

# PROPOSED CULVERT REPLACEMENT

PLAN AND PROFILE OF  
ACTON ROAD

IN THE TOWN OF

WESTFORD

MIDDLESEX COUNTY

WESTFORD ACTON ROAD OVER UNNAMED STREAM			
STATE	FED. AID PROJ. NO.	sheet no.	total sheets
MA	N.A.	1	16
PROJECT FILE NO. T1463			

TITLE SHEET & INDEX

Plotted on 12-Jan-2026 1:47 PM

T1463\_BRO1(TITLESHEET).DWG

THESE PLANS ARE SUPPLEMENTED BY THE 2025 MASSDOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, THE MASSDOT OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE MASSDOT WORKZONE SAFETY TEMPORARY TRAFFIC CONTROL, THE MASSDOT 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 2023 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) WITH MASSACHUSETTS AMENDMENTS AND THE STANDARD MUNICIPAL TRAFFIC CODE, THE TOWN OF WESTFORD SUBDIVISION RULES AND REGULATIONS, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK.

## PS&E SUBMISSION

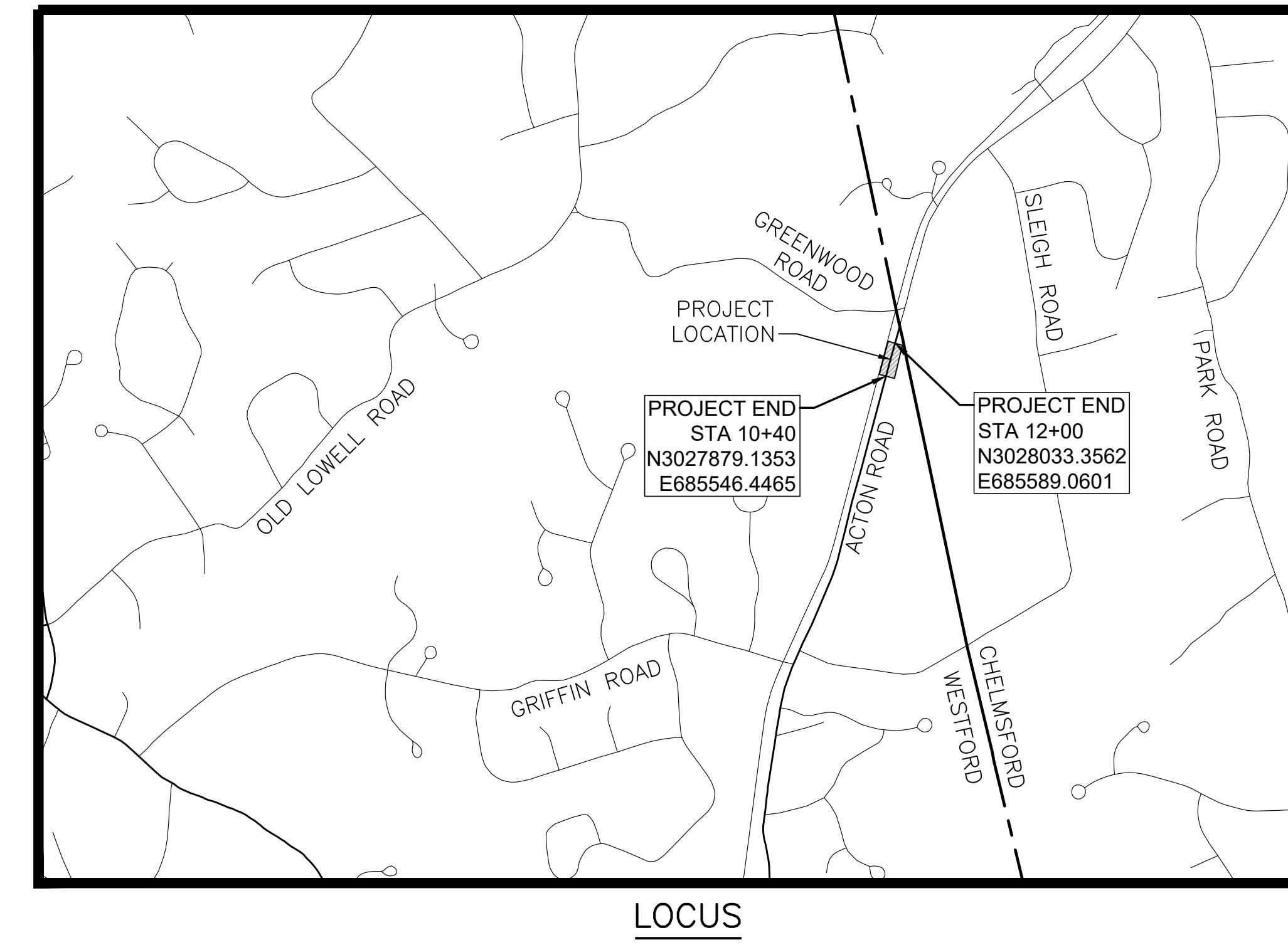
TOWN MANAGER  
KRISTEN LAS

TOWN ENGINEER  
PAUL STARRATT, P.E.

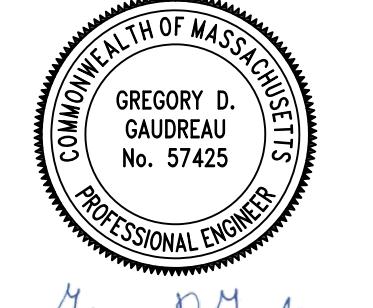
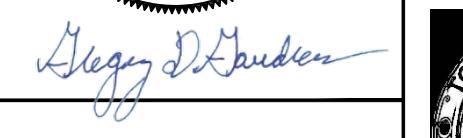
DPW DIRECTOR  
KYLE FOX

WATER SUPERINTENDENT  
MARK WARREN

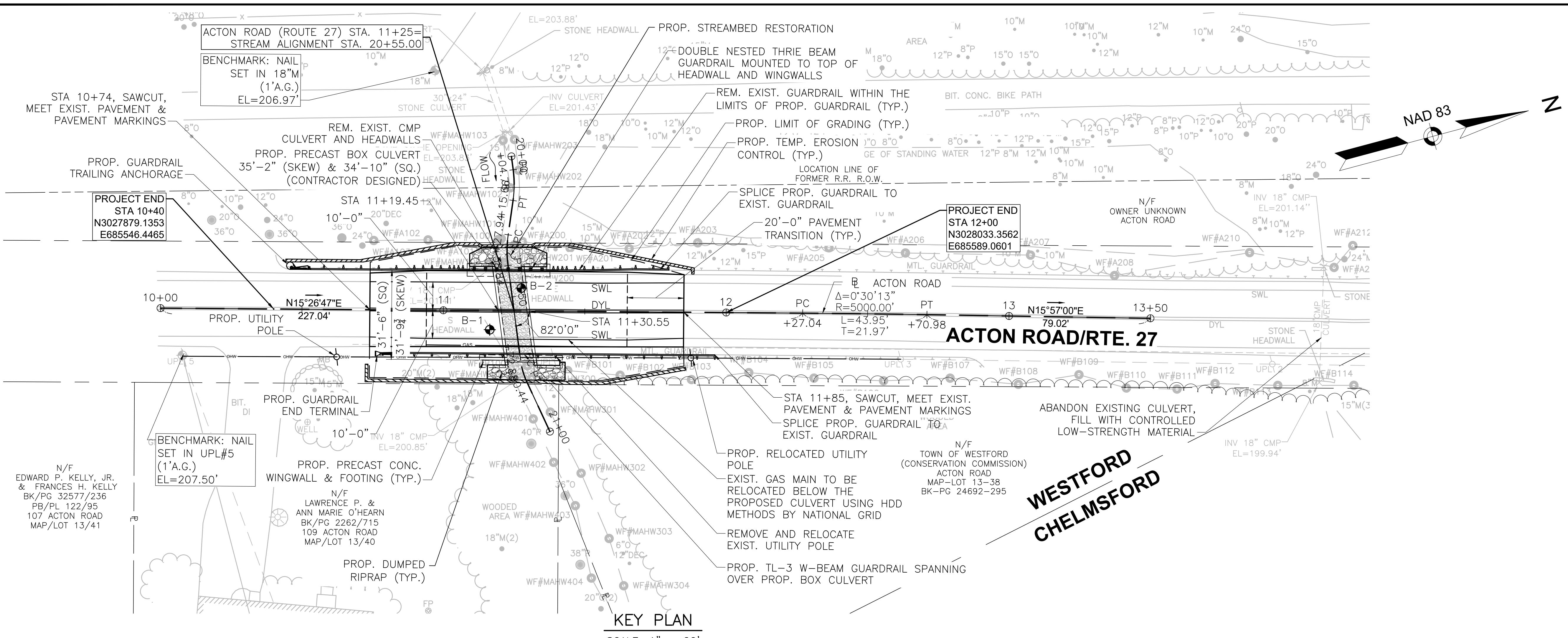
WATER COMMISSIONERS  
HUGH C. MAGUIRE, CHAIR  
TITUS PALMER, VICE CHAIR  
CHAUNCEY CHU, SECRETARY  
TIM HALL, ALTERNATE



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14	CONTROL OF WATER
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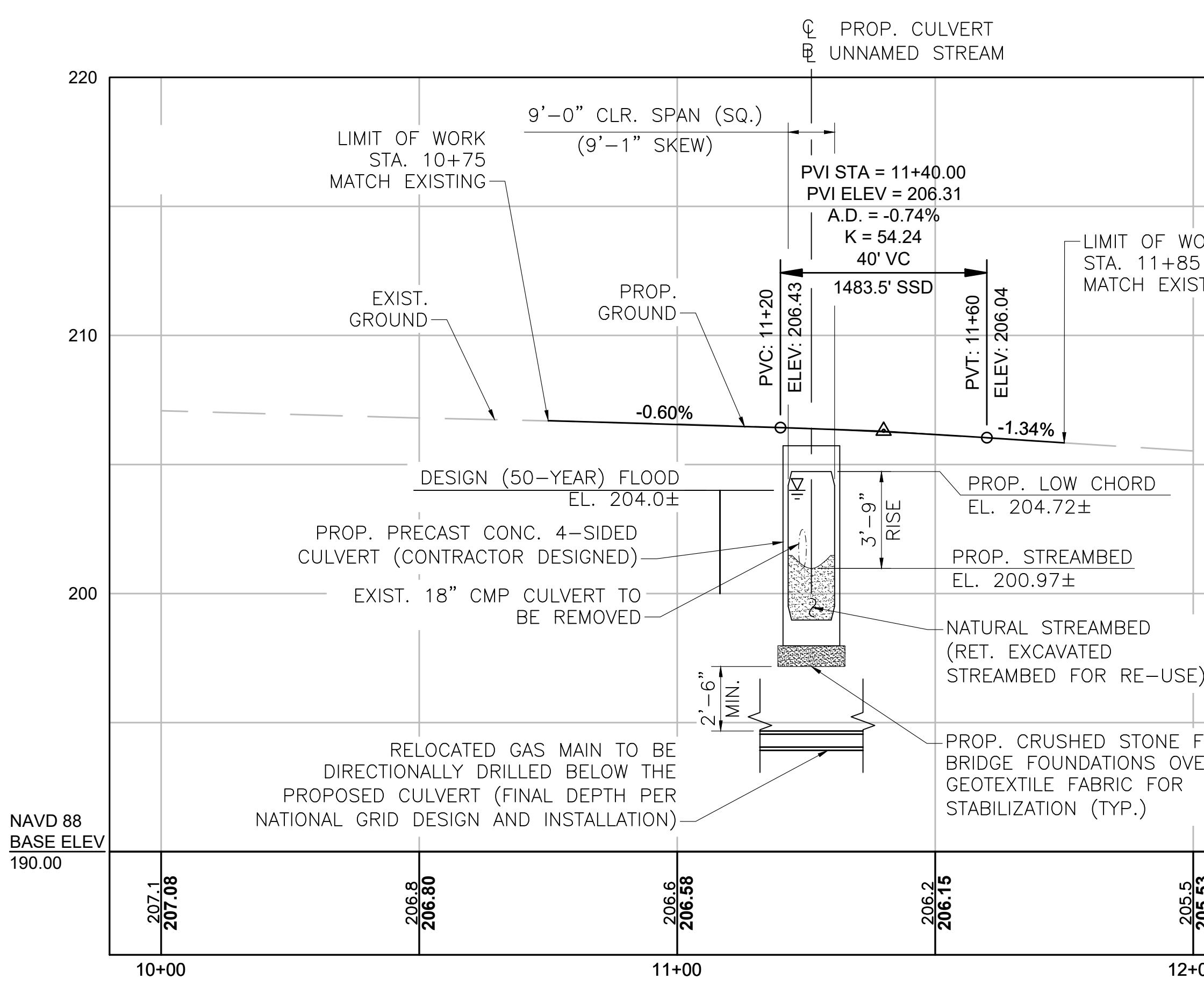
  	12/31/2025	FINAL PS&E SUBMISSION	1
	01/31/2025	PRELIMINARY PLANS	-
	DATE	DESCRIPTION	REV #
TOWN OF WESTFORD ACTON ROAD WESTFORD, MA 01886			
 APPROVED			
TOWN ADMINISTRATOR		DATE	

Final Plans Submittal (S2) 06-January-2026



## KEY PLA

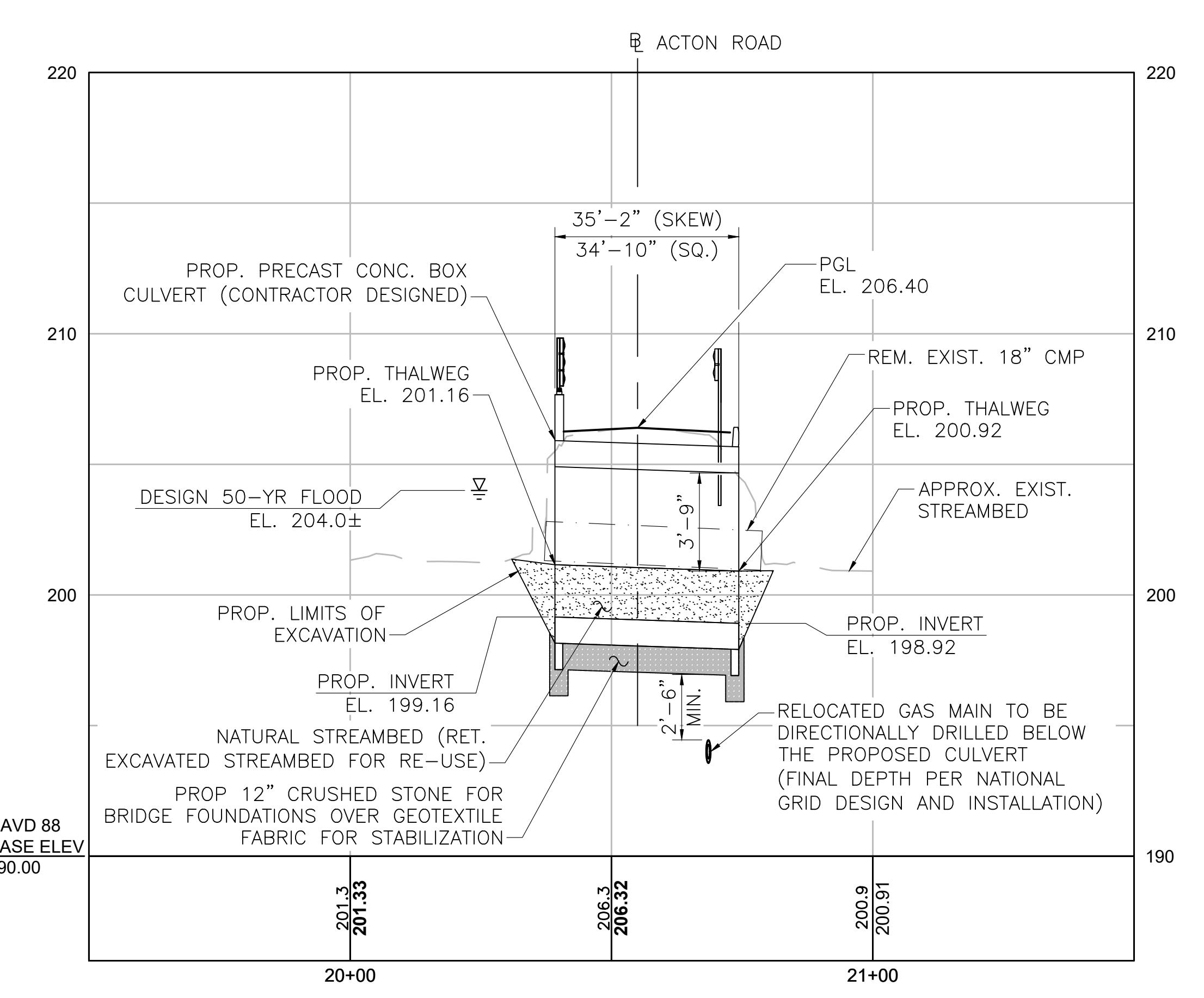
SCALE: 1" = 20



## ACTON ROAD PROFILE

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VERTICAL SCALE: 1" = 400 ft  
HORIZONTAL SCALE: 1" = 200 ft



## UNNAMED STREAM PROFILE

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VERTICAL SCALE: 1" = 400 ft  
HORIZONTAL SCALE: 1" = 400 ft

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N.A.	2	16
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## KEY PLAN & PROFILES

WESTFORD  
ACTON ROAD OVER UNNAMED STREAM

STATE	FED. AID PROJ. NO.	SCHEET NO.	TOTAL SHEETS
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GENERAL NOTES

GENERAL NOTES

DESIGN:

IN ACCORDANCE WITH THE 2020 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS LRFD BRIDGE DESIGN SPECIFICATIONS, FOR HL-93 LOADING. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH MASSDOT 2025 STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.

SURVEY BENCHMARKS:

BMRK  
NAIL SET 1' ABOVE GROUND IN UPL#5  
EL: 207.50'

BMRK:  
NAIL SET 1' ABOVE GROUND IN 18" M  
EL: 206.97'

BMRK:  
NAIL SET 1' ABOVE GROUND IN UPL#1  
EL: 208.48'

DATE:

TO BE PLACED ON THE OUTSIDE FACE OF BOTH HEADWALLS. A SHEET SHOWING SIZE AND CHARACTER OF NUMERALS WILL BE FURNISHED. THE DATE USED SHALL BE THE LATEST YEAR OF CONTRACT COMPLETION AS OF THE DATE THE FIRST HEADWALL IS CONSTRUCTED. BOTH HEADWALLS SHALL FEATURE THE SAME DATE.

SURVEY NOTES:

THE HORIZONTAL DATUM FOR THIS SURVEY IS THE MASSACHUSETTS COORDINATE SYSTEM, NAD 1983, MAINLAND ZONE. THE VERTICAL DATUM FOR THIS SURVEY IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). SAID DATUMS WERE ESTABLISHED VIA GPS OBSERVATIONS UTILIZING NAD83 (NA2011) EPOCH 2010.00 (MYCS2) AND GEOID 18.

ABUTTING PROPERTY LINES HAVE BEEN COMPILED FROM RECORD INFORMATION.

UNDERGROUND UTILITIES SHOWN HEREON ARE COMPILED FROM FIELD LOCATIONS OF STRUCTURES AND FROM AVAILABLE RECORD INFORMATION ON FILE AT THE TOWN ENGINEERING OFFICES, TOWN D.P.W., AND UTILITY COMPANIES. OTHER UNDERGROUND UTILITIES MAY EXIST. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION, SIZE & ELEVATION OF ALL UTILITIES WITHIN THE AREA OF PROPOSED WORK AND TO CONTACT "DIG-SAFE" AT 811 AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION, DEMOLITION OR CONSTRUCTION.

THIS PLAN IS THE RESULT OF AN ON-THE-GROUND INSTRUMENT SURVEY PERFORMED BY HANCOCK ASSOCIATES IN JUNE 2024.

PORTIONS OF THE SUBJECT AREA ARE LOCATED IN A SPECIAL FLOOD HAZARD AREA, ZONE "A" (NO BFE) AS SHOWN ON FEMA NATIONAL FLOOD INSURANCE PROGRAM (NFIP) FLOOD INSURANCE RATE MAP (FIRM) NUMBER 25017C0242F, HAVING AN EFFECTIVE DATE OF JULY 7, 2014.

LIMITS OF BORDERING VEGETATED WETLANDS AND MEAN ANNUAL HIGH WATER ASSOCIATED WITH UNNAMED BROOK SHOWN HEREIN WERE DELINEATED ON MAY 2 AND 3, 2024 BY HANCOCK ASSOCIATES AND LOCATED BY INSTRUMENT SURVEY.

SCALES:

SCALES NOTED ON THE PLANS ARE NOT APPLICABLE TO REDUCED SIZE PRINTS. DIVIDE SCALES BY 2 FOR HALF-SIZE PRINTS (A3).

FOUNDATIONS:

FOUNDATIONS MAY BE ALTERED, IF NECESSARY, TO SUIT CONDITIONS ENCOUNTERED DURING CONSTRUCTION, WITH THE APPROVAL OF THE ENGINEER.

UNSUITABLE MATERIAL:

ALL UNSUITABLE MATERIAL SHALL BE REMOVED WITHIN THE LIMITS OF THE FOUNDATIONS OF THE STRUCTURE, AS DIRECTED BY THE ENGINEER.

ANCHOR BOLTS:

ALL ANCHOR BOLTS SHALL BE SET BY TEMPLATE BEFORE THE CONCRETE IS PLACED.

CONCRETE:

PRECAST ELEMENTS:  
THE FABRICATOR IS RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF LIFT HOOKS FOR ALL PRECAST ELEMENTS. UNDER NO CIRCUMSTANCES WILL THE REBAR ELEMENTS SHOWN ON THE PLANS BE USED TO LIFT THE PRECAST ELEMENTS. FOR ADDITIONAL REQUIREMENTS, REFER TO THE "PRECAST CONCRETE ELEMENTS" PORTION OF ITEM 995.1 IN THE SPECIAL PROVISIONS.

THE FOLLOWING CONCRETE MIXES ARE TO BE USED:

5000 HP CONCRETE: PRECAST CULVERT, PRECAST HEADWALL, PRECAST CUTOFF WALLS, PRECAST WINGWALLS, AND PRECAST FOOTINGS.

REINFORCEMENT:

REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 31 GRADE 60. ALL REINFORCING STEEL SHALL BE EPOXY COATED, UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DRAWINGS, ALL BARS SHALL BE LAPPED AS FOLLOWS:

MODIFICATION CONDITION:

	#4 BARS	#5 BARS	#6 BARS
1. NONE	16"	17"	21"
2. 12" OF CONCRETE BELOW BAR	18"	22"	27"
3. EPOXY COATED BARS, COVER < 3db, OR CLEAR SPACING < 6db	21"	26"	31"
4. COATED BARS, ALL OTHER CASES	17"	21"	25"
5. CONDITION 2. AND 3.	23"	29"	35"
6. CONDITION 2. AND 4.	21"	27"	32"

ALL OTHER BARS SHALL BE LAPPED AS SHOWN ON THE CONSTRUCTION DRAWINGS.

WATERPROOFING:

ALL WATERPROOFING USED ON TOP SLAB OF PRECAST CULVERT SHALL BE MEMBRANE WATERPROOFING. DAMP-PROOFING SHALL BE USED ON THE EXTERIOR OF THE CULVERT SIDEWALLS AND BACK FACE OF THE WINGWALL STEMS.

TRAFFIC:

THE ROAD SHALL REMAIN OPEN TO ONE LANE OF ALTERNATING TRAFFIC DURING CONSTRUCTION TO THE MAXIMUM EXTENT POSSIBLE. A FULL DETOUR WILL BE IMPLEMENTED FOR A SHORT DURATION (EXPECTED TO BE 1-2 WEEKS) TO REMOVE THE EXISTING PIPE AND INSTALL THE NEW BOX CULVERT. THE TEMPORARY TRAFFIC CONTROL PLAN SHALL BE DESIGNED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR APPROVAL. THE TEMPORARY TRAFFIC CONTROL PLANS SHOWN ON THIS PLAN ARE CONCEPTUAL ONLY.

UTILITIES:

DURING CONSTRUCTION, THE CONTRACTOR SHALL LOCATE AND PROTECT FROM DAMAGE ALL UTILITIES THAT ARE TO REMAIN. ANY TEMPORARY UTILITY SUPPORTS OR UTILITY RELOCATIONS REQUIRED AND SHOWN ON THE CONSTRUCTION DRAWINGS SHALL BE COORDINATED WITH THE ENGINEER.

THE DOWNSTREAM END OF THE PROPOSED STRUCTURE IS IN PROXIMITY TO OVERHEAD AND UNDERGROUND UTILITIES. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER AND RESPECTIVE UTILITY COMPANIES PRIOR TO STARTING WORK.

CONTROL OF WATER SYSTEM:

CONTROL OF WATER SYSTEM SHALL BE DESIGNED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR APPROVAL, PER ITEM 991.1. APPROXIMATE LIMITS SHOWN ON THIS PLAN ARE CONCEPTUAL AND THE FINAL LOCATION SHALL BE DETERMINED BY THE CONTRACTOR.

ESTIMATED QUANTITIES (NOT GUARANTEED)	
ITEM 140.	BRIDGE EXCAVATION.....295 CY
ITEM 148.01	DREDGING AND STOCKPILING OF STREAMBED MATERIAL.....15 CY
ITEM 151.2	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES 155 CY
ITEM 156.1	CRUSHED STONE FOR BRIDGE FOUNDATIONS.....50 TON
ITEM 698.1	GEOTEXTILE FABRIC FOR STABILIZATION.....100 SY
ITEM 698.4	GEOTEXTILE FABRIC FOR PERMANENT EROSION CONTROL.....50 SY
ITEM 983.	DUMPED RIPRAP.....65 TON
ITEM 983.521	STREAMBED RESTORATION.....40 CY
ITEM 991.1	CONTROL OF WATER.....1 LS
ITEM 995.01	CULVERT STRUCTURE.....1 LS

SEISMIC DESIGN CRITERIA	
DESIGN RETURN PERIOD:	1000
DESIGN SPECTRA	
As	0.125 g
SDs	0.251 g
SD1	0.098 g
SITE CLASS	D
SEISMIC DESIGN CATEGORY (SDC)	A

HYDRAULIC DESIGN DATA	
DRAINAGE AREA (SQ. MILES)	0.15
DESIGN FLOOD DISCHARGE (C.F.S.)	67
DESIGN FLOOD FREQUENCY (YEARS)	50
DESIGN FLOOD VELOCITY (F.P.S.)	1.6
DESIGN FLOOD ELEVATION (FEET, NAVD)	204.0
BASE (100-YEAR) FLOOD DATA	
BASE FLOOD DISCHARGE (C.F.S.)	103
BASE FLOOD ELEVATION (FEET, NAVD)	204.6
DESIGN AND CHECK SCOUR DATA	
DESIGN SCOUR FLOOD EVENT	100
RETURN FREQUENCY (YEARS)	100
DESIGN FLOOD ABUTMENT SCOUR DEPTH (FEET)	0.0
DESIGN FLOOD PIER SCOUR DEPTH (FEET)	NA
CHECK SCOUR FLOOD EVENT	200
RETURN FREQUENCY (YEARS)	200
CHECK FLOOD ABUTMENT SCOUR DEPTH (FEET)	0.0
CHECK FLOOD PIER SCOUR DEPTH (FEET)	NA
FLOOD OF RECORD	
DISCHARGE (C.F.S.)	UNKNOWN
FREQUENCY (IF KNOWN, YEARS)	UNKNOWN
MAXIMUM ELEVATION (FEET, NAVD)	UNKNOWN
DATE (MM/YYYY)	UNKNOWN
HISTORY OF ICE FLOES	NO
EVIDENCE OF SCOUR AND EROSION	NO

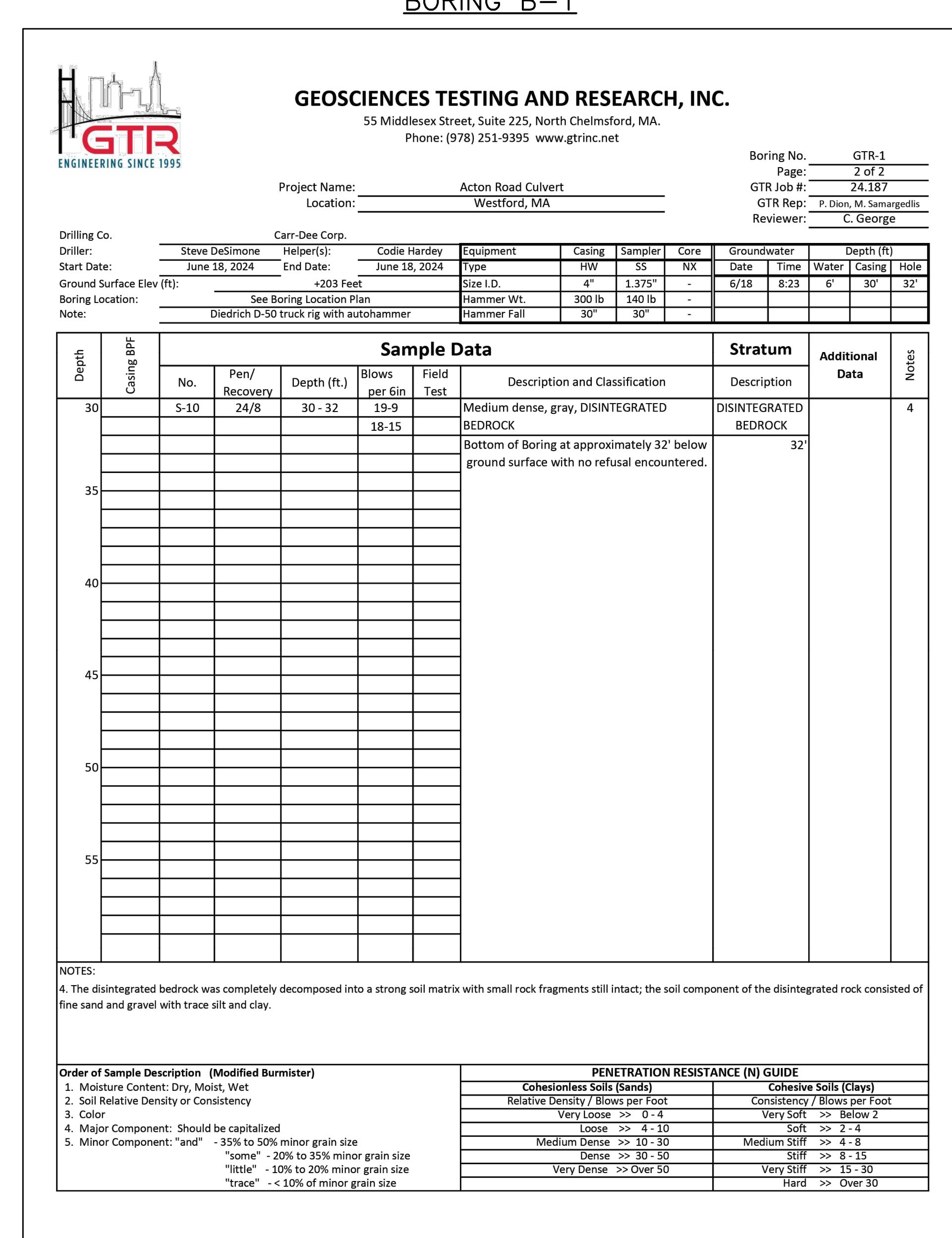
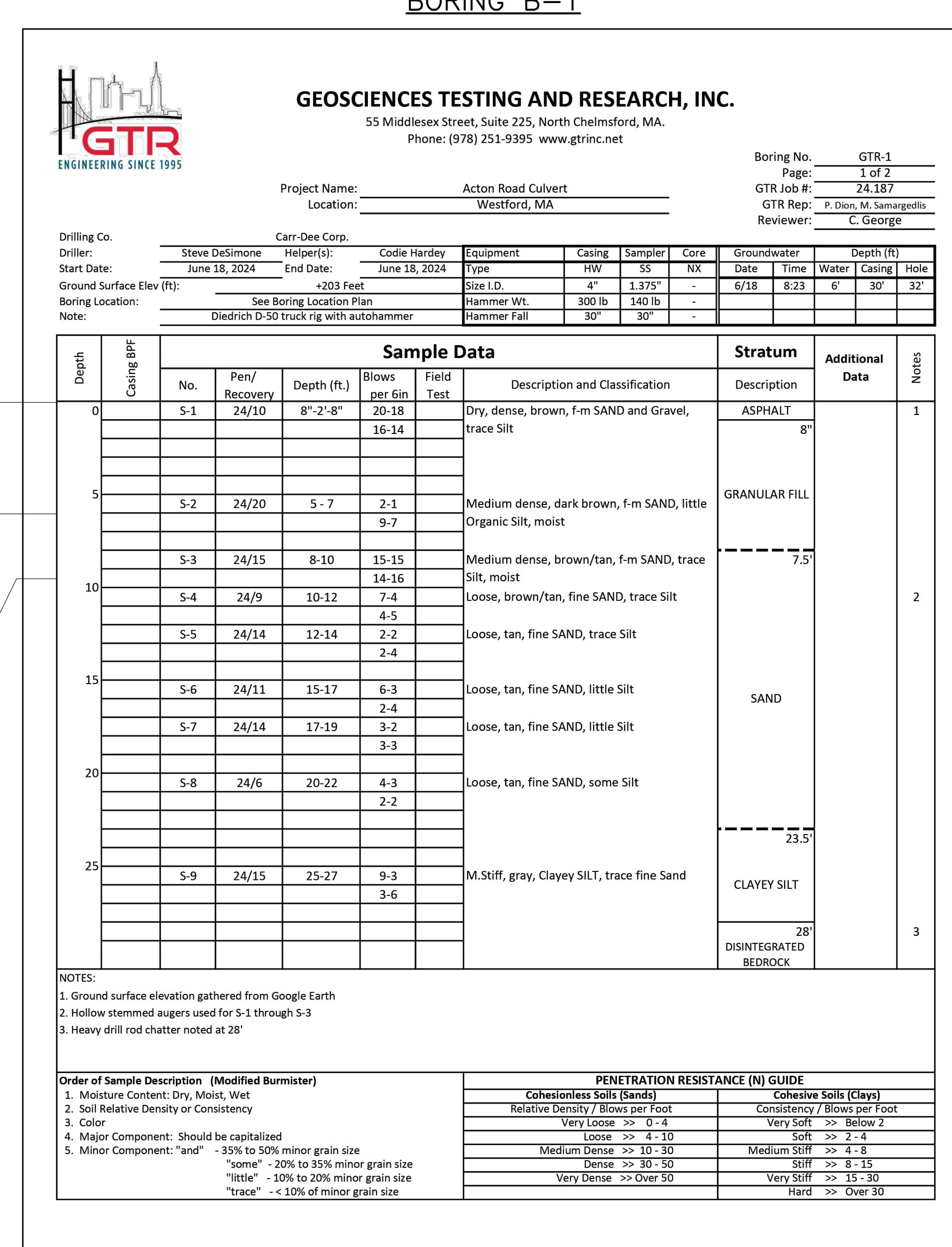
TEMPORARY WATER CONTROL DESIGN DATA	
DESIGN FLOOD DISCHARGE (C.F.S.)	2
DESIGN FLOOD FREQUENCY (YEARS)	2
DESIGN FLOOD VELOCITY (F.P.S.)	-
DESIGN FLOOD ELEVATION (FEET, NAVD)	-

WESTFORD  
ACTON ROAD OVER UNNAMED STREAM

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MA	N.A.	4	16

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BORING LOGS (1 OF 2)



**BORING NOTES:**

- LOCATION OF BORINGS SHOWN ON THE PLAN THUS: 
- BORINGS ARE TAKEN FOR PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.
- WATER LEVELS SHOWN ON THE BORING LOGS WERE OBSERVED AT THE TIME OF TAKING BORINGS AND DO NOT NECESSARILY SHOW THE TRUE GROUND WATER LEVEL.
- FIGURES IN COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A 1-3/8" O.D., 24 INCH LONG, SPLIT SPOON SAMPLER IN 6" INTERVALS USING A 140 POUND WEIGHT FALLING 30".
- ALL BORINGS WERE MADE ON JUNE 18, 2024 BY GEOSCIENCES TESTING AND RESEARCH, INC (GTR).
- THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.

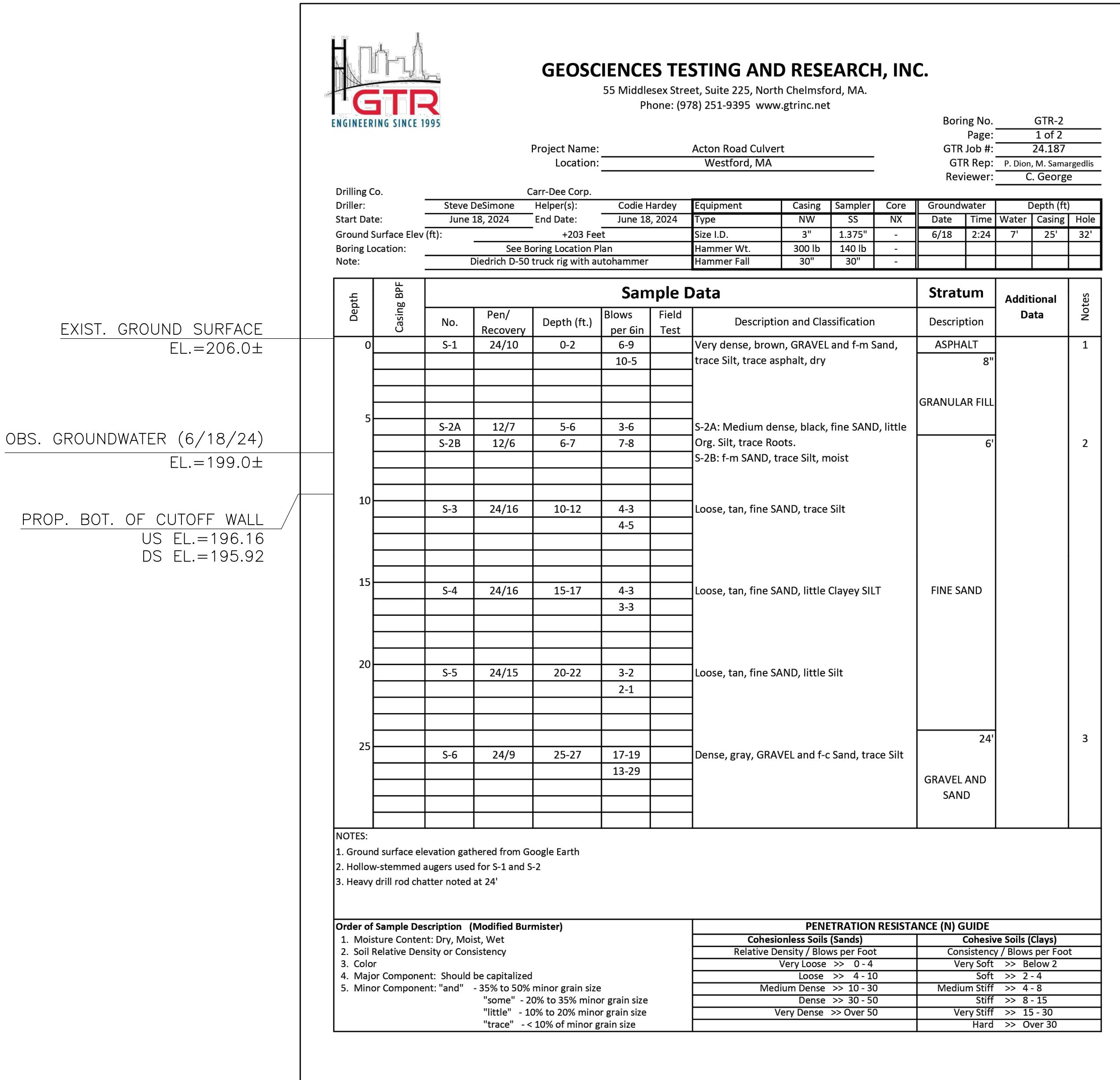
WESTFORD  
ACTON ROAD OVER UNNAMED STREAM

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MA	N.A.	5	16

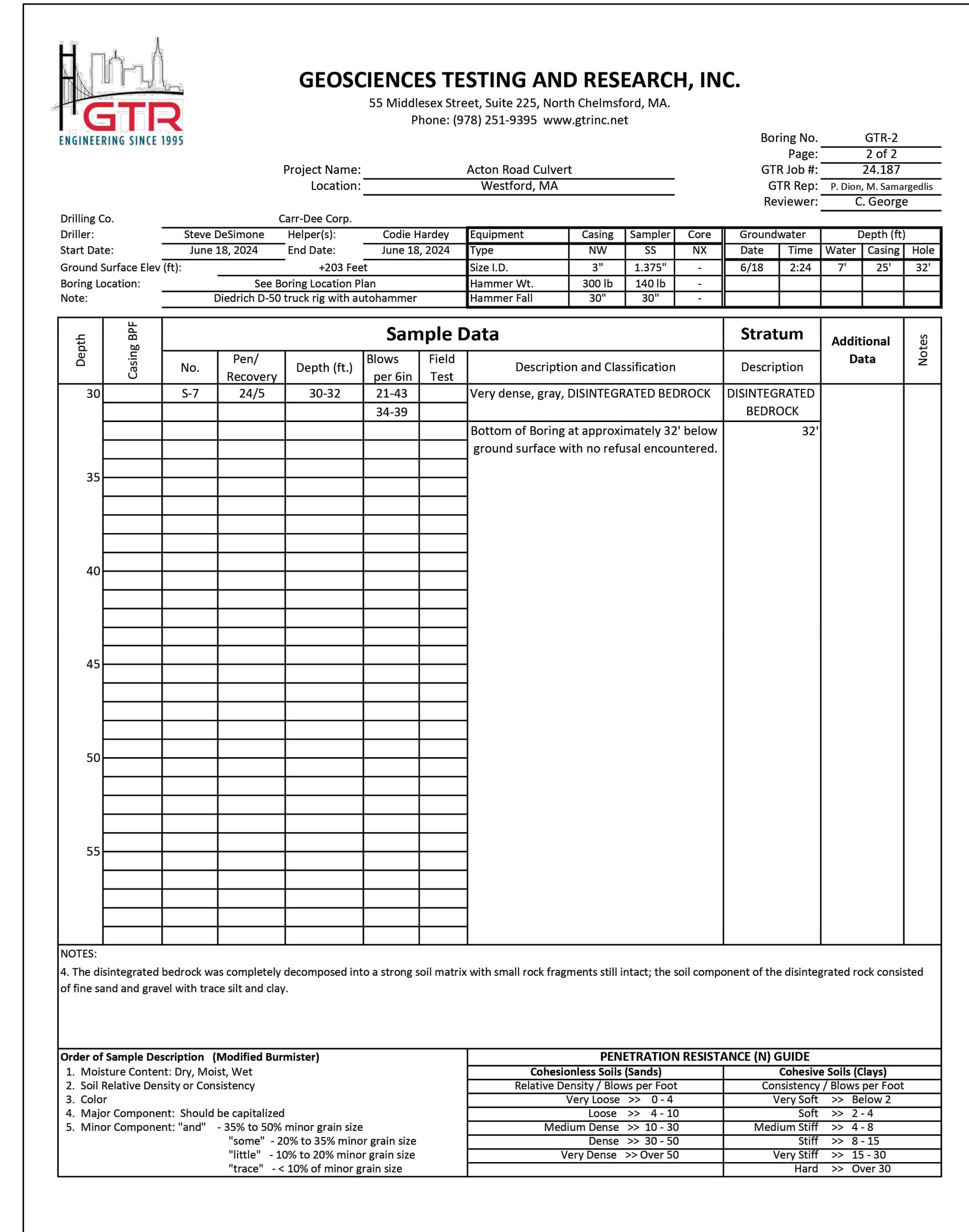
PROJECT FILE NO. T1463

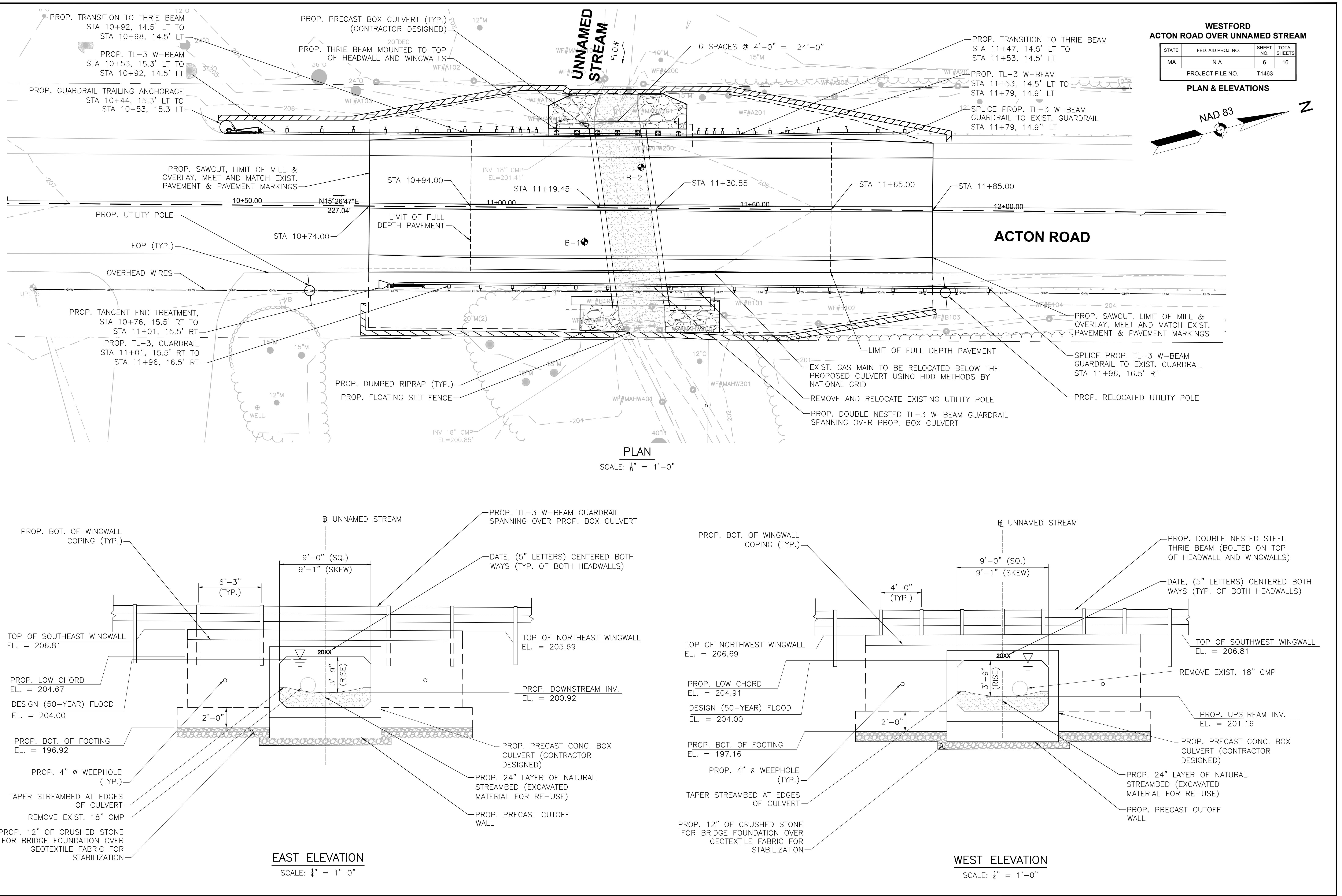
BORING LOGS (2 OF 2)

BORING B-2



BORING B-2





WESTFORD  
ACTON ROAD OVER UNNAMED STREAM

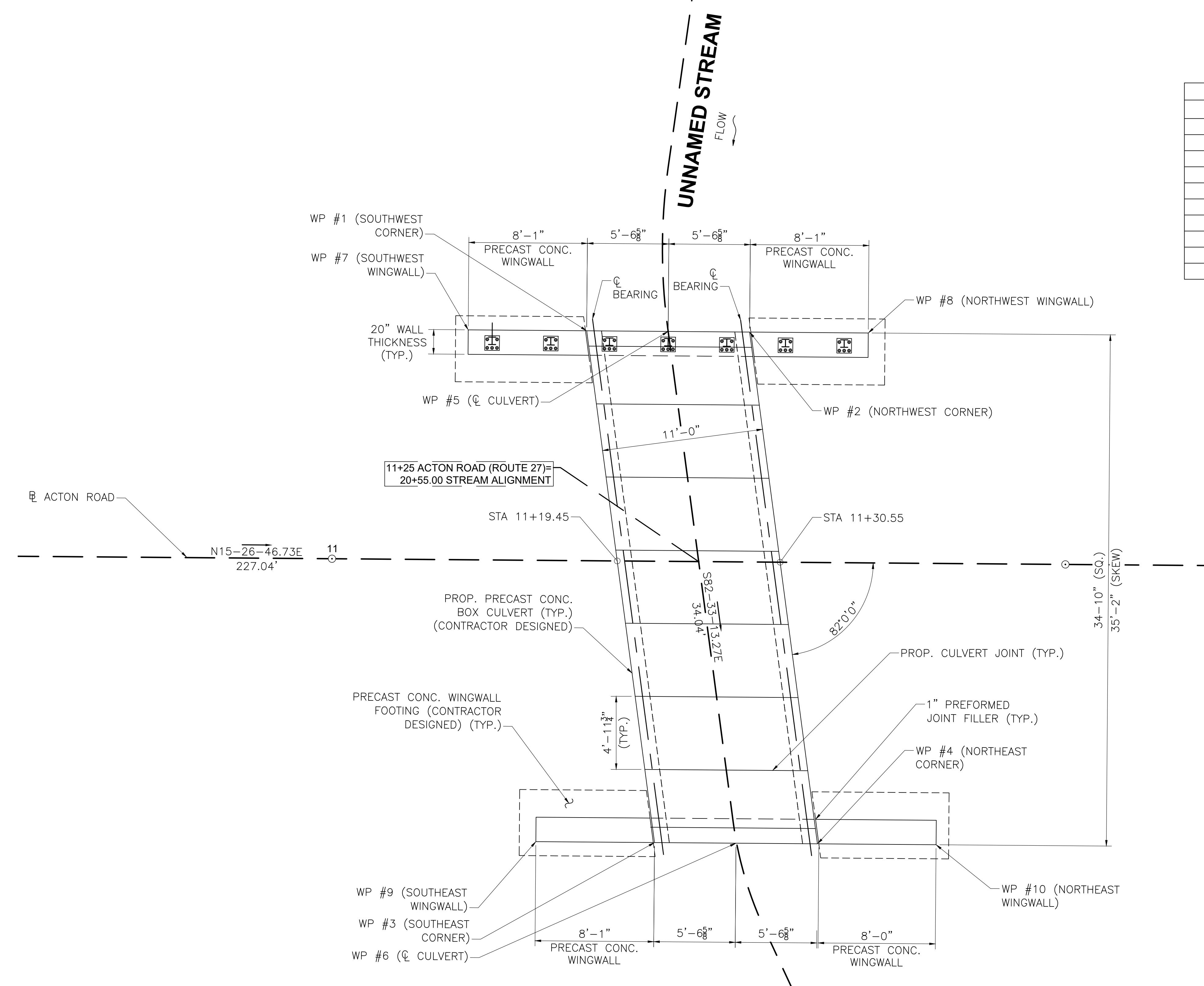
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MA	N.A.	7	16
PROJECT FILE NO. T1463			

FOUNDATION & FRAMING PLAN

NAD 83  
Z

T1463.BR07-08(FNDNPLANS).DWG

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PRECAST CONCRETE CULVERT WORKING POINTS		
WORKING POINT	STATION	OFFSET (FT)
WP #1	11+17.27	15.67 LT
WP #2	11+28.35	15.67 LT
WP #3	11+22.14	19.17 RT
WP #4	11+33.25	19.17 RT
WP #5	11+22.80	15.67 LT
WP #6	11+27.69	19.17 RT
WP #7	11+09.17	15.67 LT
WP #8	11+36.44	15.67 LT
WP #9	11+14.05	19.17 LT
WP #10	11+41.34	19.17 RT

FOUNDATION & FRAMING PLAN

SCALE:  $\frac{1}{4}$ " = 1'-0"

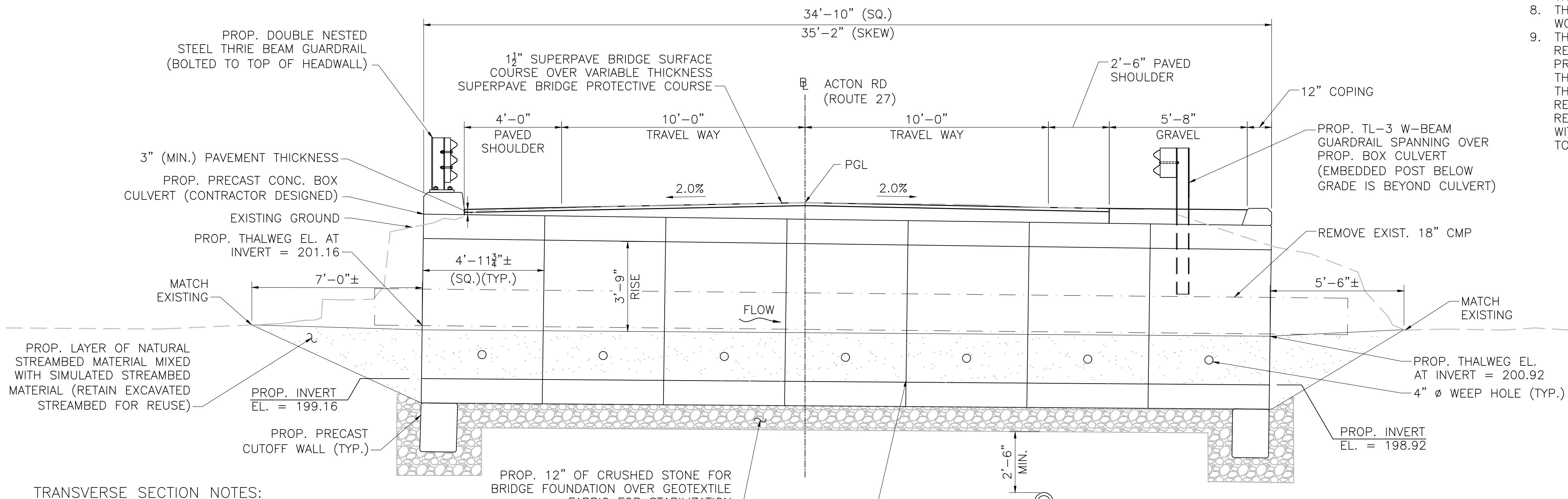
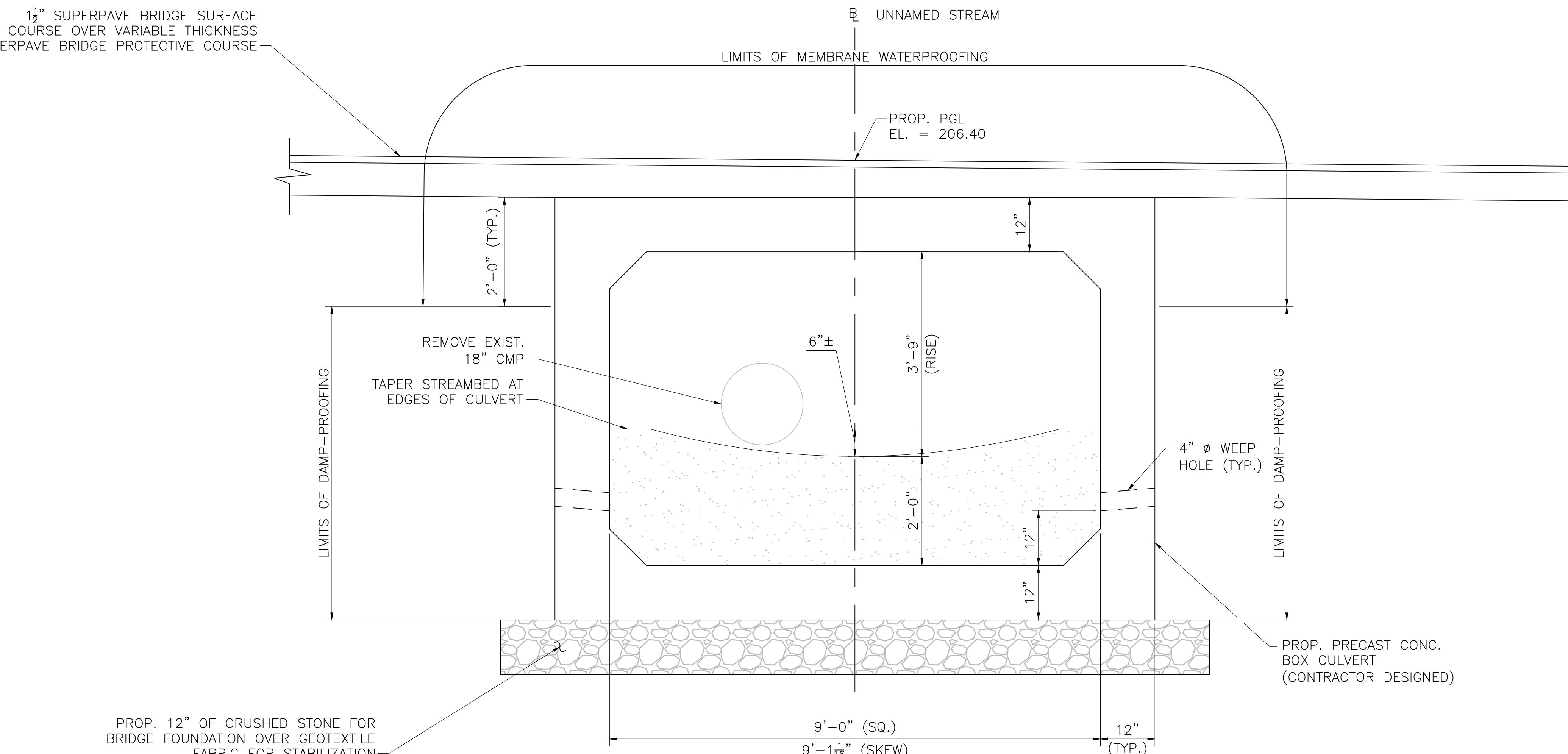
Final Plans Submittal (S2)

06-January-2026

WESTFORD  
ACTON ROAD OVER UNNAMED STREAM

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N.A.	8	16
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STRUCTURAL DETAILS (1 OF 4)



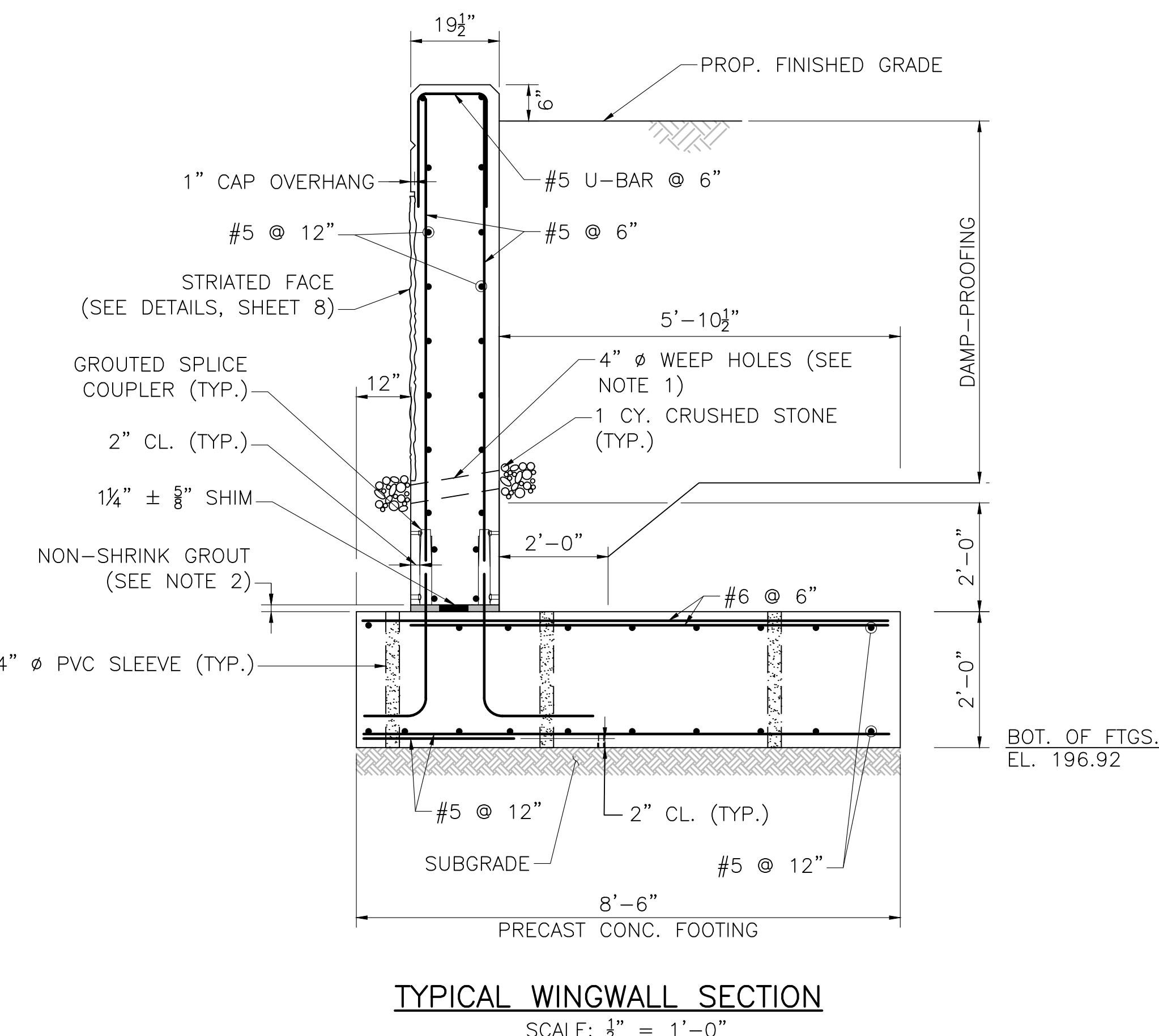
WESTFORD  
ACTON ROAD OVER UNNAMED STREAM

STRUCTURAL DETAILS (2 OF 4)

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MA	N.A.	9	16

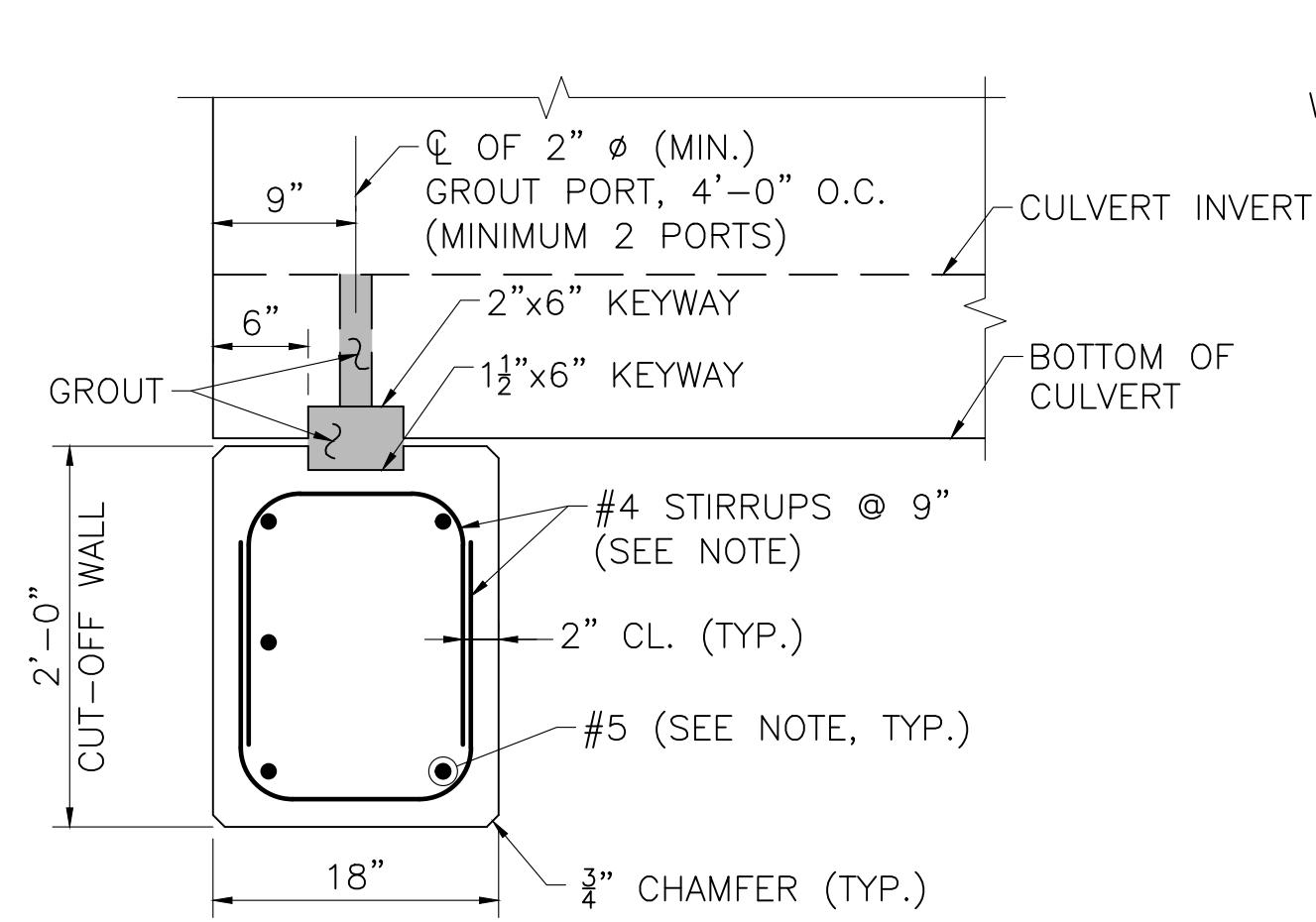
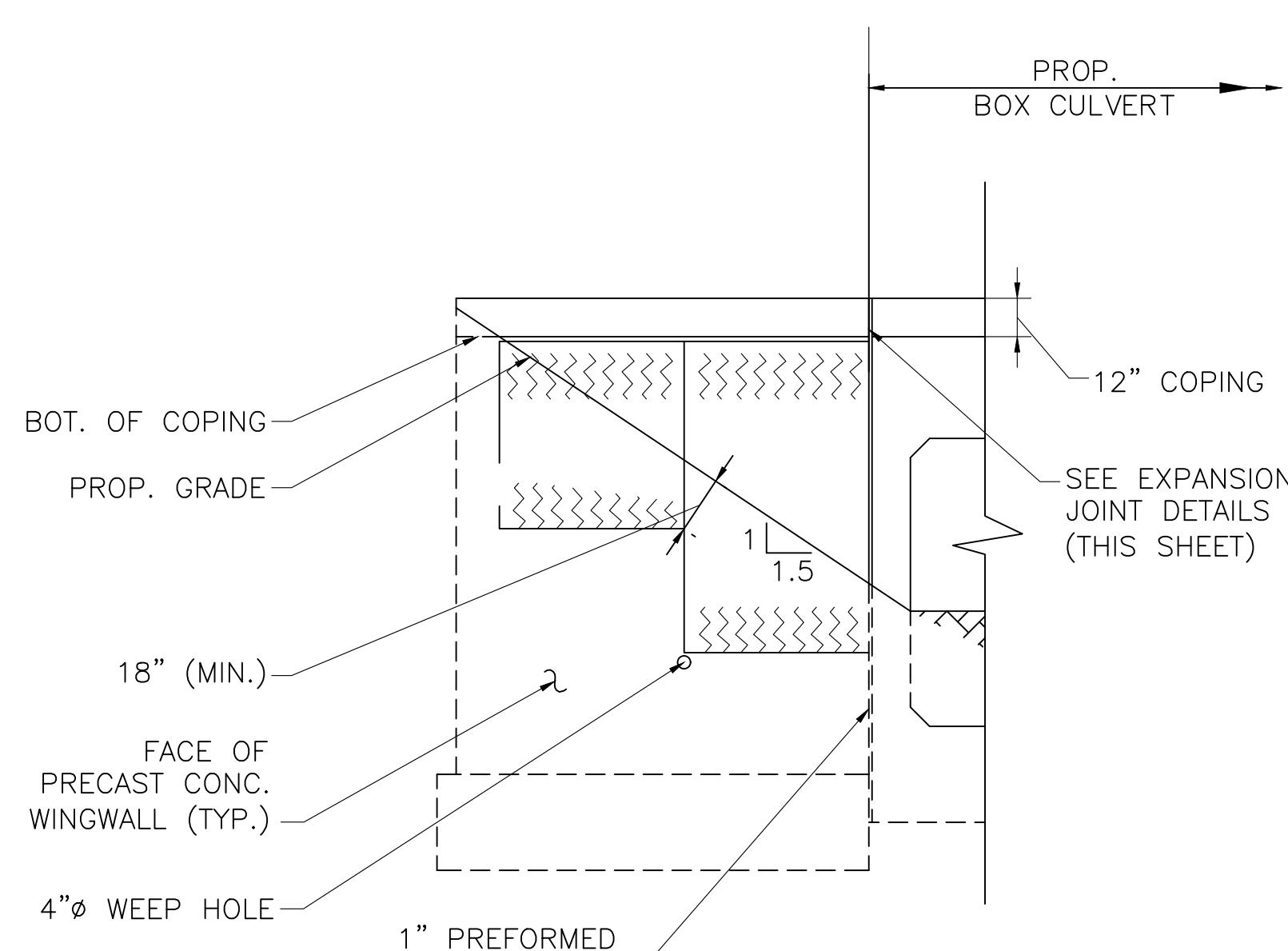
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1463-BR08-12-STRUCTUREDETAILS.DWG Plotted on 12-Jan-2026 1:48 PM



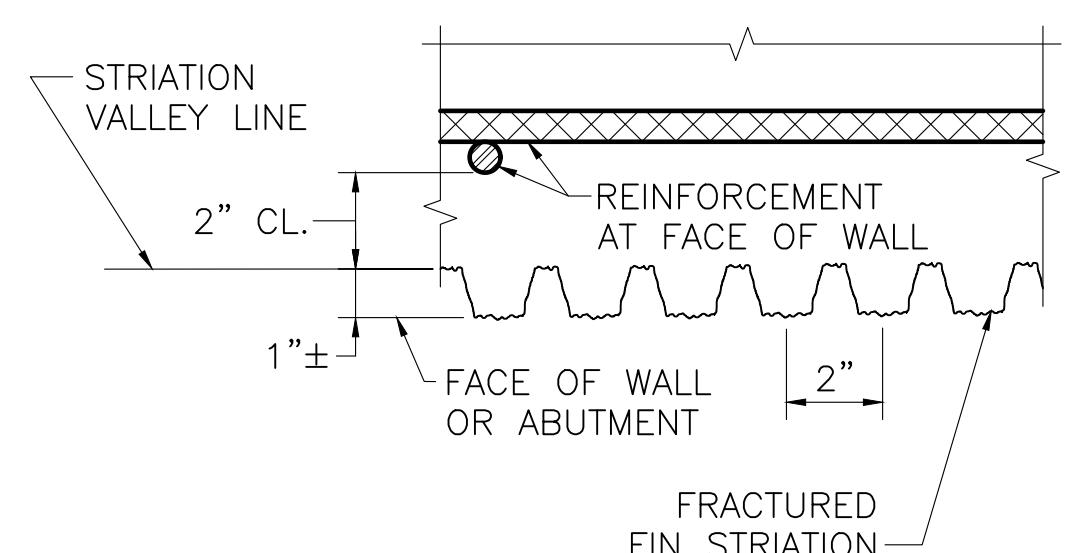
NOTES:

1. 4"  $\phi$  WEEP HOLES AT 10'-0" O.C LOCATED 18" ABOVE THE HEEL OF THE FOOTING, SLOPING 1" PER FOOT TOWARDS THE FRONT FACE. PROVIDE 1 CUBIC YARD OF CRUSHED STONE AT EACH END OF WEEP HOLE.
2. SHEAR KEYS SHALL HAVE AN EXPOSED AGGREGATE FINISH AND SHALL BE CLEANED AND SURFACE SATURATED DRY PRIOR TO PLACING CLOSURE POUR CONCRETE.
3. PRE-BED PREFABRICATED ELEMENT WITH NON-SHRINK GROUT WITH THICKNESS MORE THAN SHIM STACK.



**NOTE:**  
REINFORCEMENT SHOWN IS PRELIMINARY.  
CONTRACTOR TO DETERMINE FINAL REINFORCEMENT.

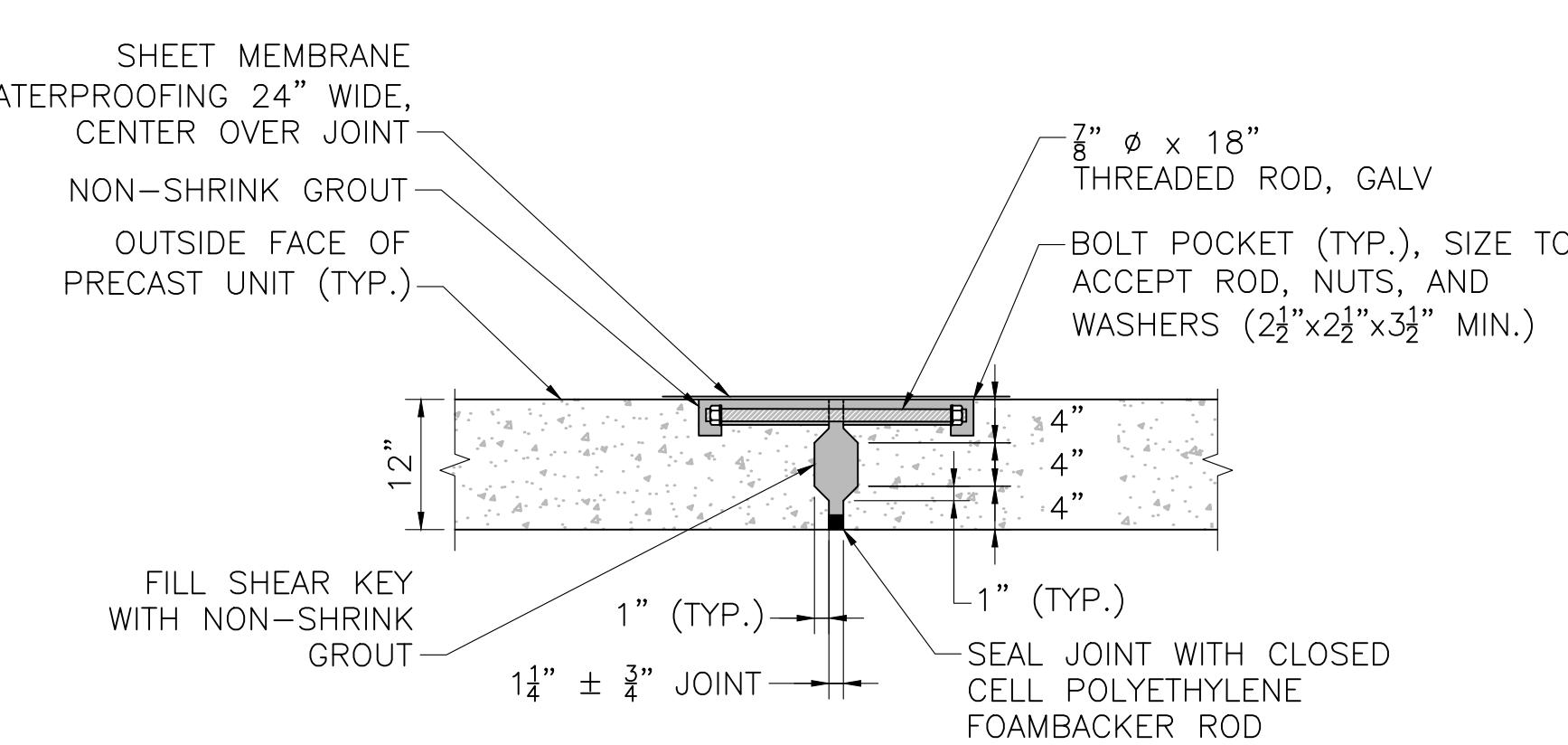
**RIPRAP DETAIL AT WINGWALLS**  
NOT TO SCALE



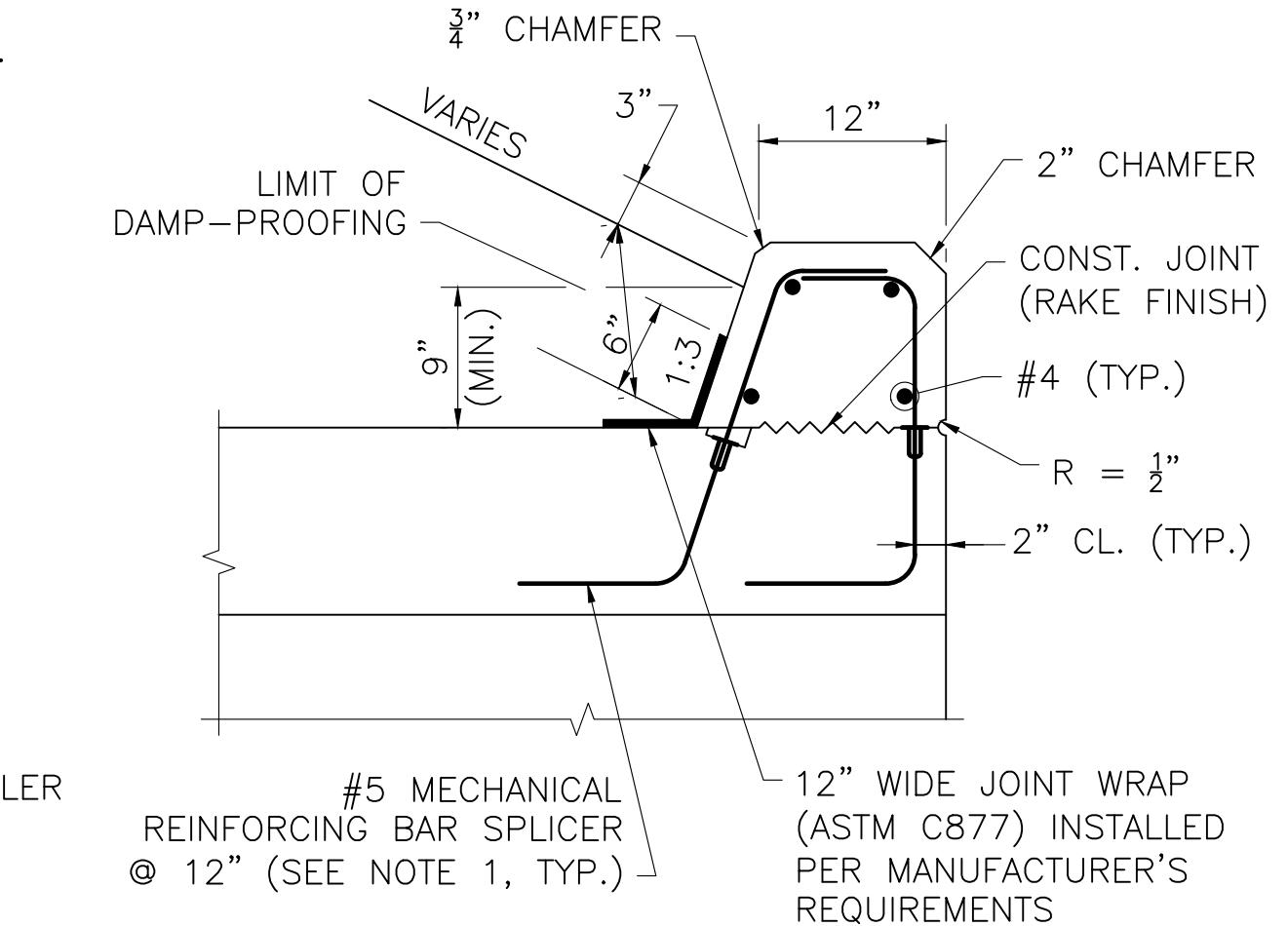
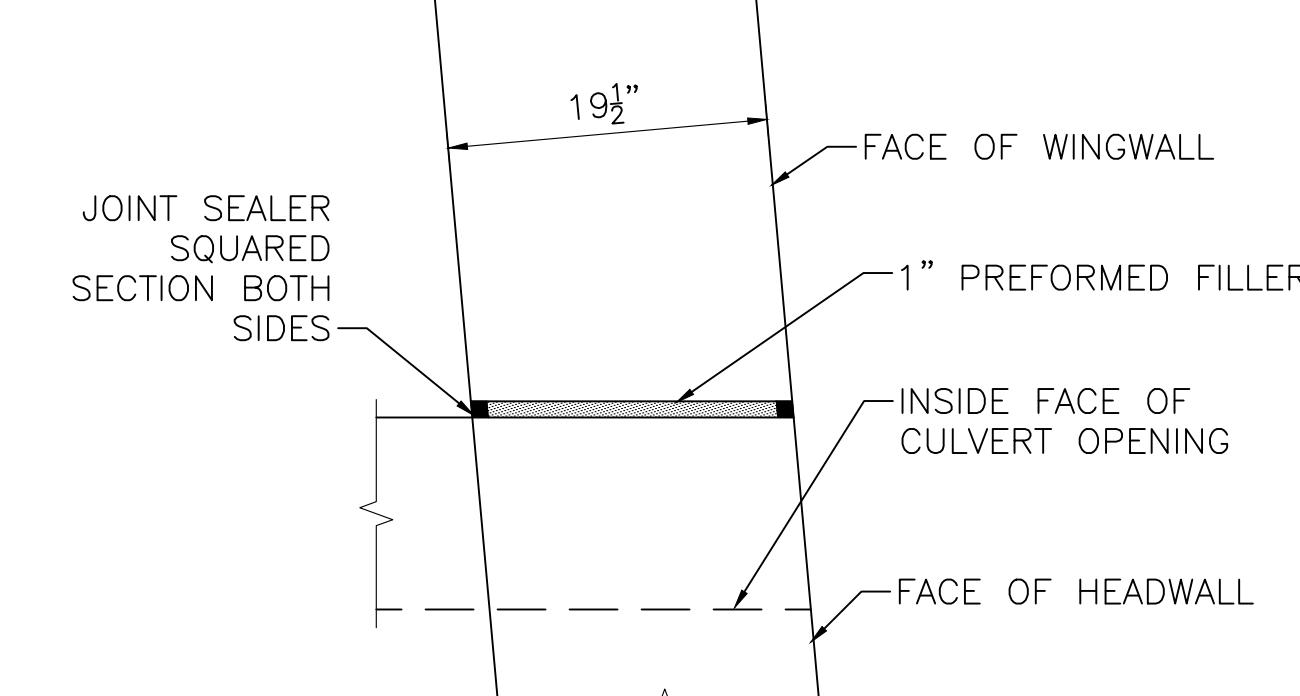
**NOTES:**

1. THE CONTRACTOR SHALL MAKE SURE THAT THE STRIATION FINS ARE PLUMB AND LINED UP VERTICALLY FROM PANEL TO PANEL FOR THE FULL HEIGHT OF THE WALL.
2. THE HORIZONTAL JOINT MAY BE OMITTED IF THE CONTRACTOR CAN DEMONSTRATE THAT THE FORM LINER PANELS CAN BE INSTALLED END TO END WITHOUT CREATING A VISIBLE SEAM IN THE FINAL CAST CONCRETE.

**TYPICAL STRIATION DETAIL**  
SCALE: 3" = 1'-0"

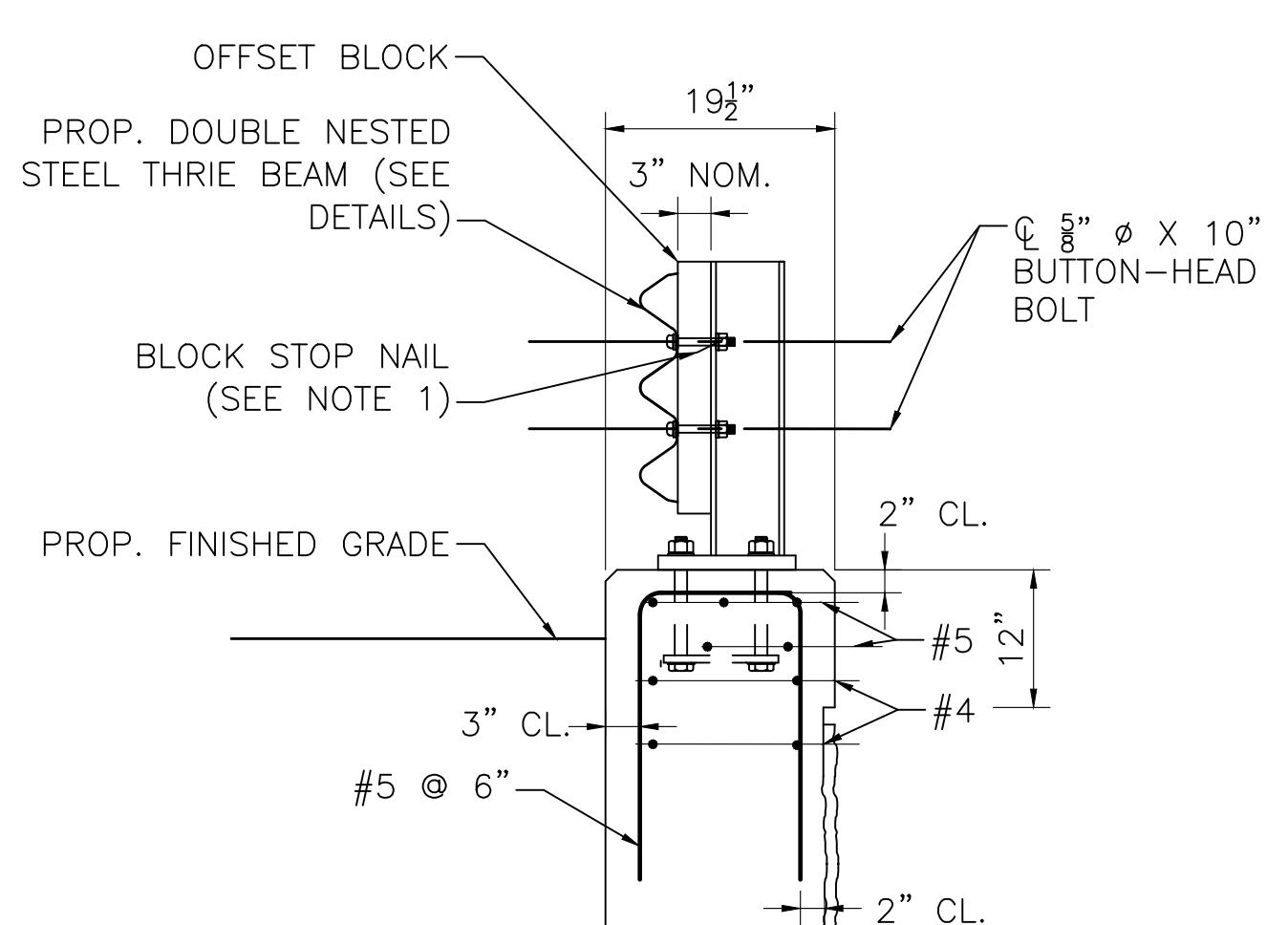
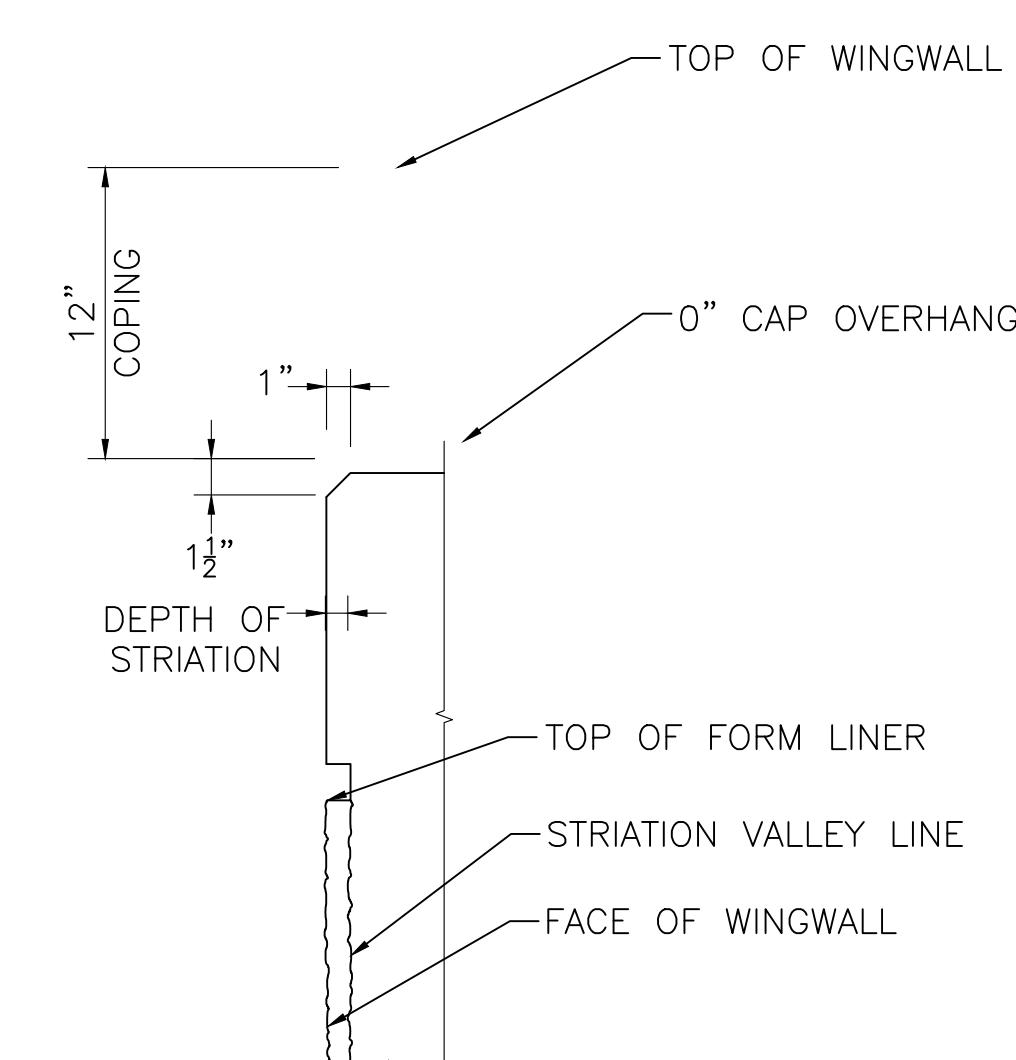


**WINGWALL JOINT PLAN**  
SCALE: 1" = 1'-0"



**NOTES:**

1. THE CONTRACTOR MAY SUBSTITUTE EXTENDED #5 HOOPS FOR THE MECHANICAL REINFORCING BAR SPLICERS AND THREADED REBARS AS SHOWN.
2. CULVERT REINFORCEMENT IS NOT SHOWN FOR CLARITY.



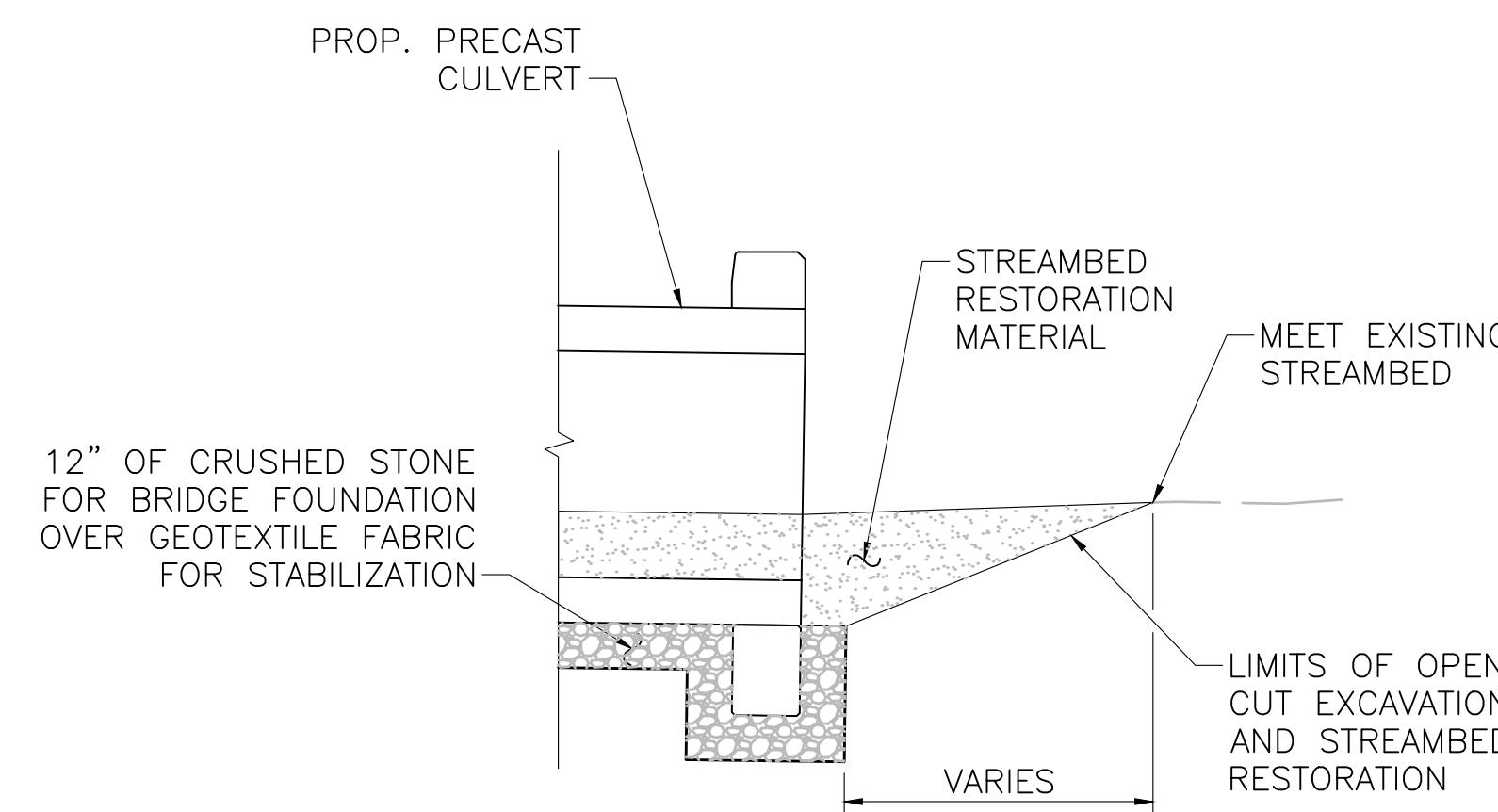
**NOTES:**

1. DRIVE ONE NAIL PER BEAM TIMBER OFFSET BLOCK TO PREVENT BLOCK ROTATION. USE ASTM A153 HOT DIP GALVANIZED STEEL  $\frac{3}{16}$ " TYPE 16D NAILS. DRIVE THE NAIL THROUGH THE UNUSED FLANGE BOLT HOLE AND BEND THE NAIL SO ITS HEAD CONTACTS THE FLANGE.

**WESTFORD**  
**ACTON ROAD OVER UNNAMED STREAM**

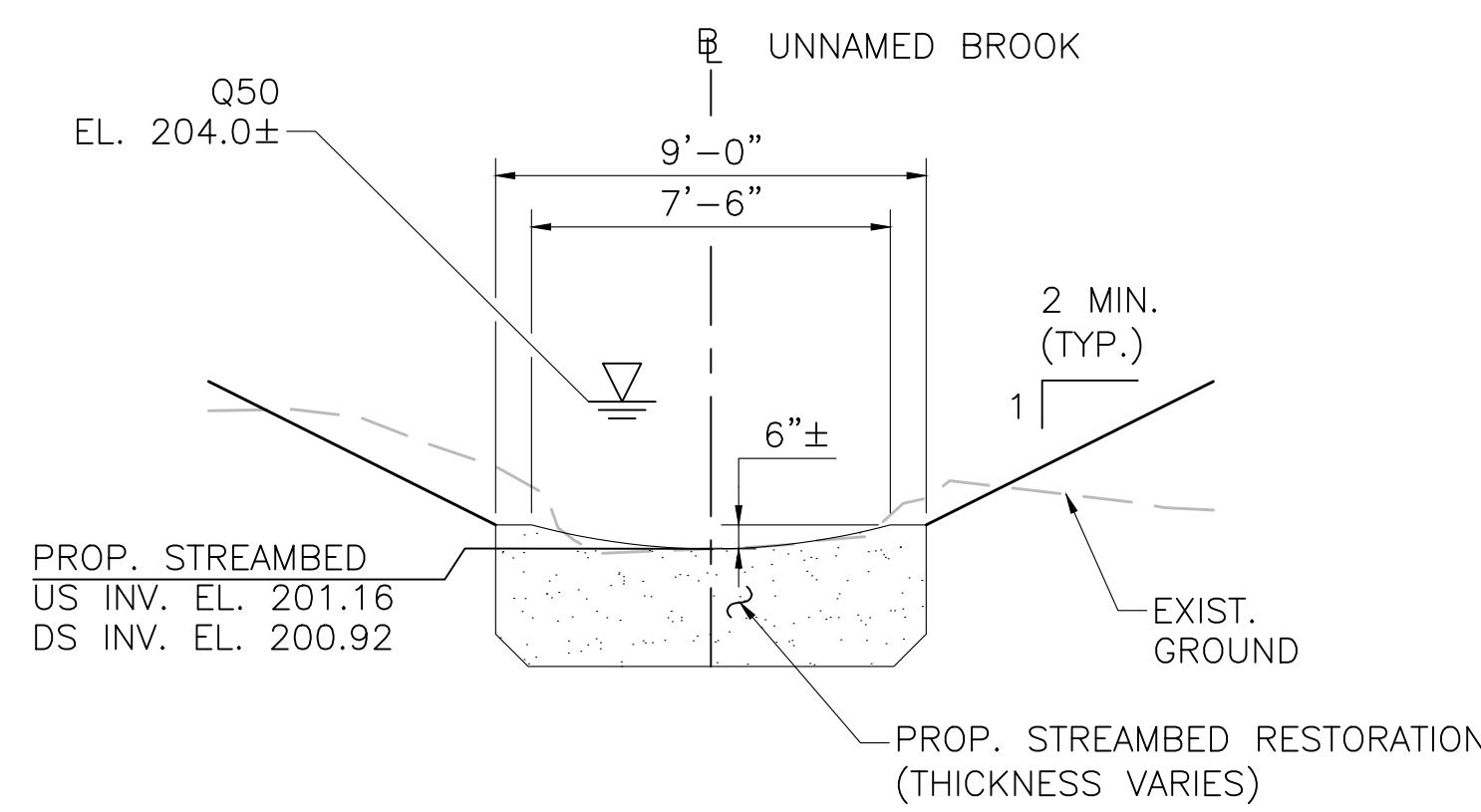
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N.A.	10	16
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STRUCTURAL DETAILS (3 OF 4)



**STREAMBED RESTORATION DETAIL**

SCALE:  $\frac{1}{4}$ " = 1'-0"



**CHANNEL APPROACH SECTION**

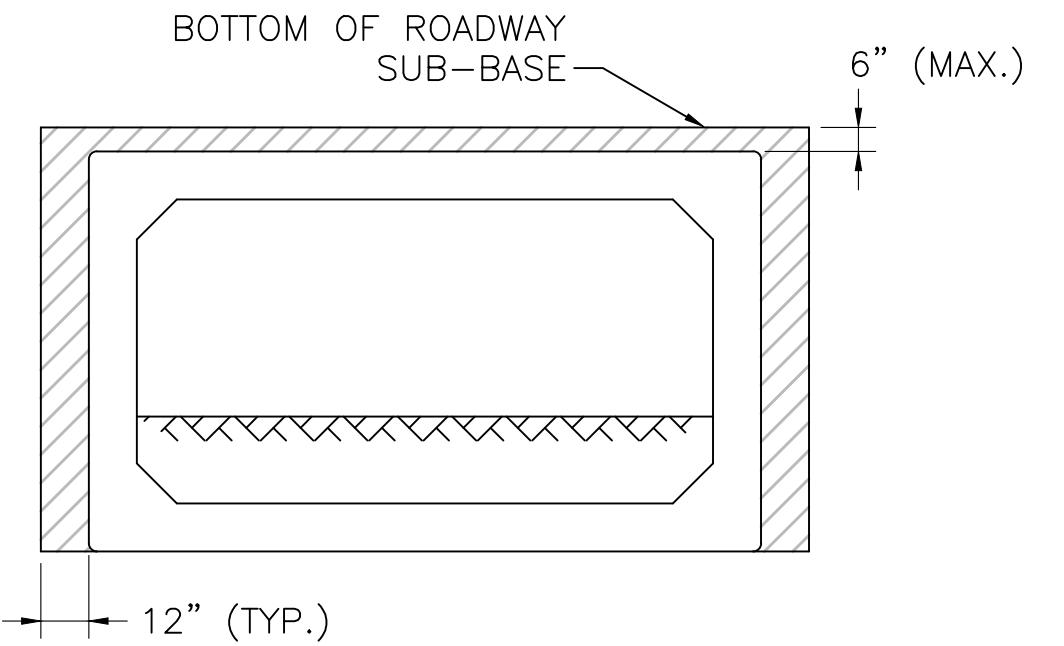
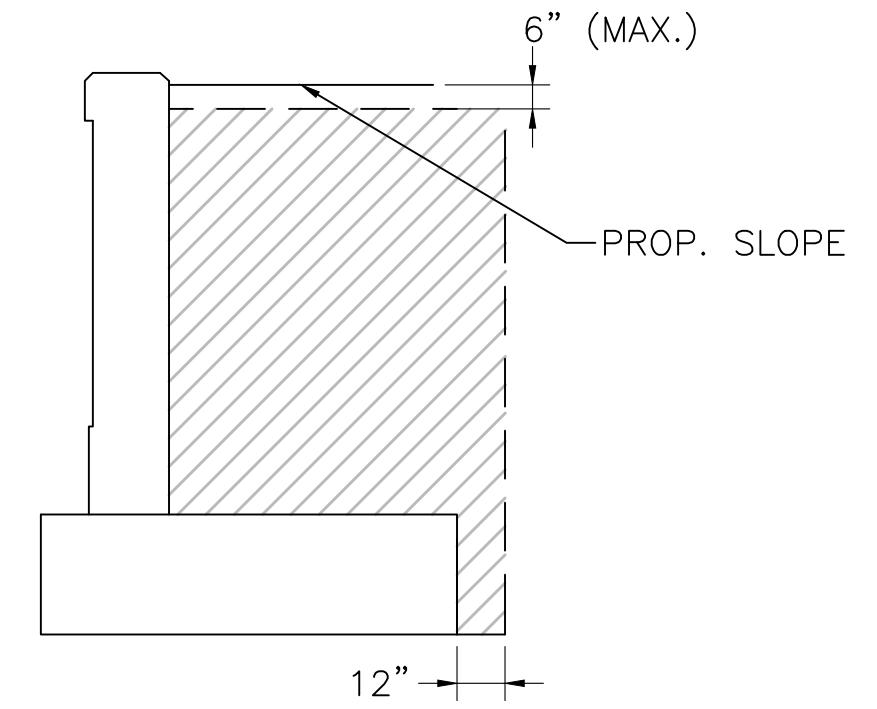
SCALE:  $\frac{1}{4}$ " = 1'-0"

**STREAMBED RESTORATION/CREATION NOTES:**

1. EXISTING STREAMBED MATERIAL THAT IS EXCAVATED SHALL BE STOCKPILED ONSITE TO BE RE-USED WHEN RESTORING/CREATING STREAMBED FOLLOWING INSTALLATION OF THE NEW CULVERT.
2. IF THERE IS INSUFFICIENT STOCKPILED STREAMBED MATERIAL FROM EXCAVATION ACTIVITIES, A SIMULATED STREAMBED MATERIAL SHALL BE USED. STONE GRADATION WILL APPROXIMATE THE FOLLOWING SIZE DISTRIBUTION; AMOUNTS FINER THAN EACH LABORATORY SIEVE (SQUARE OPENINGS) (PERCENT BY WEIGHT):

SIZE	MATERIAL	PERCENTAGE
0.01"	SAND	5
0.07"	COARSE SAND	10
1 $\frac{1}{2}$ "-2"	BANK RUN GRAVEL	25
2"-4"	SMALL COBBLE	50
4"-8"	MEDIUM COBBLE	10

3. SIMULATED STREAMBED MATERIAL SHALL CONSIST OF FIELD STONE OR NATURAL RIVER ROCK. CRUSHED STONE FROM A QUARRY OR OTHER SOURCES WILL NOT BE PERMITTED.



**NOTES:**

1. HATCHED AREAS INDICATE THE LIMIT OF GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES.
2. THE BACKFILL PLACED AROUND THE STRUCTURE SHALL BE DEPOSITED ON BOTH SIDES TO APPROXIMATELY THE SAME ELEVATION AT THE SAME TIME.

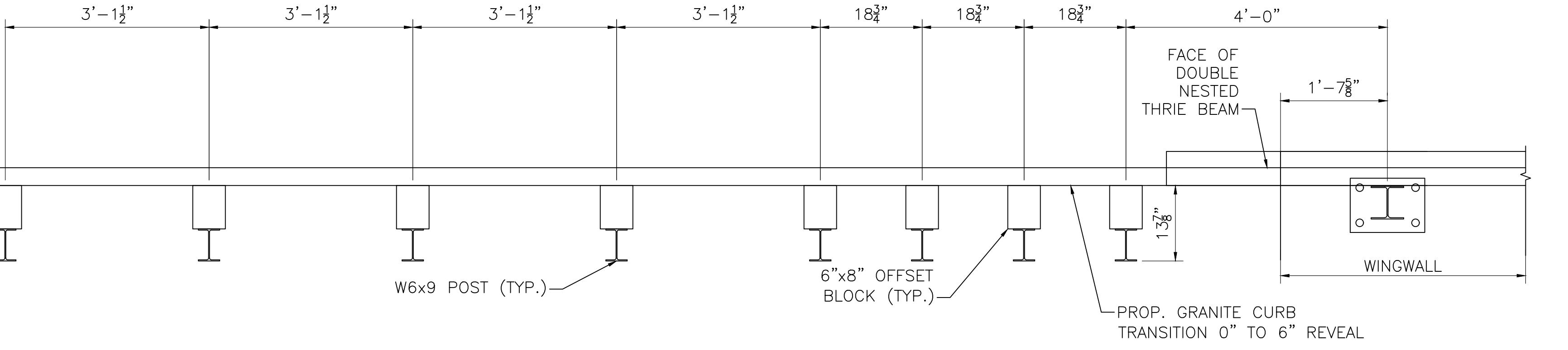
**LIMITS OF GRAVEL BORROW FOR  
BACKFILLING STRUCTURES AND PIPES**

SCALE:  $\frac{1}{4}$ " = 1'-0"

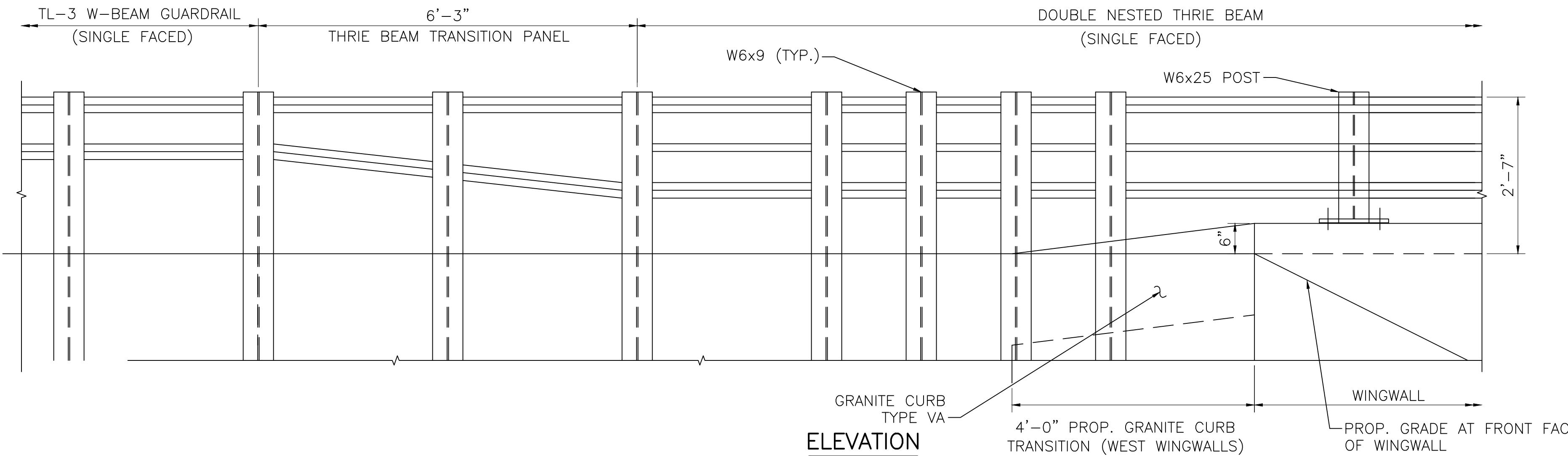
WESTFORD  
ACTON ROAD OVER UNNAMED STREAM

STATE MA	FED. AID PROJ. NO. N.A.	HEET NO. 11	TOTAL SHEETS 16
PROJECT FILE NO. T1463			

STRUCTURAL DETAILS (4 OF 4)



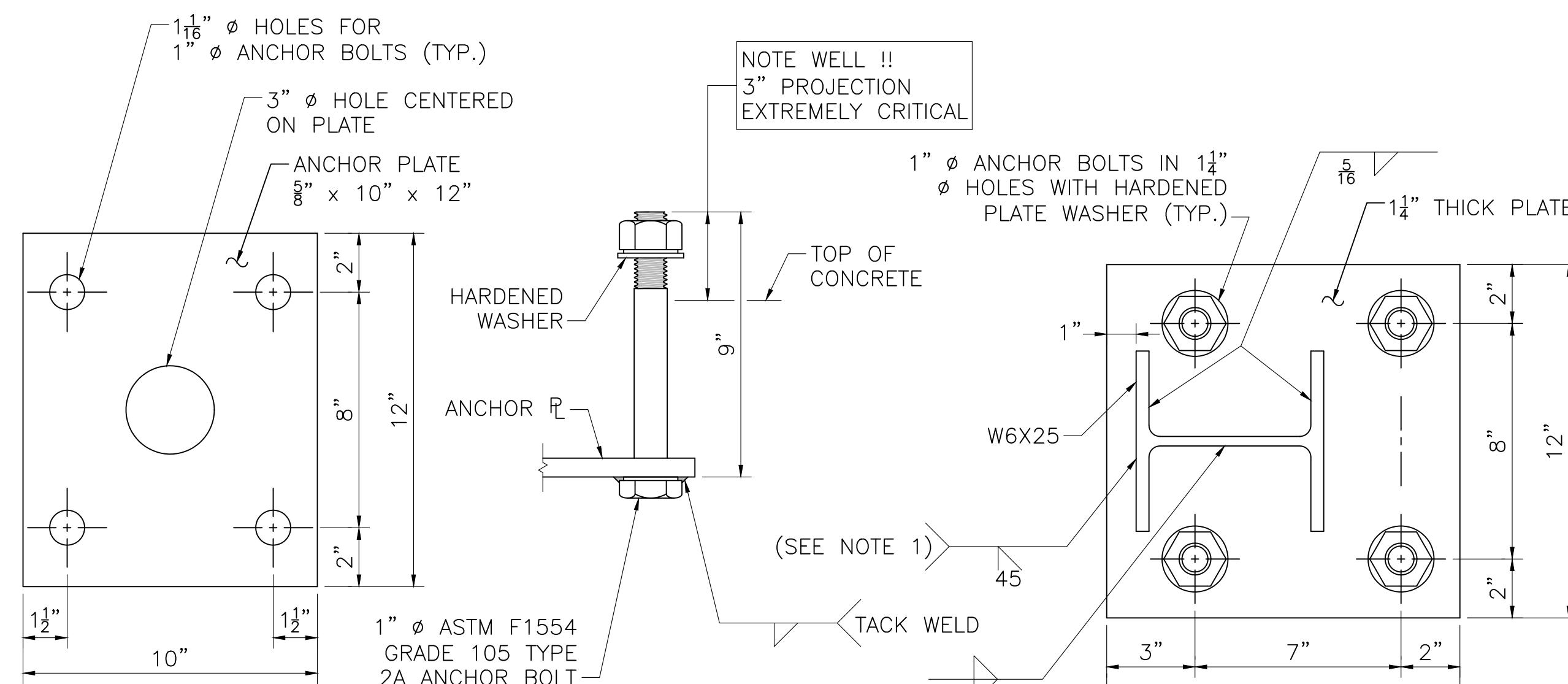
PLAN



ELEVATION

GUARDRAIL TRANSITION DETAIL

SCALE:  $\frac{3}{4}$ " = 1'-0"



ANCHOR PLATE  
SCALE: 3" = 1'-0"

ANCHOR BOLT  
SCALE: 3" = 1'-0"

BASE PLATE  
SCALE: 3" = 1'-0"

NOTE:

1. POST TO FLANGE WELD DOES NOT REQUIRE MAGNETIC PARTICLE TESTING. BEVEL OUTSIDE FLANGES OF POST. FIT POST TO BASE PLATE. WELD  $\frac{5}{16}$ " FILLET ON INSIDE OF FLANGE AND WEB. BACKGOUGE OUTSIDE OF FLANGE TO SOUND METAL. COMPLETE GROOVE WELD WITH MINIMUM OF  $\frac{1}{8}$ " REINFORCEMENT. WELD IS THE SAME ON BOTH FLANGES.

THRIE BEAM NOTES:

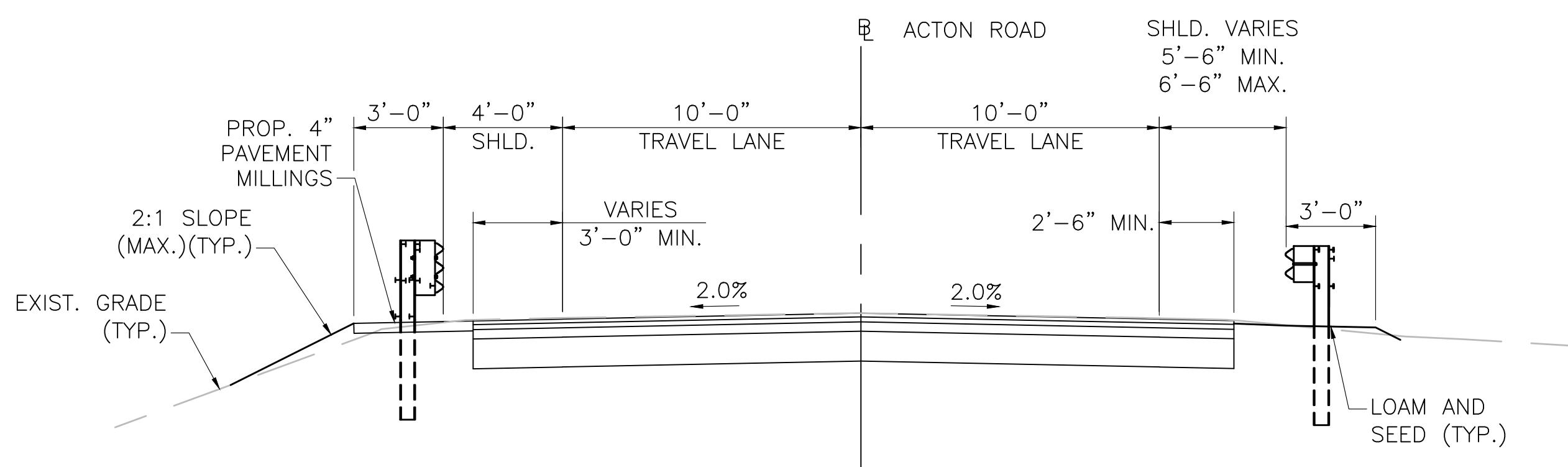
1. ALL STEEL CONNECTING BOLTS AND FASTENERS FOR POSTS SHALL CONFORM TO ASTM A325 TYPE III. ANCHOR BOLTS SHALL CONFORM TO ASTM F1554, GRADE 105.
2. RAIL POSTS AND ANCHOR PLATES SHALL BE SEATED ON MOLDED FABRIC BEARING PADS OR HALF PADS MAY BE USED IN SHIMMING FOR ALIGNMENT.
3. RAIL POSTS SHALL BE SET PERPENDICULAR TO ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION, EXCEPT THAT THE RAIL POSTS SHALL BE ALIGNED BY THE USE OF SHIMS SO THAT IN THE FINAL ADJUSTMENT NO PART SHALL DEVIATE MORE THAN ONE HALF INCH FROM TRUE HORIZONTAL ALIGNMENT. THE SHIMS SHALL BE  $3'' \times \frac{1}{2}''$  AND PLACED BETWEEN THE POST AND THE THRIE BEAM RAIL. THE THICKNESS OF THE SHIMS SHALL BE DETERMINED BY THE CONTRACTOR AND SHOWN IN THE SHOP DRAWINGS FOR APPROVAL BY THE ENGINEER BEFORE ORDERING MATERIAL FOR THIS WORK.
4. MINIMUM LENGTH OF THE THRIE BEAM SECTIONS IS EQUAL TO TWO POST SPACES.
5. THRIE BEAM GUARDRAIL STEEL SHALL BE GALVANIZED AND CONFORM TO THE AASHTO M180, CLASS B, TYPE IV AND SHALL BE 10 GAGE THICK. USE OF 12 GAGE THICK THRIE BEAM IS EXPRESSLY FORBIDDEN.
6. POSTS, HAND RAIL STEEL, ANCHOR PLATES AND BASE PLATES SHALL BE FABRICATED FROM STEEL CONFORMING TO AASHTO M270 GRADE 50 STEEL. ALL STEEL TO BE GALVANIZED.
7. SPECIAL DRILLING OF THE THRIE BEAM MAY BE REQUIRED AT THE SPLICES. ALL DRILLING DETAILS ARE TO BE SHOWN ON THE SHOP DRAWINGS.
8. PLACE A REFLECTORIZED DELINEATOR IN THE UPPER VALLEY OF THRIE BEAM EVERY THIRD POST.
9. DETAILS ARE SHOWN FOR THE STEEL THRIE BEAM HIGHWAY GUARD TO BE INSTALLED ALONG THE HEADWALL AND WINGWALLS.

WESTFORD  
ACTON ROAD OVER UNNAMED STREAM

STATE	FED. AID PROJ. NO.	SCHEET NO.	TOTAL SHEETS
MA	N.A.	12	16

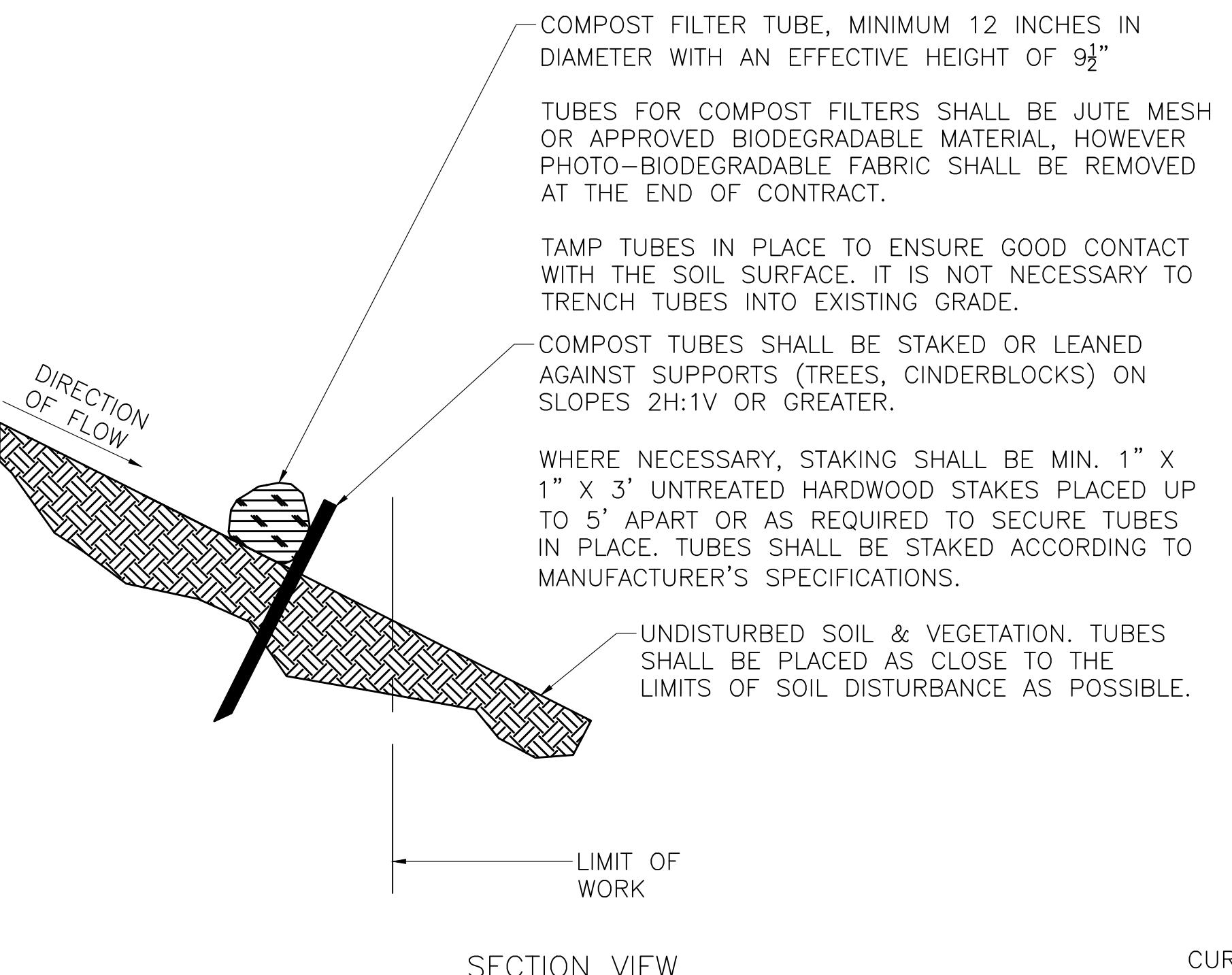
PROJECT FILE NO. T1463

MISCELLANEOUS DETAILS



TYPICAL APPROACH SECTION

SCALE:  $\frac{1}{4}$ " = 1'-0"



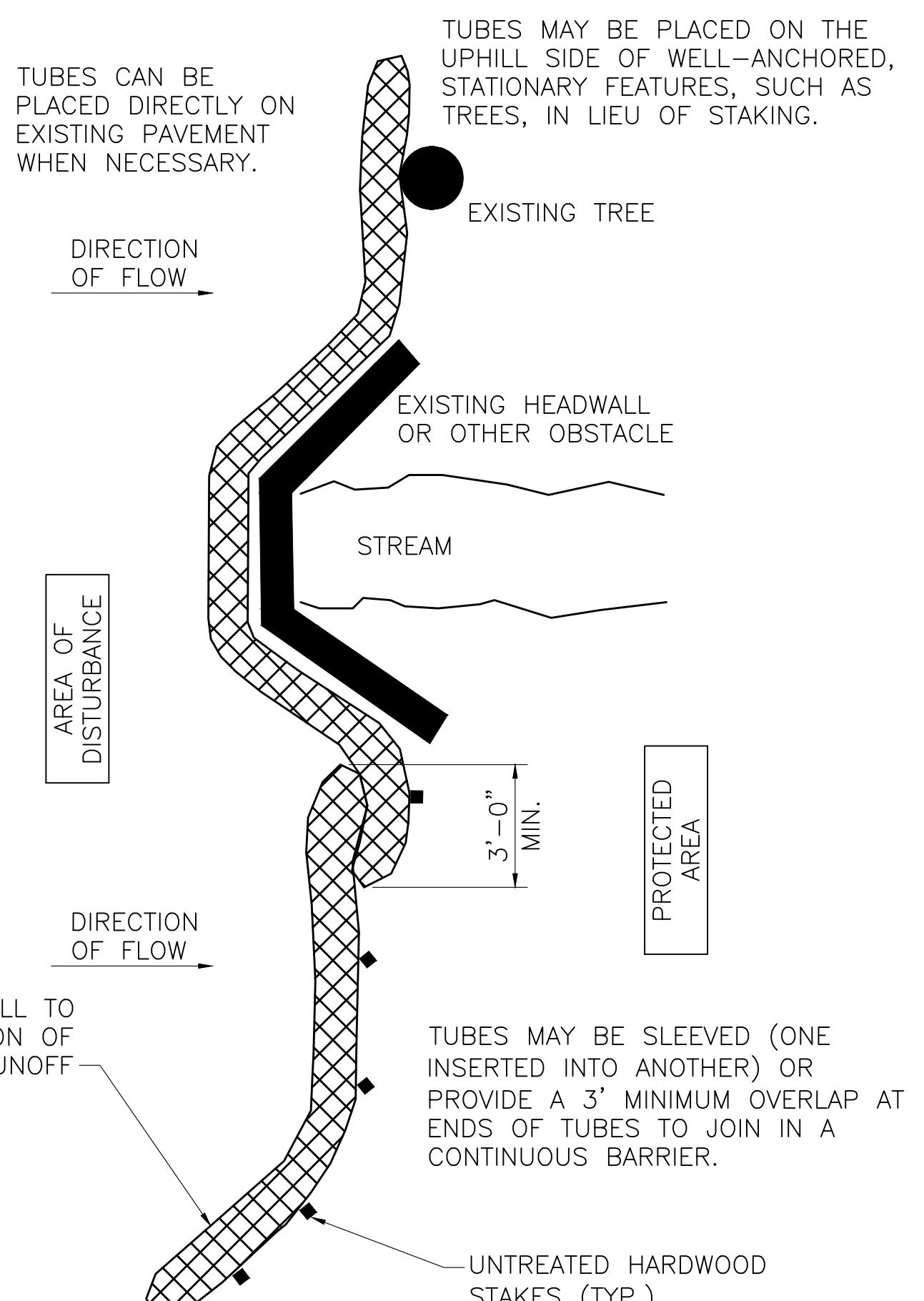
NOTES:

1. PROVIDE A MINIMUM TUBE DIAMETER OF 12" FOR SLOPES UP TO 50 FEET IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES MAY REQUIRE LARGER TUBE DIAMETERS OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO FLOW.
3. TUBE LOCATION MAY BE SHIFTED TO ADJUST TO LANDSCAPE FEATURES, BUT SHALL PROTECT UNDISTURBED AREAS AND VEGETATION TO THE MAXIMUM EXTENT POSSIBLE.
4. DO NOT INSTALL IN PERENNIAL, Ephemeral, OR INTERMITTENT STREAMS.
5. ADDITIONAL TUBES AND STAKING SHALL BE USED AT THE DIRECTION OF THE ENGINEER.

COMPOST FILTER TUBE

NOT TO SCALE

PLAN VIEW



PAVEMENT NOTES:

PROPOSED FULL DEPTH RECONSTRUCTION:

LIMITS: STA 10+95 TO STA 11+20  
STA 11+32 TO STA 11+55

SURFACE: 1 1/2" SUPERPAVE BRIDGE SURFACE COURSE 12.5 (SSC-B-12.5) OVER 2" SUPERPAVE INTERMEDIATE COURSE 12.5 (SIC-12.5) OVER 4" SUPERPAVE BASE COURSE 37.5 (SBC-37.5) OVER

SUBBASE: 12" GRAVEL BORROW, TYPE B OVER GRAVEL BORROW OR EXISTING MATERIAL MEETING TYPE B SPECIFICATIONS

PROPOSED FULL DEPTH RECONSTRUCTION (OVER CULVERT):

LIMITS: STA 11+20 TO STA 11+32

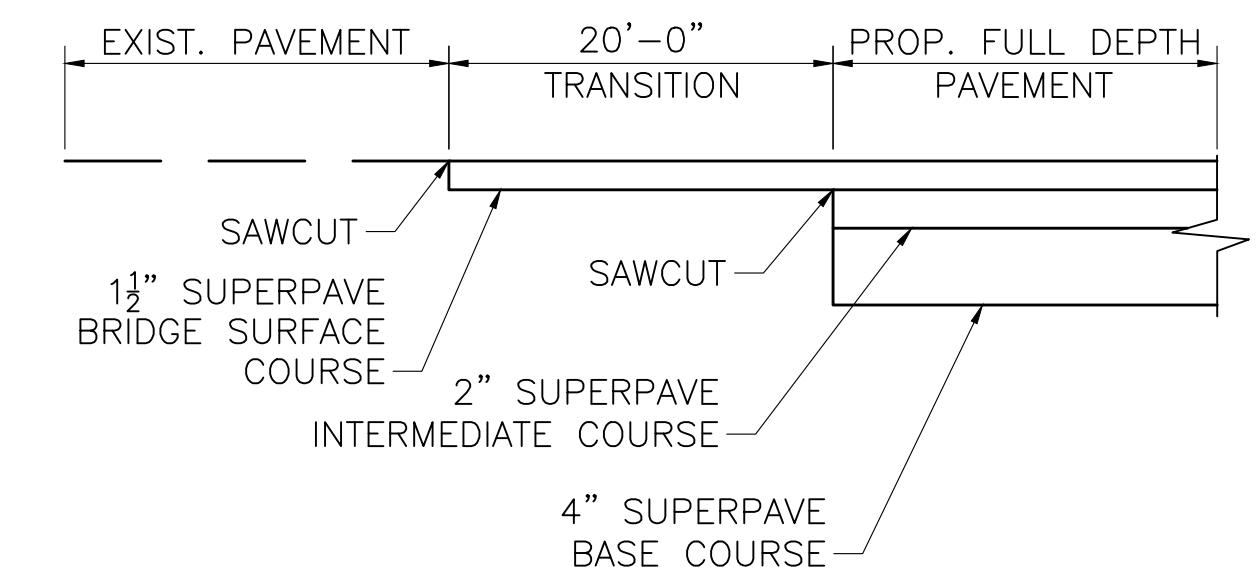
SURFACE: 1 1/2" SUPERPAVE BRIDGE SURFACE COURSE 12.5 (SSC-B-12.5) OVER VARIABLE THICKNESS SUPERPAVE BRIDGE PROTECTIVE COURSE

\*MINIMUM TOTAL PAVEMENT THICKNESS ON CULVERT SHALL BE 3" TOTAL\*

PROPOSED PAVEMENT MILLING TRANSITION:

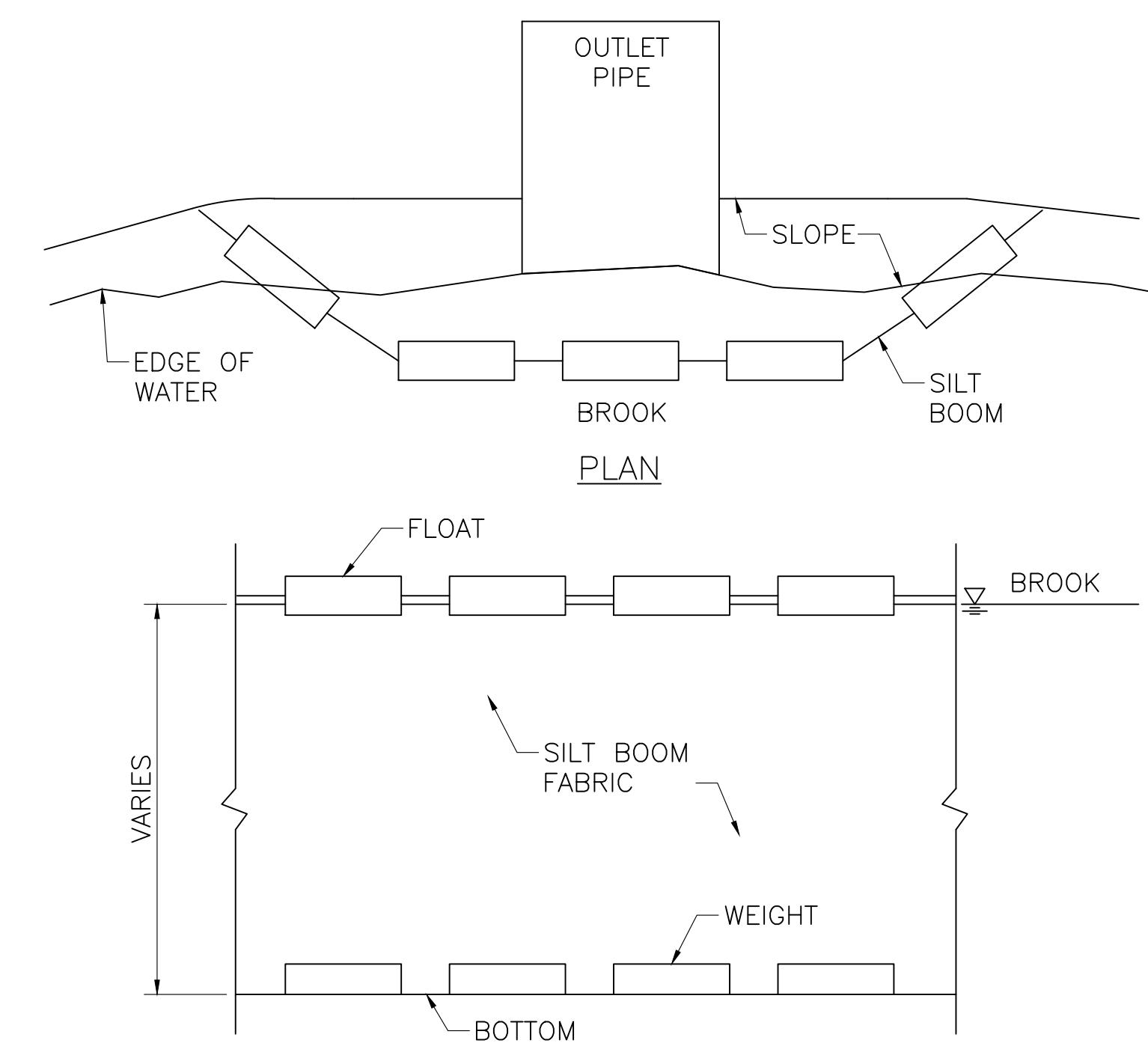
LIMITS: STA 10+75 TO STA 10+95  
STA 11+55 TO STA 11+75

SURFACE: 1 1/2" SUPERPAVE BRIDGE SURFACE COURSE 9.5 (SSC-B-9.5)



FULL DEPTH PAVEMENT TRANSITION

NOT TO SCALE

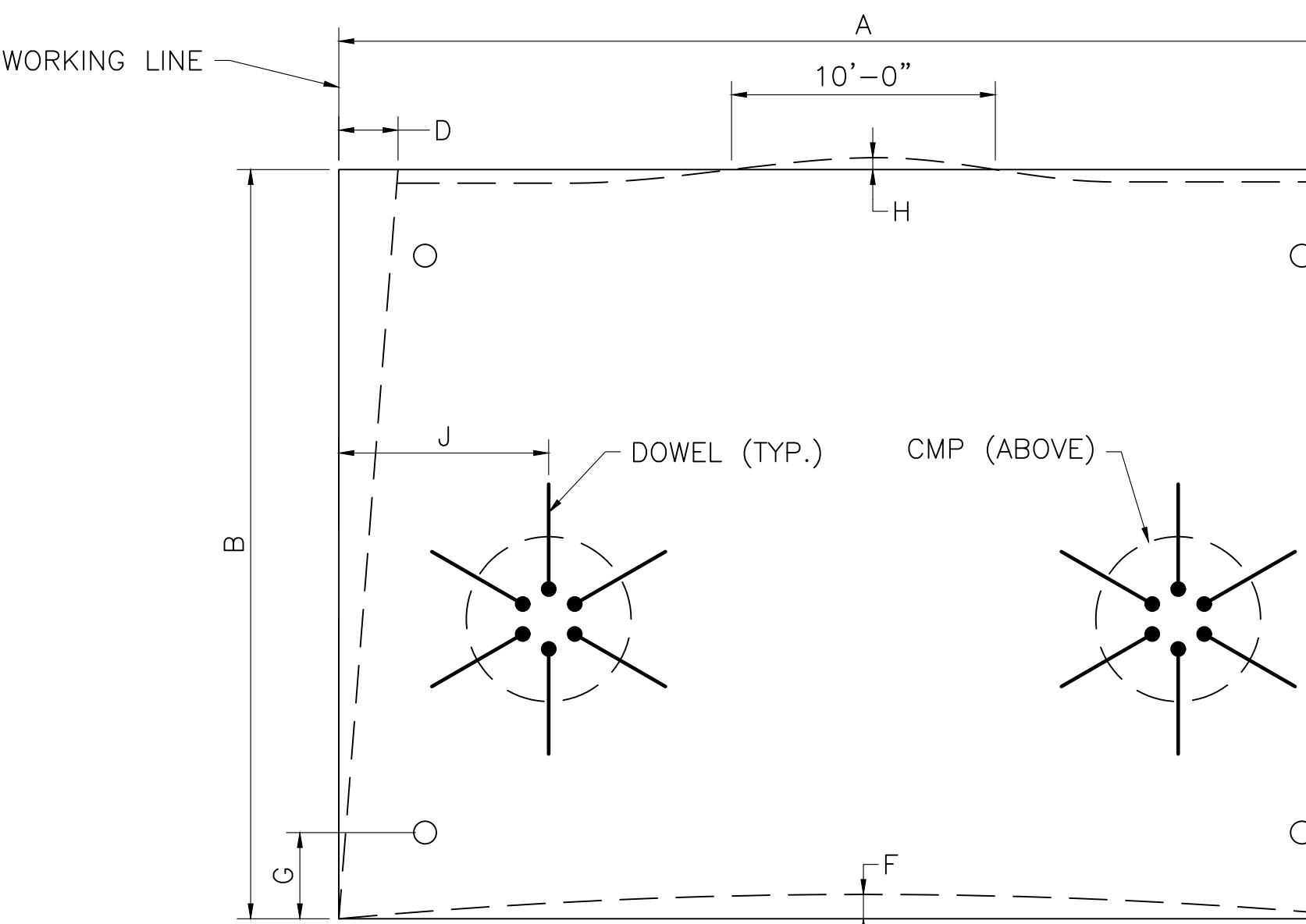


FLOATING SILT FENCE

NOT TO SCALE

**WESTFORD  
ACTON ROAD OVER UNAMED STREAM**

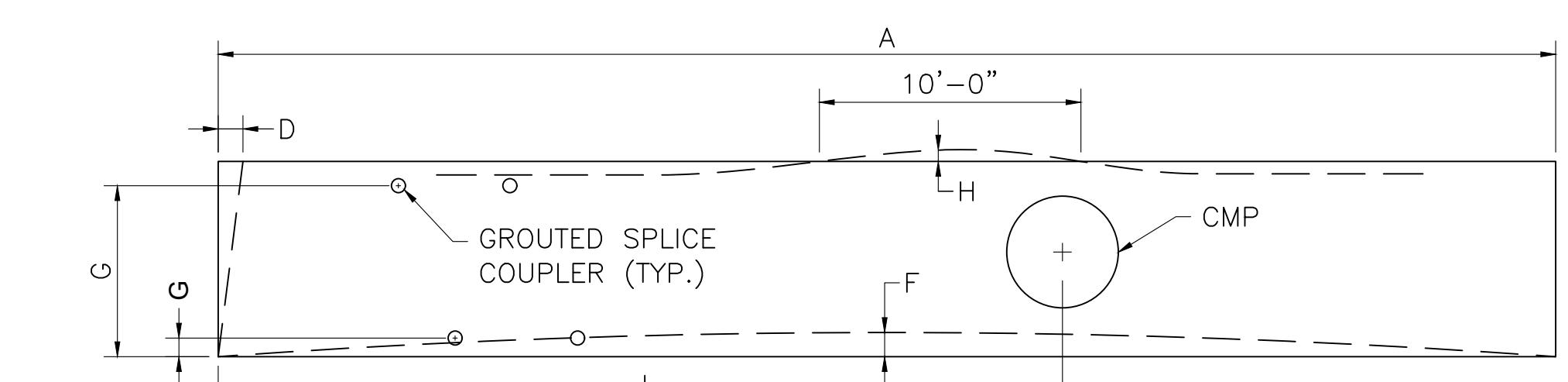
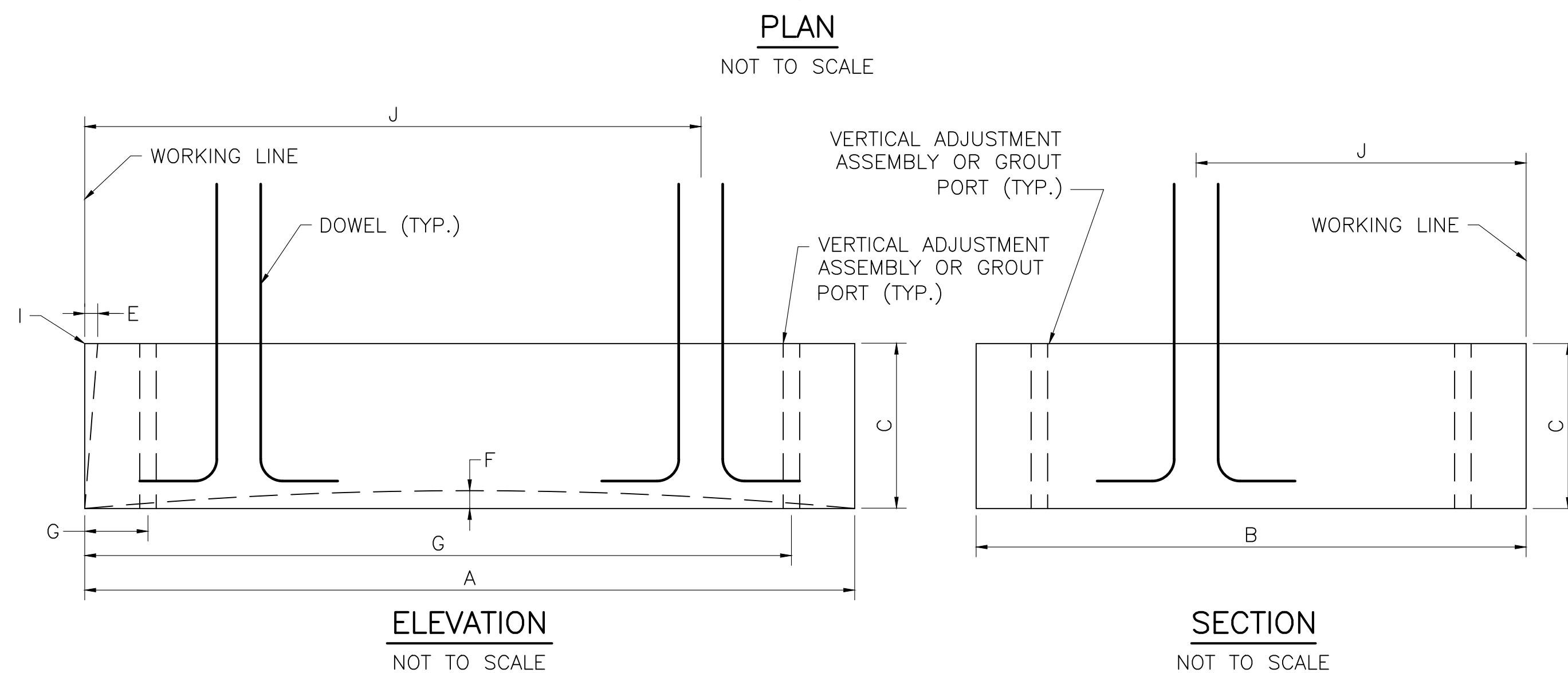
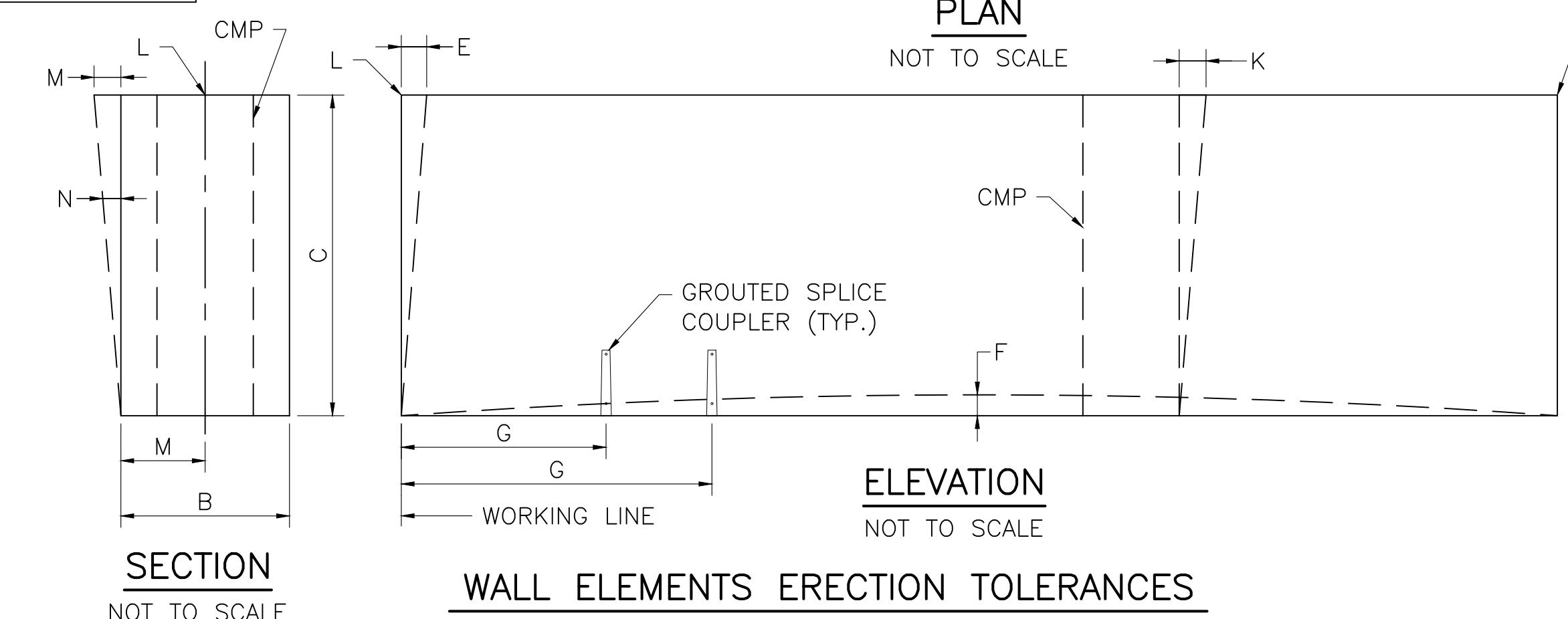
STATE MA	FED. AID PROJ. NO. N.A.	sheet no. 13	total sheets 16
PROJECT FILE NO. T1463			

**PREFABRICATION TOLERANCES****FOOTING FABRICATION TOLERANCES**

A	LENGTH (OVERALL)	$\pm\frac{1}{2}$ "
B	WIDTH (OVERALL)	$\pm\frac{1}{4}$ "
C	DEPTH (OVERALL)	$\pm\frac{1}{4}$ "
D	VARIATION FROM SPECIFIED PLAN END SQUARENESS OR SKEW	$\pm\frac{1}{8}$ " PER 12" WIDTH $\pm\frac{1}{2}$ " MAXIMUM
E	VARIATION FROM SPECIFIED ELEVATION END SQUARENESS OR SKEW	$\pm\frac{1}{8}$ " PER 12" WIDTH $\pm\frac{1}{2}$ " MAXIMUM
F	SWEEP OVER MEMBER LENGTH	$\pm\frac{1}{2}$ "
G	LOCATION OF LEVELING DEVICE OR GROUT PORT MEASURED FROM A WORKING LINE	$\pm 2$ "
H	LOCAL SMOOTHNESS OF ANY SURFACE	$\pm\frac{1}{8}$ " IN 10 FEET
J	LOCATION OF PROJECTING DOWELS MEASURED FROM A WORKING LINE	$\pm 1$ "

**FOOTING ERECTION TOLERANCES**

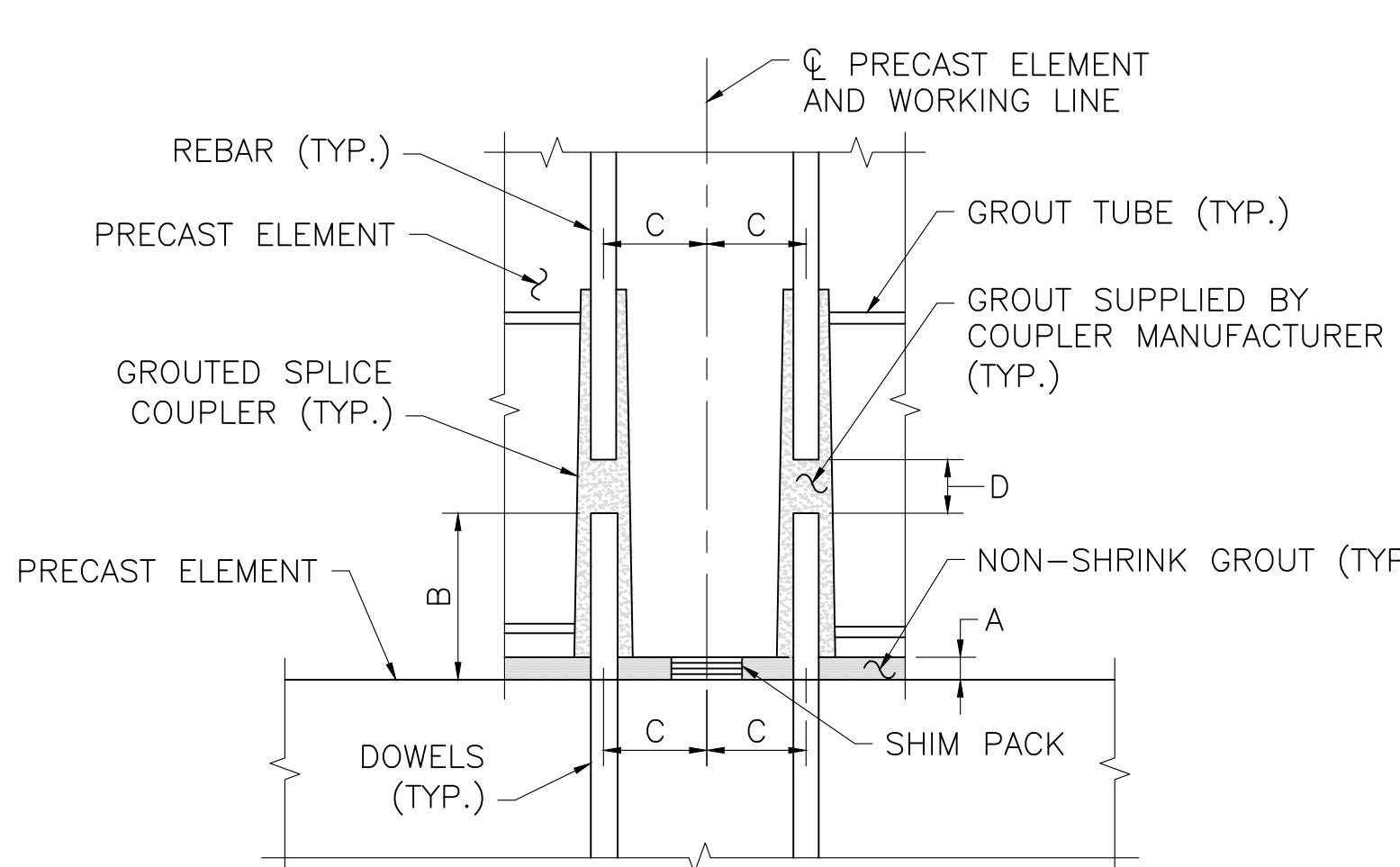
I	ERECTION ELEVATION TOLERANCE	$\pm\frac{1}{4}$ "
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**PLAN****ELEVATION****SECTION****WALL ELEMENTS ERECTION TOLERANCES**

L	ACTUAL ELEVATION FROM SPECIFIED ELEVATION MAXIMUM LOW	$\frac{1}{2}$ "
M	MAXIMUM PLUMB VARIATION OVER HEIGHT OF PANEL	$\frac{1}{2}$ "
N	PLUMB IN ANY 10 FEET OF PANEL HEIGHT	$\frac{1}{4}$ "

**WALL ELEMENTS FABRICATION TOLERANCES**

A	LENGTH (OVERALL)	$\pm\frac{1}{4}$ "
B	WIDTH (OVERALL)	$\pm\frac{1}{4}$ "
C	DEPTH (OVERALL)	$\pm\frac{1}{4}$ "
D	VARIATION FROM SPECIFIED PLAN END SQUARENESS OR SKEW	$\pm\frac{1}{8}$ " PER 12 INCH WIDTH $\pm\frac{1}{2}$ " MAXIMUM
E	VARIATION FROM SPECIFIED ELEVATION END SQUARENESS OR SKEW	$\pm\frac{1}{8}$ " PER 12 INCH WIDTH $\pm\frac{1}{2}$ " MAXIMUM
F	SWEEP OVER MEMBER LENGTH	$\pm\frac{3}{8}$ "
G	LOCATION OF GROUTED SPLICE COUPLER MEASURED FROM A WORKING LINE	$\pm\frac{1}{4}$ "
H	LOCAL SMOOTHNESS OF ANY SURFACE	$\pm\frac{1}{8}$ " IN 10 FEET
J	LOCATION OF BLOCKOUT FOR PILES OR VOIDS	$\pm 1$ "
K	MAXIMUM PLUMB VARIATION OVER HEIGHT OF CMP VOID	$\pm\frac{1}{2}$ "

**NOTES:**

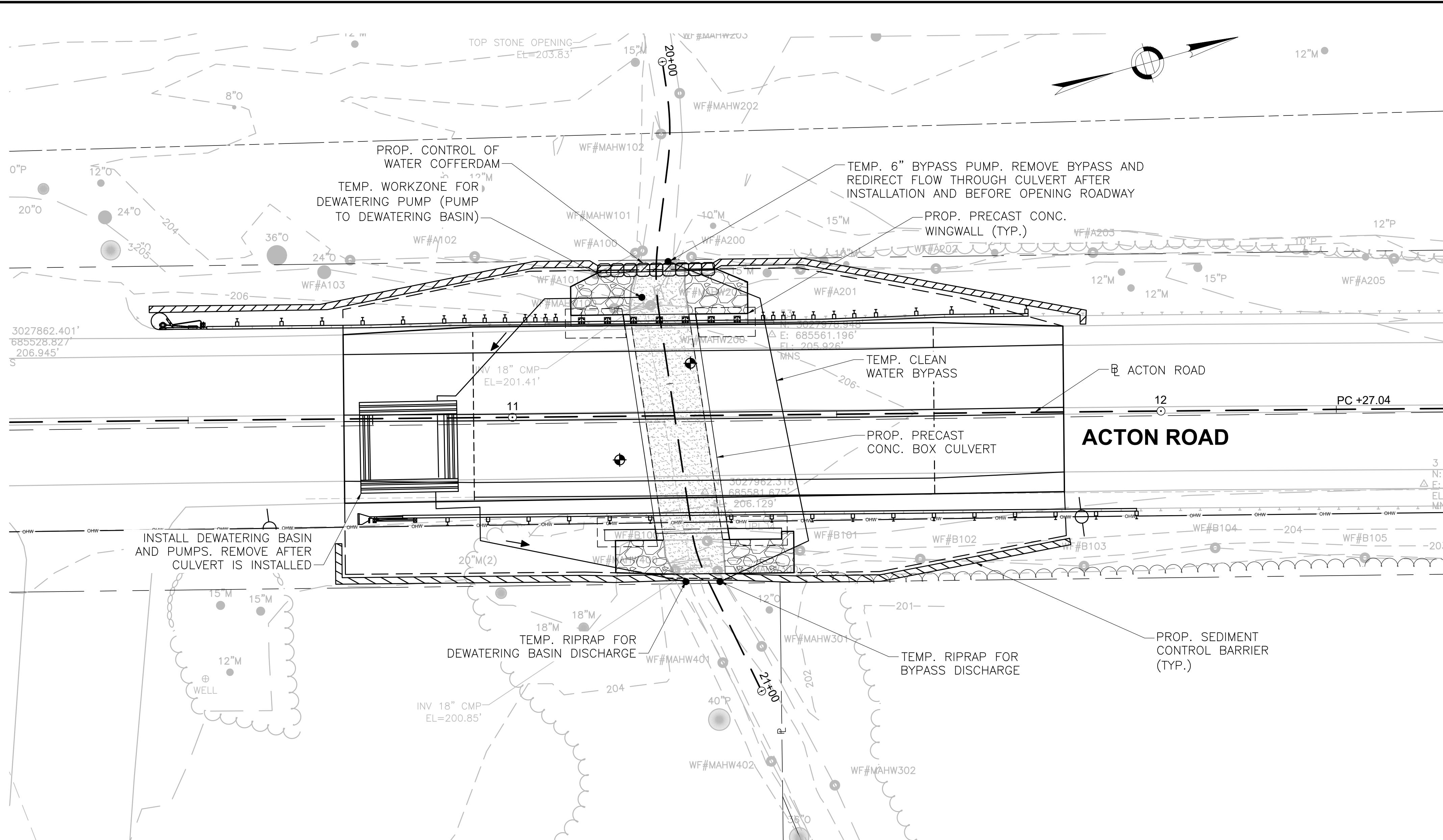
1. USE MATCHING TEMPLATES FOR THE LOCATION OF REINFORCEMENT AND GROUTED SPLICE COUPLER PLACEMENT WITHIN THE ELEMENTS TO CONTROL THE CRITICAL DIMENSION "C".
2. CONSULT MANUFACTURER OF THE GROUTED SPLICE COUPLER FOR PROPER DIMENSIONS "B" AND "D" AND FOR TOLERANCES ON THESE AND ALL DIMENSIONS.
3. BEFORE EXECUTING GROUTED SPLICE COUPLER ASSEMBLIES, ALWAYS SEEK INSTALLATION RECOMMENDATIONS FROM THE MANUFACTURER OF THE GROUTED SPLICE COUPLER USED.

**GROUTED SPLICE COUPLER DETAILS**

NOT TO SCALE

**GROUTED SPLICE COUPLER INSTALLATION TOLERANCES**

A	SHIM PACK HEIGHT	$1\frac{1}{4}$ " $\pm\frac{5}{8}$ "
B	DOWEL HEIGHT	CONSULT MANUFACTURER
C	LOCATION OF REINFORCING, GROUTED SPLICE COUPLER, AND DOWELS MEASURED FROM A WORKING LINE	$\pm\frac{1}{4}$ "
D	GAP BETWEEN DOWELS AND REINFORCING	CONSULT MANUFACTURER



WESTFORD ACTON ROAD OVER UNNAMED STREAM		
STATE	FED. AID PROJ. NO.	HEET NO. / TOTAL SHEETS
MA	N.A.	14 / 16
PROJECT FILE NO. T1463		

#### CONTROL OF WATER

#### CONTROL OF WATER NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE CONTROL OF WATER (C.O.W.) SYSTEM AND SHALL SUBMIT A C.O.W. PLAN TO THE ENGINEER FOR APPROVAL. THE C.O.W. SYSTEM SHOWN IS CONCEPTUAL ONLY. THE C.O.W. SYSTEM SHALL BE DESIGNED TO WITHSTAND A 2-YEAR STORM EVENT (NAVD).
2. ACTON ROAD SHALL BE CLOSED TO VEHICULAR AND PEDESTRIAN TRAFFIC AT THE CULVERT CROSSING PRIOR TO BEGINNING EXCAVATION. DETOUR SIGNAGE WILL BE INSTALLED IN ACCORDANCE WITH THE MUTCD AND THE TEMPORARY TRAFFIC CONTROL PLANS INCLUDED IN THESE CONSTRUCTION DRAWINGS.
3. C.O.W. SYSTEM SHALL BE INSPECTED DAILY FOR WATER LEAKS OR EROSION AND REPAIRS PROCEDURES SHALL BE IMPLEMENTED ACCORDINGLY.
4. THE CONSTRUCTION SEQUENCE WITH REGARDS TO THE C.O.W. SYSTEM SHALL BE AS FOLLOWS:
  - 4.1. CLOSE THE ROADWAY TO VEHICULAR AND PEDESTRIAN TRAFFIC AT THE CULVERT CROSSING.
  - 4.2. INSTALL EROSION CONTROLS: TEMPORARY EROSION CONTROL AROUND PROJECT LIMITS TO PROTECT THE BROOK FROM WORK ZONE SEDIMENT; FLOATING SILT FENCE IN THE DOWNSTREAM OF THE PROJECT LIMITS TO TRAP ANY FLOATING DEBRIS/SILT THAT MAY ENTER THE BROOK.
  - 4.3. INSTALL C.O.W. COFFERDAMS, BYPASS PUMP & PIPE, DEWATERING PUMPS, AND DEWATERING BASIN.
  - 4.4. PLACE TEMPORARY RIPRAP AT OUTLET FOR BYPASS DISCHARGE.
  - 4.5. DEWATER THE WORK AREA PRIOR TO (AND THROUGHOUT) EXCAVATION TO FACILITATE INSTALLING THE CULVERT, AND WINGWALLS IN THE DRY CONDITION. ALL DEWATERING FLOW SHALL PASS THROUGH THE DEWATERING BASIN TO REMOVE SEDIMENT PRIOR TO DEPOSITING BACK INTO THE BROOK.
  - 4.6. INSTALL THE PRECAST BOX CULVERT AND WINGWALLS. RESTORE THE STREAMBED IN ACCORDANCE WITH THESE PLANS. INSTALL RIPRAP EMBANKMENT AND LOAM AND SEED WITH EROSION CONTROL BLANKET IN FRONT OF THE WINGWALLS.
  - 4.7. REDIRECT BROOK FLOW THROUGH THE CULVERT.
  - 4.8. REMOVE THE C.O.W. COFFERDAMS BYPASS PUMP & PIPE AND TEMPORARY DEWATERING BASIN.

#### SANDBAG PREPARATION:

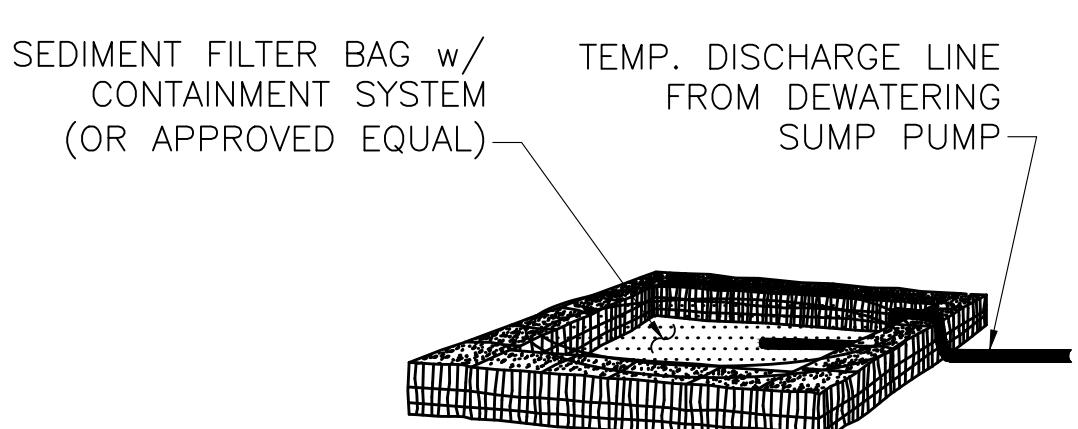
1. UTILIZE 36" X 36" X 36" POLYPROPYLENE BAGS.
2. A HEAVY BODIED OR SANDY SOIL IS MOST DESIRABLE FOR FILLING SANDBAGS. ON-SITE SOURCES MAY BE UTILIZED, AS APPROPRIATE WITH THE APPROVAL OF THE ENGINEER.
3. BAGS SHOULD BE FILLED BETWEEN ONE-THIRD TO ONE-HALF OF THEIR CAPACITY TO PREVENT THE BAG FROM BEING TOO HEAVY AND PERMITS THE BAGS TO BE STACKED WITH A GOOD SEAL.

#### SANDBAG PLACEMENT:

1. REMOVE ANY DEBRIS FROM THE AREA WHERE THE BAGS ARE TO BE PLACED.
2. FOLD THE OPEN END OF THE UNFILLED PORTION OF THE SANDBAG TO FORM A TRIANGLE.
3. PLACE THE PARTIALLY FILLED BAGS LENGTHWISE AND PARALLEL TO THE DIRECTION OF FLOW WITH THE OPEN END FACING AGAINST THE WATER FLOW.
4. TUCK THE FLAPS UNDER, KEEPING THE UNFILLED PORTION UNDER THE WEIGHT OF THE SACK.
5. STAGGER THE JOINT CONNECTIONS WHEN MULTIPLE LAYERS ARE NECESSARY USING THE PYRAMID PLACEMENT METHOD.
6. ALL SANDBAG BERMS SHALL BE A MINIMUM OF 3-FEET HIGH, UNLESS NOTED OTHERWISE.
7. PLACE POLYETHYLENE LINER ALONG WATER SIDE OF COFFERDAM AND TUCK LINER INTO TOP COURSING OF SANDBAGS AS SHOWN ON THE DETAIL ON THIS PLAN. STABILIZE LINE WITH WOODEN STAKE AND ADDITIONAL SANDBAG IN STREAM.

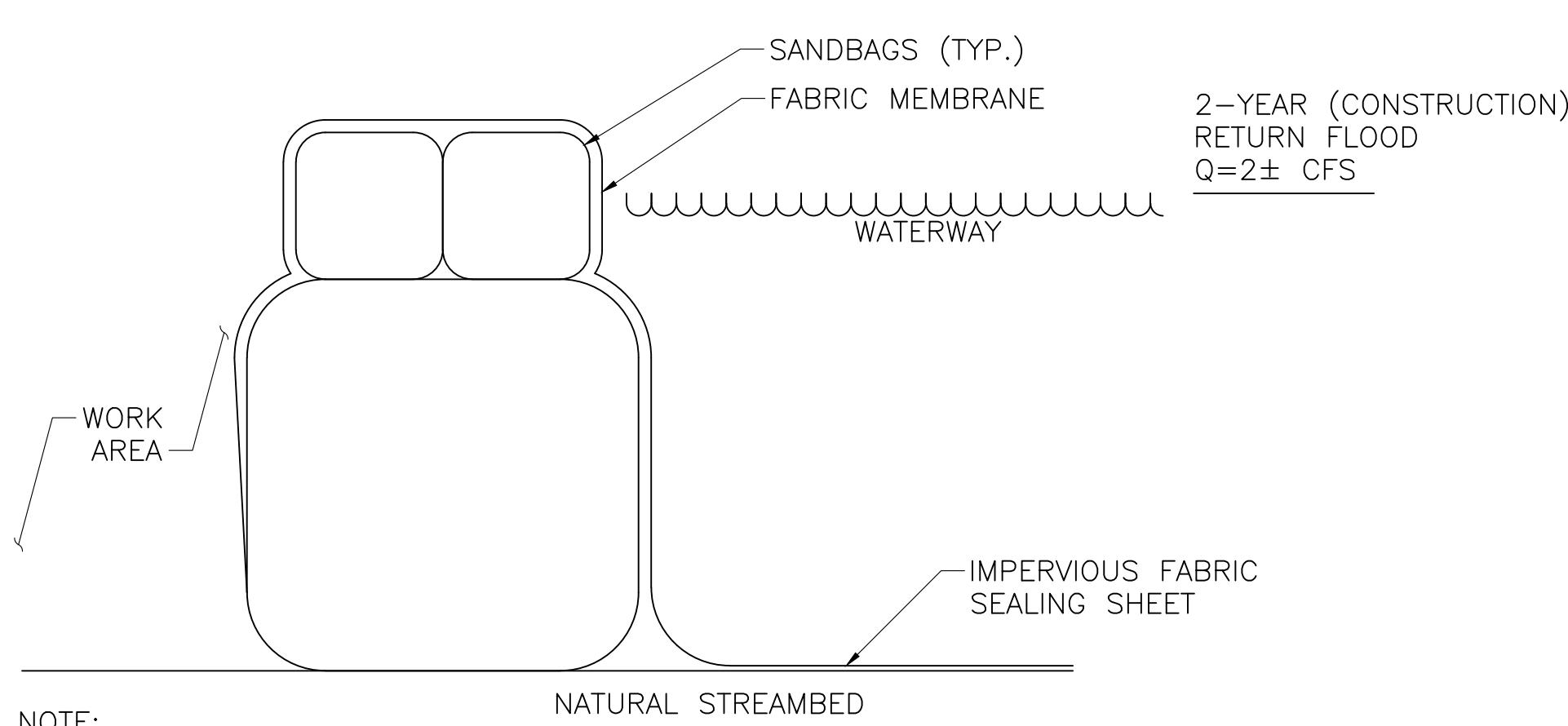
#### RESOURCE AREA RESTORATION/CREATION:

1. IMPACTED RESOURCE AREAS (BANK, LAND UNDER WATER, BORDERING VEGETATED WETLAND) SHALL BE RESTORED AT THE END OF CONSTRUCTION TO PRE-CONSTRUCTION CONDITION. NATURALLY EXCAVATED MATERIAL OR A SIMULATED MATERIAL SHALL BE USED FOR CONSTRUCTION/RESTORATION.
2. RESTORATION/CREATION SHALL INCLUDE PLANTING OF NATIVE SPECIES TO THE SITE AS DEFINED IN THE WETLAND CHARACTERIZATION REPORT FOR THE PROJECT. SPECIES INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING: HIGHBUSH BLUEBERRY, BLACK ELDERBERRY, FOX SEDGE, WOOD FERN, AND MEADOW-RUE.



NOTE:  
DISCHARGE TO DEWATERING BASIN SHOWN IS CONCEPTUAL ONLY AND IS TO BE  
DESIGNED BY THE CONTRACTOR. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS  
TO ENGINEER FOR APPROVAL.

DEWATERING BASIN  
NOT TO SCALE



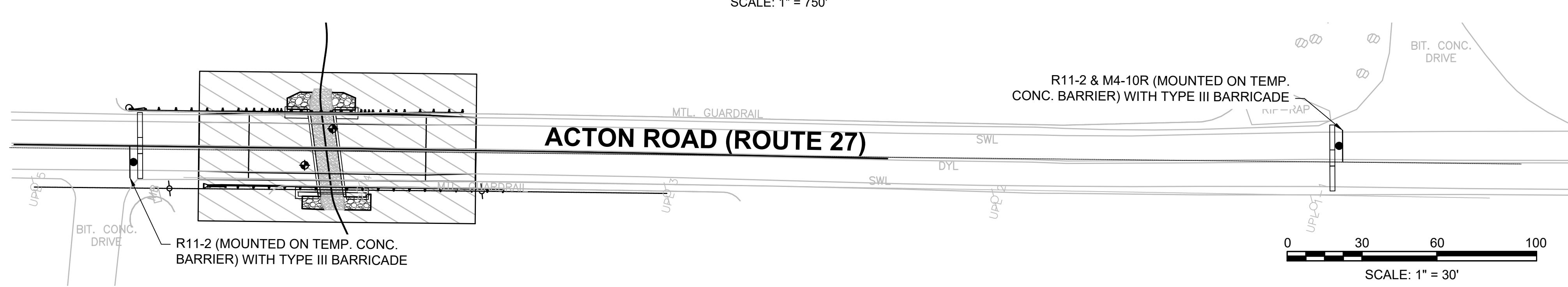
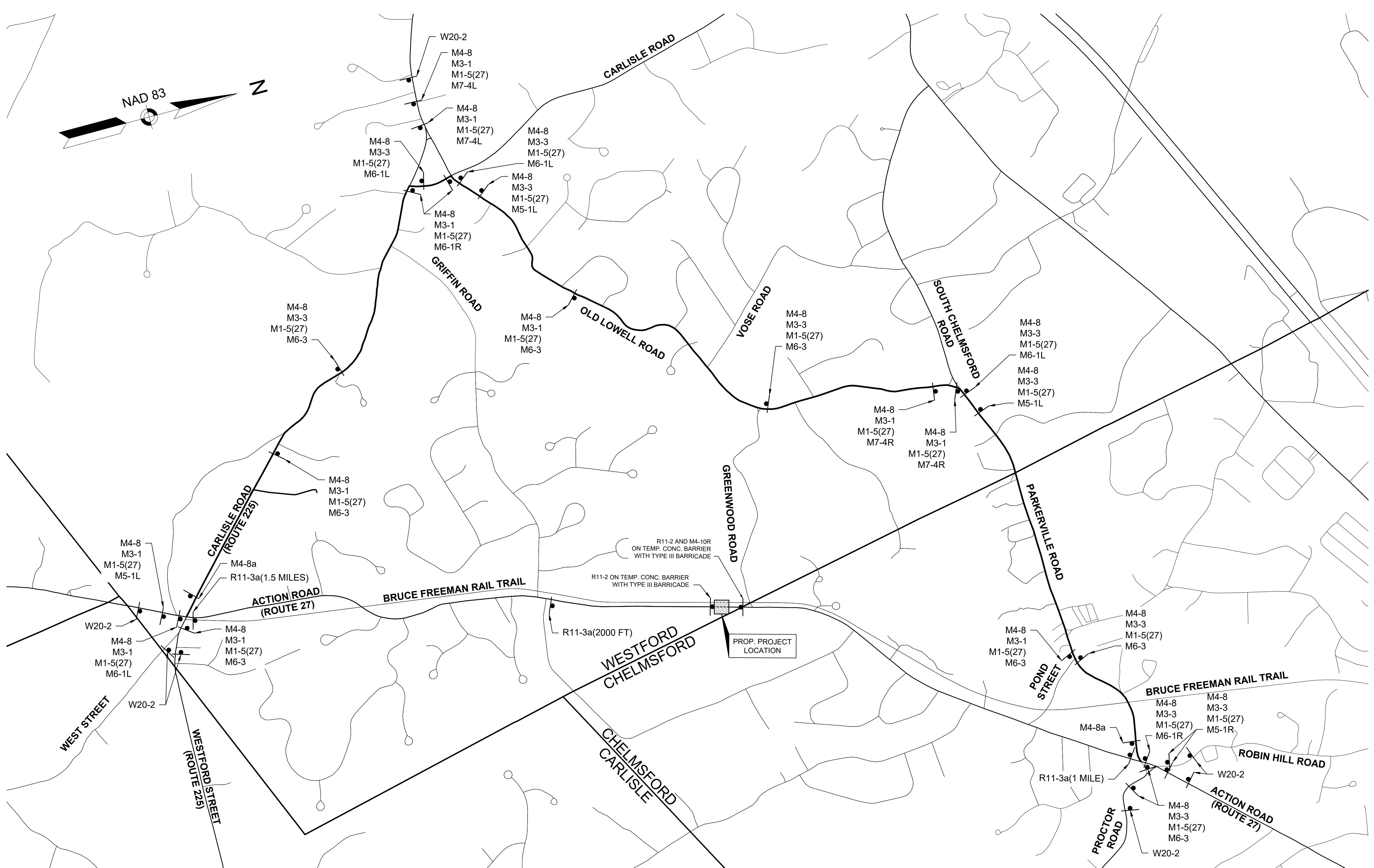
TEMPORARY COFFERDAM SECTION  
NOT TO SCALE

**WESTFORD  
ACTON ROAD OVER UNNAMED STREAM**

STATE MA	FED. AID PROJ. NO. N.A.	HEET NO. 15	TOTAL SHEETS 16
PROJECT FILE NO. T1463			

**DETOUR PLAN (1 OF 2)**

11463.DETOUR PLAN.DWG  
Plotted on 12-Jan-2025 1:50 PM



**GENERAL NOTES:**

1. ALL DETOURS ARE ESTABLISHED FOR 24-HOURS A DAY. TEMPORARY CONSTRUCTION SIGNING, BARRICADES, AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
2. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM WITH THE 2023 MANUAL ON UNIFORM TRAFFIC CONTROL (M.U.T.C.D.) AND ALL REVISIONS, UNLESS SUPERCEDED BY THESE PLANS.
3. ALL SIGN LEGENDS, BORDERS, AND MOUNTING SHALL BE IN ACCORDANCE WITH THE M.U.T.C.D.
4. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
5. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES" AND/OR "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH).
6. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
7. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS AT THE DISCRETION OF THE ENGINEER.
8. ADDITIONAL SIGNS CAN BE ADDED AS THE PROJECT PROGRESSES.
9. CONTRACTOR SHALL COORDINATE WITH THE TOWN AND INSTALL SIGNAGE SO THAT DETOUR TRAFFIC DOES NOT USE GREENWOOD ROAD WHICH IS RESTRICTED TO RESIDENTS LIVING ON GREENWOOD ROAD ONLY.

TEMPORARY TRAFFIC CONTROL LEGEND		
	WORK ZONE	
	SIGN	
	TEMPORARY CONCRETE BARRIER	

WESTFORD  
ACTON ROAD OVER UNNAMED STREAM

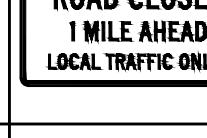
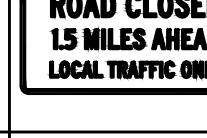
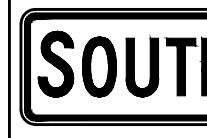
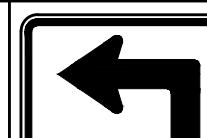
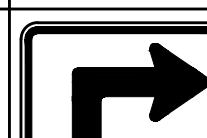
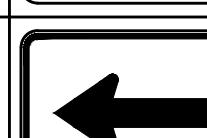
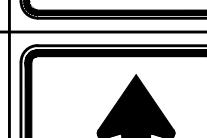
STATE	FED. AID PROJ. NO.	sheet no.	total sheets
MA	N.A.	16	16

PROJECT FILE NO. T1463

DETOUR PLAN (2 OF 2)

NOTE:

1. CONTRACTOR TO FURNISH SIGNS CONSISTENT WITH 2023 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS. SEE MANUAL FOR TEXT AND LEGEND DIMENSIONS.

TRAFFIC SIGN SUMMARY													
IDENTIFICATION NUMBER	SIZE OF SIGN (INCHES)		LEGEND	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			NUMBER OF SUPPORTS REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACKGROUND	LEGEND	BORDER			
R11-2	48	30		1			2	WHITE	BLACK	BLACK	0 ON TEMP. CONC. BARRIER	10.00	20.00
R11-3a(2000 FEET)	60	30					1	WHITE	BLACK	BLACK	1	12.50	12.50
R11-3a(1 MILE)	60	30					1	WHITE	BLACK	BLACK	1	12.50	12.50
R11-3a(1.5 MILES)	60	30					1	WHITE	BLACK	BLACK	1	12.50	12.50
W20-2	36	36					7	FL. ORANGE	BLACK	BLACK	7	9.00	63.00
M1-5	24	24					25	WHITE	BLACK	BLACK	0 25 W/ M4-8	4.00	100.00
M3-1	24	12					12	WHITE	BLACK	BLACK	0 12 W/ M4-8	2.00	24.00
M3-3	24	12					13	WHITE	BLACK	BLACK	0 13 W/ M4-8	2.00	26.00
M4-8	24	12					25	FL. ORANGE	BLACK	BLACK	25	2.00	50.00
M4-8a	24	18					2	FL. ORANGE	BLACK	BLACK	2	3.00	6.00
M4-10R	48	18					1	FL. ORANGE	BLACK	BLACK	0 ON TEMP. CONC. BARRIER	6.00	6.00
M5-1L	21	15					3	WHITE	BLACK	BLACK	0 3 W/ M4-8	2.19	6.56
M5-1R	21	15					2	WHITE	BLACK	BLACK	0 2 W/ M4-8	2.19	4.38
M6-1L	21	15					4	WHITE	BLACK	BLACK	0 4 W/ M4-8	2.19	8.75
M6-1R	21	15					3	WHITE	BLACK	BLACK	0 3 W/ M4-8	2.19	6.56
M6-3	21	15					9	WHITE	BLACK	BLACK	0 9 W/ M4-8	2.19	19.69
M7-4L	21	15					2	WHITE	BLACK	BLACK	0 2 W/ M4-8	2.19	4.38
M7-4R	21	15					2	WHITE	BLACK	BLACK	0 2 W/ M4-8	2.19	4.38

PORTABLE CHANGEABLE MESSAGE SIGNS TEXT

STARTING 14 DAYS PRIOR TO WORK

CULVERT  
WORK

STARTS  
XX-XX-XX

ROAD CLOSED  
AHEAD, SEEK  
ALTERNATE  
ROUTE

DURING DETOUR PHASE

1. ALL WORK ZONES FOR THE DETOUR PHASE ARE ESTABLISHED FOR 24-HOURS A DAY DURING THE DURATION OF THE STAGE. TEMPORARY CONSTRUCTION SIGNING, BARRICADES, AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
2. ALL DRUMS AND/OR CONES SHALL BE SET @ 20' O.C. MAX. UNLESS OTHERWISE NOTED OR ADJUSTED BY THE ENGINEER.
3. PORTABLE CHANGEABLE MESSAGE SIGN (PCMS) SHALL BE IN PLACE 14 DAYS PRIOR TO THE INITIATION OF WORK.
4. PCMS SHALL CONFORM TO THE 2009 MUTCD AS AMENDED AND SHOULD BE PLACED ON THE SHOULDER OF THE ROADWAY OR IF PRACTICAL SET WELL AWAY FROM THE TRAVEL LANE. MESSAGE SIGNS SHOULD BE PROTECTED WITH RETROREFLECTIVE TEMPORARY TRAFFIC CONTROL DEVICES WHEN PLACED WITHIN THE AVAILABLE CLEAR ZONE OR ELSE SHIELDED WITH A BARRIER OR CRASH CUSHION. THE LOCATION AND USE OF THE PCMS SHALL BE AS SHOWN ON THE ADVANCED SIGN SCHEMATICS ABOVE. ALTERNATIVE MESSAGES MAY BE DETERMINED BY THE ENGINEER IN THE FIELD.
5. REFER TO ADDITIONAL PROJECT WIDE GENERAL NOTES ON SHEET 15.