

# THE COMMONWEALTH OF MASSACHUSETTS

AMESBURY  
HAVERHILL ROAD (ROUTE 110)  
TITLE & INDEX SHEET  
SHEET 1 OF 26

## SAFETY IMPROVEMENT PROJECT HAVERHILL ROAD (ROUTE 110)

IN THE CITY OF

## AMESBURY ESSEX COUNTY

ACCESS PERMIT PROJECT

### INDEX

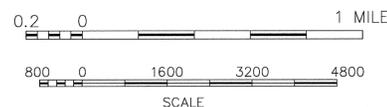
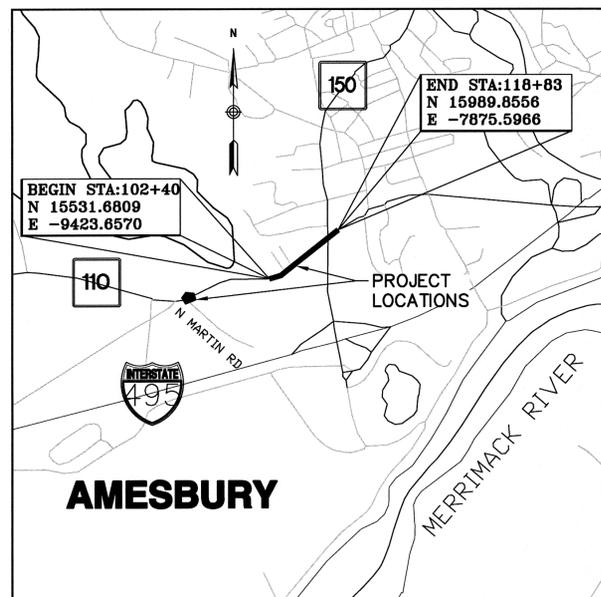
1	TITLE & INDEX SHEET
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### REFERENCE MANUALS

THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 1988, AS AMENDED, THE INTERIM SUPPLEMENTAL SPECIFICATIONS DATED JANUARY 23, 2015, THE 2014 CONSTRUCTION STANDARD DETAILS, THE 1996 CONSTRUCTION AND TRAFFIC STANDARD DETAILS (AS RELATES TO TRAFFIC STANDARD DETAILS ONLY), THE CURRENT VERSION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, OVERHEAD SIGNAL STRUCTURE & FOUNDATION STANDARD DRAWINGS DATED DECEMBER 2015, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, WILL GOVERN.

### DESIGN DESIGNATION

DESIGN SPEED	=	40 mph
ADT (2016)	=	15,547 vpd
K	=	8.4%
D	=	56.3% (WB)
T (PEAK HOUR)	=	2.0%
DHV	=	1306 vph
DDHV	=	735 vph (WB)



LENGTH OF PROJECT: 1643 FEET

PROJECT ENGINEER  
STRUCTURAL REVIEW  
TRAFFIC SIGNAL REVIEW  
HIGHWAY DEPT. AUTHORIZATION  
HIGHWAY TECH. REVIEW  
CONSTRUCTION REVIEW

\\vnb\proj\Wat-TS\09407.04\acad\te\planset\09407cov.dwg

NO.	REVISIONS	DATE

*Wayne Phillip Amico* 8/22/16  
ENGINEER DATE

**vhb** Vanasse Hangen Brustlin, Inc.  
101 Walnut St., PO Box 9151  
Woburn, MA 02472  
617.924.1770 FAX 617.924.2286

DESIGNED BY A.JV/HLF	APPROVED BY WPA	SHEET OF 1 26
DRAWN BY A.JV/PM	DTG CHECKED BY HLF	vhb CAD FILE NAME 09407cov.dwg
CHECKED BY SHK	DATE 22 AUGUST 16	JOB NO. 09407.01

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		CATCH BASIN (OR GUTTER INLET, OR LEACHING BASIN)
		EDGESTONE-TYPE NOTED
		EDGE OF ROAD
		ELECTRIC HANDHOLE (NUMBER AS NOTED)
		ELECTRIC MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
		SEWER MANHOLE
		DRAINAGE MANHOLE
		GAS GATE
		WATER GATE
		CURB STOP
		HYDRANT
		FIRE ALARM BOX
		STREET LIGHT POLE
		UTILITY POLE
		GUY POLE
		DRAIN PIPE (UNDER 24")
		DRAIN PIPE (DOUBLE LINE 24" AND OVER)
		SEWER MAIN
		ELECTRIC DUCT
		GAS MAIN
		WATER MAIN
		TELEPHONE DUCT
		MAIL BOX
		HIGHWAY GUARD (TYPE NOTED)
		FENCE (SIZE AND TYPE NOTED)
		HIGHWAY/PROPERTY BOUND (TYPE NOTED)
		CITY, TOWN, OR COUNTY LAYOUT
		STATE HIGHWAY LAYOUT (S.H.L.O.)
		EASEMENT LINE
		PROPERTY LINE
		CITY, TOWN, OR COUNTY BOUNDARY
		STATE BOUNDARY
		BASE OR SURVEY LINE
		CONSTRUCTION BASELINE
		TREE (SIZE AND TYPE NOTED)
		APPROXIMATE FULL DEPTH AREA
		DRAINAGE STRUCTURE
		WHEEL CHAIR RAMP

TRAFFIC SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		CONTROLLER PHASE ACTUATED
		TRAFFIC SIGNAL HEAD (SIZE AS NOTED)
		VIDEO DETECTION ZONE
		VIDEO DETECTION CAMERA
		MICROWAVE DETECTOR
		PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE
		EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
		VEHICULAR SIGNAL HEAD
		VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED
		FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)
		RAILROAD SIGNAL
		SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)
		MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)
		HIGH MAST POLE OR TOWER
		SIGN AND POST
		SIGN AND POST (2 POSTS)
		MAST ARM WITH LUMINAIRE
		OPTICAL PRE-EMPTION DETECTOR
		CONTROL CABINET, GROUND MOUNTED
		CONTROL CABINET, POLE MOUNTED
		FLASHING BEACON CONTROL AND METER PEDESTAL
		LOAD CENTER ASSEMBLY
		PULL BOX 12"x12" (OR AS NOTED)
		ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT

GENERAL NOTES

- TOPOGRAPHICAL INFORMATION FROM A SURVEY BY MILLENIUM ENGINEERING, SALISBURY, MASSACHUSETTS, SEPTEMBER 2007.
- THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
- WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
- THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.
- TREES AND SHRUBS WITHIN THE LIMITS OF GRADING SHALL BE REMOVED ONLY UPON APPROVAL OF THE ENGINEER.
- AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT NO EXPENSE TO THE OWNER.
- THE TERM "PROPOSED" (PROP) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET" (R&R).
- JOINTS BETWEEN NEW HOT MIX ASPHALT ROADWAY PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH BITUMEN AND BACKSANDDED.
- ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
- ALL EXISTING GRANITE CURB & EDGING SHALL BE RE-USED IN THE PROPOSED WORK, EXCEPT CURVED STONES OF A DIFFERENT RADIUS THAN PROPOSED CURB.
- ALL EXISTING STATE, COUNTY, CITY, AND TOWN LOCATION LINES AND PRIVATE PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND THEIR EXACT LOCATION ARE NOT GUARANTEED.
- PROJECT IS ON AN ASSUMED COORDINATE SYSTEM.
- WORK HOURS SUBJECT TO MASSDOT ACCESS PERMIT. RESTRICTIONS WILL BE IN ACCORDANCE TO THE ACCESS PERMIT.

PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
		LEGEND "ONLY" - WHITE
		STOP LINE
		CROSSWALK
		SOLID WHITE LINE
		SOLID YELLOW LINE
		BROKEN WHITE LINE
		BROKEN YELLOW LINE
		DOTTED WHITE LINE
		DOTTED YELLOW LINE
		DOTTED WHITE LINE EXTENSION
		DOTTED YELLOW LINE EXTENSION
		DOUBLE WHITE LINE
		DOUBLE YELLOW LINE

TRAFFIC SIGNAL

CAB.	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY DON'T WALK
FDW	FLASHING DON'T WALK
FR	FLASHING CIRCULAR RED
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR YELLOW
FYL	FLASHING YELLOW LEFT ARROW
FYR	FLASHING YELLOW RIGHT ARROW
G	STEADY CIRCULAR GREEN
GL	STEADY GREEN LEFT ARROW
GR	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
GV	STEADY GREEN VERTICAL ARROW
OL	OVERLAP
PED	PEDESTRIAN
PTZ	PAN, TILT, ZOOM
R	STEADY CIRCULAR RED
RL	STEADY RED LEFT ARROW
RR	STEADY RED RIGHT ARROW
TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALK
Y	STEADY CIRCULAR YELLOW
YL	STEADY YELLOW LEFT ARROW

ABBREVIATIONS

UTILITIES	
ACCMP	ASHPALT COATED CORRIGATED METAL PIPE
CAP	CORRUGATED ALUMINUM PIPE
CIP	CAST IRON PIPE
CIT	CHANGE IN TYPE
COND	CONDUIT
DIP	DUCTILE IRON PIPE
FES	FLARED END SECTION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HW	HEADWALL
HYD	HYDRANT
INV	INVERT
PVC	POLYVINYLCHLORIDE PIPE
PWW	PAVED WATER WAY
RCP	REINFORCED CONCRETE PIPE
TSV&B	TAPPING SLEEVE VALVE AND BOX
UP	UTILITY POLE

ALIGNMENT/GRADING

CC	CENTER OF CURVE
HP	HIGH POINT
LP	LOW POINT
PC	POINT OF CURVE
PI	POINT OF INTERSECTION
PNT	POINT
PCC	POINT OF COMPOUND CURVE
PRC	POINT OF REVERSE CURVE
PT	POINT OF TANGENT
25.45	SPOT ELEVATION

PROFILES

AD	ALGEBRAIC DIFFERENCE IN RATES OF GRADE
ELEV	ELEVATION
HSD	HORIZONTAL SIGHT DISTANCE
K	RATE OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVC	POINT OF VERTICAL CURVE
PVT	POINT OF VERTICAL TANGENT
PVRC	POINT OF VERTICAL REVERSE CURVE
PVCC	POINT OF VERTICAL COMPOUND CURVE
SSD	STOPPING SIGHT DISTANCE
VC	VERTICAL CURVE

GENERAL

ABAN	ABANDON	PGL	PROFILE GRADE LINE
ADJ	ADJUST	PROP	PROPOSED
APPROX	APPROXIMATE	PVM'T	PAVEMENT
BIT	BITUMINOUS	REM	REMOVE
BL	BASELINE	REMOD	REMODEL
BOS	BOTTOM OF SLOPE	RET	RETAIN
(BO)	BY OTHERS	ROW	RIGHT OF WAY
CEM	CEMENT	R&D	REMOVE AND DISCARD
CLF	CHAINLINK FENCE	R&R	REMOVE AND RESET
CONC	CONCRETE	R&S	REMOVE AND STACK
ELEV	ELEVATION	RT	RIGHT
EOP	EDGE OF PAVEMENT	SHLDR	SHOULDER
EXIST	EXISTING	SHLO	STATE HIGHWAY LAYOUT
FND	FOUNDATION	STA	STATION
GRAN	GRANITE	TEMP	TEMPORARY
HMA	HOT MIX ASPHALT	THLO	TOWN HIGHWAY LAYOUT
LOAM	LOAM BORROW	TOS	TOP OF SLOPE
LT	LEFT	TYP	TYPICAL
MAX	MAXIMUM		
MIN	MINIMUM		
NTS	NOT TO SCALE		

AMESBURY  
HAVERHILL ROAD (ROUTE 110)  
TYPICAL SECTIONS &  
PAVEMENT NOTES  
SHEET 3 OF 26

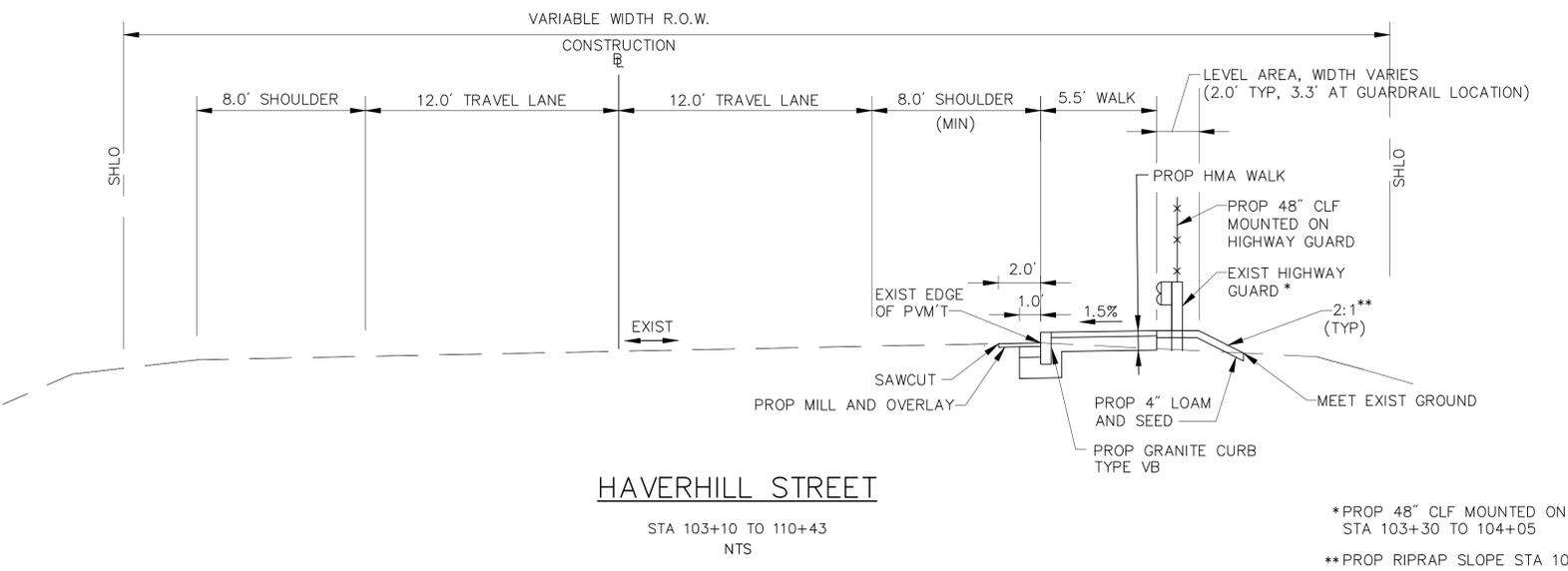
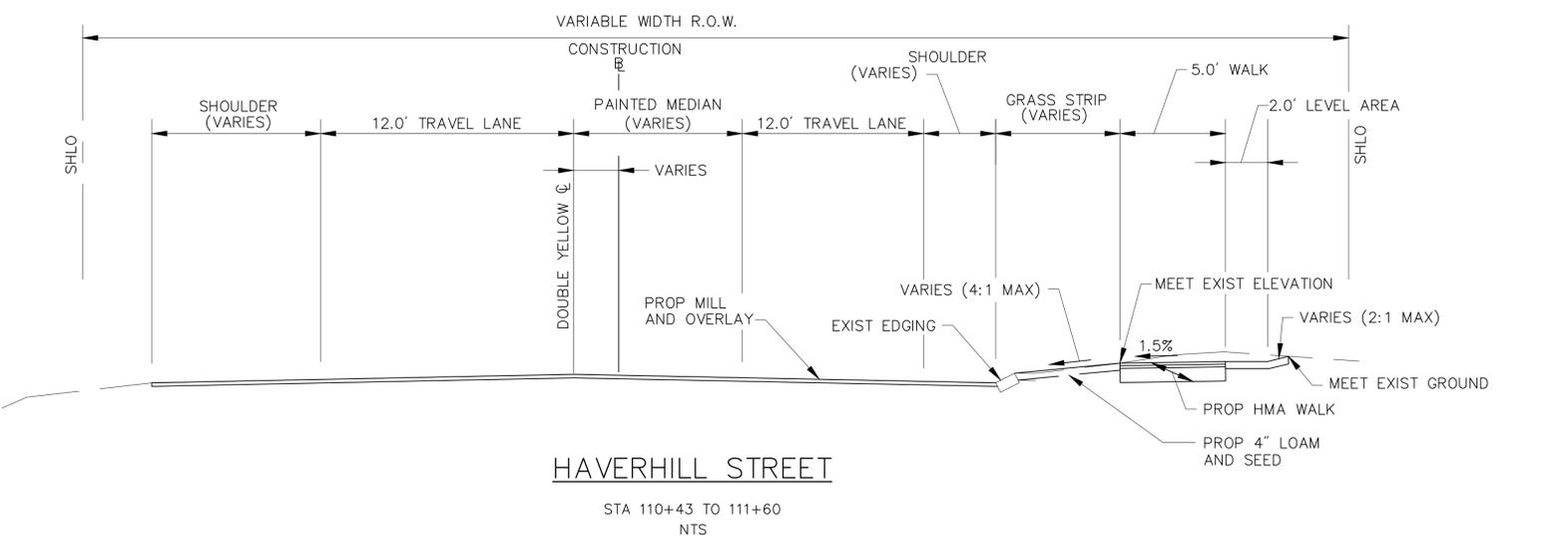
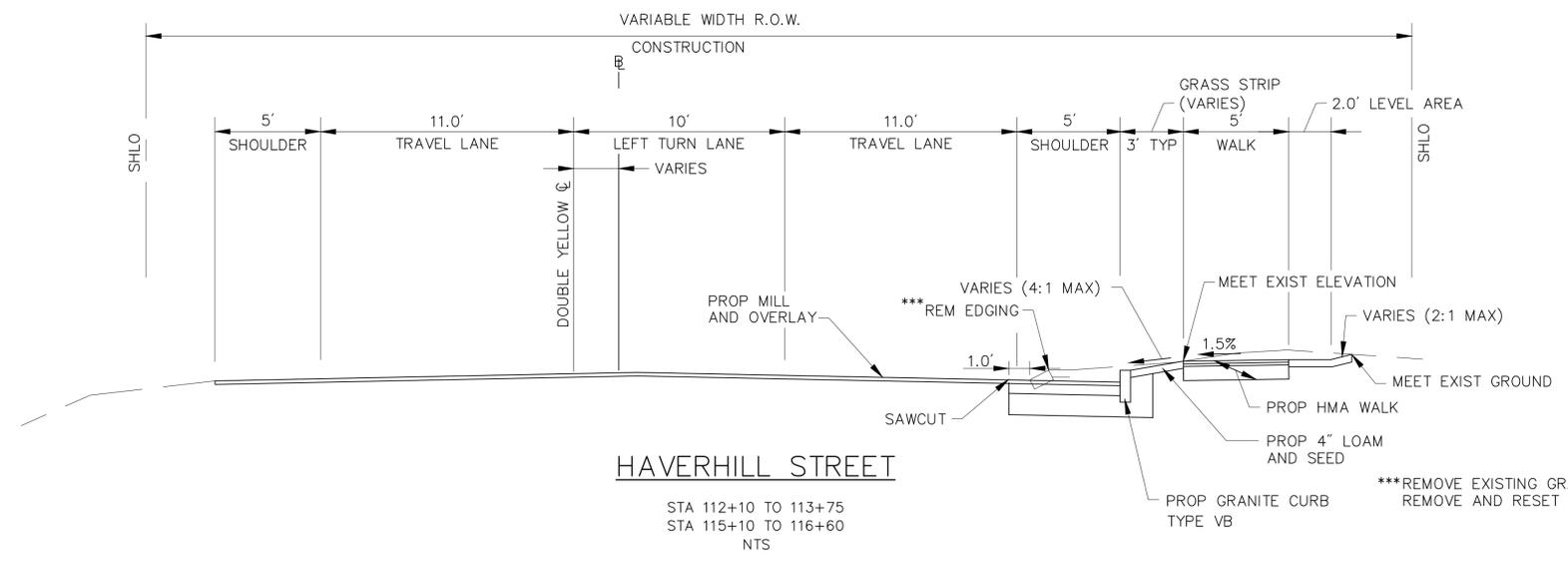
**PAVEMENT NOTES**

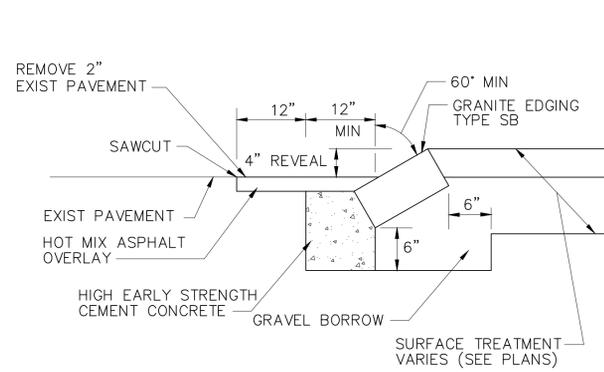
PROPOSED HOT MIX ASPHALT WALK  
SURFACE: 3" HOT MIX ASPHALT  
PLACE IN TWO LAYERS, 1.5" TOP COURSE  
OVER 1.5" BINDER COURSE  
SUBBASE: 8" GRAVEL BORROW, TYPE c

PROPOSED HOT MIX ASPHALT DRIVEWAY  
SURFACE: 3.5" HOT MIX ASPHALT  
(1.5" TOP COURSE OVER 2" BINDER COURSE)  
SUBBASE: 8" GRAVEL BORROW, TYPE c

PROPOSED CEMENT CONCRETE WALK/ WHEELCHAIR RAMP  
SURFACE: 4" CEMENT CONCRETE  
AIR ENTRAINED 4000 PSI, 3/4", 610  
SUBBASE: 8" GRAVEL BORROW, TYPE c

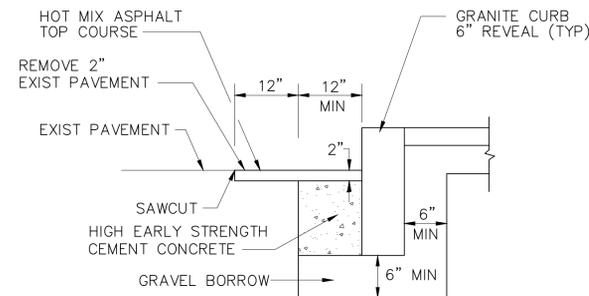
PROPOSED PAVEMENT MILL & OVERLAY  
SURFACE: 2" HOT MIX ASPHALT  
MODIFIED TOP COURSE MATERIAL.  
BITUMEN FOR PRIME COAT (RS-1) AT  
0.07 GAL/SY OVER MILLED PAVEMENT.  
MILL 2"





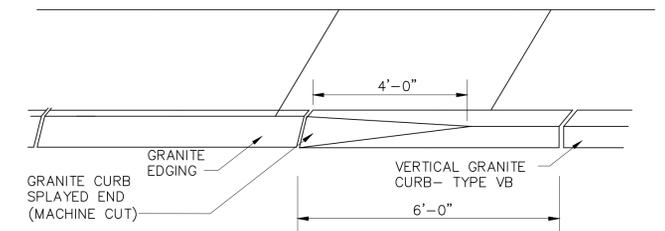
**GRANITE EDGING IN EXISTING PAVEMENT**

SCALE: NOT TO SCALE



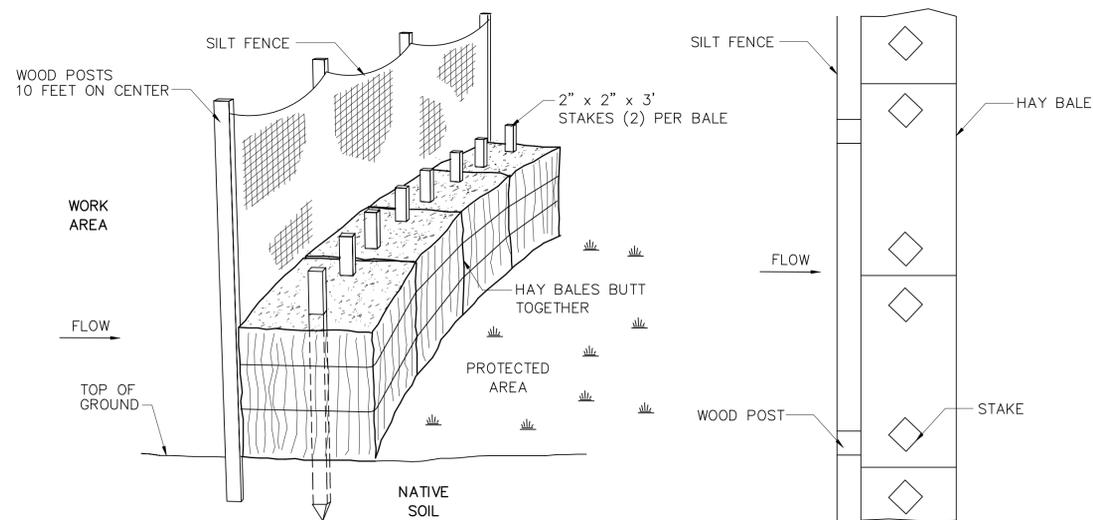
**GRANITE CURB IN EXISTING PAVEMENT**

SCALE: NOT TO SCALE



**GRANITE TRANSITION CURB - SPLAYED END**

SCALE: NOT TO SCALE



**CROSS SECTION**

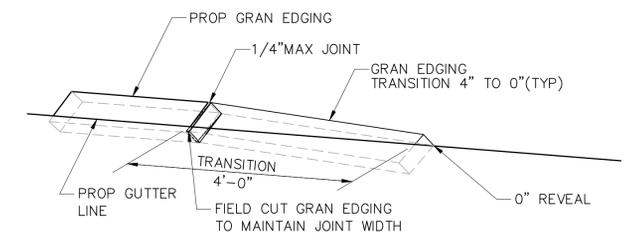
**PLAN VIEW**

**CONSTRUCTION NOTES:**

1. FILTER CLOTH SHALL BE FASTENED SECURELY TO POSTS WITH WIRE TIES OR STAPLES AND POSTS SHALL BE SPACED EVERY 10 FEET.
2. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY 6 INCHES AND FOLDED.
3. ENTRENCH SILT FENCE BUT NOT HAY BALES.
4. INSPECTIONS SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED, OR WHEN SEDIMENT ACCUMULATES TO HALF THE HEIGHT OF FENCING.

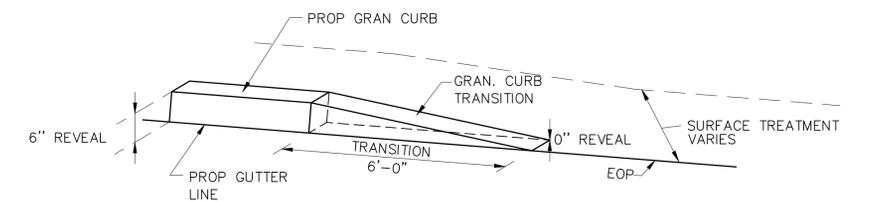
**EROSION CONTROL BARRIER**

SCALE: NOT TO SCALE



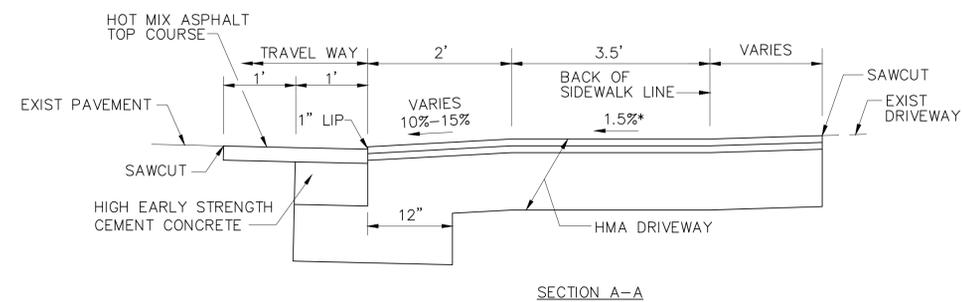
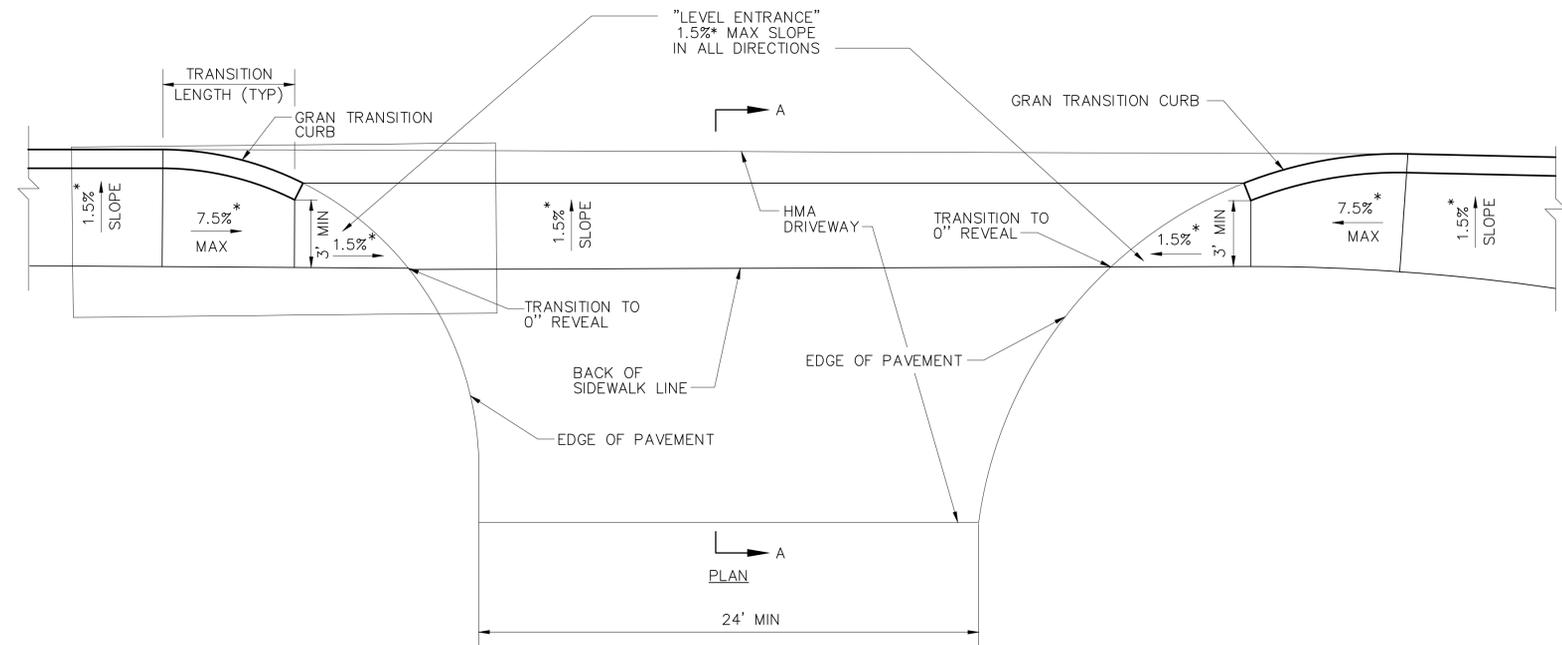
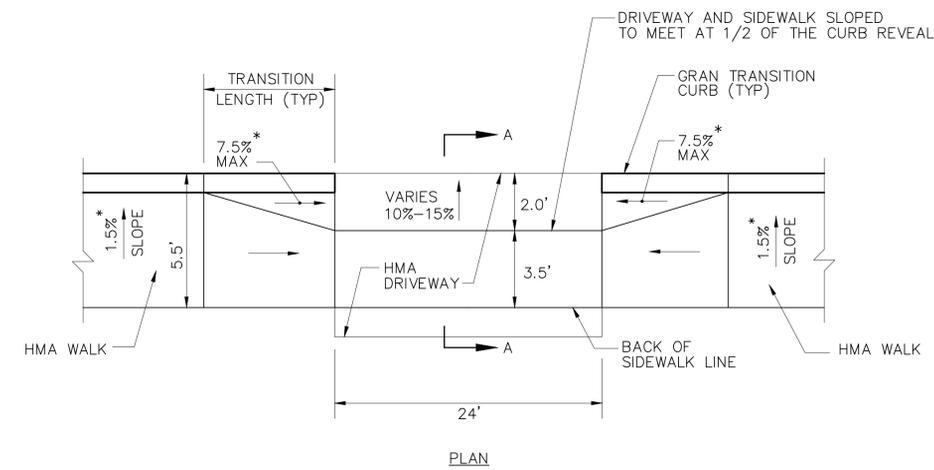
**GRANITE EDGING TRANSITION PIECE**

SCALE: NOT TO SCALE



**GRANITE CURB TRANSITION PIECE**

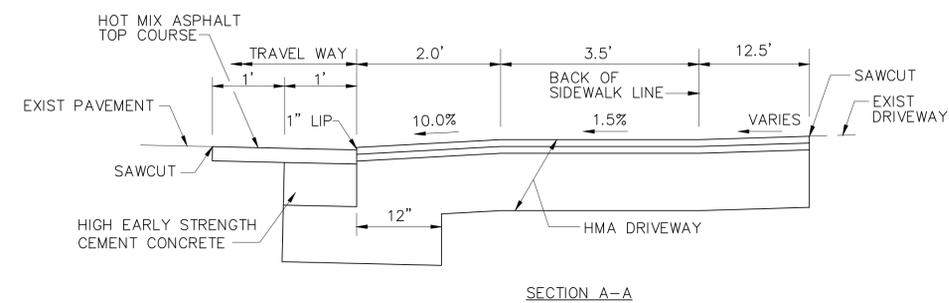
SCALE: NOT TO SCALE



STATION	SIDEWALK WIDTH	ROADWAY GUTTER	LEFT SIDE		RIGHT SIDE	
			REVEAL	TRANSITION	TRANSITION	REVEAL
104+82 RT	5.50'	4.2%	6"	15'-0"	6'-6"	6"
107+80 RT	5.50'	1.9%	6"	9'-0"	6'-6"	6"

\* TOLERANCE FOR CONSTRUCTION ±0.5%

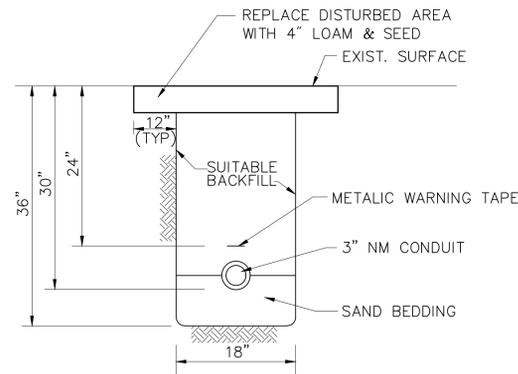
<b>RESIDENTIAL DRIVEWAY</b>	
<b>STATION 107+80 &amp; 104+82, RIGHT</b>	
SCALE:	NOT TO SCALE
DATE:	
DWG:	



STATION	SIDEWALK WIDTH	ROADWAY GUTTER	LEFT SIDE		RIGHT SIDE	
			REVEAL	TRANSITION	TRANSITION	REVEAL
110+00 RT	5.50'	1.6%	6"	6'-6"	9'-0"	6"

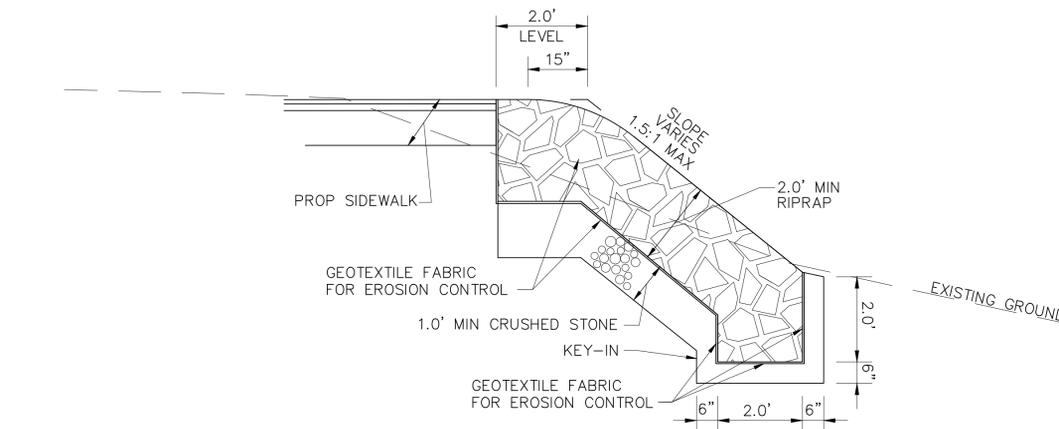
\* TOLERANCE FOR CONSTRUCTION ±0.5%

<b>VETERINARY DRIVEWAY</b>	
<b>STATION 110+00, RIGHT</b>	
SCALE:	NOT TO SCALE
DATE:	
DWG:	



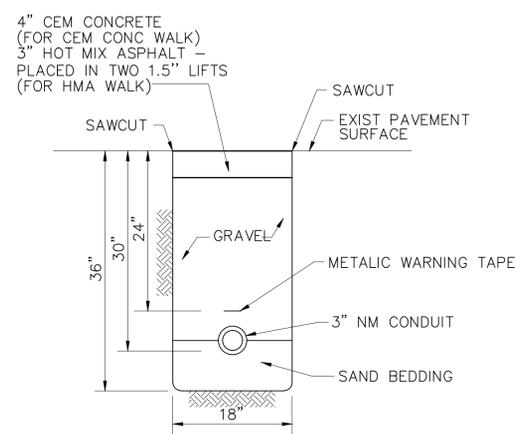
**CONDUIT IN GRASS**

SCALE: NOT TO SCALE  
DATE: APRIL 2003  
DWG: TRENCH-02



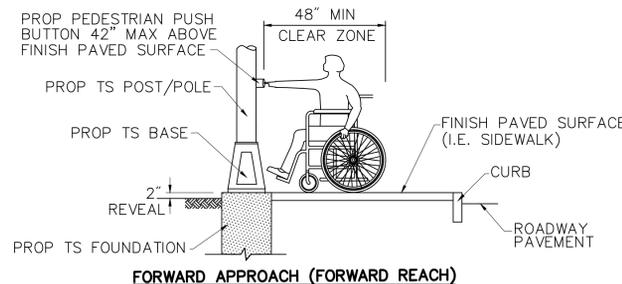
**RIPRAP SLOPE**

SCALE: NOT TO SCALE

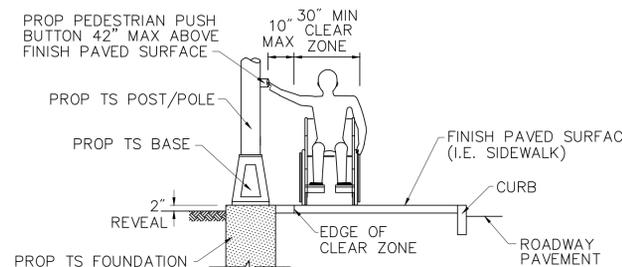


**CONDUIT IN SIDEWALK**

SCALE: NOT TO SCALE  
DATE: APRIL 2003  
DWG: TRENCH-03



**FORWARD APPROACH (FORWARD REACH)**

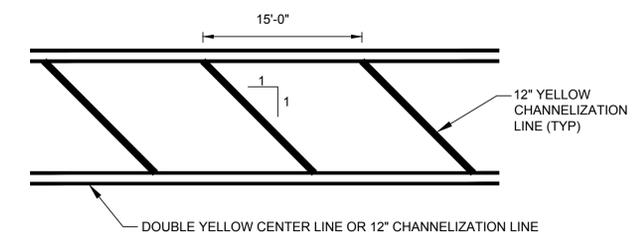


**PARALLEL APPROACH (SIDE REACH)**

NOTE: A CLEAR GROUND SPACE SHALL CONSIST OF A STABLE AND FIRM AREA, COMPLYING WITH 521 CMR 6.5 (FORWARD REACH) OR 521 CMR 6.6 (SIDE REACH) AND SHALL BE PROVIDED AT EACH OF THE PEDESTRIAN PUSH BUTTONS.  
a) WHERE A FORWARD APPROACH IS PROVIDED, PEDESTRIAN PUSH BUTTONS SHALL ABUT AND BE CENTERED ON THE CLEAR GROUND SPACE.  
b) WHERE A PARALLEL APPROACH IS PROVIDED, PEDESTRIAN PUSH BUTTONS SHALL BE WITHIN TEN INCHES (10") HORIZONTALLY OF AND CENTERED ON THE CLEAR GROUND SPACE.

**PEDESTRIAN PUSH BUTTON CLEAR ZONE**

SCALE: NOT TO SCALE  
DATE: OCTOBER 2009  
DWG: PM-10

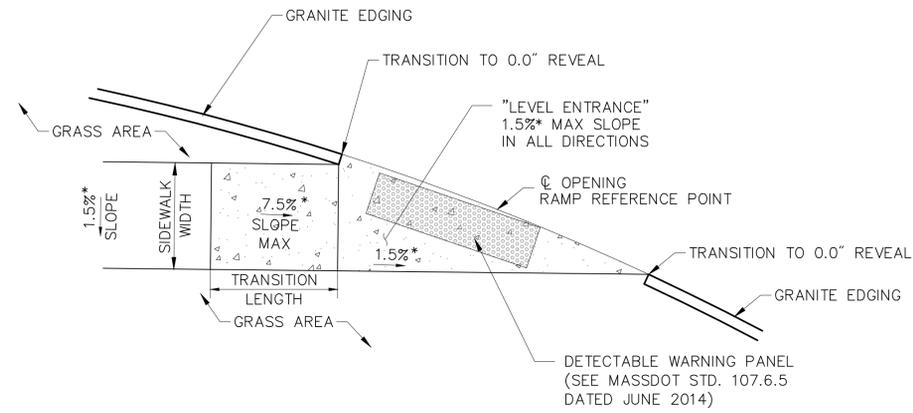


**NOTES:**

- ALL 12" THERMOPLASTIC LINES SHALL BE APPLIED IN ONE APPLICATION, NO COMBINATION OF LINES (TWO - 6" LINES) WILL BE ACCEPTED.
- LAYOUT OF GORE LINES SHALL BE APPROVED BY A MASSDOT ENGINEER PRIOR TO APPLICATION OF THERMOPLASTIC.
- ALL GORE LINES INSTALLED SHALL CONFORM TO THE RELEVANT PROVISIONS OF THE MASSACHUSETTS DOT - HIGHWAY DIVISION "STANDARD SPECIFICATION FOR HIGHWAY AND BRIDGES" DATED 1988, SECTION 860 FOR REFLECTORIZED LINE (THERMO-PLASTIC) & MATERIAL M7.01.20, LATEST REVISIONS.

**GORE AREA PAVEMENT MARKINGS**

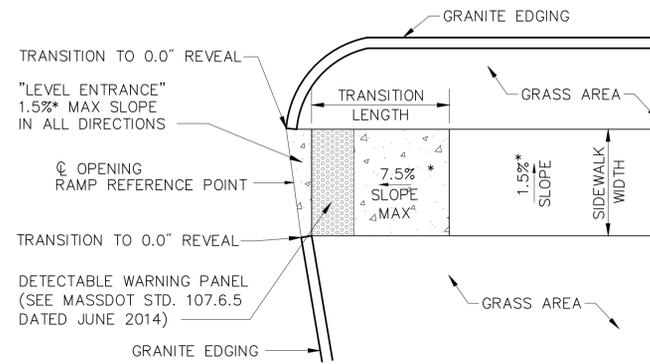
SCALE: NOT TO SCALE  
DATE: DECEMBER 2008  
DWG: PM-09



WHEELCHAIR RAMP  
SINGLE DIRECTION  
NTS

\* TOLERANCE FOR CONSTRUCTION ±0.5%

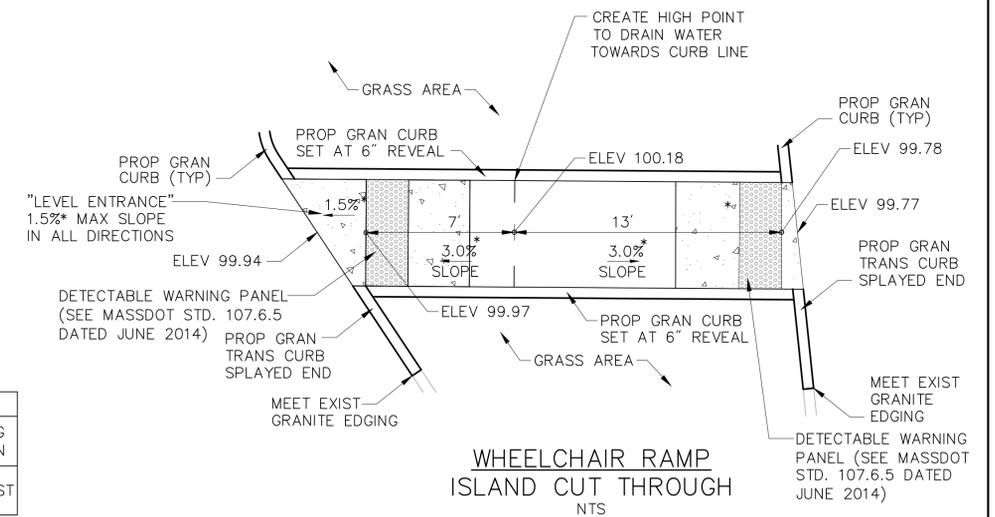
WHEELCHAIR RAMP DATA					
NO.	LOCATION	SIDEWALK WIDTH	ROADWAY GUTTER	TRANSITION LENGTH	℄ OPENING ELEVATION
1	111+72.0 33.8' RT	5.0'±	1.6%	15'-0"	MATCH EXIST



WHEELCHAIR RAMP  
SINGLE DIRECTION  
NTS

\* TOLERANCE FOR CONSTRUCTION ±0.5%

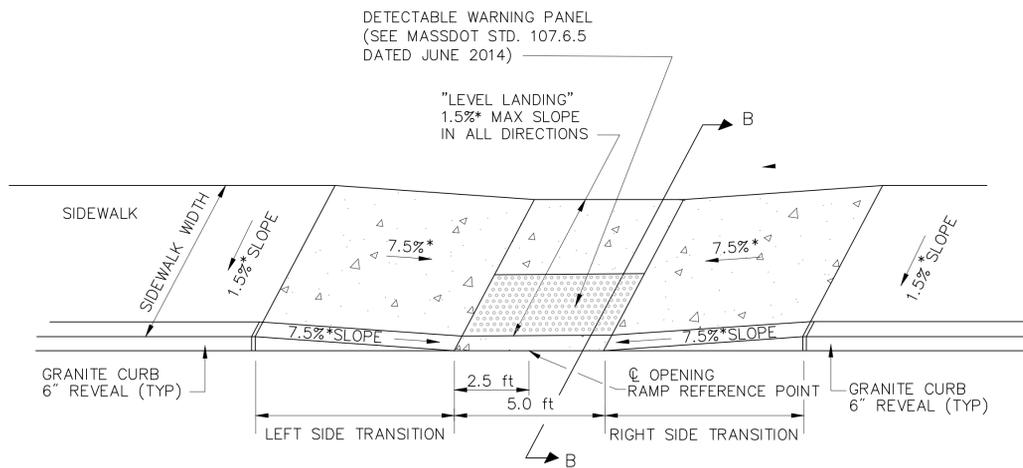
WHEELCHAIR RAMP DATA					
NO.	LOCATION	SIDEWALK WIDTH	ROADWAY GUTTER	TRANSITION LENGTH	℄ OPENING ELEVATION
2	112+11.3 31.3' RT	5.0'±	-1.0%	6'-6"	MATCH EXIST



WHEELCHAIR RAMP  
ISLAND CUT THROUGH  
NTS

\* TOLERANCE FOR CONSTRUCTION ±0.5%

WHEELCHAIR RAMP DATA					
NO.	LOCATION	SIDEWALK WIDTH	ROADWAY GUTTER	TRANSITION LENGTH	℄ OPENING ELEVATION
5	112+10 - 112+35, RT	5.0'±	1.0%	N/A	MATCH EXIST

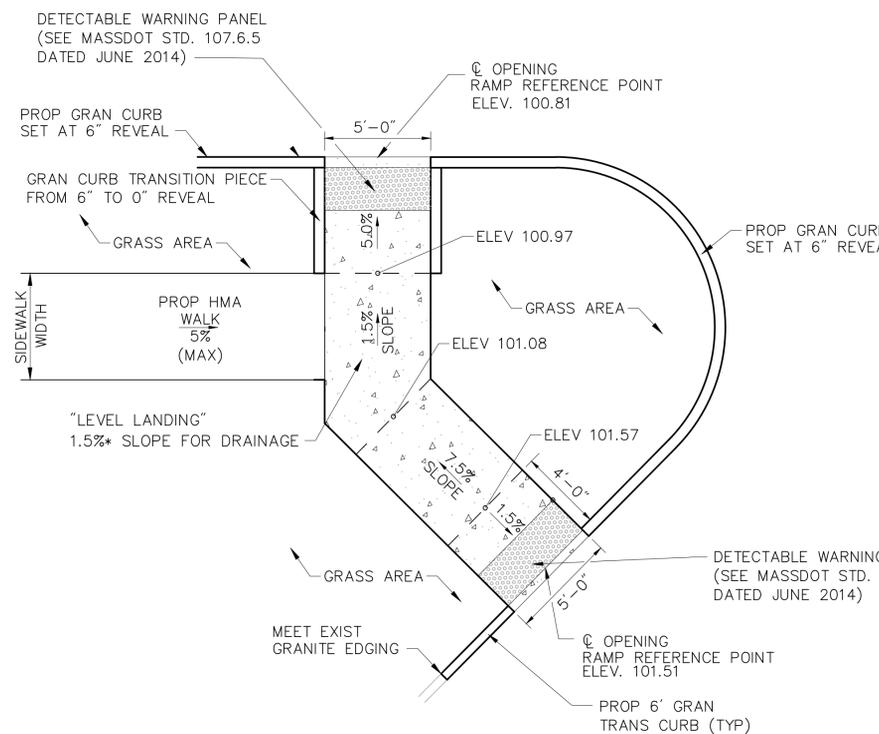


WHEELCHAIR RAMP  
PARALLEL  
NTS

\* TOLERANCE FOR CONSTRUCTION ±0.5%

WHEELCHAIR RAMP DATA										
NO.	STATION	SIDEWALK WIDTH	LEFT SIDE				RIGHT SIDE			OPENING ELEVATION
			ROADWAY GUTTER	REVEAL	TRANSITION	OPENING ELEVATION	ROADWAY GUTTER	REVEAL	TRANSITION	
4	113+69.2 18.6' LT	5.5'±	-0.7%	6"	6'-6"	MATCH EXIST	0.7%	6"	7'-8"	MATCH EXIST

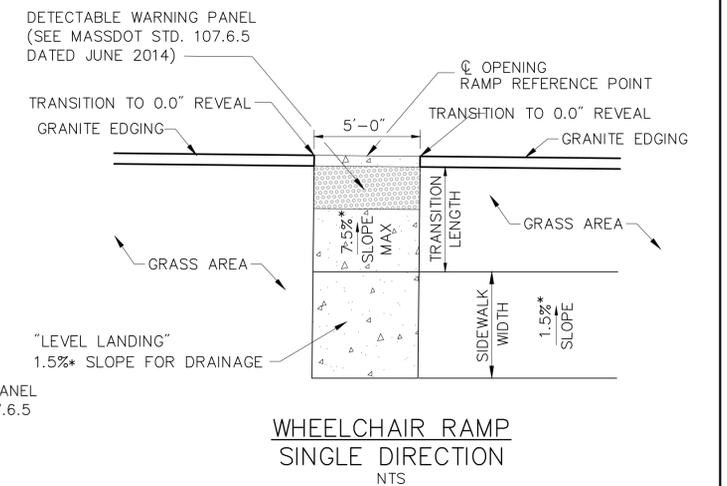
NOTE: NEGATIVE (-) ROADWAY GUTTER MAX DENOTES A LOW SIDE TRANSITION.



WHEELCHAIR RAMPS  
NUMBERS 3 AND 6  
NTS

\* TOLERANCE FOR CONSTRUCTION ±0.5%

WHEELCHAIR RAMP DATA					
NO.	LOCATION	SIDEWALK WIDTH	ROADWAY GUTTER	TRANSITION LENGTH	℄ OPENING ELEVATION
3	113+70.3 23.25' RT	5.0'±	0.7%	N/A	MATCH EXIST
6	113+78.4 40.5' RT	5.0'±	1.3%	N/A	MATCH EXIST



WHEELCHAIR RAMP  
SINGLE DIRECTION  
NTS

\* TOLERANCE FOR CONSTRUCTION ±0.5%

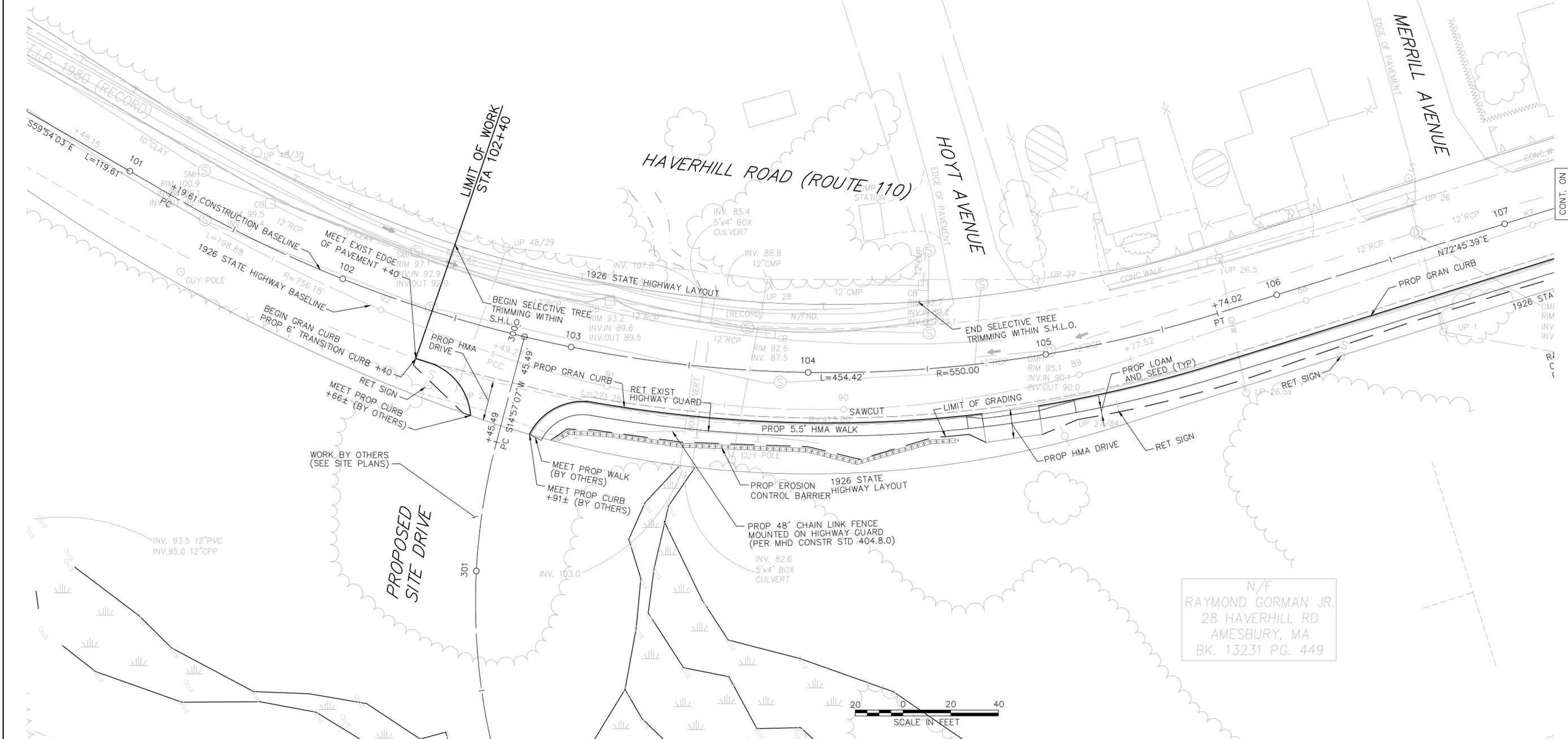
WHEELCHAIR RAMP DATA					
NO.	LOCATION	SIDEWALK WIDTH	ROADWAY GUTTER	TRANSITION LENGTH	℄ OPENING ELEVATION
7	114+22.0 57.7' RT	5.0'±	0.4%	5'-0"	MATCH EXIST

LEGEND

- LIMITS OF CEMENT CONCRETE WHEELCHAIR RAMP
- LIMITS OF DETECTABLE WARNING PANEL (SEE SPECIFICATIONS FOR COLOR)

SEE GENERAL PLANS FOR LOCATIONS OF WHEELCHAIR RAMPS

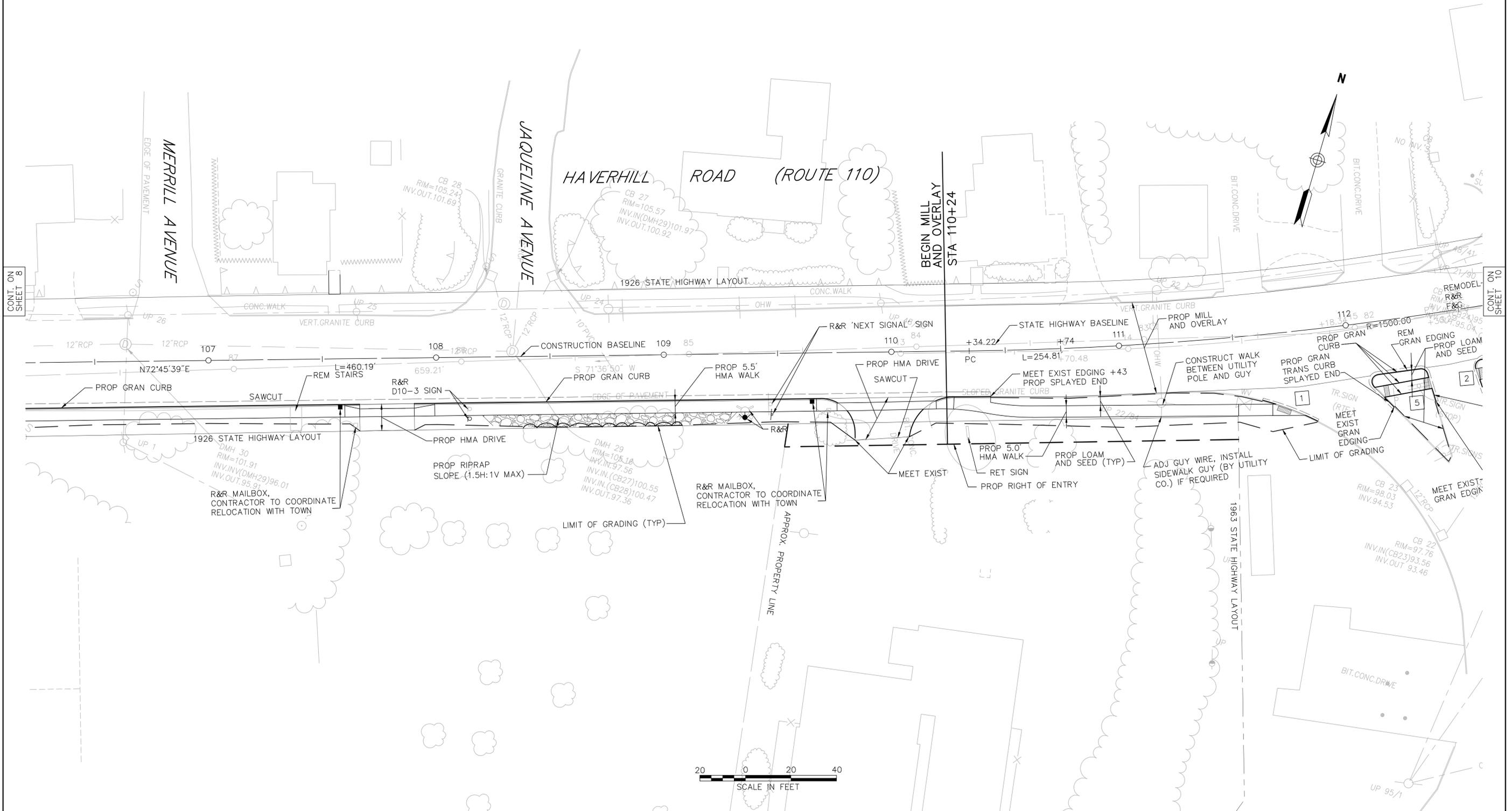
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N/F  
RAYMOND GORMAN JR.  
28 HAVERHILL RD  
AMESBURY, MA  
BK. 13231 PG. 449



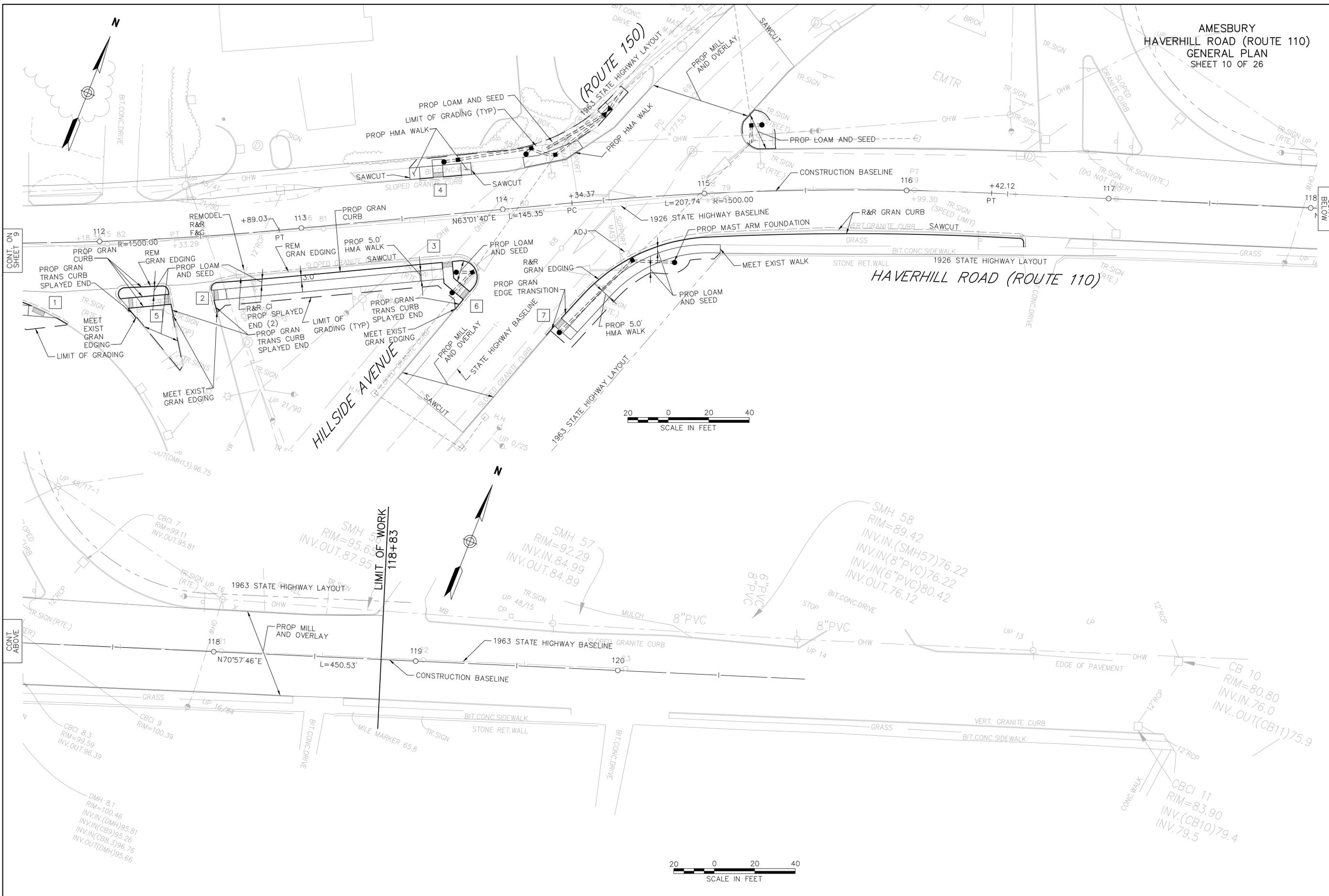
CONT. ON  
SHEET 9



CONT. ON  
SHEET 8

CONT. ON  
SHEET 10





CONT. ON SHEET 9

CONT. BELOW

CONT. ABOVE



HAVERHILL ROAD CONSTRUCTION

STATION	NORTHING	EASTING
BEGIN 100+00.00	15641.5636	-9641.4008
PC 101+19.61	15581.5792	-9537.9193
S59°54'03"E 119.61' RADIUS = 550.00' TANGENT = 241.08' LENGTH = 454.42' DELTA = 47°20'19"		
PT 105+74.02	15532.1248	-9099.0950
N72°45'39"E 460.19'		
PC 110+34.22	15668.5090	-8659.5763
RADIUS = 1500.00' TANGENT = 127.71' LENGTH = 254.81' DELTA = 9°43'59"		
PT 112+89.03	15764.2830	-8423.7819
N63°01'40"E 145.35'		
PC 114+34.37	15830.2065	-8294.2448
RADIUS = 1500.00' TANGENT = 104.04' LENGTH = 207.74' DELTA = 7°56'07"		
PT 116+42.12	15911.3289	-8103.1760
N70°57'46"E 450.53'		
END 120+92.65	16058.2835	-7677.2848

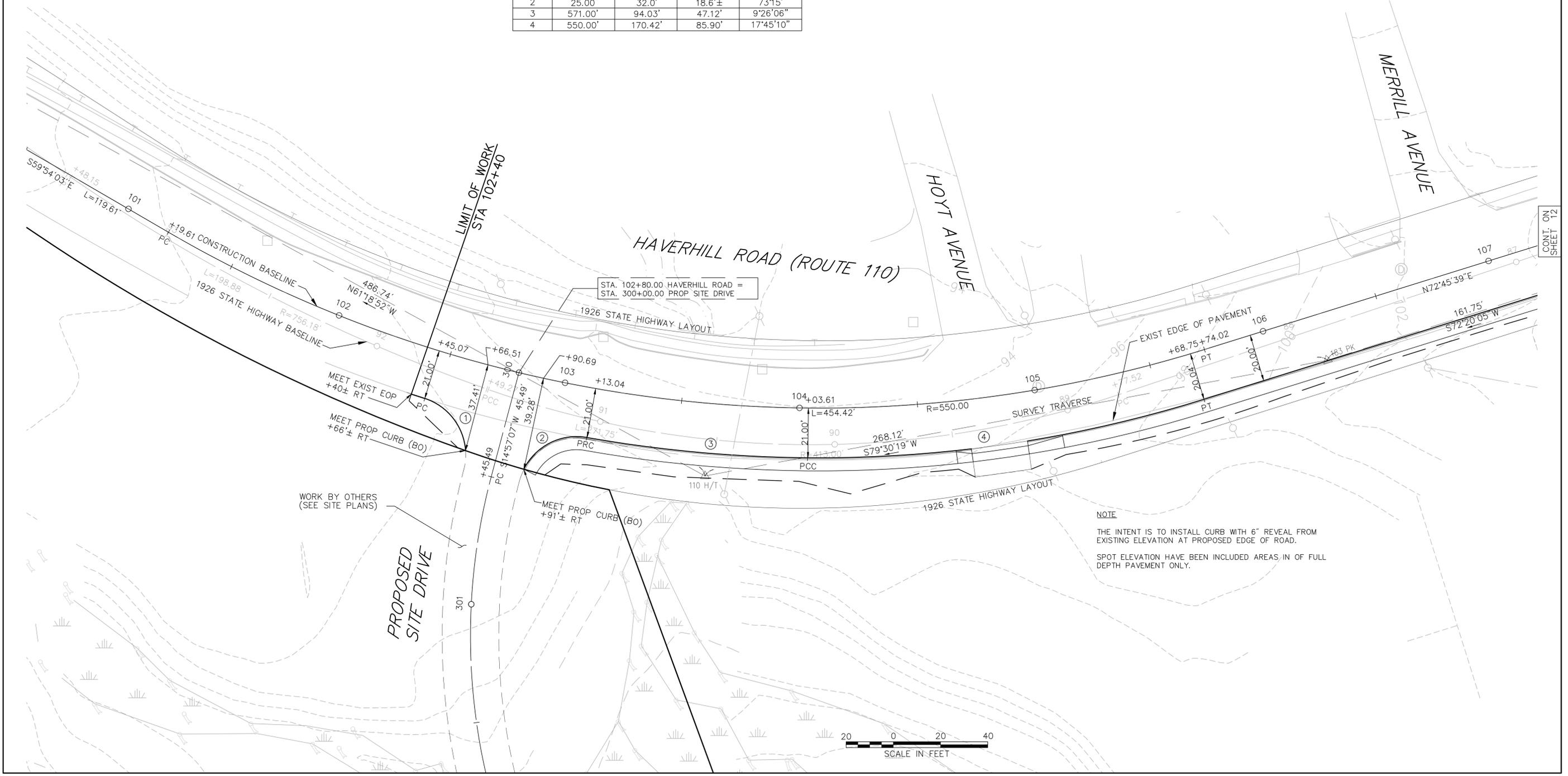
POINT	NORTHING	EASTING	ELEV.
107 PK	15609.3923	-10971.2310	113.90
108 PK	15806.7110	-10300.9768	113.53
109 PK	15712.4182	-9737.6653	110.08
110 H/T	15478.7823	-9310.6655	95.38
183 PK	15527.6194	-9047.0135	100.96
184 PK	15576.7029	-8892.9111	104.69
185 H/T	15756.3583	-8356.9185	101.40
186 PK	15284.2572	-8495.4193	90.02
187 DHSB	16168.6464	-8038.7891	--

PROPOSED SITE DRIVE CONSTRUCTION

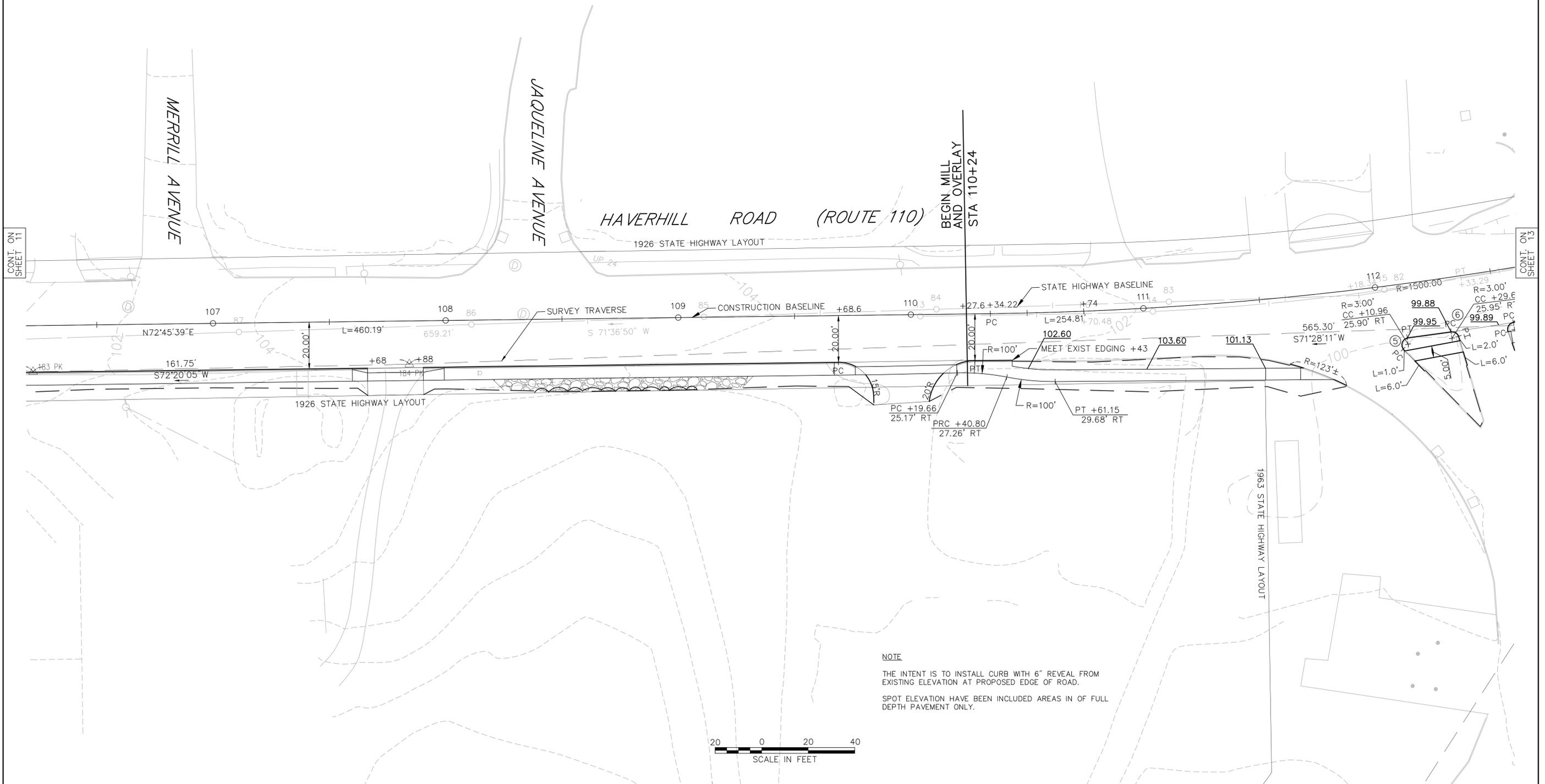
STATION	NORTHING	EASTING
BEGIN 300+00.00	15522.3711	-9389.4788
PC 300+45.49	15478.4247	-9401.2148
S14°57'07"W 45.49' RADIUS = 260.00' TANGENT = 128.10' LENGTH = 238.05' DELTA = 57°27'31"		
END 302+83.54	15253.0405	-9356.2717

CURVE TABLE

CURVE	RADIUS	LENGTH	TANGENT	DELTA
1	25.00'	29.6'	16.8'±	67°56'
2	25.00'	32.0'	18.6'±	73°15'
3	571.00'	94.03'	47.12'	9°26'06"
4	550.00'	170.42'	85.90'	17°45'10"



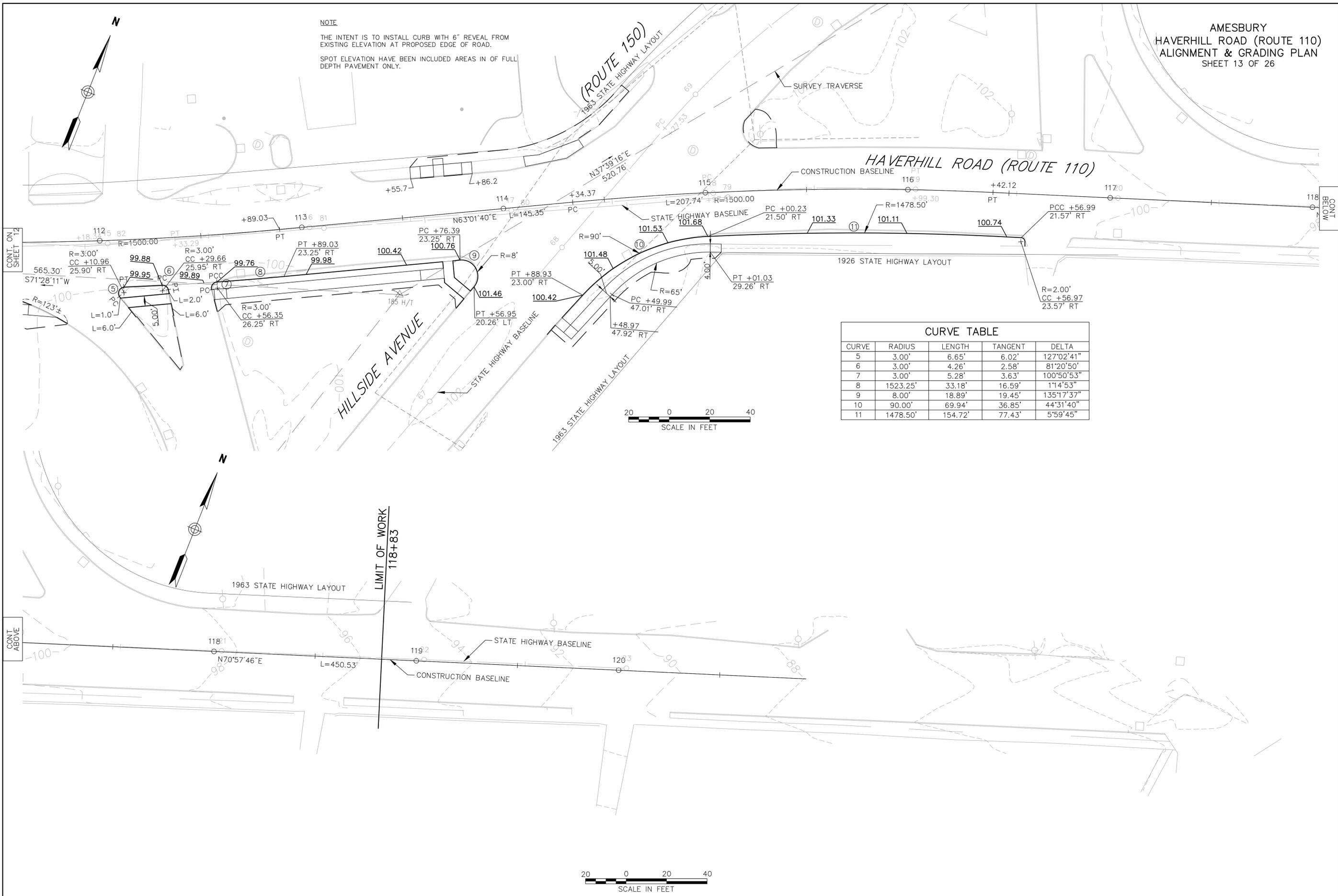
CONT. ON SHEET 12



CONT. ON  
SHEET 11

CONT. ON  
SHEET 13

NOTE  
THE INTENT IS TO INSTALL CURB WITH 6" REVEAL FROM  
EXISTING ELEVATION AT PROPOSED EDGE OF ROAD.  
SPOT ELEVATION HAVE BEEN INCLUDED AREAS IN OF FULL  
DEPTH PAVEMENT ONLY.



CURVE TABLE				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
5	3.00'	6.65'	6.02'	127°02'41"
6	3.00'	4.26'	2.58'	81°20'50"
7	3.00'	5.28'	3.63'	100°50'53"
8	1523.25'	33.18'	16.59'	1°14'53"
9	8.00'	18.89'	19.45'	135°17'37"
10	90.00'	69.94'	36.85'	44°31'40"
11	1478.50'	154.72'	77.43'	5°59'45"

CONT. ON  
SHEET 12

CONT.  
BELOW

CONT.  
ABOVE



SEQUENCE AND TIMING																											
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	FLASHING OPERATION
MINIMUM INTERVAL			6			10			6			6			10			6									
VEHICLE EXTENSION			2			2			2			2			2			2									
MAXIMUM 1			15			40			40			15			40			40									
MAXIMUM 2			15			40			40			15			40			40									
DYNAMIC MAXIMUM LIMIT			20			55			50			25			55			50									
YELLOW CLEARANCE				3			4			4			3			4			4				3				
RED CLEARANCE					2.5			1.5			1			2.5			1.5			1			1				
PEDESTRIAN INTERVAL																						7	10				
HAVEHILL ROAD	EB	A	←R-	←G-	←Y-	←R-	←FR-																				
HAVEHILL ROAD	EB	B,C	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
HAVEHILL ROAD	WB	D	←G-	←Y-	←R-	←FR-																					
HAVEHILL ROAD	WB	E,F	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
HILLSIDE AVENUE	NB	G,H,L	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FR
HILLSIDE AVENUE	SB	J,K	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	FR
PEDESTRIAN X-ING	P1-P4	ALL	DW	W	FDW	DW			OUT																		

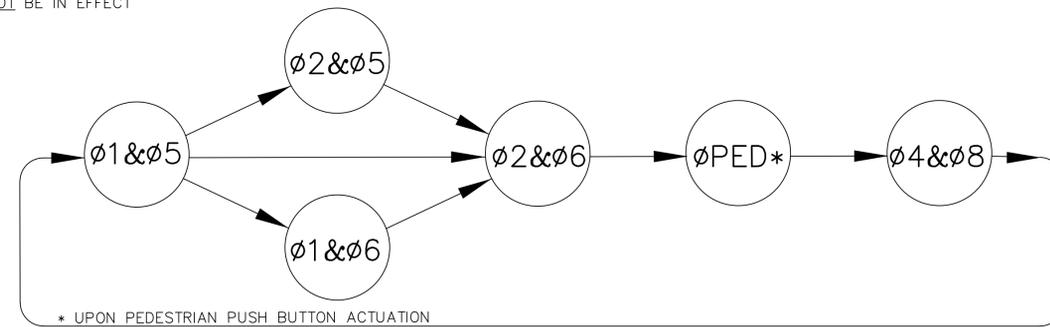
SEQUENCE & TIMING NOTES:

- IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
- THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
- IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
- IF THE ASSIGNED RIGHT-OF-WAY FOR ANY TRAFFIC MOVEMENT IS TO CHANGE DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATION FOR THAT MOVEMENT WILL DISPLAY THE APPROPRIATE CLEARANCE INTERVALS.

NOTES:

- AUTOMATIC FLASHING OPERATION PER M.U.T.C.D.
- \* UPON PEDESTRIAN PUSH BUTTON ACTUATION
- PERM = PERMISSIVE
- ø4 & ø8 DUAL ENTRY
- MAXIMUM 1 = NORMAL OPERATION
- MAXIMUM 2 = NOT USED
- DYNAMIC (MAX) STEP SHALL BE 5 SECONDS.
- DYNAMIC (MAX) SHALL BE USED ALL TIMES OF THE DAY.
- STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.
- DURING PEDESTRIAN INTERVAL, FDW THROUGH YELLOW OPERATION SHALL NOT BE IN EFFECT

PREFERENTIAL PHASE SEQUENCE



PROPOSED PRE-EMPTION PHASING & PRIORITY

DETECTOR & PRIORITY	PRE-EMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1	←R	ø2&ø5
D2	2	←Y	ø1&ø6
D3	3	←R	ø4
D4	4	←R	ø8

EMERGENCY VEHICLE PRE-EMPTION OPERATION.

- EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT EACH INTERSECTION.
- PRE-EMPTION SIGNALS SHALL BE SERVICED ON A FIRST COME, FIRST SERVE BASIS.
- IN RESPONSE TO A PRE-EMPTION SIGNAL RECEIVED AT AN INTERSECTION BY OPTICAL DETECTOR D1 (OR D2, D3, D4) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PRE-EMPTION PHASE #1 (OR #2, #3, #4) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PRE-EMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME PRE-EMPTION PHASE CLEARANCES FOR THE ASSOCIATED PHASE(S) AS SHOWN IN THE SEQUENCE AND TIMING CHART AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
- UNLESS OTHERWISE STATED, ONCE A PRE-EMPTION CALL HAS BEEN RECEIVED BY THE TRAFFIC SIGNAL CONTROLLER AND THE PRE-EMPTION PHASE IS BEING SERVICED, IT SHALL REMAIN IN THAT PHASE AS LONG AS THE CALL IS PRESENT.
- MINIMUM GREEN AND NORMAL VEHICLE CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
- PRE-EMPTION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.

PROPOSED SIGNAL HEAD DATA		
B,C,E,F,G,H,J,K,L	A,D	P1-P4
ALL 12" LENS		

NOTES:

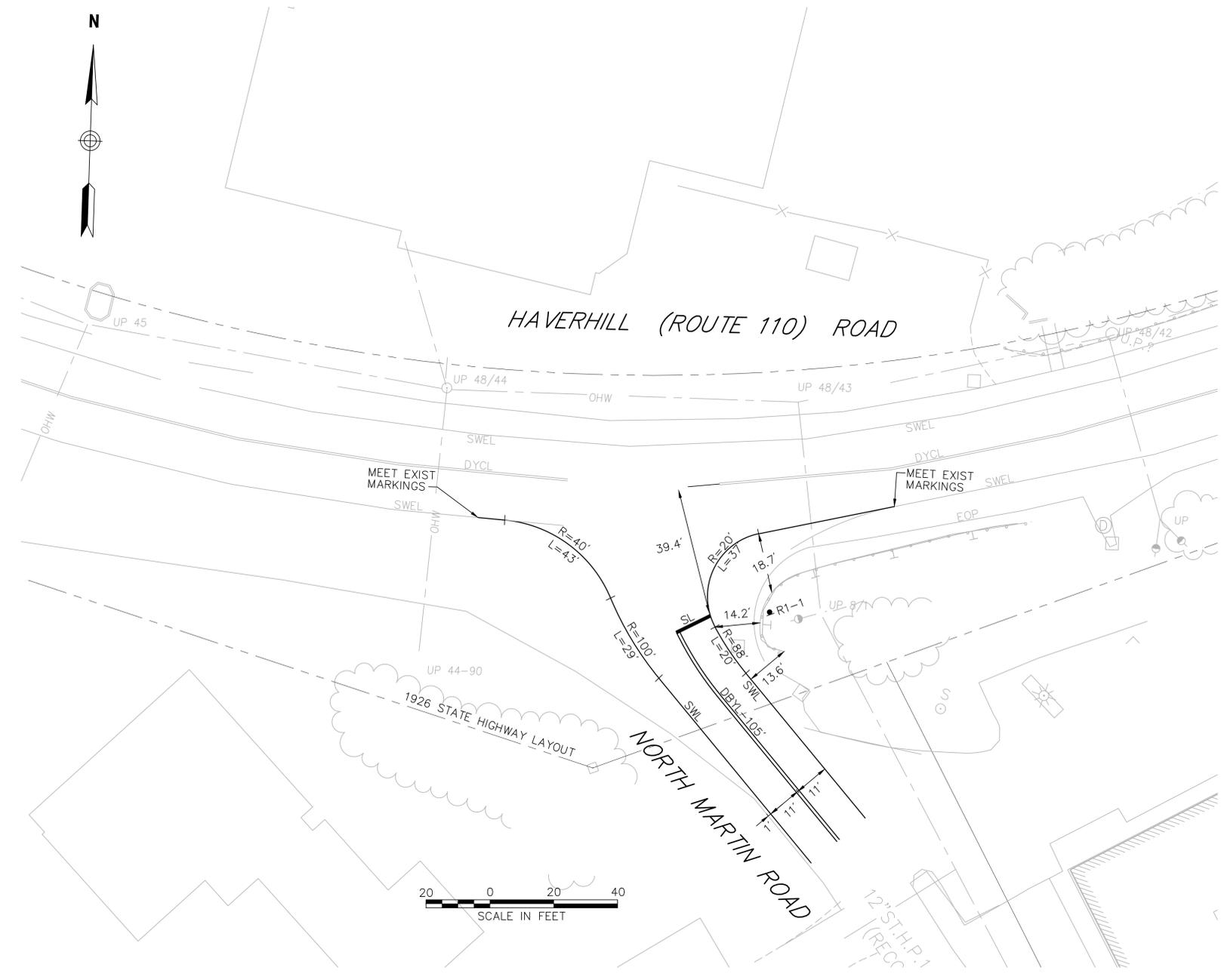
- ALL SIGNAL HEADS SHALL BE RIGID MOUNTED.
- ALL SIGNAL HEADS SHALL BE EQUIPPED WITH 5"± LOUVERED BACKPLATES. ALL BACKPLATES SHALL CONTAIN A 2" WIDE YELLOW REFLECTIVE BORDER.
- ALL SIGNAL HEADS SHALL BE EQUIPPED WITH TUNNEL VISORS.
- ALL SIGNAL DISPLAYS SHALL BE EQUIPPED WITH L.E.D. MODULES.

DETECTOR DATA				
DETECTOR NO.	ZONE SIZE	CAMERA	DELAY /EXT	CALL PHASE
1	TO BE FIELD ADJUSTED	V1	0	ø5
2	TO BE FIELD ADJUSTED	V1	0	ø2
3	TO BE FIELD ADJUSTED	V1	0	ø1
4	TO BE FIELD ADJUSTED	V1	0	ø6
5	TO BE FIELD ADJUSTED	V1	0	ø4
6	TO BE FIELD ADJUSTED	V1	0	ø8

NOTE: DELAY AND EXTENSION TIMINGS SHALL BE PROGRAMMED IN THE CONTROLLER ONLY

ITEM 816.01 TRAFFIC SIGNAL RECONSTRUCTION HAVERHILL ROAD (ROUTE 110) AT HILLSIDE AVENUE (ROUTE 150) LIST OF MAJOR ITEMS REQUIRED	
QUANTITY	DESCRIPTION
1	8ø TS 2 TYPE 1 CONTROLLER IN A TYPE 6 BASE MOUNTED CABINET INCL. FOUNDATION AND CONCRETE PAD
3	TS 25" MAST ARM TYPE 2, STEEL, INCL. FOUNDATION
1	TS 30" MAST ARM TYPE 2, STEEL, INCL. FOUNDATION
2	TS POST 8" STANDARD INCL. FOUNDATION
1	TS POST 10" STANDARD INCL. FOUNDATION
11	SIGNAL HEAD, 3-SECTION, 12" LENSES
4	PEDESTRIAN SIGNAL HEAD (L.E.D.)
2	APS PEDESTRIAN PUSH BUTTON W/R10-3e(L) AND SIGN SADDLE
2	APS PEDESTRIAN PUSH BUTTON W/R10-3e(R) AND SIGN SADDLE
6	PULL BOX-12"x12"
1	SINGLE-POINT VEHICLE DETECTION SYSTEM (1 CAMERA, VDP & CABLES)
4	EMERGENCY PRE-EMPTION OPTICAL DETECTORS & DETECTOR CABLE
2	EMERGENCY PRE-EMPTION 2 CHANNEL PHASE SELECTOR
1	EMERGENCY PRE-EMPTION SYSTEM CHASSIS
1	EMERGENCY PRE-EMPTION STROBE (WHITE LENS)
1	SERVICE CONNECTION (OVERHEAD)

PLUS NECESSARY DUCT, CABLE, LABOR, MISCELLANEOUS MATERIAL AND EQUIPMENT TO COMPLETE THE INSTALLATION AND PROVIDE AN OPERATING TRAFFIC CONTROL SIGNAL.



- CONSTRUCTION NOTES:**
1. ALL PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC.
  2. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
  3. RETAIN ALL EXISTING SIGNS UNLESS OTHERWISE NOTED.

TRAFFIC SIGN SUMMARY

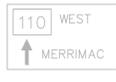
IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER			
R1-1	30"	30"		SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION" AS AMENDED			2	RED	WHITE	WHITE	P5-2	6.38	12.76
R3-2	30"	30"					2	WHITE	RED/BLACK	BLACK	P5-2	6.25	12.50
R3-5L	30"	36"					2	WHITE	BLACK	BLACK	2 MTD ON MAST ARM	7.50	15.00
R3-7L	30"	30"					2	WHITE	BLACK	BLACK	P5-2	6.25	12.50
R5-1	30"	30"					3	RED/WHITE	WHITE	--	P5-3	6.25	18.75
R6-1	36"	12"					4	BLACK/WHITE	BLACK	BLACK	4 MTD W/OTHERS	3.00	12.00
R10-3e(L)	9"	15"					2	WHITE	WHITE/BLACK/ORANGE	BLACK	2 MTD ON TS POLE/TS POST	INCLUDED UNDER ITEM 816.01	
R10-3e(R)	9"	15"					2	WHITE	WHITE/BLACK/ORANGE	BLACK	2 MTD ON TS POLE/TS POST	INCLUDED UNDER ITEM 816.01	
R10-7	24"	30"					2	WHITE	BLACK	BLACK	P5-1 1 MTD W/OTHERS	5.00	10.00
H1-2	24"	24"		AS PER MASSDOT STANDARD			1	YELLOW	YELLOW CLUSTER	--	P5-1	INCLUDED UNDER ITEM 827.21	
D3-1	48"	12"	Haverhill Rd	6"/4.5"	3	N/A	2	GREEN	WHITE	WHITE	2 MTD ON TS POLE	INCLUDED UNDER ITEM 874	
D3-2	48"	12"	Hillside Ave	6"/4.5"	3	N/A	2	GREEN	WHITE	WHITE	2 MTD ON TS POLE	INCLUDED UNDER ITEM 874	
RET D3-1	-	-											

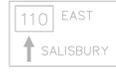
IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER			
RET D6-1	-	-											
RET D6-2	-	-											
RET D6-3	-	-											
RET D6-4	-	-											
RET D6-5	-	-											
RET D6-6	-	-											
R&R D6-7	-	-											
R&S D8-1	-	-											

NOTE: HIGH INTENSITY REFLECTIVE SHEETING SHALL BE USED FOR ALL SIGNS. SEE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, FOR VERTICAL & LATERAL CLEARANCES; THE 1977 MASSHIGHWAY DEPARTMENT CONSTRUCTION AND TRAFFIC STANDARD DETAILS, AS AMENDED, FOR SIGNS AND SUPPORTS; AND THE MASSHIGHWAY DEPARTMENT SIGN LISTINGS 1993 EDITION, AS AMENDED.

# TRAFFIC SIGN SUMMARY

AMESBURY  
HAVERHILL ROAD (ROUTE 110)  
SIGN SUMMARY  
SHEET 18 OF 26

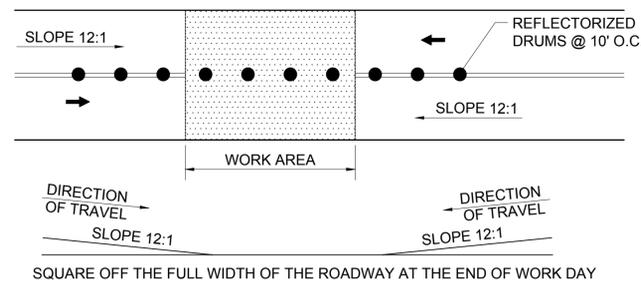
IDENTIFI- CATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK- GROUND	LEGEND	BORDER			
RET D8-2	-	-											
RET D8-3	-	-											
RET D8-4	-	-											
RET D8-5	-	-											
RET D8-6	-	-											
RET D8-7	-	-											
RET D8-8	-	-											
RET D8-9	-	-											

IDENTIFI- CATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK- GROUND	LEGEND	BORDER			
RET D8-10	-	-											
R&R D8-11	-	-											

**GENERAL NOTES**

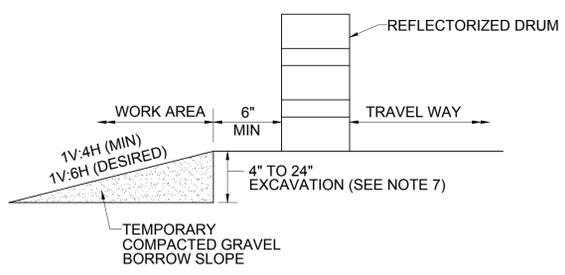
1. ALL CONSTRUCTION SIGNING, TEMPORARY TRAFFIC CONTROL DEVICES, AND ROADSIDE ELEMENTS SHALL CONFORM WITH THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AS AMENDED, THE MASSDOT STANDARD DETAILS AND DRAWINGS FOR THE DEVELOPMENT OF TEMPORARY TRAFFIC CONTROL PLANS, THE LATEST REVISIONS OF THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, (AASHTO) ROADSIDE DESIGN GUIDE, AASHTO POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, AND NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP) REPORT 350 OR THE AASHTO MANUAL FOR ASSESSING SAFETY HARDWARE (MASH).
2. ALL TEMPORARY PEDESTRIAN PATHWAYS SHALL COMPLY FULLY WITH ALL REQUIREMENTS OF THE MUTCD AND ALL APPLICABLE MASSACHUSETTS ARCHITECTURAL ACCESS BOARD (MAAB) AND AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG) REQUIREMENTS.
3. ALL DRUMS OUTSIDE TAPERS SHALL BE SET AT 20' ON CENTER MAX. UNLESS OTHERWISE NOTED OR ADJUSTED BY THE ENGINEER.
4. ALL DRUMS SHALL BE APPROXIMATELY PLACED AND MOVED AS NECESSARY TO MAINTAIN ADEQUATE ABUTTER ACCESS AT ALL TIMES. WORK MAY REQUIRE ADDITIONAL SIGNS, DRUMS AND OTHER TRAFFIC CONTROL DEVICES, GRADING AND TEMPORARY PAVEMENT FOR PASSAGE OF PEDESTRIAN, VEHICULAR AND EMERGENCY TRAFFIC THROUGH THE WORK AREAS, BOTH DURING AND AFTER WORKING HOURS, TO MAINTAIN SUCH ACCESS.
5. THE CONTRACTOR SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OR RESTRICTION OF ACCESS.
6. FOR RESTORATIVE WORK ON LOCAL ROADWAYS, A MINIMUM OF ONE LANE OF TRAFFIC IN EACH DIRECTION ON TWO WAY STREETS SHALL BE MAINTAINED AT ALL TIMES, EXCEPT THAT DURING WORKING HOURS, TRAFFIC MAY BE REDUCED TO ONE LANE UNDER POLICE CONTROL FOR SHORT TIME PERIODS WHEN REQUIRED FOR THE WORK, AS SHOWN UNLESS OTHERWISE APPROVED BY THE ENGINEER.
7. FOR DROP-OFFS 4" OR LESS, CONDITION MAY BE MITIGATED WITH W8-9 (LOW SHOULDER) SIGN OR TEMPORARY CHANNELIZATION DEVICES. FOR DROP-OFFS GREATER THAN 4" BUT NO MORE THAN 12", DETERMINE WHETHER IT IS MORE COST EFFECTIVE TO INSTALL BOTH TEMPORARY CHANNELIZATION DEVICES AND A 1V:4H (MIN) TO 1V:6H (DESIRED) WEDGE OR TO SHIELD IT. FOR DROP-OFFS GREATER THAN 12" BUT NO MORE THAN 24", DETERMINE WHETHER IT IS MORE COST EFFECTIVE TO MAINTAIN AN ADDITIONAL 5' OF SHOULDER WIDTH AND INSTALL BOTH TEMPORARY CHANNELIZATION DEVICES AND A 1V:6H (DESIRED) WEDGE OR TO SHIELD IT. FOR DROP-OFFS 24" OR GREATER USE BARRIER IN ACCORDANCE WITH MASSDOT WORK ZONE POSITIVE PROTECTION GUIDELINES.
8. 11' MINIMUM LANE WIDTHS SHALL BE MAINTAINED UNLESS OTHERWISE NOTED.
9. NON-ESSENTIAL TRAFFIC CONTROL DEVICES AND SIGNS SHALL BE COVERED OR REMOVED DURING NON-WORKING HOURS WHEN NOT IN USE.
10. SIGNS INSTALLED ON PORTABLE STANDS REQUIRE 12 INCH MINIMUM MOUNTING HEIGHT FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE SIGN.
11. SIGNS INSTALLED ON PORTABLE STANDS PLACED AMONG CHANNELIZATION DEVICES REQUIRE A 36 INCH MINIMUM MOUNTING HEIGHT FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE SIGN.
12. SIGNS MOUNTED ON P5 POSTS REQUIRE A MINIMUM 84 INCH MOUNTING HEIGHT FROM THE ROADWAY OR SIDEWALK SURFACE TO THE BOTTOM OF THE SIGN.
13. TEMPORARY MARKINGS SHALL BE WATER-BORNE PAINT OR SURFACE-APPLIED REMOVABLE TAPE, AS APPROVED BY THE ENGINEER.
14. ALL TEMPORARY DOUBLE YELLOW CENTER LINES (DYCL) SHALL BE 6 INCHES WIDE.
15. THE FIRST 5 DRUMS ON TAPERS SHALL BE REFLECTORIZED DRUMS WITH TYPE A LIGHTS.
16. REFLECTORIZED CONES SHALL BE A MINIMUM OF 36 INCHES IN HEIGHT.
17. CONES MAY BE USED IN LIEU OF DRUMS OUTSIDE OF TAPER AREAS.
18. ADVISORY SPEED PLATES (W13-1P) SHALL BE USED IF APPROPRIATE AND AS REQUESTED BY THE ENGINEER. ADVISORY SPEED SHALL BE AS ESTABLISHED BY THE APPROPRIATE AGENCY WITH JURISDICTION OVER THE ROADWAY ON WHICH THE SIGN WILL BE MOUNTED.
19. NO WORK SHALL OCCUR WITHIN THE PUBLIC WAY ON STATE RECOGNIZED HOLIDAYS UNLESS OTHERWISE APPROVED BY THE ENGINEER.
20. CONTRACTOR SHALL SECURE WORK AREAS TO PREVENT UNAUTHORIZED ACCESS AT ALL TIMES.
21. THERE IS NO DESIGNATED BICYCLE LANE ON THE ROADWAY WITHIN THE PROJECT LIMITS. BICYCLES ARE EXPECTED TO SHARE THE ROAD WITH GENERAL VEHICULAR TRAFFIC.
22. W20-8a SIGNS SHALL BE INSTALLED IN ADVANCE (100' MIN) OF AREAS WHERE UTILITY CASTINGS HAVE BEEN RAISED IN ADVANCE OF PAVING OPERATIONS OR AS REQUESTED BY THE ENGINEER.
23. W8-15 SIGNS SHALL BE INSTALLED IN ADVANCE (100' MIN) OF PAVEMENT MILLING AREAS OR AS REQUESTED BY THE ENGINEER.

LEGEND	
	FLAGGER
	POLICE OFFICER
	TRAFFIC SIGNAL
	REFLECTORIZED DRUM
	REFLECTORIZED DRUM WITH TYPE A FLASHER
	TEMPORARY CONSTRUCTION SIGN
	TRAFFIC CONE
	TYPE III BARRICADE
	ARROW BOARD (AB) (RIGHT OR LEFT)
	ARROW BOARD (AB) (CAUTION)
	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
	TRUCK MOUNTED ATTENUATOR
	TEMPORARY BARRIER
	TEMPORARY IMPACT ATTENUATOR (TYPE NOTED)
	WORK AREA (PUBLIC ACCESS RESTRICTED)
	TRAFFIC FLOW
	PEDESTRIAN ROUTE
	CONSTRUCTION FENCE
	PEDESTRIAN CHANNELIZATION DEVICE
NTS	NOT TO SCALE



**TEMPORARY PAVEMENT TRANSITION DETAIL**

SCALE: N.T.S.



NOTE:  
CONTRACTOR SHALL INSTALL W8-9 SIGN ON ALL ROADWAYS 350 FT IN ADVANCE OF THE START OF DROP-OFF CONDITION.

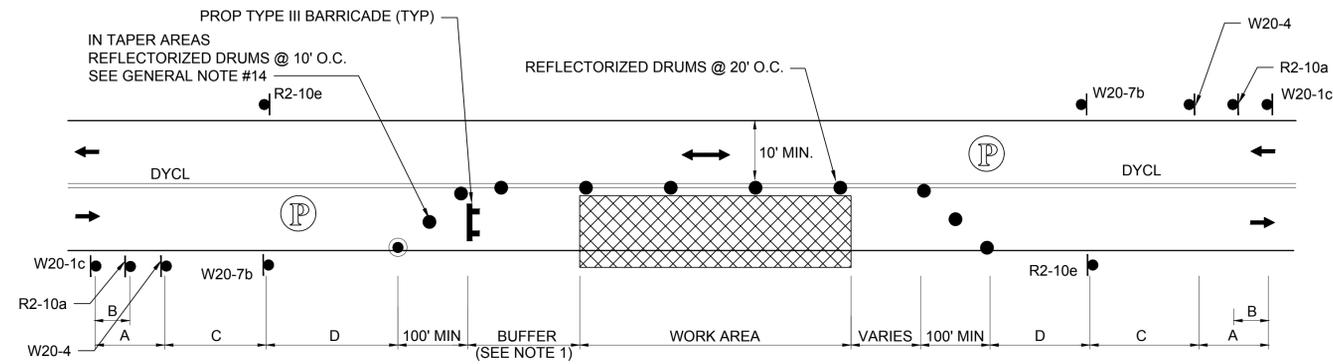
**TYPICAL ROADWAY DROP-OFF PROTECTION**

SCALE: N.T.S.

ROAD TYPE	DISTANCE BETWEEN SIGNS (FEET)			
	A	B	C	D
HAVERHILL RD	500	250	500	500
HILLSIDE AVE				

BUFFER SPACING	
SPEED (MPH)	DISTANCE (FEET)
35	250
40	305
45	360

LANE TAPER LENGTH FORMULAS	
L= TAPER LENGTH IN FEET	
W= WIDTH OF ROADWAY TO BE SHIFTED OR REDIRECTED IN FEET	
S= POSTED SPEED LIMIT IN MPH	
POSTED SPEED	
40 MPH OR LESS	GREATER THAN 40 MPH
$L = \frac{WS^2}{60}$	L= WS

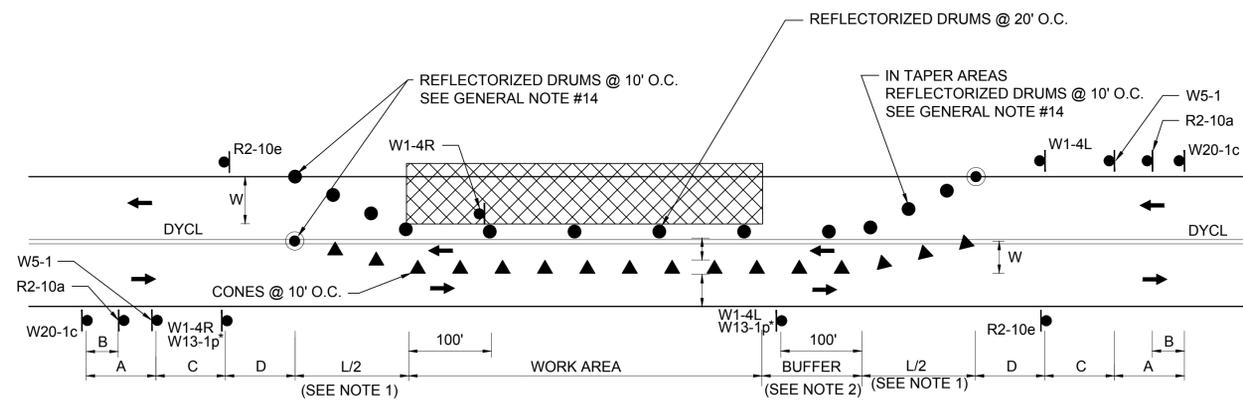


NOTES:

1. SEE BUFFER SPACING CHART ON TTCP GENERAL NOTES & LEGEND SHEET.
2. REFER TO ADVANCE SIGN SPACING TABLE ON TTCP GENERAL NOTES & LEGEND SHEET.

**TYPICAL TWO-WAY STREET LANE CLOSURE ALTERNATING TRAFFIC**

SCALE: N.T.S.

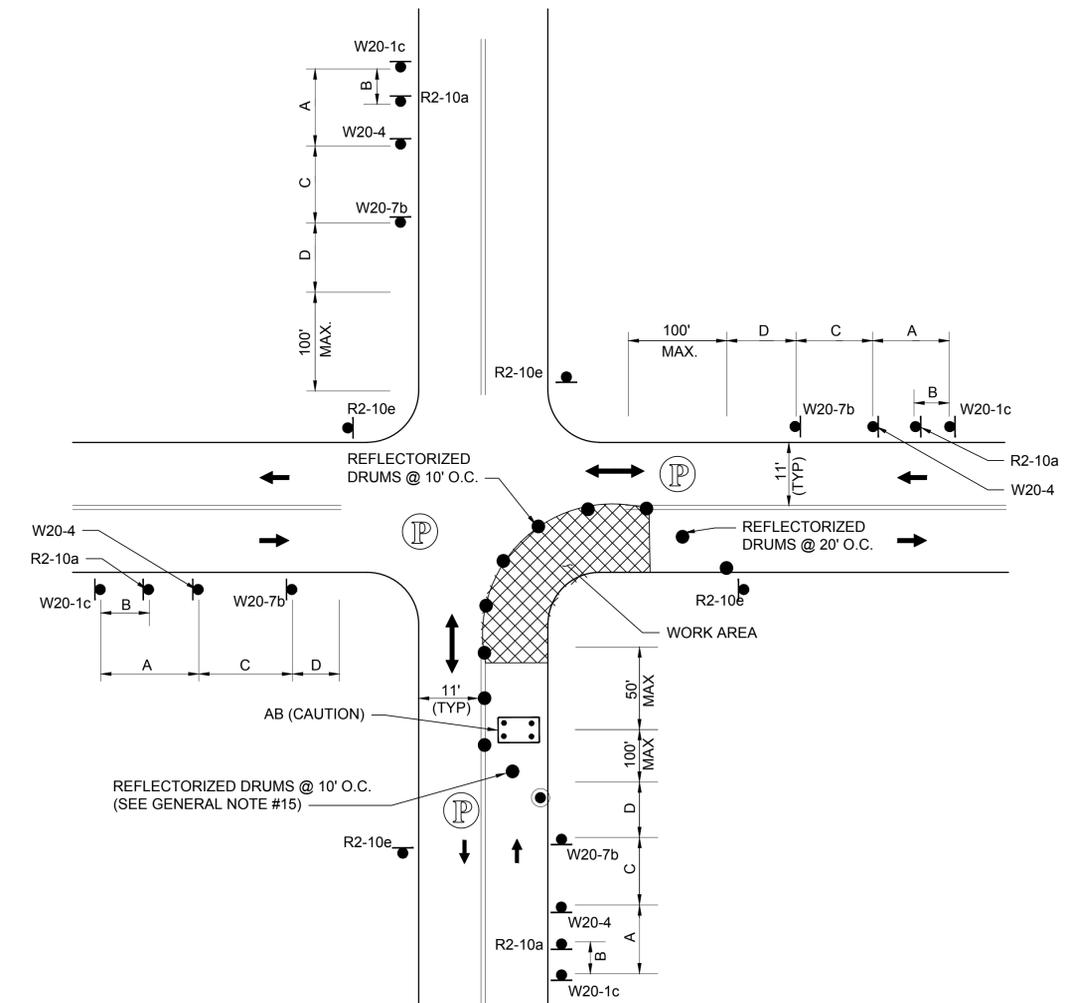


NOTES:

1. SEE TAPER LENGTH FORMULA ON TTCP GENERAL NOTES & LEGEND SHEET.
2. SEE BUFFER SPACING CHART ON TTCP GENERAL NOTES & LEGEND SHEET.
3. REFER TO ADVANCE SIGN SPACING TABLE ON TTCP GENERAL NOTES & LEGEND SHEET.
4. \* SEE NOTE 18 ON TTCP GENERAL NOTES & LEGEND SHEET.

**TYPICAL TWO-WAY STREET LANE SHIFT**

SCALE: N.T.S.

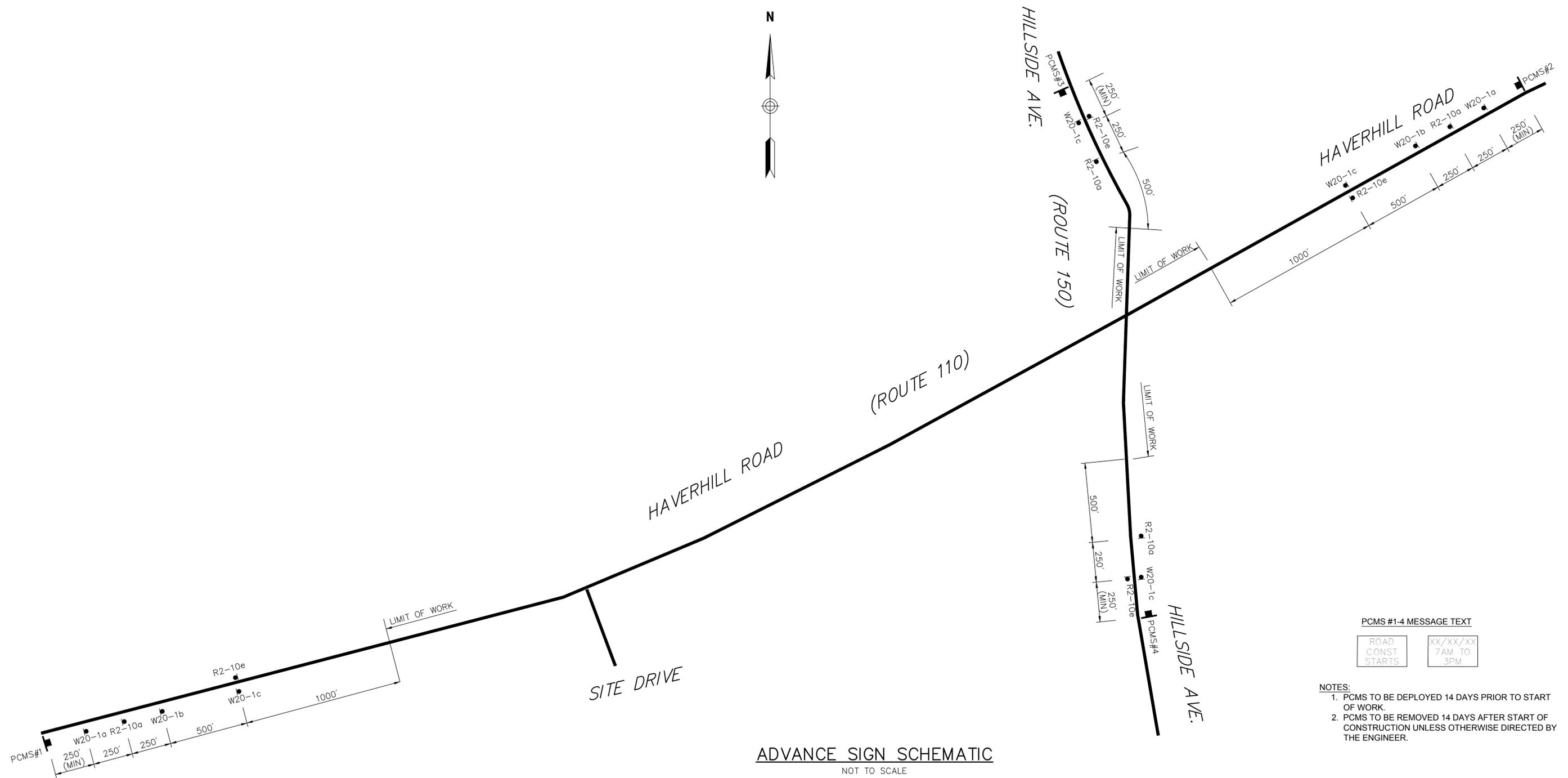


NOTE:

ADVANCE WARNING SIGN PLACEMENT TO BE ADJUSTED AS NECESSARY

**ONE LANE BI-DIRECTIONAL TRAFFIC AT INTERSECTIONS**

SCALE: N.T.S.



**ADVANCE SIGN SCHEMATIC**

NOT TO SCALE

ALL ADVANCE SIGNS TO BE IN PLACE FOR THE DURATION OF THE PROJECT.

**PCMS #1-4 MESSAGE TEXT**

ROAD CONST STARTS	XX/XX/XX 7AM TO 3PM
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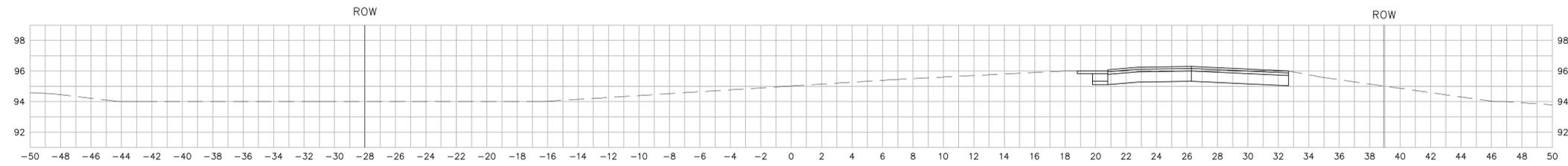
- NOTES:**
1. PCMS TO BE DEPLOYED 14 DAYS PRIOR TO START OF WORK.
  2. PCMS TO BE REMOVED 14 DAYS AFTER START OF CONSTRUCTION UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

TEMPORARY TRAFFIC CONTROL SIGN SUMMARY									
IDENTIFI- CATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			COLOR		
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.	BACK- GROUND	LEGEND	BORDER
R2-10a	48"	36"		AS PER MASSDOT STANDARD			FLUOR- ESCENT ORANGE	BLACK	BLACK
R2-10e	36"	48"		↓			WHITE	BLACK	BLACK
							FLUOR- ESCENT ORANGE		
W1-4L	36"	36"		SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION"; AS AMENDED			FLUOR- ESCENT ORANGE	BLACK	BLACK
W1-4R	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK
W5-1	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK
W8-15	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK
W13-1p	24"	24"					FLUOR- ESCENT ORANGE	BLACK	BLACK
W20-1a	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK
W20-1b	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK
W20-1c	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK
W20-4	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK
W20-7b	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK
W20-8a	36"	36"		↓			FLUOR- ESCENT ORANGE	BLACK	BLACK

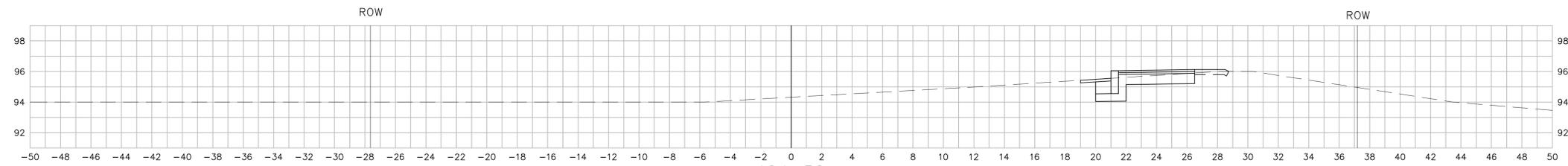
NOTES:

1. HIGH INTENSITY REFLECTIVE SHEETING SHALL BE USED FOR ALL SIGNS. SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION" FOR TEXT DIMENSIONS, AS AMENDED; THE 1977 MASSHIGHWAY DEPARTMENT CONSTRUCTION AND TRAFFIC STANDARD DETAILS, AS AMENDED, FOR SIGNS AND SUPPORTS; AND THE MASSHIGHWAY DEPARTMENT SIGN LISTINGS 1993 EDITION, AS AMENDED.

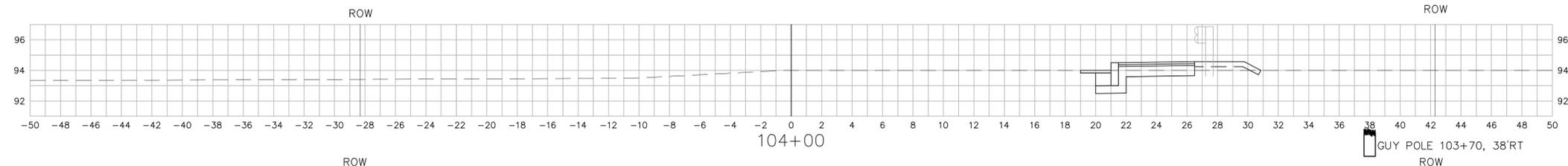
AMESBURY  
HAVERHILL ROAD (ROUTE 110)  
CROSS SECTIONS  
SHEET 23 OF 26



104+80

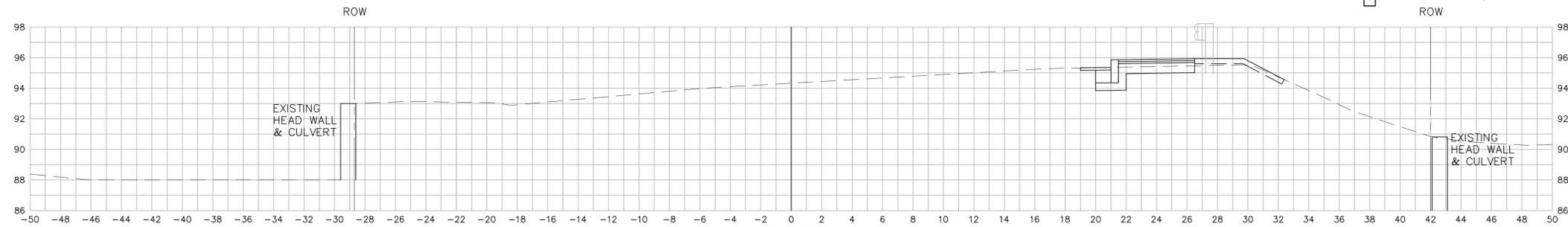


104+50



104+00

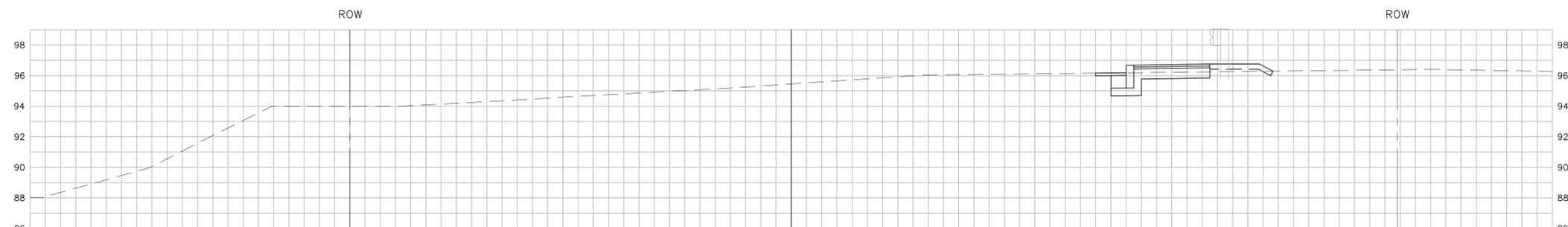
GUY POLE 103+70, 38'RT  
ROW



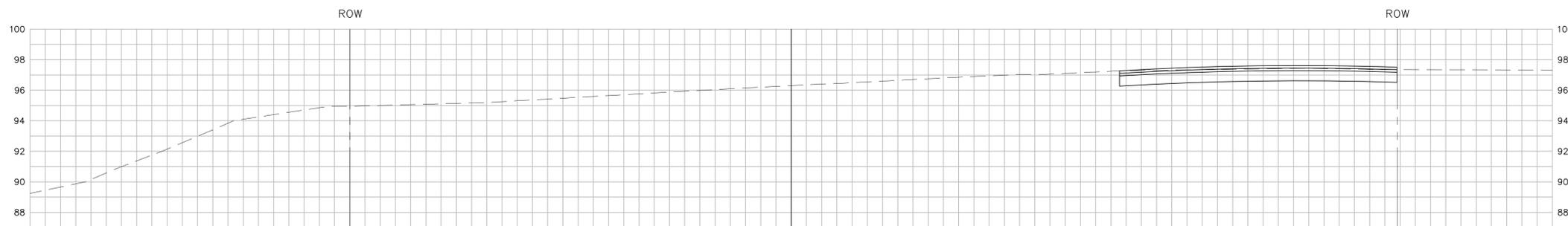
103+50

EXISTING  
HEAD-WALL  
& CULVERT

EXISTING  
HEAD-WALL  
& CULVERT

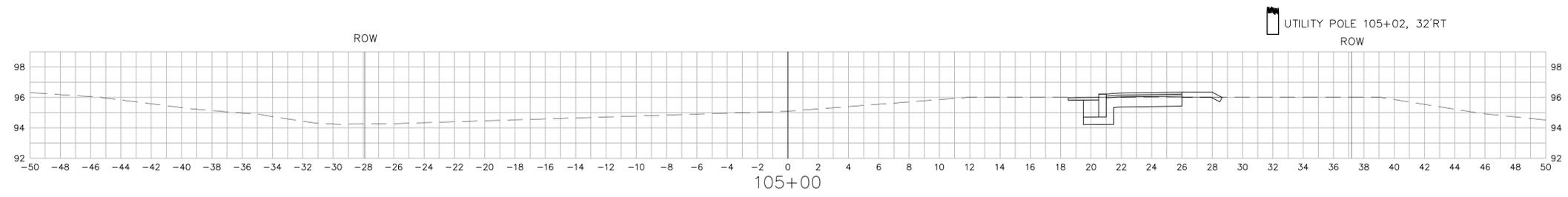
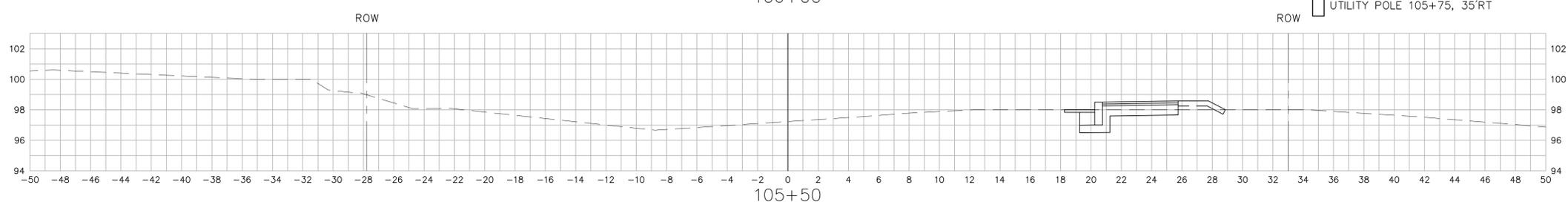
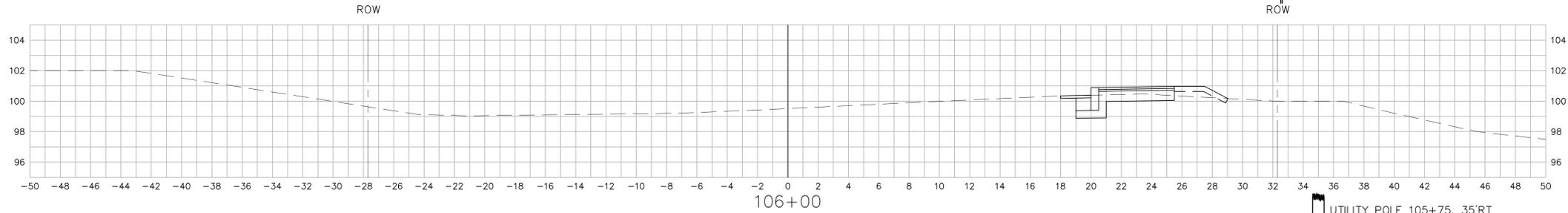
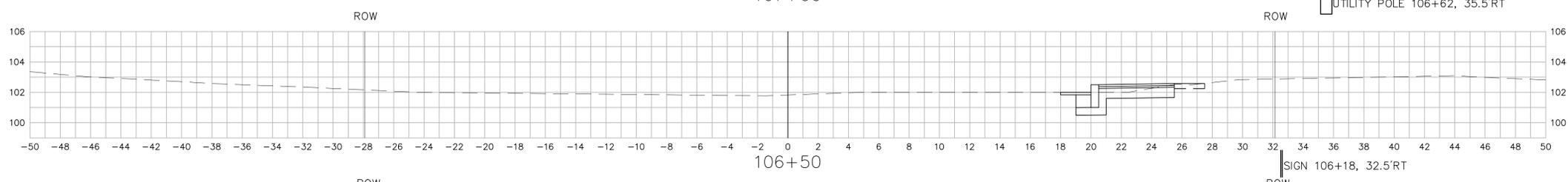
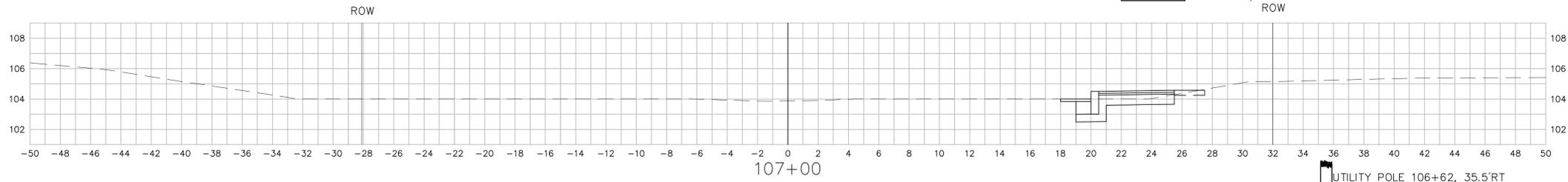
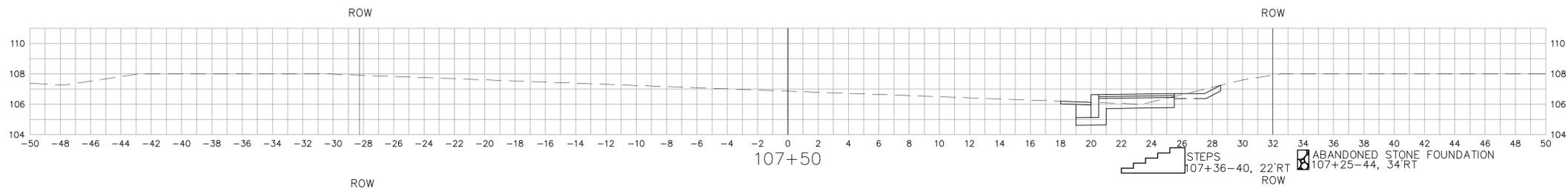


103+00

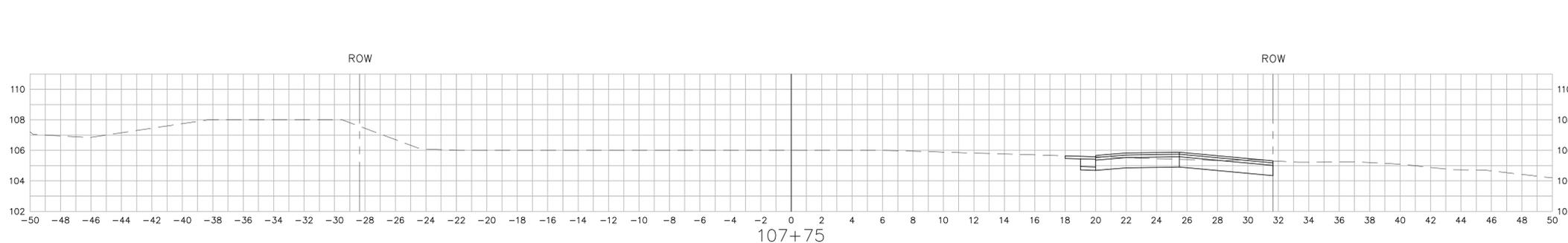
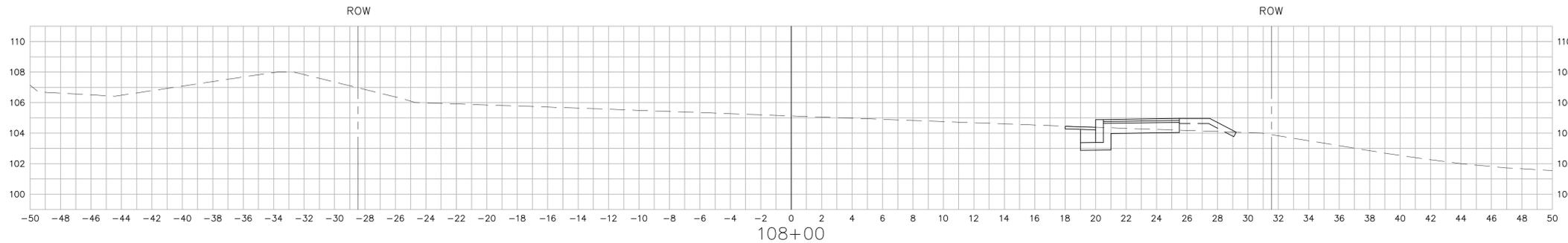
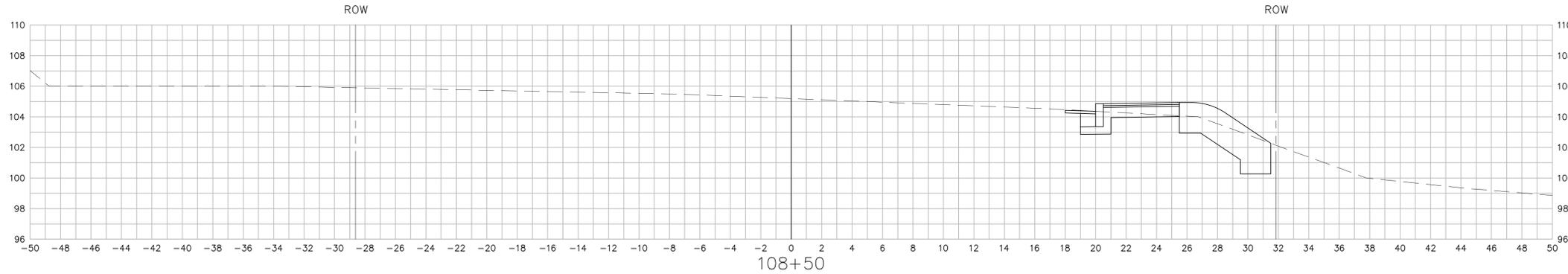
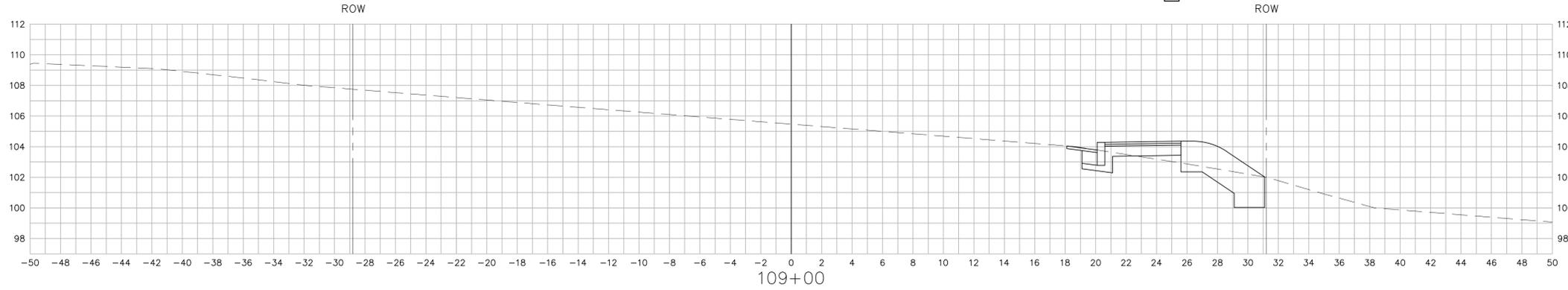
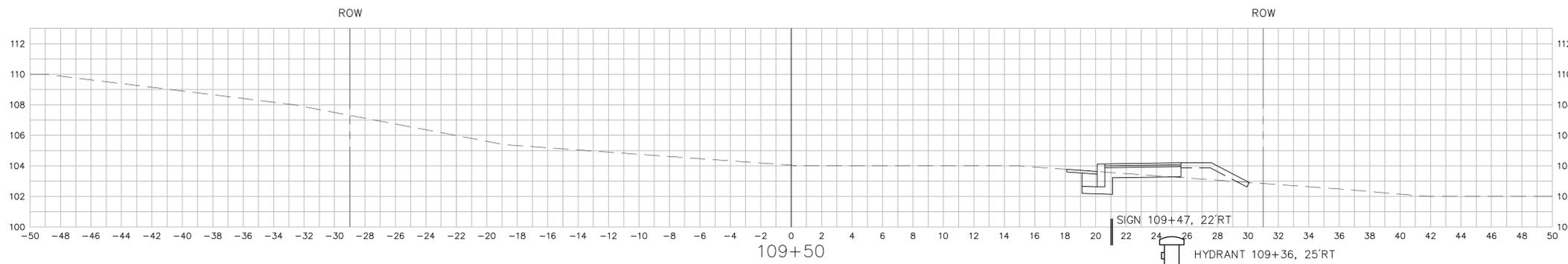


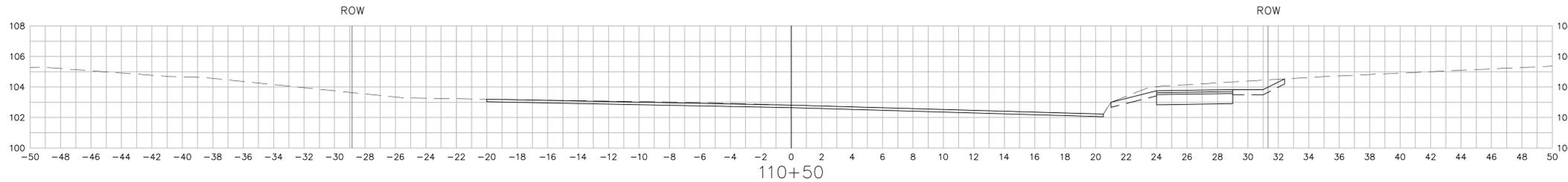
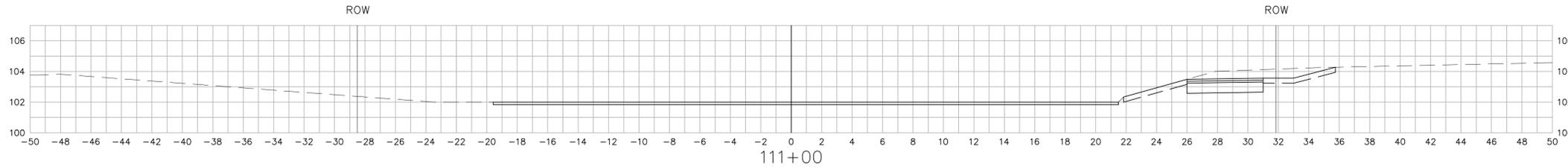
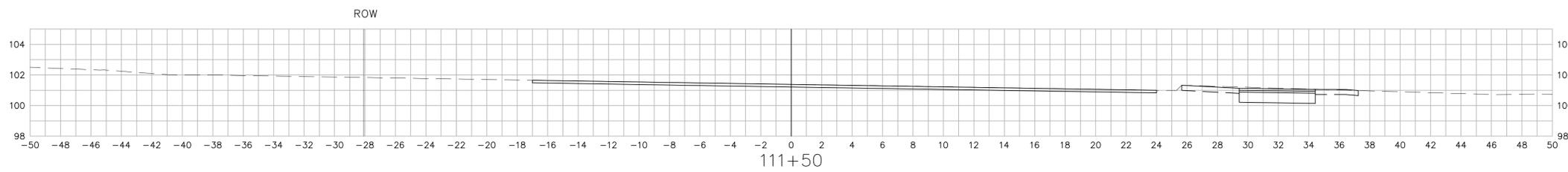
102+75

AMESBURY  
HAVERHILL ROAD (ROUTE 110)  
CROSS SECTIONS  
SHEET 24 OF 26



AMESBURY  
HAVERHILL ROAD (ROUTE 110)  
CROSS SECTIONS  
SHEET 25 OF 26





COMMERCIAL SIGN 110+22, 31'+RT

