sheaves: Mount sheaves and support frame on pit floor or guide rail. Provide frame with guides or pivot point to enable free vertical movement and proper tension of rope and tape.

L. Hoist and Governor Ropes:

1. 8 x 19 or 8 x 25 Seale construction, traction steel type. Fasten with staggered length, adjustable, spring isolated wedge type shackles or OEM suspension means for machine room-less elevators
2. Governor rope to suit Contractor's specification.

M. Electrical Wiring and Wiring Connections:

1. Conductors and Connections:
   a. Copper throughout with individual wires coded and connections on identified studs or terminal blocks.
   b. Use no splices or similar connections in wiring except at terminal blocks, control compartments, or junction boxes.
   c. Provide 10% spare conductors throughout. Run spare wires from car connection points to individual elevator controllers in the machine room.
   d. Provide four (4) pair of spare shielded communication wires in addition to those required to connect specified items.
   e. Tag spares in machine room.
2. Conduit:
   a. Painted or galvanized steel conduit, EMT, or duct.
   b. Minimum Conduit Size: 1/2 in.
   c. Flexible heavy-duty service cord may be used between fixed car wiring and car door switches for door protective devices.
   d. Conduit from the closest hoistway of each elevator group or single elevator to the firefighters' control room, and/or main control console. Coordinate size, number, and location of conduits with Electrical Contractor.
3. Traveling Cables:
   a. Flame and moisture-resistant outer cover.
   b. Prevent traveling cable from rubbing or chafing against hoistway or equipment within hoistway.
   c. Provide 5 pair of shielded wires and twisted shielded pair for card reader.
   d. Provide one (1) RG-6/U coaxial CCTV cables within traveling cable from car controller to car top, plus 3 f excess loop at both ends.
   e. Provide two pair 14-gauge wire for CCTV power.

4. Auxiliary Wiring: Connect fire alarm initiating devices, emergency two-way communication system, firefighters' phone jack, paging speaker, CCTV, card reader

2.05 MACHINE ROOM EQUIPMENT

A. Arrange equipment in existing machine room spaces and/or as shown on drawings.

B. Solid State Power Conversion and Regulation Unit:

1. Provide solid state, alternating current, variable voltage, variable frequency (ACV3F), I.G.B.T. converter/inverter drives.

2. Design unit to limit current, suppress noise, and prevent transient voltage feedback into building power supply. Provide internal heat sink cooling fans for the power drive portion of the converter panels. Conform to IEEE standards 519-1992 for line harmonics and switching noise.

3. Isolate unit to minimize noise and vibration transmission. Provide isolation transformers, filter networks, and choke inductors.

4. Suppress solid-state converter noises, radio frequency interference, and eliminate regenerative transients induced into the mainline feeders or the building standby power generator.

5. Supplemental direct-current power for the operation of hoist machine brake, door operator, dispatch processor, signal fixtures, from separate static power supply.

6. ACV3F Drives for gearless elevators shall be regenerative and utilize IGBT converter/inverter and dynamic braking during overhauling condition.

C. Encoder: Direct drive, solid-state, digital type. Update car position at each floor and automatically restore after power loss.

D. Controller: UL/CSA labeled.

1. Compartment: Securely mount all assemblies, power supplies, chassis switches, relays on a substantial, self-supporting steel frame. Completely enclose equipment with covers. Provide means to prevent overheating.

2. Relay Design: Magnet operated with contacts of design and material to insure maximum conductivity, long life, and reliable operation without overheating or excessive wear. Provide wiping action and means to prevent sticking due to fusion. Contacts carrying high inductive currents shall be provided with arc deflectors or suppressors.

3. Microprocessor-Related Hardware:

a. Provide built-in noise suppression devices which provide a high level of noise immunity on all solid-state hardware and devices.

b. Provide power supplies with noise suppression devices.

c. Isolate inputs from external devices (such as pushbuttons) with opto-isolation modules.

d. Design control circuits with one leg of power supply grounded.

e. Safety circuits shall not be affected by accidental grounding of any part of the system.

f. System shall automatically restart when power is restored.

g. System memory shall be retained in the event of power failure or disturbance.

h. Equipment shall be provided with Electro Magnetic Interference (EMI) shielding within FCC guidelines.

4. Wiring: CSA labeled copper for factory wiring. Neatly route all wiring interconnections and securely attach wiring connections to studs or terminals.

5. Permanently mark components (relays, fuses, PC boards) with symbols shown on wiring diagrams.

6. Provide controller or machine mounted auxiliary, lockable “open,” disconnect if mainline disconnect is not in sight of controller and/or machine.

2.06 HOISTWAY ENTRANCES

A. Complete entrances bearing fire labels from a certified testing laboratory approved by authority having jurisdiction.

B. Frames: 14-gauge stainless steel at all floors. Bolted and lapped head to jamb assembly at all floors. Provide Arabic floor designation/Braille plates, centered at 60" above finished floor, on both side jambs of all entrances. Provide plates at main egress landing with “Star” designation. For designated emergency car, provide “Star of Life” cast designation plates at height of 78 in. - 84 in. above finished floor on both side jambs at all floors. Braille indications shall be below Arabic floor designation. Provide cast floor designation/Braille plates as manufactured by SCS Elevator Products, Inc. with permanent rear fasteners.

C. Door Panels: 16-gauge stainless steel, sandwich construction without binder angles. Provide leading edges of center-opening doors with rubber astragals. Provide a minimum of two gibs per panel, one at leading and one at trailing edge with gibs in the sill groove entire length of door travel. Construct door panels with interlocking, stiffening ribs. Sight Guards: 14 gauge, same material and finish as hoistway entrance door panels. Construct without sharp edges.

D. Sills: Extruded nickel silver.

E. Sill Supports: Structural or formed steel designed to support door sill based upon car loading classification. Mount to eliminate need for grout under the sill.

F. Fascia, Toe Guards and Hanger Covers: 14-gauge stainless steel. Struts and Headers: Provide all support of entrances and related material to building structure. Provide door open bumpers on entrances equipped with vertical struts.

G. Elevator Identification Signage: Provide alpha-numerical car label at designated floor. Provide metal plate, finish to match designated fixture finish.

H. Finish of Frames and Doors: Satin Stainless Steel

I. Hoistway Access: Hoistway Access Switches: Mount in entrance frame side jamb at top and bottom

J. Entrance Equipment:

1. Door Hangers: Two-point hanger roller with neoprene roller surface and suspension with eccentric upthrust roller adjustment.
2. Door Tracks: Bar or formed, cold-drawn removable steel tracks with smooth roller contact surface.
3. Door Interlocks: Operable without retiring cam. Paint interlock box flat black.
4. Door Closers: Spring, spirator, or jamb/strut mounted counterweight type. Design and adjust to insure smooth, quiet mechanical close of doors.

K. Hoistway Access Switches: Mount in wall / entrance frame side jamb at top and bottom floors. Provide switch with faceplate.

L. Floor Numbers: Stencil paint 4 in. high floor designations in contrasting color on inside face of hoistway doors or hoistway fascia in location visible from within car.

2.07 CAR EQUIPMENT

A. Frame: Welded or bolted, rolled or formed stainless steel channel construction to meet load classification specified.

B. Safety Device: Type “B,” flexible guide clamp.

C. Platform: Isolated type, constructed of steel, or steel and wood that is fireproofed on underside. Design and construct to accommodate load classification requirements. Provide Class “A” construction for passenger elevators,. Provide recess to accommodate a minimum ½ in. floor thickness.

D. Platform Apron: Minimum 14-gauge steel, reinforced and braced to car platform with Contractor’s standard finish.

E. Guide Shoes: Roller type with three or more spring dampened, sound-deadening rollers per shoe. Minimum 6 in. outside diameter.

F. Finish Floor Covering:

1. Passenger Car: Resilient flooring shall be furnished and installed by SECTION 090005-RESILIENT FLOORING.

G. Sills: One-piece Nickel Silver extrusion with extruded extension between car entrance columns to face of car front return. Extruded extension to match finish of sill.

H. Door Panels: 16-gauge stainless steel, sandwich construction without binder angles. Provide leading edges of center-opening doors with rubber astragals. Provide a minimum of two gibs per panel, one at leading and one at trailing edge with gibs in the sill groove entire length of door travel. Construct door panels with interlocking, stiffening ribs. Door Hangers: Two-point suspension. Hanger roller with non-metallic surface and eccentric roller adjustment.

I. Door Track: Bar or formed, cold-drawn removable steel track with smooth roller contact surface.

J. Door Header: Construct of minimum 12-gauge stainless steel, shape to provide stiffening flanges.

K. Door Electrical Contact: Prohibit car operation unless car door is closed.

L. Door Clutch: Heavy-duty clutch, linkage arms, vane assembly and pickup rollers or cams to provide positive, smooth, quiet door operation. Design clutch so car doors can be closed, with hoistway doors open.

M. Restricted Opening Device: Provide mechanical car-door restrictor to prevent opening of doors when outside unlocking zone.

N. Door Operator: High speed, heavy-duty door operator capable of opening doors at no less than 2.0 fop's. Accomplish reversal in no more than 2-½ in. of door movement. Provide solid-state door control with closed loop circuitry to constantly monitor and automatically adjust door operation based upon velocity, position, and motor current. Provide a minimum of four controller-based motion profiles, per floor, per door, to maintain consistent, smooth, and quiet door operation at all floors, regardless of door weight or varying air pressure. Acceptable closed-loop door operators:

1. KONE
2. Otis
3. Schindler
4. ThyssenKrupp

5. GAL MOVFR

O. Door Reversing Device:

1. Infrared Reopening Device:

a. Black fully enclosed device with full screen infrared matrix or multiple beams extending vertically along leading edge of each door panel to minimum height of 7 ft. above finished floor. Device shall prevent doors from closing and reverse doors at normal opening speed if beams are obstructed while doors are closing, except during nudging operation. In event of device failure, provide for automatic shutdown of car at floor level with doors open.

2. Nudging Operation: After beams of door control device are obstructed for a predetermined time interval (minimum 20.0-25.0 seconds), warning signal shall sound and doors shall attempt to close with a maximum of 2.5 foot pounds kinetic energy. Activation of the door open button shall override nudging operation and reopen doors.

3. Interrupted Beam Time: When beams are interrupted during initial door opening, hold door open a minimum of 3.0 seconds. When beams are interrupted after the initial 3.0 second hold open time, reduce time doors remain open to an adjustable time of approximately 1.0-1.5 seconds after beams are reestablished.

4. Differential Door Time: Provide separately adjustable timers to vary time that doors remain open after stopping in response to calls.

a. Car Call: Hold open time adjustable between 3.0 and 5.0 seconds.

b. Hall Call: Hold open time adjustable between 5.0 and 8.0 seconds. Use hall call time when car responds to coincidental calls.

P. Car Operating Panel:

1. Passenger: One car operating panel applied or integral faceplate consisting of a metal box containing the vandal resistant operating fixtures, mounted behind the car swing front return panels.

a. Provide manually operated stop switch within Firefighters' Phase II compartment

b. Provide "door open" button to stop and reopen doors or hold doors in open position.

c. Provide "door close" button to activate door close cycle. Cycle shall not begin until normal door dwell time for a car or hall call has expired, except firefighters' operation.

d. Locked panel including Phase II fire access switch and hidden floor buttons, call cancel button, door open, door close, switch, stop switch, light jewel, fire communication jack within locked panel, for fire officer use and use of car on independent service only.

Q. Car Top Control Station: Mount to provide safe access and utilization while standing on car top.

R. Work Light and Duplex Plug Receptacle: GFCI protected outlet at top and bottom of car. Include on/off switch and lamp guard.

S. Communication System:

1. Two-way communication instrument in car with automatic dialing, tracking, and recall features, with shielded wiring to car controller in equipment space. Provide dialer with automatic rollover capability with minimum two numbers.

a. Actuate two-way communication via “Help” button.

b. Button or adjacent light jewel shall illuminate and flash when call is acknowledged.

c. Button shall match car operating panel pushbutton design.

d. Provide “Help” button tactile symbol, engraved signage, and Braille adjacent to button mounted integral with car front return panel.

2. Install remote speaker(s) provided under Item 1.01. E.1 in car behind front return panel with drilled speaker pattern, with shielded wiring to equipment space junction box.

3. Provide two-way communication between car and equipment space.

2.08 CAR ENCLOSURE

A. Passenger Elevator: Provide complete as specified herein.

1. Shell: Reinforced 14-gauge furniture steel formed panels. Apply sound-deadening mastic to exterior. Provide concealed ventilation cutouts.

2. Canopy: Reinforced 12-gauge furniture steel formed panels with lockable, contacted, hinged emergency exit. Interior finish white color reflective baked enamel.

3. Front Return Panels and Integral Entrance Columns: Reinforced 14-gauge furniture steel clad with minimum 16 gauge satin finish stainless steel. Swing entire unit on substantial pivot points (minimum three) for service access to car operating panel(s). Locate pivot points to provide full swing of front return panel without interference with side wall finish or handrail. Secure in closed position with concealed three-point latch. Provide firefighters' and service compartments with recessed flush cover and cutouts for operating switches, and similar items.

4. Transom: Reinforced 14-gauge furniture stainless steel clad with minimum 16 gauge satin finish stainless steel full width of enclosure.

5. Car Door Panels: Reinforced minimum 16-gauge furniture steel clad with minimum 18 gauge satin finish stainless steel. Same construction as hoistway door panels. Base: Baked enamel.

6. Interior Wall Finish: Removable panels, faced and edged, with color core plastic laminate, color and finish as selected by Architect.

7. Ventilation: Morrison Products, Inc. three-speed model SOE No. 06-01055 exhaust blower mounted to car canopy on isolated rubber grommets. Exhaust blower shall meet noise and vibration criteria. Lighting: Provide direct incandescent fixtures with wiring and hookup. Coordinate with emergency lighting requirements

8. Suspended Ceiling: Six-section satin finish stainless steel panels with lighting cutouts in each panel.

9. Handrails: Minimum 1-¼ in. diameter stainless steel tubular grab bar with backing plates and captive nuts across rear wall. Bolt rails through car walls from back and mount on 1-½ in. deep solid round stainless steel standoff spacers no more than 18 in. O.C. Return handrail/guardrail ends to car walls.

10. Pads and Buttons, Car P1 Three-piece removable pads. Two pads covering side walls and adjacent front returns and one covering rear wall. Provide cutouts to access main car operating panel.

2.09 HALL CONTROL STATIONS

A. Pushbuttons: Provide flush mounted faceplates. Include pushbuttons for each direction of travel which illuminate to indicate call registration. Include approved engraved message and pictorial representation prohibiting use of elevator during fire or other emergency as part of faceplate. Pushbutton design shall match car operating panel pushbuttons. Provide vandal resistant pushbutton and light assemblies. Include approved engraved message and pictorial representation prohibiting use of elevator during fire or other emergency as part of faceplate.

2.10 SIGNALS

A. Hall Position Indicator: Provide at lobby entrance to indicate travel direction of arriving car. Locate as detailed on architectural drawings. Illuminate up or down LED lights and sound tone once for up and twice for down direction prior to car arrival at floor. Sound level shall be adjustable from 20-80 dBA measured at 5 ft. in front of hall control station and 3 ft. off floor. Illuminate light until the car doors start to close. Provide advanced hall lantern notification to comply with ADA hall call notification time. Car direction lenses shall be arrow shaped with faceplates. Lenses shall be minimum 2-½ in. in their smallest dimension. Provide vandal resistant lantern and light assemblies consisting of series of dots or lines for maximum visibility.

B. Car Direction Lantern
Provide flush-mounted car lantern in all car entrance columns.
Illuminate up or down LED lights and sound tone once for up and twice for down direction
Sound level shall be adjustable from 20-80 dBA measured at 5 ft. in front of hall control station and 3 ft. off floor.
Car direction lenses shall be arrow shaped with or without faceplates.
Provide vandal resistant lantern and light assemblies consisting of series of dots or lines for maximum visibility.

C. Car Position Indicator: Alpha-numeric digital indicator containing floor designations and direction arrows a minimum of 1/2 in. high to indicate floor served and direction of car travel. Locate fixture in each car operating panel. When a car leaves or passes a floor, illuminate indication representing position of car in hoistway. Illuminate proper direction arrow to indicate direction of travel.

D. Alpha-numeric digital indicator containing floor designations and direction arrows a minimum of ½ in. high to indicate floor served and direction of car travel. Mount integral with hall lanterns at main floor. Provide vandal resistant indicator and light assemblies.

E. Faceplate Material and Finish: Satin stainless steel all fixtures.

F. Floor Passing Tone: Provide an audible tone of no less than 20 decibels and frequency of no higher than 1500 Hz, to sound as the car passes or stops at a floor served.

PART 3 EXECUTION

3.01 EXAMINATION

A. Field measure and examine substrates, supports, and other conditions under which elevator work is to be performed.

B. Do not proceed with work until unsatisfactory conditions are corrected.

C. Prior to start of Work, verify hoistway is in accordance with shop drawings. Dimensional tolerance of hoistway from shop drawings: -0 inches +2 inches. Do not begin work of this section until dimensions are within tolerances.

D. Prior to start of Work, verify projections greater than 2 inches (4 inches if ASME A17.1/CSA B44 2000 applies) must be beveled not less than 75 degrees from horizontal.

E. Prior to start of Work, verify landings have been prepared for entrance sill installation. Traditional sill angle or concrete sill support shall not be required.

F. Prior to start of Work, verify elevator pit has been constructed in accordance with requirements, is dry and reinforced to sustain vertical forces, as indicated in approved submittal. Verify that sumps or sump pumps located within pit shall not interfere with installed elevator equipment.

G. Prior to start of Work, verify control space has been constructed in accordance with requirements, with access coordinated with elevator shop drawings, including sleeves and penetrations.

H. Verify installation of GFCI protected 20-amp in pit and adjacent to each signal control cabinet in control space.

3.02 PREPARATION

A. Coordinate installation of anchors, bearing plates, brackets and other related accessories.

3.03 INSTALLATION

A. Install all equipment in accordance with Contractor's instructions, referenced codes, specification, and approved submittals.

B. Install machine room equipment with clearances in accordance with referenced codes and specification.

C. Install all equipment so it may be easily removed for maintenance and repair.

D. Install all equipment for ease of maintenance.

E. Install all equipment to afford maximum accessibility, safety, and continuity of operation.

F. Remove oil, grease, scale, and other foreign matter from the following equipment and apply one coat of field-applied machinery enamel.

1. All exposed equipment and metal work installed as part of this work which does not have architectural finish.

2. Neatly touch up damaged factory-painted surfaces with original paint color. Protect machine-finish surfaces against corrosion.

G. Interference with Other Work:

1. Guide rail brackets attached to steel shall be installed prior to application of fireproofing.

2. Coordinate construction of entrance walls with installation of door frames and sills. Maintain front wall opening until elevator equipment has been installed.

a. Ensure adequate support for entrance attachment points at all landings.

b. Coordinate wall openings for hall push buttons, signal fixtures and sleeves. Each elevator requires sleeves within the hoistway wall.

c. Coordinate emergency power transfer switch and power change pending signals required for termination at the primary elevator signal control cabinet in each group.

d. Coordinate interface of elevators and fire alarm system.

e. Coordinate interface of dedicated telephone line.

3.04 FIELD QUALITY CONTROL

A. Work at jobsite shall be checked during course of installation. Full cooperation with reviewing personnel is mandatory. Accomplish corrective work required prior to performing further installation.

B. Have Code Authority acceptance inspection performed and complete corrective work.

3.05 ADJUSTMENTS

A. Static balance car to equalize pressure of guide shoes/rollers on guide rails.

B. Lubricate all equipment in accordance with Contractor's instructions.

C. Adjust motors, controllers, leveling switches, limit switches, stopping switches, door operators, interlocks, and safety devices to achieve required performance levels.

3.06 CLEANUP

A. Keep work areas orderly and free from debris during progress of project. Remove packaging materials daily.

B. Clean machine room equipment and paint floor.

C. Clean hoistways, car, car enclosure, entrances, operating, and signal fixtures.

3.07 DEMONSTRATION

A. Prior to substantial completion, instruct Owner's Representative on the proper function and required daily maintenance of elevators. Instruct personnel on emergency procedures.

END OF SECTION