ENVIRONMENTAL HEALTH & SAFETY PLAN (HASP)

For

Charles C. Cashman and New Amesbury Elementary School
193 Lions Mouth Road
Amesbury, Massachusetts 01913
MassDEP RTN 3-36397

Prepared for:

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ECMS Project No. 1009.073

Environmental & Construction Management Services, Inc.

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1.0 INTRODUCTION

This document is the Environmental Health & Safety Plan (HASP) for use by construction workers and ancillary construction support staff during construction of a new elementary school building on the Site of the existing Cashman Elementary School. This HASP shall be used as a supplement to the Contractor's own site health and safety plan. It shall not be used as a substitute for any other required HASPs.

DiNisco Design, Inc. (*DiNisco*) is the architect supporting the City of Amesbury for the project at 193 Lions Mouth Road in Amesbury, Massachusetts (subject property). Refer to Figure 1, Site Locus/Location Plan for the general location of the Site.

This HASP was prepared by *Environmental & Construction Management Services, Inc. (ECMS)* at the request of *DiNisco* to support construction of a new elementary school for PreK through 2nd grade, new parking and egress drive on a portion of the subject property that is currently occupied by the Packer and Randall Little League Fields and wooded area. Site work covered by this HASP is anticipated to include the following:

- clearing and grubbing;
- cutting, filling, and grading;
- excavation for utility installation;
- excavation for foundations and footings;
- excavation and grading for access roads and bioretention areas;
- dewatering as necessary to support excavation; and
- construction of a new building, roadways, parking, planted and play areas.

Based on known environmental conditions at the property, these activities will require handling and management of arsenic-impacted soil. All excavated and/or disturbed soil will be managed as specified in the Soil and Groundwater Management Plan (SGMP). All project personnel directly or indirectly involved in construction activities on the project site will adhere to the requirements of this HASP.

The General Contractor will designate a Superintendent to manage and oversee the implementation of the project. The Superintendent has responsibility for achieving project objectives including health and safety, initiating project activities, monitoring and adjusting efforts and resources as needed to ensure that established schedules are maintained, and managing the performance of all parties. The General Contractor will also designate a Site Safety Officer (SSO) with overall responsibility for safe execution of the project.

ECMS will provide support for the implementation of this HASP and the associated Soil and SGMP under separate cover. *ECMS* will designate a Field Safety Officer (FSO) to perform

field monitoring, provide training, and conduct daily safety meetings during the phases of construction that include potential exposure to soil and/or groundwater.

All contractors and sub-contractors are responsible for the safety of their own workers and for compliance with this HASP. The scope of this plan is limited to environmental conditions resulting from elevated metals concentrations in soil. Safety-related aspects of general construction work covered by 29 CFR 1926 will remain the responsibility of the general contractor and its subcontractors.

2.0 BACKGROUND

ECMS conducted a Phase I Environmental Site Assessment (Phase I ESA) in September 2018 to identify and evaluate actual and potential environmental liabilities associated with the subject property. The Phase I ESA did not reveal any recognized environmental conditions (RECs).

In July 2020, *ECMS* completed the collection of loam/topsoil and subsoil samples from representative areas proximate to the Cashman School and from the fields adjacent to the school for laboratory analysis for potential oil and/or hazardous material (OHM) prior to proposed site construction activities. Soil sampling results indicated the presence of the metal arsenic, at concentrations above applicable standards in the shallow soil samples across the area of proposed construction. Based on the concentrations detected, the condition was reportable under the Massachusetts Contingency Plan (MCP) 310 CMR 40.0000.

Given the presence of school-aged children, an emergency assessment was performed to assess the presence of these metals in shallow soil in other areas of the site, including infield of Randall and Packer fields. As described in Section 2.4, *Environmental Site Characterization,* arsenic was not detected in the surface soil samples from the infield of Randall or Packer Fields at concentrations above applicable standards.

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 adjacent Woodsom Farm (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 4th grade students (approximately 443 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 is located 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.

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.

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 Cashman School building has a sewage ejector system that was observed along the entrance driveway area south of the school.

2.4 Environmental Site Characterization

In July and August 2020, *ECMS* collected pre-construction surface and subsurface soil samples for laboratory analysis in order to characterize the soils that may require off-site disposal. Soil sampling results indicated the presence of arsenic at concentrations above applicable standards in every location sampled across the proposed work site. Additional surface soil samples were subsequently collected on July 31, 2020 from the two baseball infields (Randall and Packer Fields) at the site to verify that arsenic was not present in the imported red clay soils on either field. No arsenic was detected over any reportable concentration in any of the eight (8) surface infield samples analyzed. In addition, one (1) soil sample collected on August 12, 2020 from the outfield on Randall field at a depth of approximately 2 feet below grade did not have arsenic above its reportable concentration.

The assessment revealed elevated arsenic concentrations in 28 of 28 shallow soil samples (excluding the soil samples collected from both infields and one (1) sample from the outfield of Randall Field). The concentrations of generally exceeded reportable thresholds of 20 milligrams per gram (mg/kg), and in some cases exceeded Imminent Hazard (IH) Threshold of 40 mg/kg. No soil sample had a concentration of arsenic detected over its applicable Upper Concentration Limits (UCL) of 500 mg/kg. Soil analytical results are presented in Tables 1 through 7 and soil sampling locations are depicted on Figure 3.

Though arsenic detected in the site soils are background condition associated with known elevated arsenic concentrations in bedrock, their presence in soil poses a potential risk to construction workers at the site. Additional soil sampling (areas of topsoil/loam) is anticipated to be completed prior to commencement of construction activities, with the goal of assessing if the loam/topsoil has concentrations of arsenic.

2.5 Release Notification Retraction

After extensive soil sampling, including sampling with the MassDEP, *ECMS* concluded that the presence of the arsenic detected on the site was from naturally occurring sources.

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).

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.

On September 17, 2020, *ECMS* submitted a Retraction of Release Notification dated September 17, 2020 in accordance MCP 310 MR 40.0335 to the MassDEP via eDEP.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

ECMS is the consultant responsible for the development of this Environmental Health & Safety Plan (HASP). Mr. Kevin J. Kavanaugh, LSP, CHMM is the primary point of contact for this project. All correspondence concerning the content or implementation of this plan should be directed to him [via email at kevin.kavanaugh@ecmsinc.com; or via telephone at (617) 338-2121 ext. 2].

This plan will be implemented by *ECMS*, the general contractor, and its subcontractors during earthwork in support of this project.

An *ECMS* field scientist will be responsible for the execution of field activities, including monitoring, sampling, and stockpile management. *ECMS* field scientists have completed 40-hour OSHA Hazardous Waste Operations (HAZWOPER) training as well as 8-hour HAZWOPER Supervisor training and are experienced in excavation oversight and field screening techniques. Contact information for key contractors and individuals is as follows:

Client: *DiNisco Design, Inc.*
Site Name: Cashman and New Amesbury Elementary School
Site Location: 193 Lions Mouth Road, Amesbury, Massachusetts

General Contractor: To Be Determined

Site work contractor: To Be Determined

Field Safety Officer: *ECMS*
288 Grove Street #391, Braintree, Massachusetts 02184
Project Manager: Kevin J. Kavanaugh o: (617) 338-2121 m: (617) 212-9255
Field Scientist: To Be Determined
LSP: Kevin J. Kavanaugh, LSP o: (617) 338-2121 m: (617) 212-9255

Additional Subcontractors: _____

The general contractor's Superintendent will communicate with *ECMS* regarding this HASP and be responsible for its implementation.

4.0 SCOPE AND APPLICATION OF HASP

This HASP defines the requirements and protocols to be followed during excavation, other soil-disturbing activities, and dewatering activities during the construction project. Applicability extends to contractors, subcontractors, governmental officials, and visitors that enter the site while such activities are occurring. For the purposes of this HASP, the term "site" shall be used to identify construction areas associated with this project and under the direct control of the general contractor. This HASP is complementary to any contractor Safety Plan covering general construction site safety. In cases where both documents provide project standards or requirements, the more stringent requirements will apply.

All contractor personnel and their subcontractors (hereafter referred to as "project personnel") will be informed of the site emergency response procedures and any potential fire, explosion, health, or safety hazards posed by project operations. This HASP summarizes those hazards and defines protective measures planned for the site.

This HASP must be reviewed by all project personnel and visitors who may enter any active work area, regardless of whether the area has been designated an Exclusion Zone (EZ) or

Contaminant Reduction (Decontamination) Zone (CRZ). For purposes of this plan, work zones are referred to as EZ and CRZ whenever the provisions of this plan apply.

An agreement to comply with the requirements contained herein must be signed by all project personnel and visitors who may enter such areas (See Appendix A, HASP Acknowledgement Sheet). The EZ and CRZ will be designated based on the potential for contact with, or exposure to, identified contaminants at concentrations above established Occupational Safety & Health Administration (OSHA) Permissible Exposure Limits (PEL), Massachusetts Contingency Plan RC-S1 soil standards, or other applicable guidelines.

Lockout-tagout procedures are not included in this HASP. If installed lines or equipment will be energized during this phase of the project, OSHA lockout-tagout procedures shall be instituted.

5.0 SITE DESCRIPTION AND PROJECT OPERATIONS ANALYSIS

This section provides an overview of the scope of project activity, as well as a historical analysis of the project areas. The purpose of this section is to review the potential project chemical and physical hazards to which workers may be exposed when working in or near the site. Additional data will be gathered once construction begins, and this plan will be revised, if appropriate, based on the new data.

5.1 Summary of Work

The project scope includes construction of a new school building new parking lot, driveways, playground and planted areas on a portion of the subject property that is currently occupied by the Packer and Randall Little League Fields and wooded area. Preparation of the new building area entails the excavation of potentially contaminated soil. The excavation edges will be sloped, or trench shields will be used to protect workers in excavations. Depth of excavation will generally average 5 feet below current grade but may extend deeper at certain locations.

Although dewatering is not anticipated at the site, provisions are included in this HASP for groundwater management. If recovered, groundwater will be treated and discharged in accordance with the terms of an approved permit or contained on site pending off-site disposal.

Excavated soil will be stockpiled adjacent to the excavation, or in a primary stockpile area pending characterization as needed for off-site disposal/recycling, as specified in the SGMP.

Project activities will include:

Site Preparation:

- Establishment of work zones;
- Tree clearing; and
- Grubbing and removal of surface material

Excavation and Backfilling:

- Soil excavation, filling and grading;
- Dust, vapor and odor control;
- Soil classification;
- Soil management;
- Soil transportation and disposal;
- Equipment decontamination; and
- Excavation backfilling.

Construction and Demolition:

- Installation of utilities;
- Construction of a new building, roadways, parking, planted and play areas;

Water Management (not currently anticipated):

- Construction dewatering; and
- Water treatment and discharge.

5.2 Environmental Site Characterization and Chemical Hazards

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. Not including the eight (8) Randall and Packer Little infield red clay soil samples, 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.

Arsenic concentrations in soil exceed the Massachusetts Contingency Plan (MCP) standard for soils, regardless of soil classification (20 milligrams per kilogram [mg/kg]).

Although the contaminants detected in soil at concentrations above the applicable thresholds have been shown to be attributable to naturally-occurring background conditions, but their presence in soil still poses a potential risk to construction workers at the site as well as to populations that may be impacted by offsite migration of soil. The table below presents locations of constituents that exceed their applicable MCP Method 1 soil standards and the maximum detected concentrations:

Compounds Exceeding MCP Method 1 Soil Standards

Compound	Sample Location	Maximum Detected Concentration (mg/kg)	MCP Soil Standard Exceeded (mg/kg)
Arsenic	28/29 samples >RC 15/28 samples >IH 0 samples > UCL	82.3	Method 1 S-1, S-2, S-3 = 20 IH Threshold = 40 UCL = 200

mg/kg milligrams per kilogram.
UCL Upper Concentration Limit.
IH Imminent Hazard (applies only to shallow soil samples).

No groundwater samples have been collected to date for the analysis of arsenic in groundwater.

5.3 Target Constituents for Monitoring

Soil samples were collected and analyzed as part of the characterization activities. Summary tables are presented in Appendix B.

Compounds of concern for the site are limited to arsenic. Field monitoring will be conducted using a dust meter to monitor exposure to dust potentially impacted by metals.

Monitoring will be performed in the typical worker breathing zone via hand-held instruments, and at the project fence line by fixed monitoring stations.

5.4 Other Potential Chemical Hazards

As with any construction site, hazardous materials may be expected to be present in various forms, including in consumer commodities. Some common types may include:

- Fuel and lubricants (*e.g.*, gasoline, diesel fuel, hydraulic oil);
- Cleaning agents (*e.g.*, detergents, respirator sanitizers, hand cleaners);
- Firefighting agents (*e.g.*, chemical fire extinguishers); and
- Miscellaneous chemicals (*e.g.*, marking paint, bulk office supplies).

5.5 Physical Hazards

As an active construction zone, there are physical and safety hazards associated with working at the site, to include:

- Potential contact with energized electrical lines;
- Engulfment hazards associated with excavations;
- Injuries from contact with objects, such as items that may fall or trench shields that may suddenly move;
- Cuts and abrasions from contact with sharp objects such as nails, metal shards, and broken glass;
- Falling or tripping on slippery surfaces, uneven terrain, or congested work surfaces;
- Dangers related to working near heavy equipment and vehicular traffic; and
- Heat stress / Cold stress.

As such, workers must be aware of these physical hazards and exercise caution at all times. Proper personal protective equipment (PPE) must be worn at all times by

project personnel to protect against physical hazards. Minimum required PPE includes a hard hat, safety glasses, construction work shoes, and a reflective vest that must be worn by all project personnel at all times while on site.

5.6 Biological Hazards

Potential biological hazards on the site are relatively minor, yet not insignificant, and may include the following:

- ticks, bees, mosquitoes and other insects which may carry disease;
- rats/rodents, dogs, or other wildlife may pose a potential for bites and disease, such as rabies;
- poison ivy, oak, or sumac may be found in overgrown areas and pose skin irritation hazards.

Project personnel will avoid contact with poisonous plants. Insect repellants may be used by project personnel as necessary.

5.7 COVID-19 Virus Hazard

Refer to the OSHA "Guidance on Preparing Workplaces for COVID-19. https://www.osha.gov/Publications/OSHA3990.pdf

6.0 TASK BY TASK HAZARD ANALYSIS

The evaluation of potential health and safety hazards related to this project is based upon the available knowledge of site conditions and anticipated risks. This HASP is designed to address and minimize these risks to the greatest extent possible.

The following major project phases or tasks include:

- Mobilization and Maintenance/Demobilization;
- Material Handling: Excavating, Transporting, Backfilling, and Compacting;
- Construction; and
- Dewatering (not currently anticipated).

The subsections that follow describe each task and operation in terms of the specific hazards associated with it, and any protective measures to be implemented in order to reduce or eliminate those hazards. In addition, hazards and protective measurements associated with all phases of the project or general work tasks are also discussed. All noted protective measures will be implemented when appropriate throughout the duration of the various project phases.

At least three full working days (excluding weekends) before any new excavation, or when any excavation will be expanded beyond the pre-planned limits, DigSafe will be notified.

For activities not specifically listed below, hazards and preventative measures will be discussed at tailgate safety meetings prior to start of the activity.

6.1 General Project Hazards and Precautions

Certain hazards potentially exist throughout all phases of the project. These hazards and the preventative measures designed to minimize or eliminate the risk of these hazards are presented in the tables below.

General Project Hazards and Precautions

Potential Hazards	Preventative Measures
Back Strain	• Use proper lifting techniques. • Use two or more employees for lifting large, heavy items. • Take sufficient rest breaks.
Heat Stress	• FSO shall monitor heat stress. See Section 13.3 for details. • Take sufficient rest breaks and drink fluids.
Eye Injuries	• Safety glasses shall be worn at all times. • Goggles or face shield shall be worn as appropriate.
Hand Injuries	• Employees handling debris or sharp objects must wear leather gloves.
Foot Injuries	• Work boots shall be used.
Head Injuries	• Hard hats shall be worn at all times.
Hearing Damage	• Hearing protection shall be required for any operations at 85 dB and above.
Slips, Trips and Falls	• Good housekeeping shall be implemented. • Walkways and aisles shall be kept clear. • Wiring, plumbing, hoses, etc. shall be untangled and neat. • Workers shall remain alert while walking. • Tripping and poor footing hazards shall be repaired as they are discovered or must be clearly identified.
Electrical Shock	• Tools and cord shall be inspected prior to use. • Ground Fault Circuit Interrupt (GFCI) electrical outlets shall be utilized.
Fire Hazards/ Burns	• Air monitoring for flammable atmospheres. • Smoking in designated areas only. • Combustible chemicals shall be stored properly. • Firefighting equipment (fire extinguishers) will be available on site (see Section 15.2). • No fueling operations will be left unattended. • Personnel will be aware of mufflers and other hot parts of equipment while operating equipment. • Personnel will not attempt to service/fuel any piece of equipment until it has sufficiently cooled down.

Potential Hazards	Preventative Measures
Falling Hazards	• Fall protection such as harnesses, hand rails, and temporary fences shall be utilized.
Biological Hazards	• Avoid wildlife when possible. • Wear insect repellant as necessary. • Use good personal hygiene. • Personal inspections for ticks should be performed.
Moving Vehicles	• Employees will wear vests when appropriate.
Hot Work Hazards	• Fire extinguishers will be available. • FSO shall approve a hot work permit prior to hot work. • Appropriate PPE shall be worn. • Compressed gas shall be stored properly.
Chemical Exposure Hazards	• Air monitoring in worker breathing zones and within the work area shall be performed in accordance with Section 9.0 of this HASP. • Proper PPE shall be worn to minimize dermal and inhalation exposure to contaminants. • Dust and vapor controls shall be implemented. Proper decontamination procedures shall be followed.
Hazard Associated with Spills	• All chemicals will be kept in appropriate containers - closed and labeled. Chemical containers shall be stored indoors or provided with secondary containment. • All fuel spills will be cleaned up immediately and immediately reported to the FSO. • Spill and absorbent materials shall be readily available. • Employees will be instructed as to proper fueling techniques. • Fuel nozzle and hose will be secured in holder after use. • Fuel caps will be secured after fueling operations. Sealed containers will be used for transport of all hazardous materials.

6.2 Mobilization, Maintenance and Demobilization

Mobilization, Maintenance and Demobilization Hazards and Precautions

Potential Hazards	Preventative Measures
Injuries due to flying debris	• Personnel not directly involved with operations shall keep clear. • Windows and doors will be closed during equipment operation. • Proper PPE shall be worn, to include proper eye protection. • All appropriate guards shall be used on equipment. • Training of proper use of equipment shall be performed. • Eyewash will be readily available on site.

Pinching/injuries caused from objects/equipment in motion	• Guards shall be maintained on all equipment as appropriate. • Employees shall wear safety vests. • Heavy equipment and vehicles shall have back up alarms. • Equipment, cables, chains, and loads shall be inspected periodically. • Workers shall wear work gloves when handling rough or sharp material. • Spotters will be present during all movement of heavy equipment. • No personnel shall be permitted under the crane or heavy equipment swing radius during operation. • All operations shall be performed under the supervision of a competent person. • Hand signals shall be established.

6.3 Material Handling: Excavation, Transportation, Backfilling & Compacting

Material Handling: Excavation, Transportation, Backfilling & Compacting and Precautions

Potential Hazards	Preventative Measures
Pinching/injuries caused from objects/equipment in motion	• Guards shall be maintained on all equipment as appropriate. • Employees shall wear safety vests. • Heavy equipment and vehicles shall have back up alarms. • Equipment, cables, chains, and loads shall be inspected periodically. • Workers shall wear work gloves when handling rough or sharp material. • Spotters will be present during all movement of heavy equipment. • No personnel shall be permitted under the crane or heavy equipment swing radius during operation. • All operations shall be performed under the supervision of a competent person. • Hand signals shall be established. • All personnel will establish eye contact with operators prior to approaching equipment. • Personnel will avoid equipment swing areas and blind sides. • All slings, chains, and ropes will be rated for the load which it is expected to lift. • Only qualified and trained personnel will set up rigging prior to any hoist or lift.
Rollovers	• Equipment will have rollover protective structures and seat belts • Operators will wear seat belts when operating equipment. • Equipment will not be operated on grades that exceed

Potential Hazards	Preventative Measures
	manufacturer's recommendations.
Excavation Hazards	• Competent persons shall determine appropriate protection method (i.e., slopes, trench boxes, etc.) • Competent persons shall inspect excavations daily and following rain for any excavations over 4 feet in depth. • Ladders shall be placed at least every 25 feet for entrance/exit in excavations more than 4 feet. • Ladders shall be inspected periodically. • Ladders shall be securely tied off. • Contact Dig Safe at 811 at least three full working days prior to any new excavation.
Injuries due to falling items into excavations	• Barricades with visible barriers shall be placed around all open excavations. • Excavated material shall be kept at least 2 feet from the excavation depending on the depth of excavation. • All employees shall wear proper PPE. • All ground personnel will stay clear of suspended loads.

7.0 PERSONAL TRAINING REQUIREMENTS

7.1 Groundwater and Decontamination Water Storage

As a remedial effort under the MCP, all handling of potentially-contaminated soil falls under the requirements of 29 CFR 1910.120 *Hazardous Waste Operations and Emergency Response* (HAZWOPER). Therefore, the training requirements of §1910.120(e) apply to the project, as follows:

§1910.120(e)(3)(i) General site workers (such as equipment operators, general laborers and supervisory personnel) engaged in…activities that expose or potentially expose workers to hazardous substances and health hazards must receive a minimum of 40 hours of instruction off the site and a minimum of three (3) days actual field experience under the direct supervision of a trained experienced supervisor.

§1910.120(e)(3)(ii) Workers on site only occasionally for a specific limited task (such as, but not limited to, ground water monitoring, land surveying, or geophysical surveying) and who are unlikely to be exposed over permissible exposure limits and published exposure limits shall receive a minimum of 24 hours of instruction off the site, and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

Each of these certifications carries an annual 8-hour refresher requirement.

Contractor personnel shall provide a copy of the certification of such training and/or refresher to the FSO prior to entering the active work area. Copies of training

certificates and documented experience will be maintained in a dedicated file during the project.

7.2 Competent Person

Prior to any excavation work, a "competent person" must assess excavation conditions and determine actions in order to ensure worker safety. A Competent Person is an individual who either through training or experience is "capable of identifying all predictable hazards" associated with the excavation activities. Additionally, he or she will have authorization to take prompt corrective action to eliminate any hazards, including but not limited to shutting down operations.

7.3 Initial Health & Safety Briefing

The FSO shall conduct a site-specific Health and Safety briefing for all contractors, visitors (*e.g.*, inspectors), or any others who will work on the site. The Health and Safety briefing shall include, at a minimum, the following:

- The contents of this site-specific Health and Safety Plan;
- Names of personnel and alternates responsible for site health and safety;
- Project roles and responsibilities;
- Potential health hazards associated with known or potential contamination present in the various work areas;
- Work practices that the employee can use to minimize risks to safety and health;
- Visitor requirements;
- Evacuation routes and signals;
- Health and safety emergency procedures;
- Reporting of fires, emergencies and first aid incidents;
- Emergency and contingency procedures;
- Location of First Aid, Eyewash, Decontamination areas, and Emergency Equipment;
- Location of Emergency Contact Phone List; and
- Hospital Route.

8.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Soil suitable for reuse will be backfilled into the excavation from which it was removed, to the maximum extent practicable, at the depth from which it was removed. Material that cannot be replaced into the initial excavation location will be backfilled in areas of similar characteristics and metals concentrations, and at appropriate depths, to the extent feasible.

8.1 Description of Levels of Protection

PPE will be used when project and support activities involve known or suspected atmospheric contamination, when contaminated vapors, gases, or particulates may be generated by site activities, or when direct contact with skin-affecting substances may occur. The specific levels of protection and necessary components for each have been divided into four categories according to the degrees of protection afforded: Levels A, B, C, D.

Modification of these levels is permitted and routinely employed during site work activities to maximize efficiency (e.g., Modified Level D). Likewise, the type of chemical protective ensemble will depend upon contaminants, concentrations, and degree of contact or potential exposure.

The level of protection selected shall be based upon the following:

- Type, measured concentration, and toxicity of the chemical substance in the ambient atmosphere.
- Potential for exposure to substances in air, splashes of liquids, or other direct contact with materials due to work executed.
- Knowledge of chemicals on site along with properties such as toxicity, route of exposure, and contaminant matrix (e.g., soil, water, air).
- Understanding of chemical, physical, and biological hazards that may be encountered.

In situations where the type of chemical, concentration, and possibilities of contact are not known or if unforeseen conditions are encountered, the appropriate level of protection will be selected based on professional experience and judgment of the FSO until the hazards can be better defined.

8.1.1 Level A PPE

Level A attire offers the highest level of respiratory and skin protection available through the use of self-contained breathing apparatus inside a fully encapsulated, air tight, vapor tight, chemical protective suit. Only specially trained and qualified

individuals may don Level A, usually only under emergency conditions. **The use of Level A is not anticipated on this project.**

8.1.2 Level B PPE

Level B attire offers the highest level of respiratory and less skin protection available through the use of supplied air and a chemical protective suit. **The use of Level B is not anticipated on this project.**

8.1.3 Level C PPE

Level C should be worn when the criteria for using air-purifying respirators are met and a lesser level of skin protection is needed. While **Level C is not anticipated on this project,** the FSO shall direct the usage of Level C if deemed necessary.

Level C PPE

PPE	Description
Respiratory Protection:	Air purifying respirator, full or half face, cartridge equipped with P-100 (HEPA) filter cartridge.
Clothing:	For job tasks where splashing of wet material is likely: Pro/Shield 2 or 3, or polyethylene coated Tyvek coveralls, with attached hoods. Where only dry material contact is likely: Any of the above, Tyvek, Pro/Shield 1, or NexGen.
Gloves (outer):	Nitrile rubber (leather/cotton type to be left inside the work zone may be substituted in dry conditions only).
Gloves (inner):	Latex or nitrile surgical type.
Boots:	Construction work boots.
Boot Covers (outer):	Latex (disposable) or slush boots (reusable).
Head Protection:	Hard hat.
Eye/Face Protection:	Chemical splash goggles or safety glasses with side shields at all time (if half face respirator is used.
Other:	Warning vests; fall protection devices, as needed; hearing protection, as needed.

8.1.4 Level D (Modified) PPE

Modified Level D should be worn when respiratory protection is not warranted but dermal protection is necessary. Modified Level D will be used in areas where elevated concentrations of contaminants are anticipated or encountered.

Level D Modified PPE

PPE	Description
Respiratory Protection:	None required.
Clothing:	For job tasks where splashing of wet material is likely: Pro/Shield 2 or 3, or polyethylene coated Tyvek coveralls, with attached hoods. Where only dry material contact is likely: Any of the above, Tyvek, Pro/Shield 1, or NexGen.
Gloves (outer):	Nitrile rubber (leather/cotton type to be left in the work zone may be substituted in dry conditions only).
Gloves (inner):	Latex or nitrile surgical type.
Boots:	Construction work boots.
Boot Covers (outer):	Latex (disposable) or slush boots (reusable).
Head Protection:	Chemical splash goggles or safety glasses with side shields at all time.
Eye/Face Protection:	Hard hat.
Other:	Warning vests as needed; fall protection devices, as needed; hearing protection, as needed.

8.1.5 Level D PPE

Level D provides minimal protection against chemical hazards. It is normally worn only as a work uniform and not in any area with significant respiratory or skin contact hazards.

Non-intrusive work or work conducted in areas designated as "clean" or consistent with background by the Site Superintendent, SSO, or FSO may be conducted in Level D PPE.

Level D PPE

PPE	Description
Respiratory Protection:	None required.
Clothing:	Cloth coverall or long sleeve shirt and full-length pants.
Gloves (outer):	Appropriate for work task.
Gloves (inner):	None required.
Boots:	Construction work boots.
Boot Covers (outer):	None required.
Head Protection:	Safety glasses with side shields at all times.
Eye/Face Protection:	Hard hat.
Other:	Warning vests as needed; fall protection devices, as needed; hearing protection, as needed.

8.2 Initial Levels of Protection

Initial Levels of PPE

Job Tasks	Initial Level of Protection
Mobilization	Level D
Excavation	Level D or Modified Level D*
Soil/Sediment Handling	Level D or Modified Level D*
Decontamination	Level D or Modified Level D*
Dewatering/Water Treatment	Level D or Modified Level D*
Demobilization	Level D
Other project activities without potential exposure to contaminated soil or groundwater	Level D, with routine precautions for specific activities
Mobilization	Level D
Excavation	Level D or Modified Level D*

8.3 Initial Levels of Protection

The level of protection provided by PPE selection shall be upgraded or downgraded based upon a change in site conditions or observations. Particular attention in this regard will be paid to air monitoring data. The reevaluation process will be ongoing during the project. The FSO will have discretion, in consultation with the Site Superintendent, to modify PPE ensembles as his/her observations dictate.

When a significant change occurs in the process or tasks performed, the hazards and PPE will be re-assessed. Some indicators of the need for reassessment are:

- Receipt of new site characterization data:
- Commencement of a new work phase, such as the start of work that begins on a different portion of the site;
- Change in job tasks during a work phase;
- Change of season/weather or ambient temperature;
- When temperature extremes or individuals' medical considerations limit the effectiveness of PPE;
- Contaminants other than those previously identified are encountered;
- Change in work scope, which affects the degree of contact with contaminants; and/or
- Capacity of personnel to work in PPE.

Before the workers actually begin work in their PPE ensembles, the anticipated duration of the work mission will be established. This will be determined at the daily tailgate safety briefing.

Situations that may affect the duration of work, include:

- Weather conditions;
- Job tasks;
- PPE permeation rates; and/or
- Respirator end of service life.

8.3 Standard Operating Procedures (SOPs) for PPE

Proper inspection of PPE features several sequences of inspection depending upon specific articles of PPE and frequency of use. The different levels of inspection are as follows:

- Inspection and operational testing of equipment received from the factory or distributor;
- Inspection of equipment as it is issued to workers;
- Inspection before each use;
- Inspection after use and prior to maintenance;
- Periodic inspection of stored equipment; and
- Periodic inspection when a question arises concerning the appropriateness of the selected equipment, or when problems with similar equipment arise.

The following PPE inspection checklist will be implemented and shall be conducted by the user. This ensures that the user has checked out the specific device or article and that the user is familiar with its use. Before use:

1. Determine that the clothing material is correct for the specified task at hand
2. Visually inspect for
   Imperfect seams;
   Non-uniform coatings; Tears;
   Malfunctioning closures; Defects
3. During the work task, periodically inspect for:
   Evidence of chemical attack such as discoloration, swelling, stiffening, and softening;
   Closure failure;
   Tears;
   Punctures;
   Seam discontinuities.

Workers will be reminded that chemical permeation can occur without any visible effects.

9.0 RESPIRATORY PROTECTION

Air purifying respirators and self-contained breathing apparatus are not anticipated to be required for this project. Information is provided herein in the event that unforeseen conditions are encountered. The following subsections define standard operating procedures for air purifying respirators and self-contained breathing apparatus.

All types of respiratory protection will be used as per the manufacturer's recommendations. The respirator will be put on in a non-contaminated area and taken off last after decontamination.

Respiratory protection will be worn in all EZs and CRZs as required by this HASP (*i.e.*, when conditions indicate that respiratory protection is required). Deviation from or non-adherence to respirator requirements will result in removal from such area followed by disciplinary action and possible termination.

All workers requiring respiratory protection will be fit-tested with their specific brand/model/size of respirator prior to donning the respirator for use in contaminated areas of the job site.

Appropriate documentation should be furnished to the site SSO prior to use. In the absence of appropriate documentation, the SSO will see that the worker is fit-tested and that the appropriate documentation is completed. As required, all personnel donning respiratory protection will be clean shaven.

All workers will be trained in compliance with 29 CFR 1910.134 on the proper use, care, limitations, maintenance, and fitting of respirators. The contractor will provide respiratory protective equipment for all contractor personnel. Subcontractors shall be responsible for supplying the necessary equipment, fit-testing, and medical monitoring for compliance with this plan.

While use of Level A, B, or C respiratory protection is not anticipated, the contractor and its subcontractors must be prepared for such upgrades when indicated by the SSO. Preparation should include procurement of equipment, fit-testing, training, and medical monitoring to avoid unnecessary delays in the resumption of work.

9.1 Air Purifying Respirators

Air-purifying respirators (APR) shall consist of those pieces of respiratory protection specified under Level C PPE. Typically, this will consist of either a half or full-face negative pressure respirator fitted with the appropriate filter cartridge or canister.

9.1.1 Cartridge Change-out Frequency

At the current time, no planned job tasks are anticipated to use APRs. If conditions warrant an upgrade to Level C protection, a cartridge change-out schedule will be developed and discussed at tailgate safety meetings prior to donning Level C PPE. Results of air monitoring will be used to determine levels of air contaminants. These data, along with cartridge maximum use and end of service life levels, will be used to determine the appropriate change-out schedule. At a minimum, cartridges will be changed daily when in use.

9.1.2 Daily Cleaning Procedure

Each user of a respirator is responsible for cleaning, maintaining, and inspecting his/her own respiratory protection devices. The steps to be followed for cleaning and disinfecting daily are as follows:

1. Respirator Disassembly – Respirators are taken to a clean location where the filters, cartridges, or canisters are removed. For a thorough cleaning, inhalation and exhalation valves, speaking diaphragm, and any hoses are to be removed.
2. Cleaning – In most instances the appropriate cleaning and disinfecting solution provided by the manufacturer is used and is dissolved in warm water in an appropriate tub. Using gloves, the respirator is placed in the tub and swirled for a few moments. A soft brush may be used to facilitate cleaning.
3. Rinsing – The cleaned and disinfected respirators are rinsed thoroughly in water to remove all traces of detergent and disinfectant. The rinse water will be containerized by the "Contractor" for offsite disposal/discharge with dewatering fluids.
4. Drying – The respirators may be allowed to air dry in the room on a clean surface. They may also be hung upside down, but care must be taken not to damage or distort the face pieces.
5. Re-assembly and Inspection – The clean, dry respirator face piece should be re-assembled and inspected in an area separate from the disassembly area to avoid contamination.

Special emphasis should be given to inspecting the respirators for detergent or soap residue left by inadequate rinsing. This problem appears most often under the seat of the exhalation valve and can cause valve leakage or sticking.

9.1.3 Inspection & Checkout

1. Each respirator user will visually inspect the entire APR unit for any obvious damages, defects, or deteriorated rubber.
2. Make sure that the face piece harness is not damaged. The serrated portion of the harness can fragment, which will prevent proper face seal adjustment.
3. Inspect lens for damage and proper seal in face piece.
4. Exhalation Valve – Pull off plastic cover and check the valve for debris or for tears in the neoprene valve (which could cause leakage).
5. Inhalation Valves (two) – Screw off cartridges/canisters and visually inspect neoprene valves for tears. Make sure that the inhalation valves and cartridge receptacle gaskets are in place.
6. Make sure a protective cover lens is attached to the lens.
7. Make sure the speaking diaphragm retainer ring is hand-tight.
8. Make sure that you have the correct cartridge.
9. Don respirator and perform negative and positive pressure tests.

9.1.4 Storage of Air Purifying Respirators

OSHA requires that respirators be stored to protect against dust, sunlight, heat, extreme cold, excessive moisture, damaging chemicals, and mechanical damage. Storage of respirators should be in a clean, secure area that minimizes the chance for contamination or unsanitary conditions. APRs will be stored in a secure area.

9.2 Self-Contained Breathing Apparatus (SCBA)

Positive pressure demand, full-face self-contained breathing apparatus (SCBA), or pressure demand supplied-air respirator (SAR) with escape air bottle (NIOSH approved), will be used when the highest level of respiratory protection is needed. SCBA/SARs may be required for standby use at the job site if the SSO or Competent Person determines their use may be necessary. The contractor shall supply all SCBA or SAR equipment when required for its employees. Subcontractors shall supply respirator protection for their employees along with documentation of required certifications and training.

SCBA cleaning, inspection, checkout, and storage procedures shall be discussed on site by the SSO with the employees that may be required to don SCBA equipment prior to the use of such equipment.

9.3 Air-Line Breathing Air Compressors

The contractor will be responsible for the operation of any air compressor to supply breathing air. The steps to be followed for performing inspections of the air compressors are as follows:

1. Prior to job startup, the contractor will conduct an air test of the compressor air to verify Grade D status. Results of this test will be maintained by the SSO.
2. The compressor will be set up in an area so that the exhaust from vehicles, other equipment, and the compressor itself does not have an influence upon the quality of air at the air intake. The placement of the compressor should be such that no outside contaminants could be introduced into the compressor.
3. Perform required maintenance to the air compressor prior to use.
4. Inspect and test emergency backup air supply. Ensure that backup air supply is full.
5. Oil-lubricated air compressors must comply with OSHA 1910.134 and contain a temperature alarm and a carbon monoxide alarm. Alarms will be located in close proximity to the operation and monitored continuously by the "Contractor".
6. In addition, all manufacturers' maintenance and inspection requirements must be followed.

10.0 MEDICAL SURVEILLANCE REQUIREMENTS

Medical monitoring programs are designed to track the physical condition of all personnel on a regular basis as well as survey pre-employment or baseline conditions prior to potential exposures on project subject to the requirements of 29 CFR 1910.120 (HAZWOPER). All personnel that have the potential to enter the EZ or CRZ will provide proof that they are fit for duty and able to wear respiratory protection prior to reporting to the job site. The FSO will require documentation of acceptable medical clearance prior to each worker's entry into the EZ or CRZ.

10.1 Baseline and Pre-Assignment Medical Monitoring

Prior to being assigned to a hazardous activity involving direct exposure to toxic materials, each person must have received a HAZWOPER-type medical examination within the previous 12 months. In special cases, this period may be extended to 24 months based on a written authorization from the worker's physician.

As suggested by NIOSH, OSHA, and the EPA Occupational Safety and Health Guidance Manual:

- The minimum medical monitoring requirements for work at the site is as

follows:
- Complete medical and work history;
- Review of medical history and general exam by a Board-Certified Physician;
- Determination of fitness for duty.

- If using respiratory protection, all of the above plus:
  - Completion of OSHA Respiratory Protection Questionnaire and review by a Board-Certified Physician. If deemed necessary, the following will apply:
    Pulmonary function tests;
    Medical qualification to use a respirator; Respiratory fit test (yearly).

- If handling or removing hazardous material or wastes, all of the above plus:
  - Chest X-ray (every 2 years or as recommended by Board Certified Physician);
  - Eye examination and visual acuity;
  - Audiometry;
  - Blood chemistry, including hematology, and serum analyses;
  - Tetanus booster.

The pre-assignment physical will provide written clearance by a qualified physician that personnel are fit for duty and able to wear respiratory protection, if appropriate. Only those employees determined by the pre-assignment physical as fit for duty and able to wear respiratory protection will be allowed to work in potentially-contaminated work areas or handle contaminated soil or groundwater.

Those personnel having received the appropriate physical examinations and clearance within the past 12 months will be deemed acceptable to enter the EZ or CRZ for this project, providing that appropriate documentation is provided to the FSO. Such documentation will be maintained in a dedicated file during the project.

10.2 Medical Data Sheets

All personnel authorized to enter the EZ or CRZ will be required to supply proof that the appropriate medical examinations and surveillance were completed prior to the first day of work at the site. Emergency contact information and notification of allergies and/or previous medical conditions will be given to the FSO prior to work at the site. These submittals will be kept confidential and stored in a locked cabinet on site.

Medical data collected on the job site, as described in the sections below, will be recorded on Medical Data Sheets. An example form is provided in Appendix D.

10.3 Heat Stress

Temperatures inside protective equipment can be as much as 25% greater than external ambient temperatures with humidity near 100%. Excessive temperatures and loss of body fluids can result in health conditions ranging from heat rash, cramps, and exhaustion to heat stroke and possibly death.

Heat stress can be caused by a number of factors including workload, weather conditions, personal protective equipment, and physical condition of the individual. Work activities related to materials handling will require the use of personal protective equipment, increasing the risk of worker heat stress.

Prior to the start of work, each contractor will assess predicted PPE to be worn, weather, and all work site conditions and tasks in order to determine the level of work demand with the following table as a guide.

Screening Criteria for Work Demand Category

Categories	Example Activities
Resting	• Sitting quietly • Sitting with moderate air movements
Light	• Sitting with moderate arm and leg movements • Standing with light work at machine or bench while using mostly arms • Using a table saw • Standing with light or moderate work at machine or bench and some walking about
Moderate	• Scrubbing at a standing position • Walking about with moderate lifting or pushing • Walking on a level at 6 km/hr while carrying 3 kg weight load
Heavy	• Carpenter sawing by hand • Shoveling dry sand • Heavy assembly work on a non-continuous basis • Intermittent heavy lifting with pushing or pulling
Very Heavy	• Shoveling wet sand

Contractors will monitor their employees for heat stress as needed. Two methods of monitoring for heat stress may be utilized: heart rate and core body temperature. The following table provides guidelines for monitoring of core temperature.

Heat Stress Action Levels

Work Demands	Action Level	Action
Light	85° F WBGT	• Tympanic temperatures monitored at least every two (2) hours
Moderate	82° F WBGT	• Tympanic temperatures monitored at least every two (2) hours
Heavy	79° F WBGT	• Tympanic temperatures monitored at least every two (2) hours
Very Heavy	77° F WBGT	• Tympanic temperatures monitored at least every

Work Demands	Action Level	Action
		two (2) hours
Any work utilizing impermeable clothing or using respiratory protection	70º F WBGT	• Tympanic temperatures monitored at least hourly

Individuals pulse rate can also be monitored when and if the action levels above are exceeded. Pulse or heart rate is the best indicator of overall stress being applied to the body. The most widely accepted pulse measurement and evaluation method is known as the "Age Adjusted Maximum Heart Rate" (AAMHR). The AAMHR is considered to be the maximum heart rate which an individual can maintain for extended periods without damaging heart muscles. However, this limit may be lower for individuals with pre-existing medical conditions.

$$AAMHR = 220 - Age$$

If a measured pulse rate exceeds 85% of the AAMHR, the individual should be restricted from additional work activities until the pulse rate returns to within 5% of the pre-work baseline and less than 90 beats per minute.

10.3.1 Heat Stress Related Symptoms

Heat stress includes several types of heat related illnesses, each with specific symptoms, listed below:

- Heat rash caused by continuous exposure to heat and humid air. Decreases the body's ability to tolerate heat.
- Heat cramps caused by excessive perspiring without proper and adequate electrolyte replacement. Symptoms include:
  - pain in the hands, feet, and abdomen; and muscle spasms.
- Heat exhaustion caused from inadequate blood circulation due to cardiovascular dehydration. Symptoms include:
  - pale, cool skin; excessive perspiring;
  - fainting;
  - nausea; and dizziness.
- Heat stroke, most serious form of heat stress, body temperature regulation fails and body temperature rises rapidly. Immediate action must be taken to cool the body. Medical attention is required. Symptoms include:
  - red, hot, dry skin;

- lack of perspiration;
- nausea / dizziness; rapid pulse;
- and coma.

10.3.2 Heat Stress Management

When necessary, these general controls will be used to control heat stress:

- Workers will be given verbal instructions and reminders during tailgate safety meetings;
- The drinking of water in small volumes (about 1 cup) throughout the day will be encouraged.
- Worker will be allowed to self-limit their exposures if they detect signs and symptoms of heat strain in themselves or others;
- Individuals taking medications which may put them at greater risk, such as for blood pressure, cardiovascular medication, body temperature regulation, renal or sweat gland functions, and those who abuse or are recovering from alcoholism, will be counseled on the dangers. A healthy lifestyle will be encouraged;
- Personnel must be able to recognize signs and symptoms of heat stress and administer immediate attention;
- Work/rest schedules planned according to weather conditions, workload, and level of personal protective equipment;
- Provide shaded rest area on sunny or hot days;
- Allow personnel to become acclimated to site conditions, personal protective equipment, and workload. Rotate teams of personnel in hot weather;
- Utilize cooling devices to assist body cool down (i.e., showers, cooling jackets, etc.);
- Encourage personnel to maintain their physical fitness.
- Also, if air temperatures rise above 80 °F, shelter or shaded areas should be provided and daily safety briefings should include awareness items for heat stress.

10.4 Cold Stress

Personnel working in extreme cold, even for a short time, may experience severe injury to the surface of the body (frostbite), or profound generalized cooling (hypothermia). Frostbite usually occurs to parts of the body having high surface to volume ratios, such as fingers, toes, ears, and nose. Incipient frostbite is characterized by a blanching or whitening of the skin. Superficial frostbite is characterized by skin with a waxy or white appearance that is firm to the touch, but the skin underneath is resilient. Deep frostbite is characterized by cold pale skin that is solid to the touch.

Systematic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms include shivering, apathy, listlessness, sleepiness, unconsciousness, freezing of the extremities, and even death.

The extent of frostbite and hypothermia is influenced greatly by wind speed, wind chill, and wetness of the skin. Thus, the body can cool rapidly when chemical protective equipment is removed and the clothing underneath is soaked with perspiration. Workers experiencing signs of hypothermia should be immediately removed from the environment, placed in a warm location, covered with dry blankets and provided with warm liquids. Wet clothing should be removed and replaced with dry clothing and outerwear.

11.0 AIR MONITORING PROGRAM

This section explains the general concepts of air monitoring as they pertain to personal protection and related surveillance activities taking place at the site. The purposes of air monitoring are to:

- Identify the potential presence of chemical contaminants in air;
- Warn of hazardous atmospheres before confined space entry;
- Quantify worker exposures to airborne contaminants;
- Assess whether current levels of personal protection are sufficient;
- Assist in the determination of proper and /or additional levels of protection, when needed.

Direct reading instruments or instantaneous measurement techniques will be used for the assessment of worker exposures to site-generated dust. The types of measurements to be conducted on this project are based upon analysis of the contaminants believed to exist at the site, along with their potentials for exposure.

This worker-exposure air monitoring program includes provisions for ambient and perimeter air monitoring program while soil-intrusive work is being conducted.

11.1 Air Monitoring Plan

11.1.1 Direct Reading/Instantaneous Monitoring

Prior to the start of work each day, all operational work areas will be surveyed by the FSO. In addition, periodic measurements will be taken in the worker breathing zone throughout the day.

Respirable dust will be measured using a Thermo Electron DustScan Scout with a PM_{10} cutoff or equivalent instrument in the work area and set up at each of two perimeter air monitoring stations. Results will be compared to action levels for both short-term and long-term averaging periods.

Total volatile organic vapors will be measured using a Photoionization Detector (PID). These measurements also will be compared to exposure limit values listed in the table below. Unless unforeseen conditions are encountered, vapor measurements will be limited to septic system and UST removal activities.

The first air monitoring survey of the day will be completed before work begins. Completion of this survey and the initial air monitoring results will be documented on the site Air Monitoring Log (See Appendix E). Follow up (periodic) results will also be recorded on the log at least hourly. High priority areas of monitoring include open excavations, excavator cabs, spoils piles, and the work area boundary.

If real time air monitoring results in any work area exceed the action levels, the level of protection will be upgraded or actions taken as necessary to ensure that personnel are protected for the worst-case contaminant of concern until the presence of that compound can be negated. Actions will be taken to ensure that personnel in the work area are protected for the worst-case contaminant of concern.

11.1.2 Action Levels

Air Monitoring Work Zone Action Levels

Parameter	Action Level	Action
Total Dust (as PM_{10})	<0.02 mg/m^3 sustained 15 min. >0.02 mg/m^3 in work zone or >0.05 mg/m^3 at the project fence line >0.02 mg/m^3 sustained 15 min.	• Level D • Monitor continuously. Implement dust suppression methods. • Level C. Continue dust suppression methods. Do not re-enter until total dust concentrations are below 0.02 mg/m^3 for 15 consecutive minutes.
Volatile Organic Compounds (VOCs) (Photoionization Detector readings taken continuously and calibrated to read as benzene.)	< 1 ppm 1 to 5 ppm sustained 15 min. 5 to 50 ppm sustained 15 min > 50 ppm sustained 15 min.	• Level D • Monitor continuously. • Level C w/ full-face piece, organic vapor cartridges. Use vapor control methods. • Stop work. Evacuate personnel from the EZ and re- evaluate. Do not re-enter until PID readings are below 1 ppm for 3 consecutive measurements taken 5 minutes apart.

Breathing zone instrument readings for at least 15 minutes (*i.e.*, sustained) will determine the need for upgrading/downgrading of PPE and the corresponding action level. Numerical derivation of the project action level for dust is presented in Appendix F.

11.2 Integrated Sampling

Sustained elevated levels of hazardous substances are not anticipated. Consequently, no integrated sampling is included in this program. Action level responses will be based upon instantaneous readings.

11.3 Equipment Calibration

All instrument calibration will be checked in accordance with manufacturer instructions and acceptable industrial hygiene protocol. Instruments will be recalibrated if calibration checks yield erroneous results, or at the minimum frequency as required by the manufacturer, whichever occurs first. In addition, the instrument will be calibrated in the temperature at which it will be used, or the calibration will be corrected mathematically for differences in temperature, humidity, and barometric

pressure, where appropriate. All calibrations required by this HASP will be recorded in writing and will be maintained on site for the duration of the project.

No calibrations are necessary for the dust meters. However, the dust meter should be "zeroed" in accordance with manufacturer instructions on a daily basis before use and before start of work. The instruments will also be checked by a factory-trained technician prior to field deployment.

The PID will be calibrated per the manufacturer's recommendations. The appropriate photosensitivity will be set on the instrument to read as benzene.

11.4 Perimeter Monitoring

In addition to the monitoring described herein, monitoring will be performed at the project perimeter for dust when soil-intrusive work is being conducted. Data logging will be continuous. The program is designed to protect human health and the environment surrounding the site through the collection of air monitoring data and establishment of contingencies to mitigate off- property airborne contaminant levels exceeding project action levels.

Perimeter dust monitoring will be conducted using a minimum of three (3) PDR-1000 Mini-RAM instruments (or equivalent) equipped with active air intake pumps. The monitoring locations must be approved by the project owner and will be in upwind and downwind locations along the project site perimeter, with at least one station situated between the active work area and the school and the work area and the residences along Lions Mouth Road. Daily wind direction will be measured prior to establishing the monitoring locations.

All readings will be data-logged. Perimeter dust concentrations should not range above 0.05 mg/m^3, measured on a time-averaged 8-hour basis. If the limit is exceeded, dust control methods shall be implemented immediately.

11.5 Dust Suppression Methods

When work zone action levels are reached, measures to control or reduce dust and vapor emissions will be employed. Potential methods to reduce emissions are as follows:

- Use of low permeability tarpaulin or suitable means to cover exposed areas and materials;
- Limiting the amount of exposed areas, as much as possible;
- Water or mist spray for dust suppression;
- Expedient restoration of disturbed surfaces.

12.0 SITE CONTROL MEASURES

The following section defines measures and procedures for maintaining site control. Site control is an essential component in the implementation of the site health and safety program.

In the event that work zones are determined to be necessary, all personnel are to be accounted for when on the job site by a system that will be established at the start of the project. This system may incorporate electronic badges, a foreman sign-in/out procedure, or other methods designed to ensure that all personnel are accounted for when the job site is secured for the day. An example Sign In/Sign Out Log is provided in Appendix G.

A site safety checklist for the project is provided in Appendix H and will be completed for the site on a weekly basis and maintained in the job site trailer.

12.1 Work Zone Definitions

Site contaminants are present at concentrations that exceed applicable risk-based standards, even though they may be attributable to background conditions. As a result, an EZ, CRZ, and Support Zone (SZ) will be established as a component of site control. The zones are described below:

The EZ will be located only in those specific areas where potential for over exposure to the identified contaminants exists. The EZ is defined as the area where contamination is either known or likely to be present, or because of activity, will provide a potential to cause harm to personnel or exposed populations. This area will be demarcated with orange construction fencing or barrier tape, as appropriate for site conditions and activities. Entry into the EZ requires the use of PPE and proper training. The EZ for this project will be established by the FSO. No eating, drinking, or smoking will be permitted in this area.

The CRZ is the area where personnel conduct personal and equipment decontamination. This zone provides a buffer between contaminated areas and clean areas. Activities to be conducted in this zone will also require PPE and training. No eating, drinking, or smoking will be permitted in this area.

The SZ is situated outside the EZ and the CRZ in a clean area in which the chance to encounter hazardous materials or conditions is minimal. All external roadways leading to the site, other than those identified as possibly contaminated, are considered to be in the clean zone. The SZ will generally be positioned upwind of the EZ when possible.

12.2 Site Security

All work areas will be secured during non-working hours. At a minimum, open excavations will be covered to protect the general public. During the course of work, all site visitors will sign in and out of the site. See Appendix H, Site Sign In/Sign Out Log.

12.3 Buddy System

During intrusive activities, the implementation of a buddy system is mandatory. A buddy system requires at least two people who work as a team, each looking out for the other and in voice or visual contact.

12.4 Project Communication

Successful communications between project personnel is essential. The following communications systems may be available during activities on the site.

- Two-way radios;
- Intrinsically safe radio (if deemed necessary);
- Air horns;
- Hand signals;
- Cellular phones.

12.4.1 Air Horn Alerts

Air Horn Alerts

Signal	Definition
One long blast	Attention
Two long blasts	Leave when possible
Three long blasts	Leave area immediately (Emergency)
Repeated short blasts	Send backup support
Very Heavy	Shoveling wet sand

12.4.1 Hand Signals

Hand Signals

Signal	Definition
Hands clutching throat	Out of air – cannot breathe
Hands on top of head	Need assistance
Thumbs up	OK / I am OK / I understand
Thumbs down	No / Negative
Arms waiving upright	Trouble / Send backup support
Grip partner's wrist	Exit area immediately

12.5 Spill Prevention

Contractors will take all necessary precautions to prevent any spill of a hazardous substance during this project. To ensure this, all containers will meet legal requirements for size, shape, and material compatibility and will be properly stored. All chemicals will be stored upright in properly closed or sealed containers that are compatible with the material being stored, and shall be stored indoors, over secondary containment or on an impermeable surface as appropriate.

Refer to Section 15.0 for Emergency Procedures for spill response.

13.0 DECONTAMINATION PLAN

Decontamination involves the orderly, controlled removal of contaminants. Standard decontamination sequences are presented in the examples below. All site personnel should minimize contact with soil and groundwater, when possible, in order to minimize the need for extensive decontamination.

Personnel decontamination will consist of safe work practices, use of disposable PPE, good personal hygiene, and personal decontamination before breaks and at the completion of each day. Decontamination for workers using Modified Level D is described below. The primary objective of personnel decontamination, regardless of PPE level, is to prevent movement of contaminated soil from the site on workers skin and clothing.

The level of protection for decontamination personnel working in the CRZ will be one level lower that the personnel exiting the EZ.

13.1 Routine Personal Decontamination – Modified Level D

1. All liquid resistant suits will be scrubbed with water and industrial soap solution, if needed, in a total body wash pool with a long handle brush, followed by a freshwater rinse. The boots will be included in this step of the decontamination.
2. Disposable coveralls will be removed and placed in a plastic trash bag.
3. Disposable gloves will be removed and placed in a plastic trash bag.
4. Respirators will be decontaminated with a damp paper towel prior to removal to remove gross contamination as required. Respirators shall be washed in a respirator sanitizing solution, rinsed, and then air-dried at least daily, when in use.
5. Hands, face and any other potentially contaminated area will be thoroughly washed with a water/mild soap solution, rinsed, and dried with paper towels.
6. Hard hats shall be thoroughly washed with a water/industrial soap solution,

rinsed and dried. (OR the dirty hard hat may be kept in the EZ for reuse there)

7. If leather/cotton work gloves are used, they will be removed and stored in the work area.

Station 1: Equipment Drop
Deposit equipment used on site (tools, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, cool down stations may be set up within this area.

Station 2: Outer Garment, Boots, and Gloves, Wash Rinse
Wash outer boots, outer gloves, and splash suit (if being used) with water and detergent solution. Rinse off using large amount of water.

Station 3: Outer Boot and Glove Removal
Remove outer boots and gloves. Place in storage area.

Station 4: Boot, Gloves and Outer Garment Removal
Boots, chemical resistant splash suit (if being used), inner gloves removed and deposited in storage area.

Station 5: Field Wash
Hands and face are thoroughly washed.

13.2 Emergency Decontamination

Should a worker be splashed with hazardous chemical contaminants, the worker will immediately be escorted to the field decontamination station and be decontaminated as follows:

1. Wash off under pressurized shower or sprayer
2. Remove all contaminated clothing
3. Remove all wet clothing
4. Cover with blanket or dress in clean, dry clothing
5. Transport to hospital if necessary

13.3 Equipment Decontamination

Equipment must be decontaminated in order to prevent the spread of contaminated soil from the project site onto roadways or other properties. All earthmoving/transportation equipment that has been used within an EZ will be decontaminated with a dry decontamination method, high pressure steam, or pressure washer at the decontamination pads prior to the removal of the equipment from the

site. If necessary, an industrial grade, non-phosphate detergent may be utilized. Decontamination of EZ equipment during the project will take place in a localized temporary decontamination pad constructed of crushed stone of sufficient thickness to support the equipment and underlain by polyethylene sheeting with bermed edges.

Anti-Tracking Pad(s) will be placed in the CRZ to ensure trucking operations do not spread contamination through the site. Tracking pads will consist of crushed stone underlain by polyethylene sheeting.

Contractors will minimize contact of equipment with the contaminated soil and groundwater to the greatest extent possible. Whenever possible, excavation and transportation equipment will be based on clean, undisturbed soil, allowing only the bucket to contact contaminated soil.

13.4 Disposition of Contaminated Wastes

All equipment shall be decontaminated or disposed of properly.

All wash water from equipment decontamination will be containerized and disposed with dewatering fluids.

Disposable PPE and soil generated during equipment decontamination will be disposed of as other project wastes in a manner acceptable to treatment facility needs.

14.0 ILLUMINATION AND SANITATION

14.1 Illumination

Site operations will not begin until lighting is adequate at dawn and will cease in time to permit personnel to secure the site prior to dusk. If work schedules require work outside of these time constraints, then portable lights providing adequate lighting will be provided.

14.2 Sanitation

Potable water will be provided for workers at each work area. All workers are required to wash their hands, at a minimum, before eating lunch and before leaving the site.

14.3 Housekeeping

To minimize potential accidents and cross contamination, the site will be maintained in a generally clean and orderly condition. Personal waste materials, such as PPE, paper towels, and respirator cartridges, etc. will be disposed of in waste containers.

The site will be set up so as to be reasonably free from significant safety hazards. Wires and hoses will be positioned so they do not obstruct or present a safety hazard in walkways and evacuation routes.

15.0 EMERGENCY PROCEDURES

This section describes contingencies and emergency procedures to be implemented at the site. This plan should be coordinated with local disaster and emergency management plans as appropriate. In addition, meetings or other communication with the local hospital, rescue squad, hazardous materials unit, and fire department will occur so as to advise the emergency response representatives of the nature and type of contaminants victims may have been exposed to while on site. Directions to the hospital will be posted on site when this HASP is in effect. Emergency procedures will be posted and covered in daily site briefings.

15.1 Pre-Emergency Planning

During the site briefings held periodically, all employees will be trained in and reminded of provisions of the emergency response plan, communications systems, and evacuation routes.

15.2 Emergency Equipment and Facilities

Contractors are responsible for providing their own emergency equipment, which should include:

- First-aid kit;
- Fire extinguisher appropriate to potential fire hazards;
- Portable eye wash near any areas of chemical use or splashing;
- Mobile phone and/or two-way radio; and
- Chemical spill kits and/or absorbents.

15.3 Personnel Roles and Lines of Authority

The Site Superintendent has primary responsibility for responding to emergencies upon consultation with, and advice from, the FSO. This includes taking appropriate measures to ensure the safety of site personnel and the public. Possible actions may

involve evacuation of adjacent personnel. The Site Superintendent is responsible for ensuring that corrective measures have been implemented, appropriate authorities are notified, and follow up reports completed.

15.4 Incident, Accident, and Illness Reports

All HASP non-conformance incidents will be recorded in the site log by the FSO and will be reported to the general contractor Project Manager at the time of incident. Any inquires by the general public, news media, or regulatory agencies will immediately be referred to the general contractor PM and project owner.

Written confirmation of verbal reports is to be submitted within 24 hours. An Incident Report Form will be used for this purpose whenever any contractor or subcontractor employee is injured, or equipment damage occurs. A copy of the form is included in Appendix I. Completed forms will be maintained on site for the duration of the project.

Information released from the health care provider and not deemed confidential patient information is to be attached to the appropriate form. Any medical information not released by patient consent is to be filed in the individual's medical record and treated as confidential.

15.5 Evacuation Procedures

If anyone discovers a fire, chemical spill or release, or other process upset necessitating emergency action, he or she will immediately notify the Site Superintendent. An immediate decision will be made as to whether to evacuate the site or take other action.

An evacuation map will be developed by the Site Superintendent and posted on site in the field trailer. This will be reviewed at a tailgate safety meeting prior to work. The evacuation map shall show two entrances/exits and off-site assembly points.

The primary response to any emergency will be to protect the health and safety of employees, contractors, and visitors on site, as well as individuals at the school and in the surrounding community. Steps will be taken to identify, contain, treat, and properly dispose of the materials involved as a secondary response.

15.6 Alerting System

When notified to evacuate, all personnel will be expected to proceed to the closest site exit and mobilize to the predetermined safe distance assembly area associated with the evacuation route. Personnel will remain at that area until an authorized individual provides further instructions.

15.7 Emergency Medical Treatment

Any person who becomes ill or injured in the EZ must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is life threatening, at least partial decontamination should be completed (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket). First aid should be administered while awaiting an ambulance or paramedics.

Any person being transported to a clinic or hospital for treatment will take with them information on the chemical(s) they have been exposed to at the site, along with a copy of the individual's medical clearance certifications.

Prior to the start of work, the FSO shall confirm the nearest hospital's location and phone number. This information along with directions from the site to the facility shall be posted in the office trailer.

SITE ADDRESS:
68 Elm Street
Amesbury, MA

HOSPITAL ADDRESS:
Lawrence General Hospital
1 General Street
Lawrence, MA (978) 638-4000

DIRECTIONS TO HOSPITAL:

1. Depart site west and turn left onto Lions Mouth Rd
2. Continue onto Friend St
3. Slight right onto Highland St
4. Turn right onto Highland St
5. Turn right onto MA-150 S/Hillside Ave
6. Turn right to merge onto I-495 S toward Haverhill
7. Follow I-495 to Marston St in Lawrence
8. Take the exist 45 from I-495 S
9. Merge onto Marston St
10. Slight right towards Prospect St
11. Continue onto Prospect St
12. Take exit 45B to merge onto Marston St
13. Continue onto Prospect St
14. Turn left onto General St. Destination will be on the right

A map showing the route to the hospital, including directions, is included as Figure 4 - *Hospital Route Map*. The travel time is approximately 15 minutes.

15.8 Emergency Contacts & Notification Systems

The table attached in Appendix J provides names and telephone numbers for emergency contact personnel and key project contacts. It will be kept on site for the duration of the project. In the event of a medical emergency, personnel will take direction from the Site Superintendent and FSO and notify the appropriate emergency organization. In the event of a fire or spill, the Site Superintendent will ensure that the appropriate local, state, and federal agencies are notified.

Prior to posting, the Site Superintendent and FSO shall confirm the appropriate contact names and phone numbers are listed.

15.9 Non-Emergency Medical Care

Conditions requiring non-emergency medical care may be treated by the Occupational Health provider. When a condition is a non-emergency and can be addressed on a walk-in basis, the contractor's employer may specify a walk-in clinic. Chemical exposures of any kind shall be routed to the emergency facility listed above.

15.10 Fire and Explosion Procedures

In the event of a fire or explosion, the local Fire Department should be summoned immediately. Upon their arrival, the Site Superintendent or designated alternate will advise the fire commander of the location, nature, and identification of the hazardous materials on site.

If it is safe to do so, site personnel may:

1. Use firefighting equipment available on site to control or extinguish the fire, and
2. Remove or isolate flammable or other hazardous materials that may contribute to the fire.

15.11 Spill and Leak Procedures

In the event of a spill or leak that may enter any surface water, sanitary sewerage pipeline, storm sewer, or other off-site conveyance, site personnel will:

1. Inform supervisor immediately;
2. Terminate work activities (at the discretion of the Site Superintendent of FSO);
3. Prevent entry of spill materials into any waterways;
4. Follow site emergency notification and evacuation procedures, when

necessary;

5. Locate the source of spillage and stop the flow if it can be done safely; and
6. Begin containment and recovery of the spilled materials if it can be done safely.

If the spill or release is expected to pose significant hazards or is beyond the capabilities of the available personnel, then the FSO will be contacted immediately. When contacted, the FSO will obtain and assess the following information:

1. The material spilled or released;
2. Location of the release or spill;
3. An estimate of the quantity released and the rate at which it is being released;
4. Any injuries involved;
5. Fire and/or explosion or possibility of these events occurring; and
6. The area and materials involved in the location of the fire or explosion.

In the event of a chemical spill that is not contained within a dike or bermed area, an area of isolation will be established around the spill and the material(s) involved. When any spill occurs, only those persons involved in the oversight or performance of the emergency cleanup will be allowed within the designated hazard area. If possible, this area will be roped, fenced, barricaded, or otherwise blocked off.

If an incident may threaten the health or safety of the surrounding community, the public will be informed and possibly evacuated from the area. The Site Superintendent will notify the proper agencies in the event that this is necessary. The telephone numbers of emergency response organizations are listed in Section 15.10, above.

If the control and cleanup of the spill or release is within the capabilities of on-site personnel and the release does not migrate beyond the perimeter of the site, the Site Superintendent will notify the FSO, who will determine reporting requirements. Reporting of spills or releases in accordance with federal, state, and local regulations is the responsibility of the Site Superintendent.

Contractors that have the potential to generate a spill or release (such as heavy equipment operators) should be equipped with the following spill response equipment:

- Loose dry absorbent (e.g., sawdust, vermiculite, multipurpose sorbent);
- Oil containment booms and pads;
- Shovels - wooden handle, steel type;
- Brooms - wooden handle, push type; and
- Wrenches and tools for tightening fittings and valves.

15.12 Incident Follow-up and Critique

Following all emergency response actions and activation of this plan, the Site Superintendent will conduct a debriefing session of all key personnel involved. The response will be critiqued, documented, and response plans revised, if necessary. Corrective actions will be listed where procedures were inadequate or need improvement. Responsible persons will be listed and held accountable for follow-up.

FIGURES

APPENDIX A

HASP ACKNOWLEDGEMENT/SIGNATURE LOG

APPENDIX B

SITE SUMMARY DATA

APPENDIX C

SAFETY MEETING LOG

APPENDIX D

MEDICAL DATA SHEET

APPENDIX E

AIR MONITORING LOG

APPENDIX F

EXPOSURE/RISK CALCULATIONS

APPENDIX G

SIGN IN/SIGN OUT LOG

APPENDIX H

HEALTH & SAFETY FORMS

APPENDIX I

INCIDENT REPORT FORM

APPENDIX J

EMERGENCY CONTACT PERSONNEL LIST