

# MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION

HARDWICK/NEW BRAINTREE  
CREAMERY ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	1	37
PROJECT FILE NO.		608851	

TITLE SHEET & INDEX

PLAN AND PROFILE OF  
CREAMERY ROAD BRIDGE REPLACEMENT OVER WARE RIVER  
(BRIDGE NO. H-08-003=N-07-002 (C7G))

IN THE CITY/TOWN OF

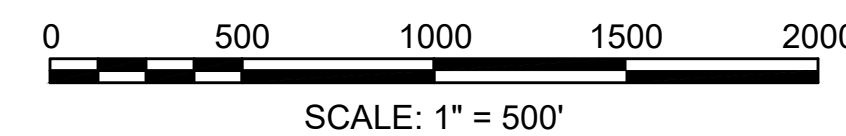
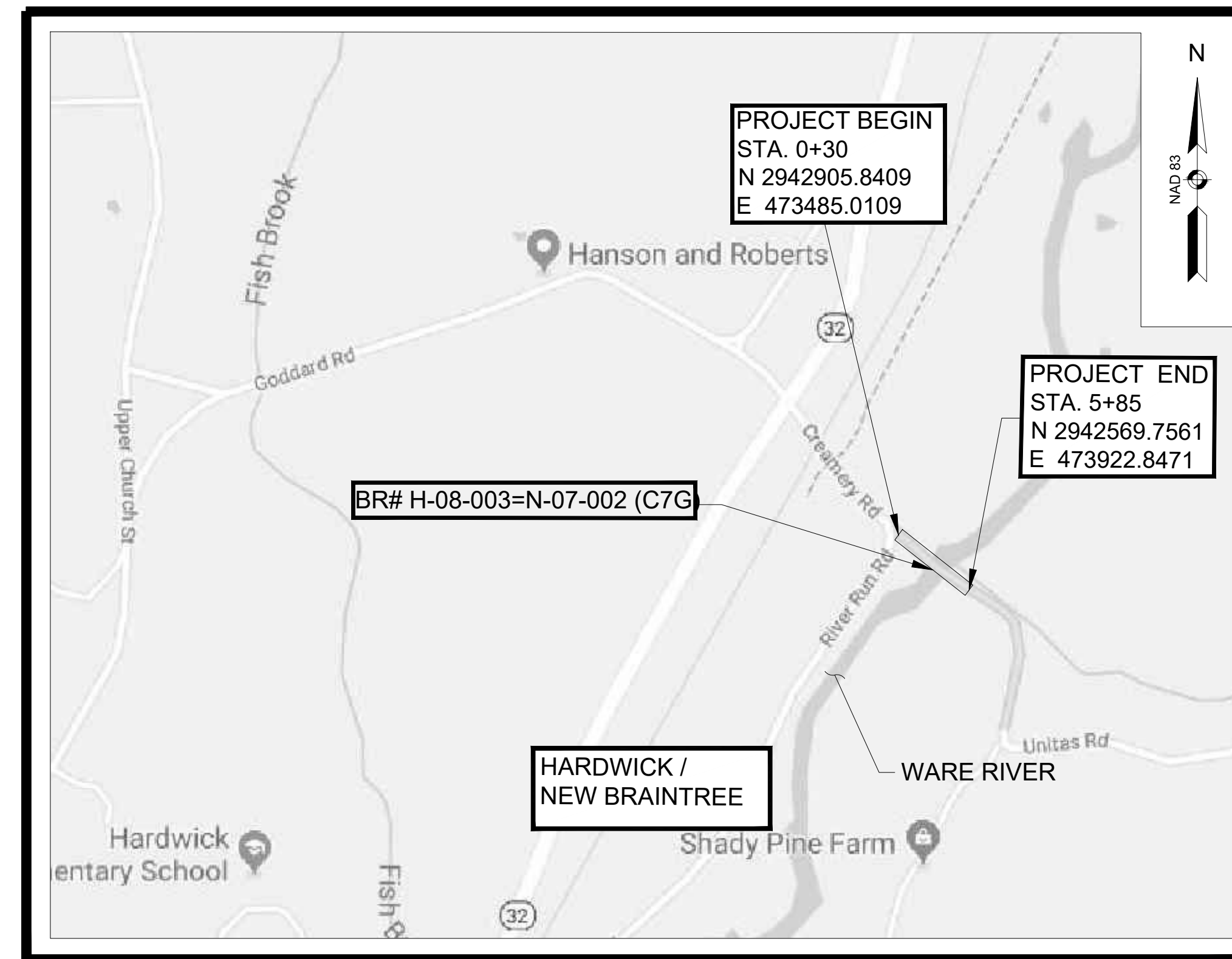
## HARDWICK/NEW BRAINTREE WORCESTER

FEDERAL AID PROJECT NO. BFS(BR-OFF)-003S(750)X

THESE PLANS ARE SUPPLEMENTED BY THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK.

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LENGTH OF PROJECT = 490.85 FEET = 0.09 MILES


### DESIGN DESIGNATION (CREAMERY ROAD)


DESIGN SPEED	25 MPH
ADT	109

DATE	DESCRIPTION	REV #



Charles Packer  
Professional Engineer





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APPROVED

Carrie Lavallee,  
P.E.

Digitally signed by Carrie Lavallee, P.E.  
Date: 2024.07.18 09:18:19 -0400

CHIEF ENGINEER

07/18/2024

DATE

**GENERAL SYMBOLS**

EXISTING	PROPOSED	DESCRIPTION
		JERSEY BARRIER
		CATCH BASIN
		CATCH BASIN CURB INLET
		FLAG POLE
		GAS PUMP
		MAIL BOX
		POST SQUARE
		POST CIRCULAR
		WELL
		ELECTRIC HANDHOLE
		FENCE GATE POST
		GAS GATE
		BORING HOLE
		MONITORING WELL
		TEST PIT
		HYDRANT
		LIGHT POLE
		COUNTY BOUND
		GPS POINT
		CABLE MANHOLE
		DRAINAGE MANHOLE
		ELECTRIC MANHOLE
		GAS MANHOLE
		MISC MANHOLE
		SEWER MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
		MASSACHUSETTS HIGHWAY BOUND
		MONUMENT
		STONE BOUND
		TOWN OR CITY BOUND
		TRAVERSE OR TRIANGULATION STATION
		TROLLEY POLE OR GUY POLE
		TRANSMISSION POLE
		UTILITY POLE W/ FIREBOX
		UTILITY POLE WITH DOUBLE LIGHT
		UTILITY POLE W / 1 LIGHT
		UTILITY POLE
		BUSH
		TREE
		STUMP
		SWAMP / MARSH
		WATER GATE
		PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING
		CONTOURS (ON-THE-GROUND SURVEY DATA)
		CONTOURS (PHOTOGRAMMETRIC DATA)
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
		GUARD RAIL - DOUBLE FACE - STEEL POSTS
		GUARD RAIL - DOUBLE FACE - WOOD POSTS
		CHAIN LINK OR METAL FENCE
		WOOD FENCE
		SEDIMENTATION FENCE
		TREE LINE
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE
		LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT

**TRAFFIC SYMBOLS**

EXISTING	PROPOSED	DESCRIPTION
		CONTROLLER PHASE ACTUATED
		TRAFFIC SIGNAL HEAD (SIZE AS NOTED)
		WIRE LOOP DETECTOR (6' x 6' TYP UNLESS OTHERWISE SPECIFIED)
		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

**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

**ABBREVIATIONS**

GENERAL	
AADT	ANNUAL AVERAGE DAILY TRAFFIC
ABAN	ABANDON
ADJ	ADJUST
APPROX.	APPROXIMATE
A.C.	ASPHALT CONCRETE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
BIT.	BITUMINOUS
BC	BOTTOM OF CURB
BD.	BOUND
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BR.	BRIDGE
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CC	CEMENT CONCRETE
CCM	CEMENT CONCRETE MASONRY
CEM	CEMENT
CI	CURB INLET
CIP	CAST IRON PIPE
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CSP	CORRUGATED STEEL PIPE
CO.	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DHV	DESIGN HOURLY VOLUME
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DW	STEADY DON'T WALK - PORTLAND ORANGE
DWY	DRIVEWAY
ELEV (or EL.)	ELEVATION
EMB	EMBANKMENT
EOP	EDGE OF PAVEMENT
EXIST (or EX)	EXISTING
EXC	EXCAVATION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN.	FOUNDATION
FLDSTN	FIELDSTONE
GAR	GARAGE
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
GRAN	GRANITE
GRAV	GRAVEL
GRD	GUARD
HDW	HEADWALL
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HYD	HYDRANT
INV	INVERT
JCT	JUNCTION
L	LENGTH OF CURVE
LB	LEACH BASIN
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MB	MAILBOX
MH	MANHOLE
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NIC	NOT IN CONTRACT
NO.	NUMBER
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PCR	PEDESTRIAN CURB RAMP
P.G.L.	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
POC	POINT ON CURVE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PROJ	PROJECT
PROP	PROPOSED
PSB	PLANTABLE SOIL BORROW
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT

**HARDWICK/NEW BRAINTREE CREAMERY ROAD**

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**LEGEND & ABBREVIATIONS**

**ABBREVIATIONS (cont.)**

GENERAL	
PWW	PAVED WATER WAY
R	RADIUS OF CURVATURE
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REM	REMOVE
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SHLD	SHOULDER
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
X-SECT	CROSS SECTION

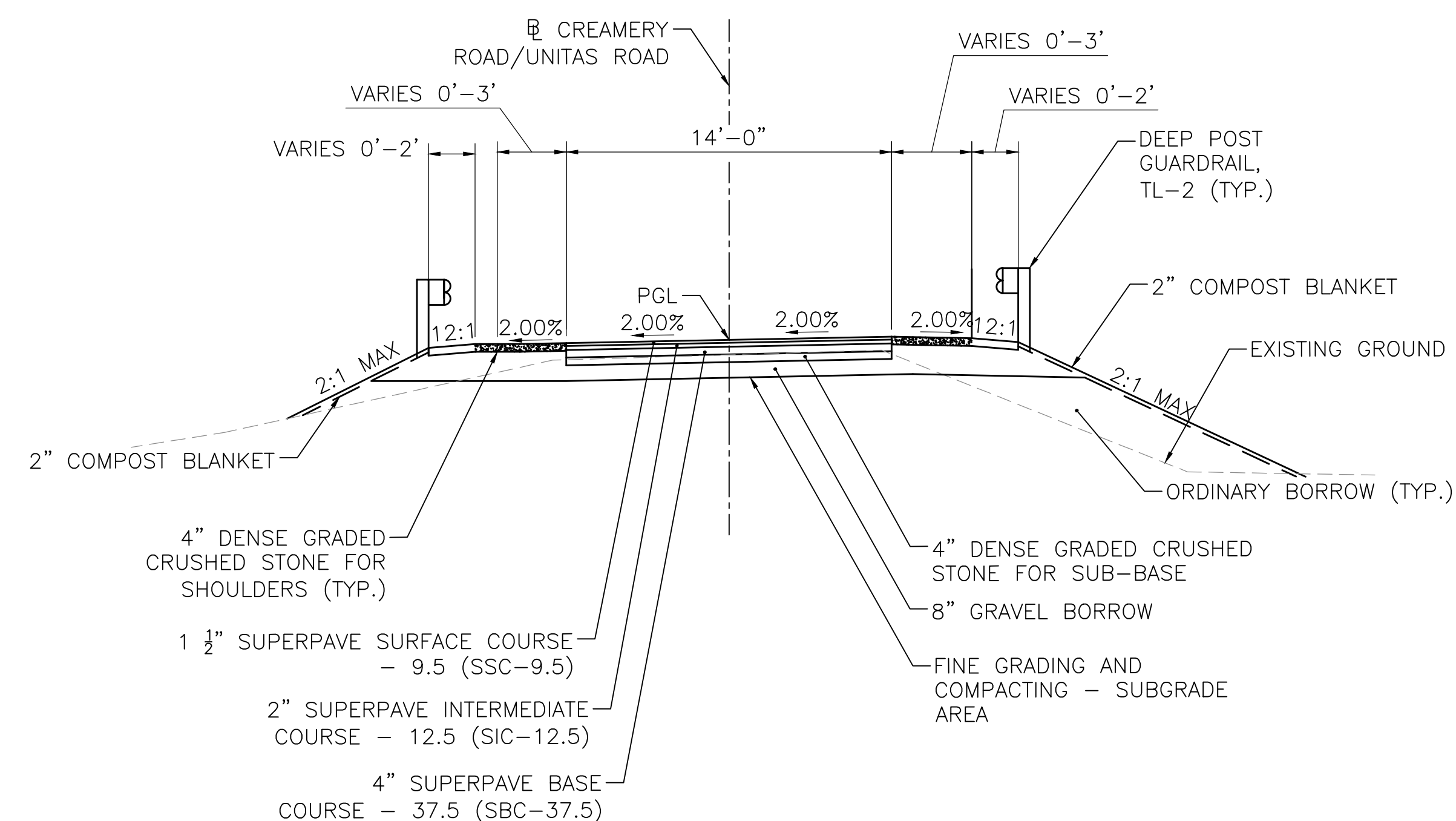
**TRAFFIC SIGNAL ABBREVIATIONS**

CAB	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY UPRAISED HAND
FDW	FLASHING UPRAISED HAND
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 WALKING PERSON
Y	STEADY CIRCULAR YELLOW
YL	STEADY YELLOW LEFT ARROW

**HARDWICK/NEW BRAINTREE  
CREAMERY ROAD**

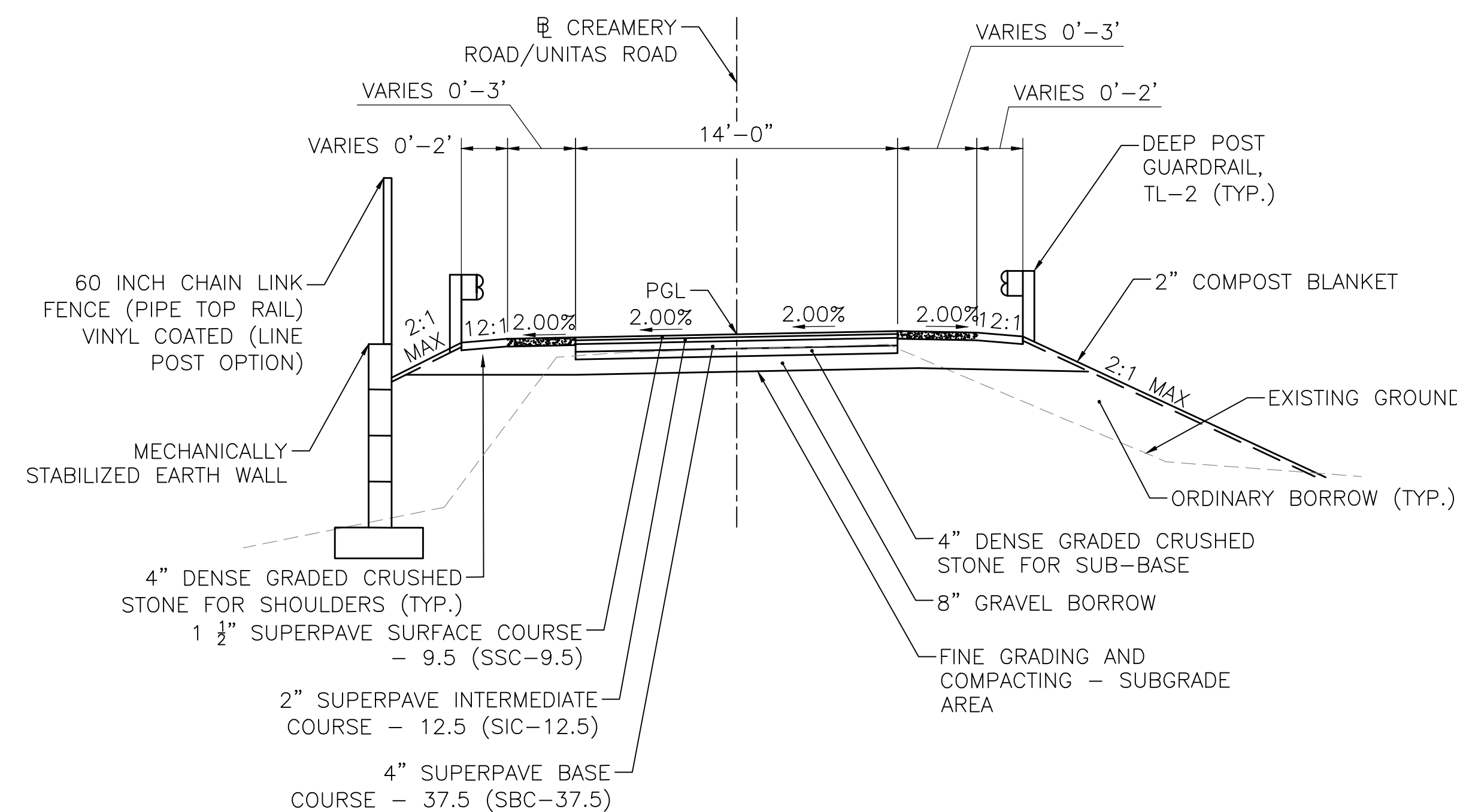
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**TYPICAL SECTION**



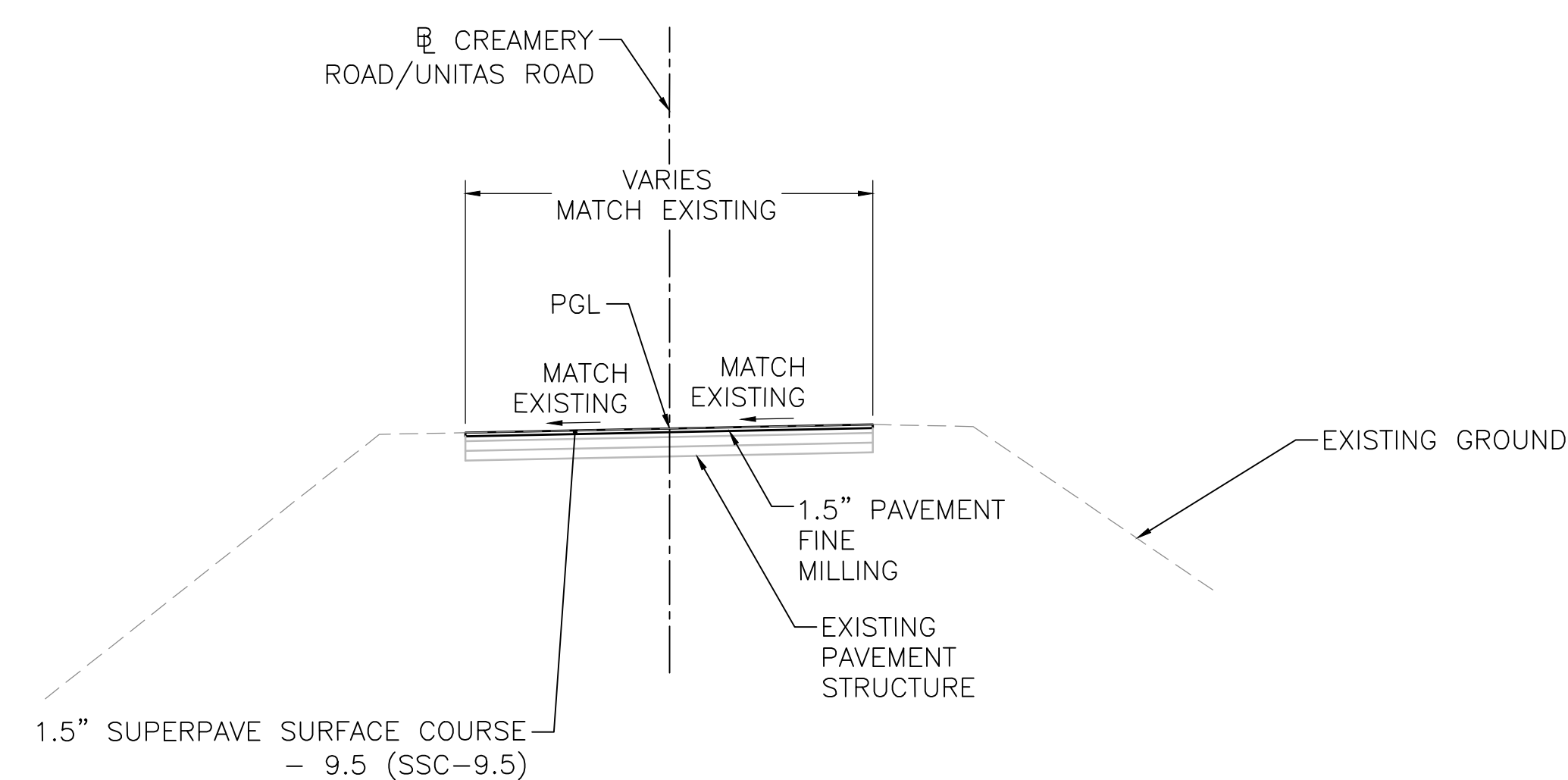
**TYPICAL SECTION - FULL DEPTH RECONSTRUCTION  
CREAMERY ROAD/UNITAS ROAD**

SCALE: 1" - 5'  
STA. 0+85 TO STA. 2+59  
STA. 3+93 TO STA. 4+75



**TYPICAL SECTION - FULL DEPTH RECONSTRUCTION  
CREAMERY ROAD/UNITAS ROAD**

SCALE: 1" - 5'  
STA. 4+75 TO STA. 5+60



**TYPICAL SECTION - PAVEMENT FINE MILLING  
CREAMERY ROAD/UNITAS ROAD**

SCALE: 1" - 5'  
STA. 0+30 TO STA. 0+83  
STA. 5+60 TO STA. 5+85

**PAVEMENT NOTES**

**PROPOSED FULL DEPTH PAVEMENT**

**SURFACE:** 1.5" SUPERPAVE SURFACE COURSE 9.5 (SSC - 9.5) OVER 2" SUPERPAVE INTERMEDIATE COURSE 12.5 (SIC - 12.5) OVER 4" SUPERPAVE BASE COURSE 37.5 (SBC - 37.5)

**SUBBASE:** 4" DENSE GRADED CRUSHED STONE FOR SUB-BASE OVER 8" GRAVEL BORROW

ASPHALT EMULSION FOR TACK COAT APPLIED AT A RATE OF 0.06 TO 0.08 GAL/SY OVER BASE AND INTERMEDIATE COURSES.

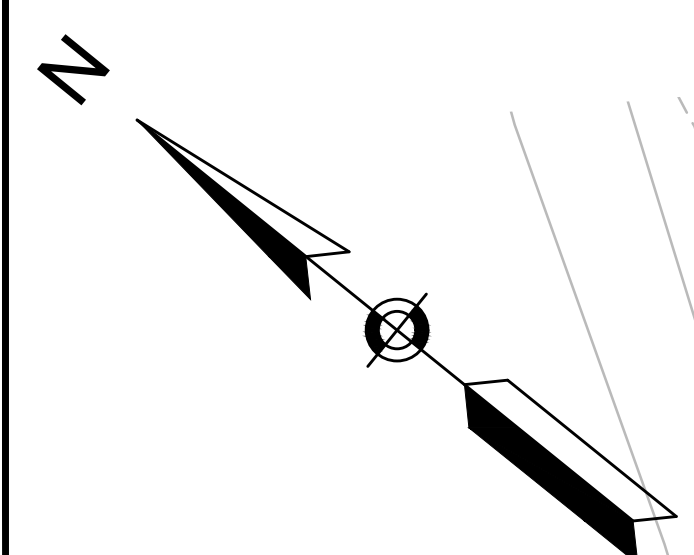
**PROPOSED PAVEMENT FINE MILLING**

1.5" DEPTH

**SURFACE:** 1.5" SUPERPAVE SURFACE COURSE 9.5 (SSC - 9.5)

ASPHALT EMULSION FOR TACK COAT APPLIED AT A RATE OF 0.07 TO 0.09 GAL/SY OVER MILLED SURFACE.





DRAINAGE DETAILS  
SEE BELOW

HIGHWAY GUARD DETAILS  
DEEP POST GUARDRAIL, TL-2 (SINGLE FACED) STATION RANGES  
STA. 1+00 LT TO STA. 2+57 LT  
STA. 1+32 RT TO STA. 2+57 RT  
STA. 3+92 LT TO STA. 5+80 LT  
STA. 3+92 RT TO STA. 5+80 RT

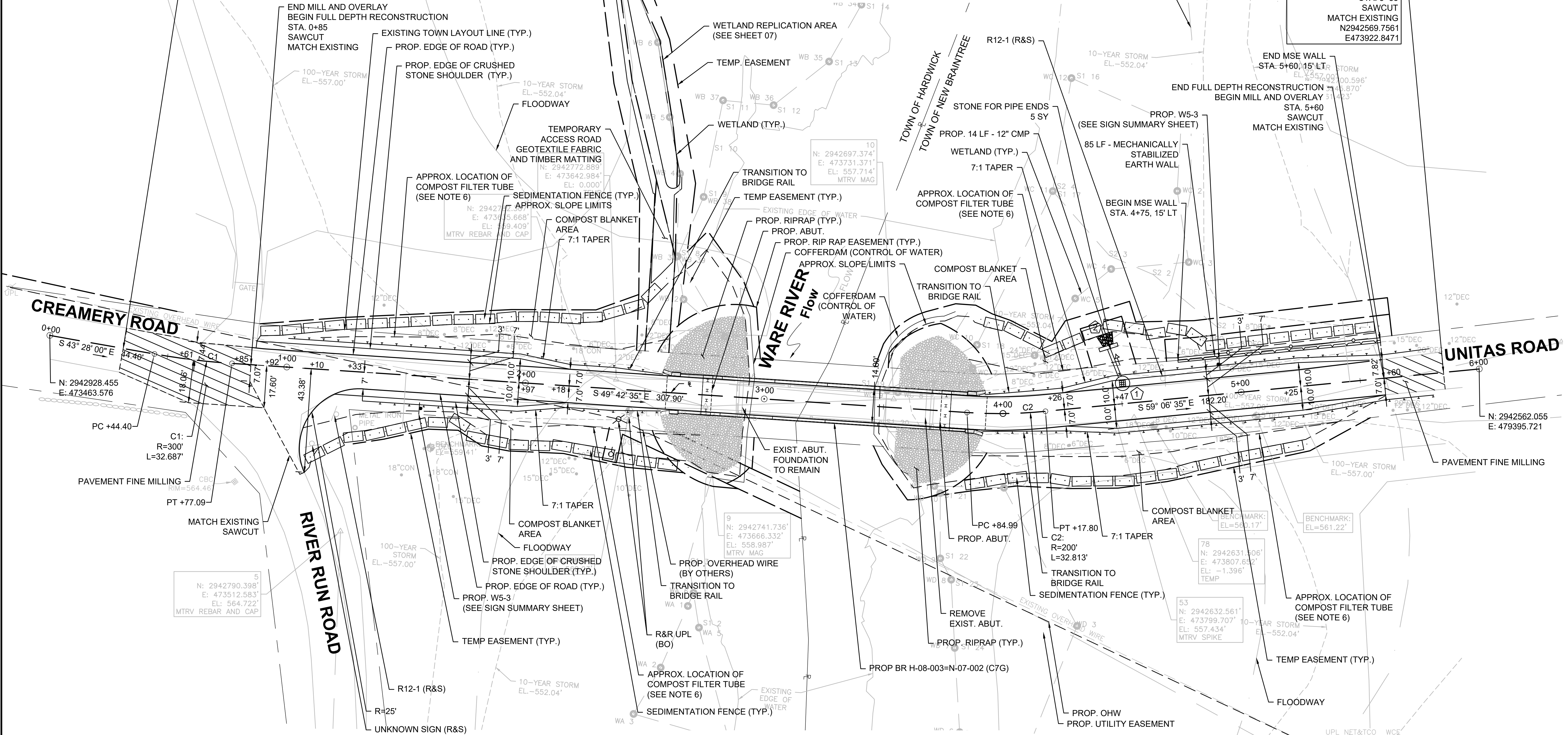
**HARDWICK/NEW BRAINTREE  
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**CONSTRUCTION PLANS**

PROJECT BEGIN  
BEGIN MILL AND OVERLAY  
STA. 0+30  
SAWCUT  
MATCH EXISTING  
N2942905.8409  
E473485.0109

PROJECT END  
END MILL AND OVERLAY  
STA. 5+85  
SAWCUT  
MATCH EXISTING  
N2942569.7561  
E473922.8471

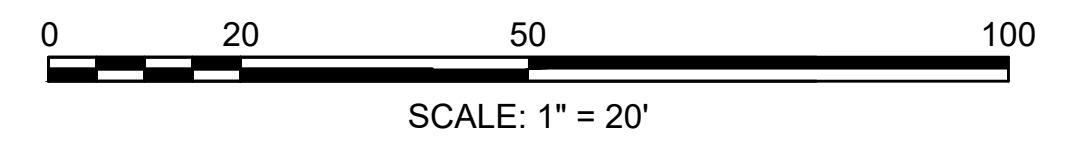


**DRAINAGE STRUCTURE DATA**

NO.	TYPE	STATION	RIM ELEV.	INV. ELEV. OUT
①	CATCH BASIN	4+51, 10' LT	TF=558.19	552.00
②	ENDWALL	4+47, 23' LT		FL=551.75

- NOTES:**
- LIMITS OF RETAINING WALL ARE APPROXIMATE. CONTRACTOR SHALL CONFIRM LIMITS OF GRADING DURING CONSTRUCTION.
  - SEE STANDARD DETAILS E206.4.0 AND E206.4.1 FOR DIMENSIONS AND MATERIALS FOR ENDWALL CONSTRUCTION.
  - CHAIN LINK FENCE TO BE INSTALLED ON TOP OF RETAINING WALL.
  - SEE STANDARD DETAIL E201.12.0 FOR DIMENSIONS AND MATERIALS FOR CATCH BASIN DETAIL.
  - PROPOSED CATCH BASIN AT STA. 4+51, 10' LT SHALL BE DEEP SUMP.
  - COMPOST FILTER TUBES SHALL BE INSTALLED IN FRONT OF GUARDRAIL AND MID WAY DOWN ALL SIDE SLOPES. SEE CROSS SECTION SHEETS 34-37 FOR INSTALLATION LOCATIONS.

ALL PROPOSED DRAINAGE PIPES SHALL BE REINFORCED CONCRETE PIPE CLASS III



FOR PROFILE PLANS:  
SEE SHEET NOS. 05

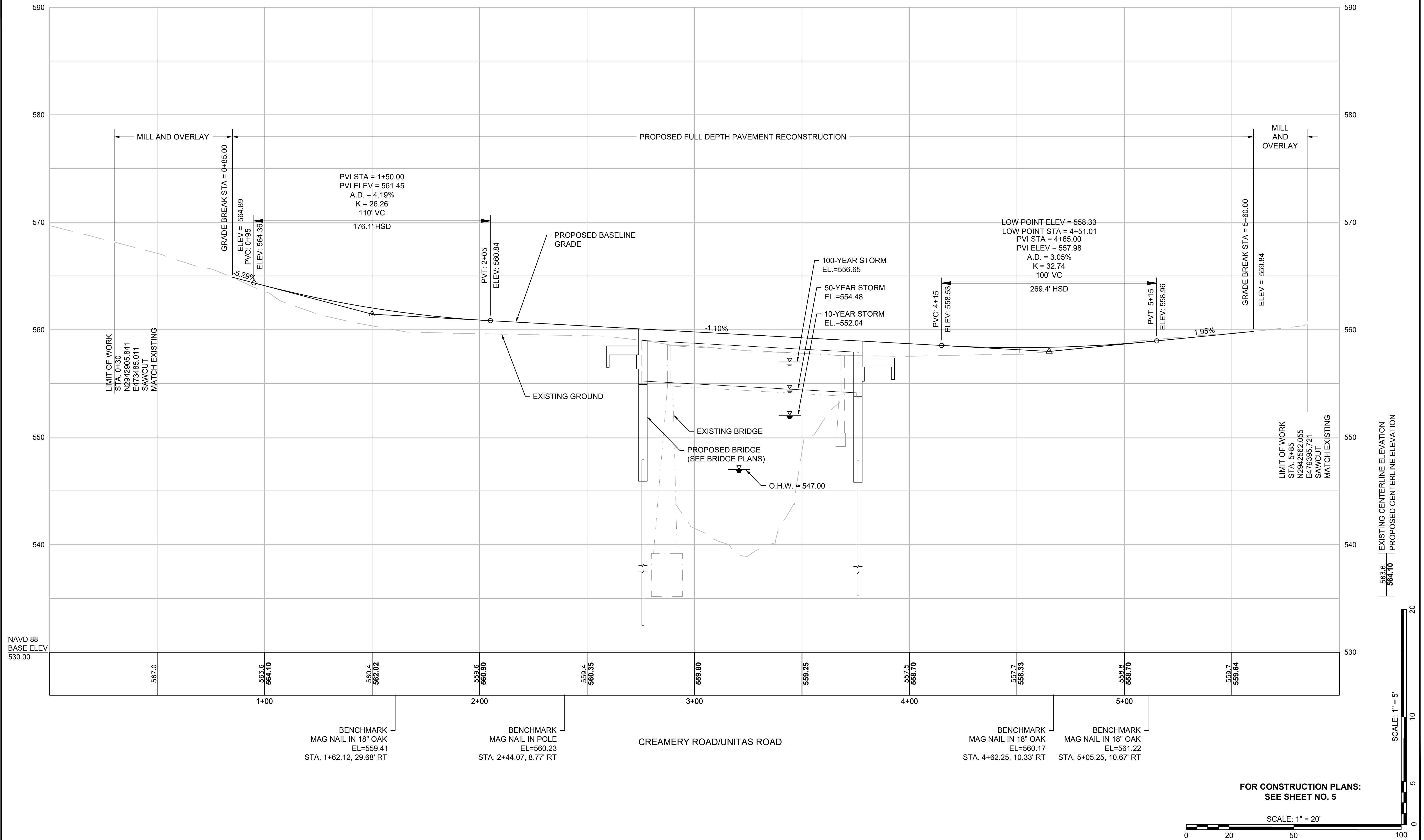


NOTE: AVERAGE BANK WIDTH UNDER BRIDGE STRUCTURE IS APPROXIMATELY 65'

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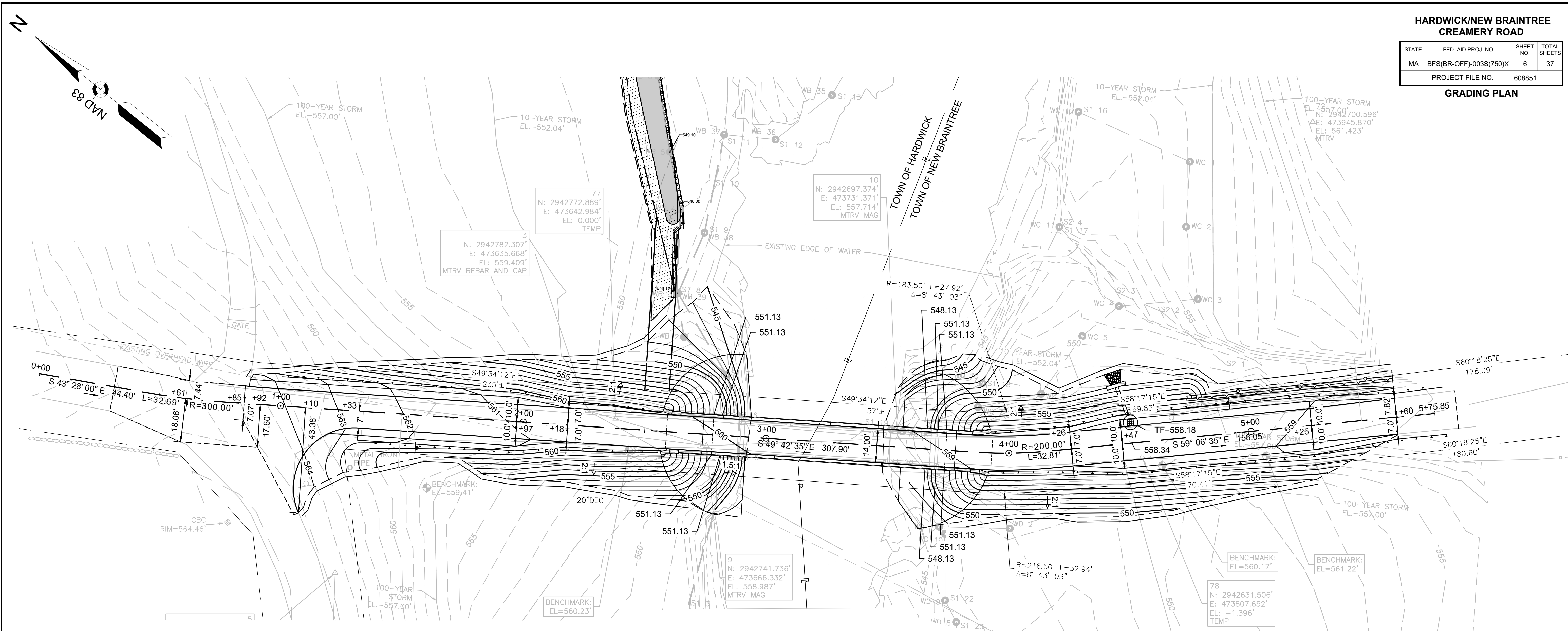
**PROFILE**



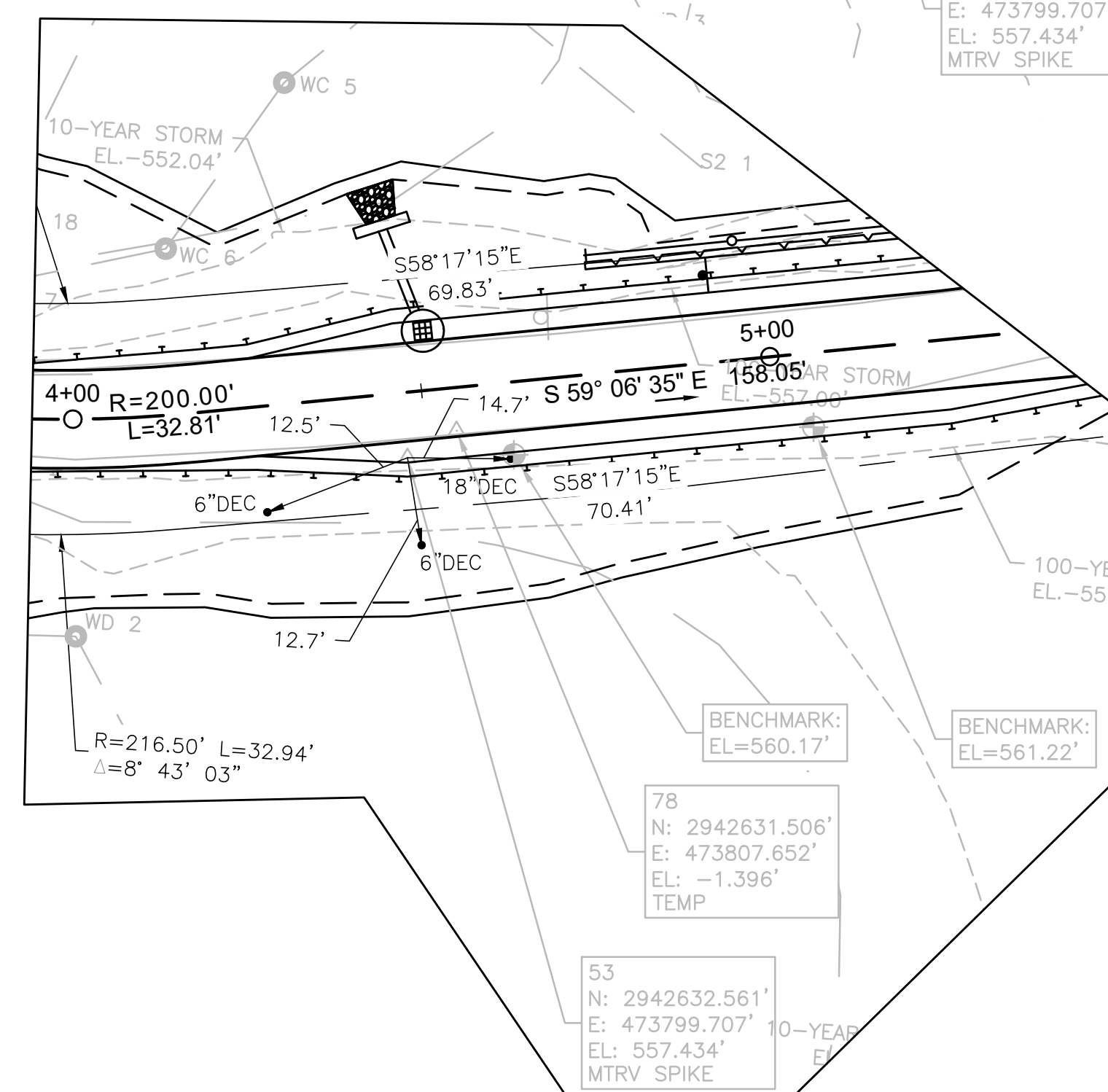
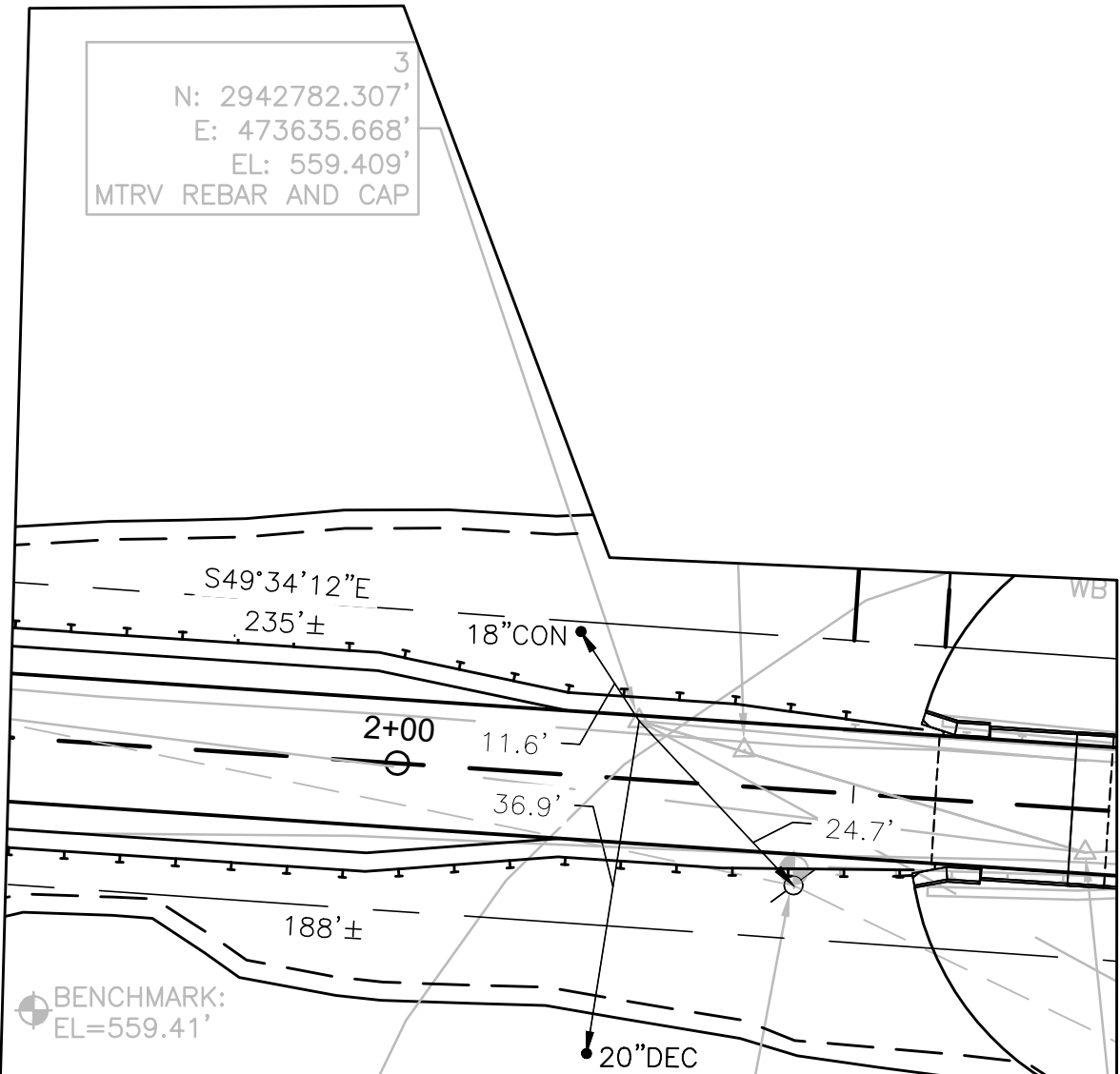
**HARDWICK/NEW BRAINTREE  
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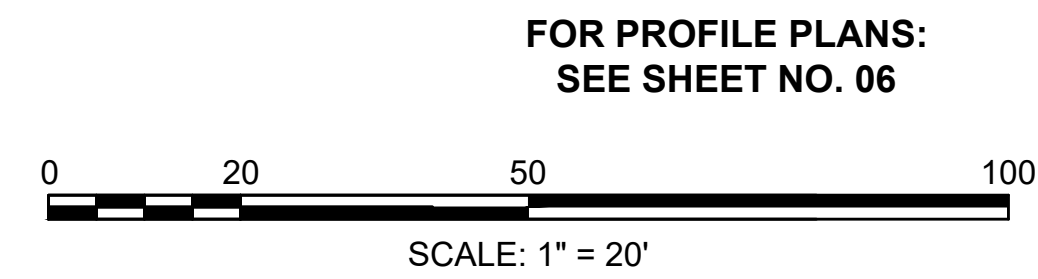
**GRADING PLAN**



Curve Table: Alignments							
Curve #	Radius	Tangent	Delta	Length	PC	PT	PI
C1	300.00'	16.360	6°14'34.09"	32.687	N:2942896.228 E:473494.123	N:2942873.775 E:473517.856	N:2942884.354 E:473505.377
C2	200.00'	16.443	9°24'00.76"	32.813	N:2942674.669 E:473752.714	N:2942655.593 E:473779.368	N:2942664.035 E:473765.257



NOTES:  
1. LIMITS OF RETAINING WALL ARE APPROXIMATE. CONTRACTOR SHALL CONFIRM LIMITS OF GRADING DURING CONSTRUCTION.

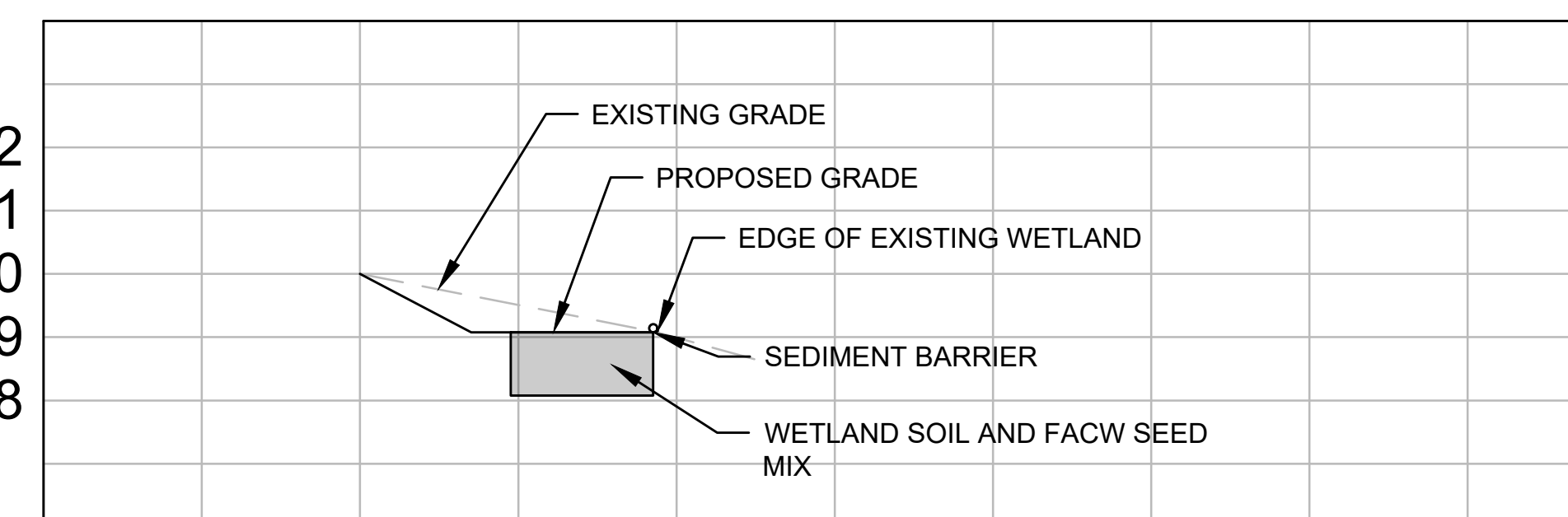
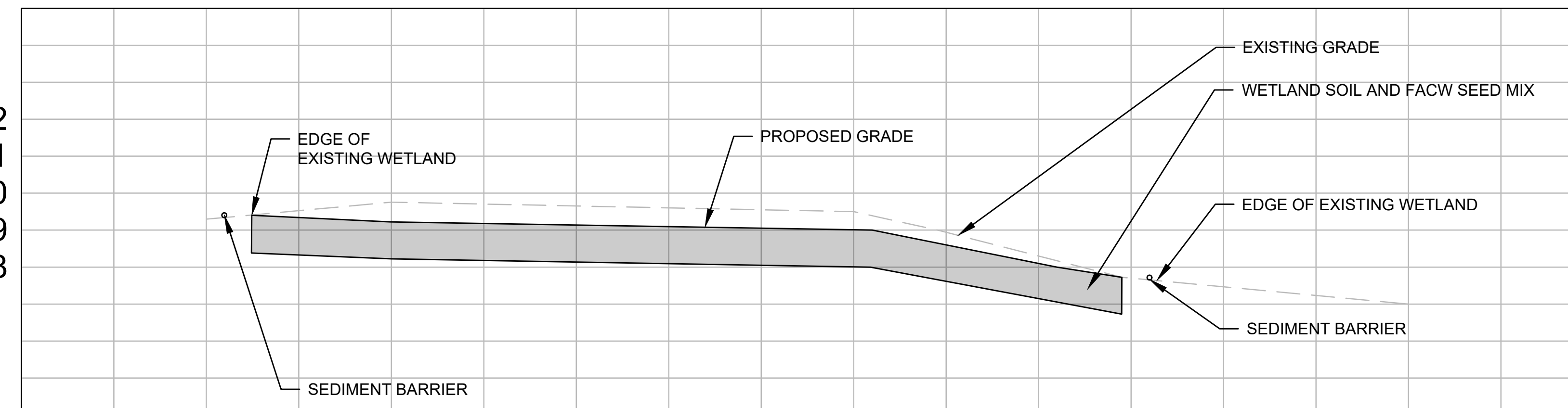
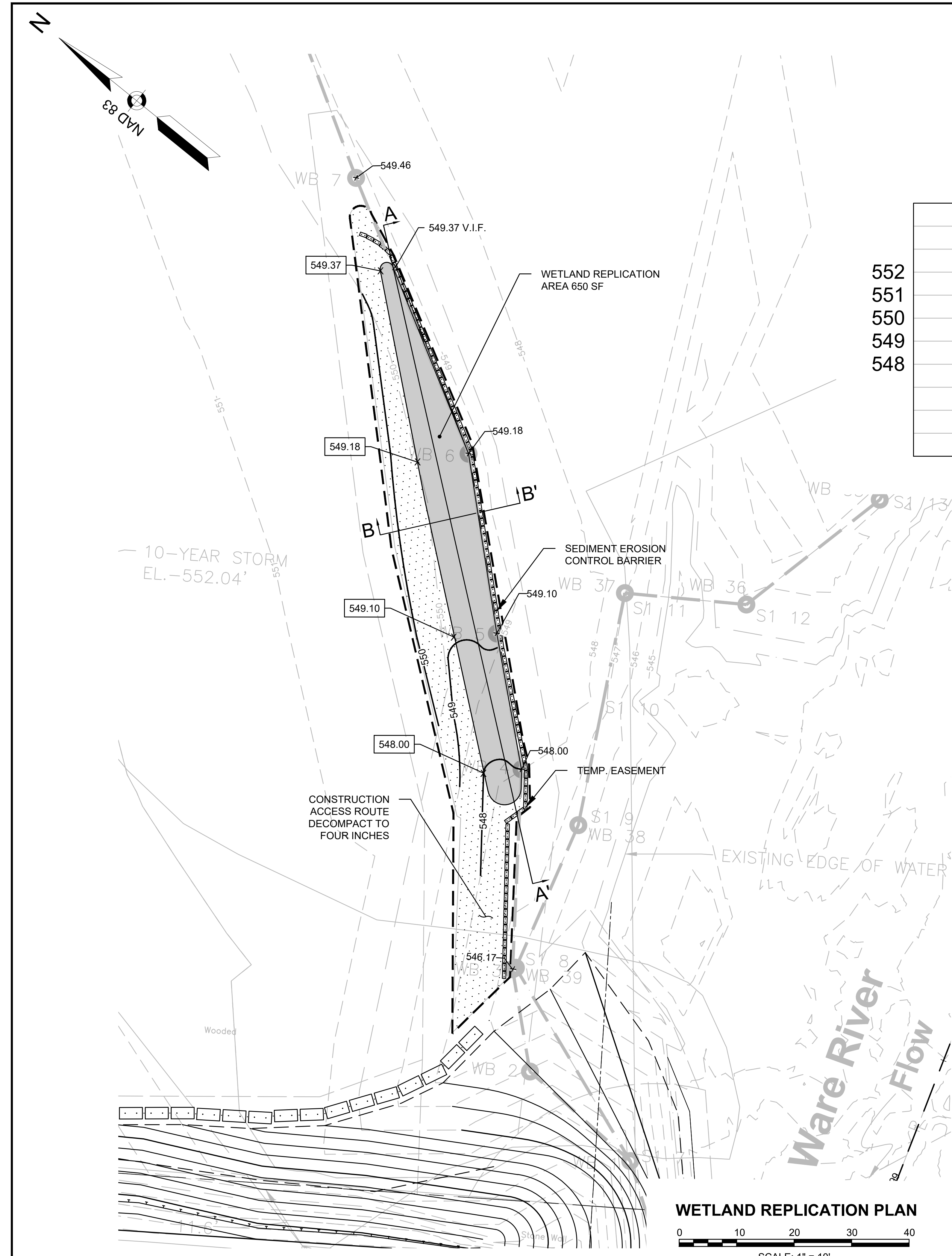


FOR PROFILE PLANS:  
SEE SHEET NO. 06

**HARDWICK/NEW BRAINTREE  
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**WETLAND REPLICATION PLAN**



**LEGEND**

- COMPOST BLANKET AND MID-HEIGHT GRASSLAND SEED MIX IN ALL UPLAND DISTURBED AREAS
- WETLAND SOIL AND FACW MEADOW MIX
- LIMIT OF WORK
- SEDIMENT CONTROL BARRIER
- PROPOSED CONTOUR
- EXISTING CONTOUR
- PROPOSED SPOT GRADE
- EXISTING GRADE AT WETLAND FLAG

**NOTES:**

1. COIR FIBER ROLL SHALL BE USED IN LIEU OF SEDIMENT CONTROL BARRIER WHERE ADJACENT SOILS ARE SATURATED, OR IF THERE IS A POTENTIAL FOR STANDING WATER AT THE LOCATION OF THE BARRIER.
2. SEED MIXES IN AND AROUND THE WETLAND REPLICATION SHALL BE HAND BROADCAST.
3. FINAL GRADES TO BE SET APPROXIMATELY 6-12 INCHES ABOVE GROUNDWATER ELEVATION. MINOR ADJUSTMENTS IN FINAL GRADES SHALL BE MADE IN THE FIELD BY THE WETLAND SPECIALIST.
4. REPLICATION AREA SHALL BE EXCAVATED TO A DEPTH BETWEEN TWELVE (12) AND EIGHTEEN (18) INCHES BELOW THE FINAL DESIGN ELEVATIONS. THE SALVAGED TOPSOIL MATERIAL AND B-HORIZON SUBSOIL MATERIAL EXCAVATED FROM THE WETLAND IMPACT AREAS SHALL BE PLACED IN SEPARATE STOCKPILES TO BE REUSED IN THE PROPOSED REPLICATION AREA IF SUITABLE.
5. REPLICATION AREA GRADING SHOULD MATCH THE ELEVATIONS OF THE ABUTTING WETLAND TO MAINTAIN A HYDROLOGIC CONNECTION. WETLAND SPECIALIST SHALL INSPECT THE SUB-GRADE OF THE REPLICATION AREA TO ENSURE THAT THE PROPER HYDROLOGY HAS BEEN ESTABLISHED. MINOR MODIFICATIONS TO THIS GRADING PLAN MAY BE MADE IN THE FIELD BY THE QUALIFIED WETLAND SPECIALIST IN RESPONSE TO SUBSURFACE HYDROLOGIC CONDITIONS.

**WETLAND REPLICATION PLAN**

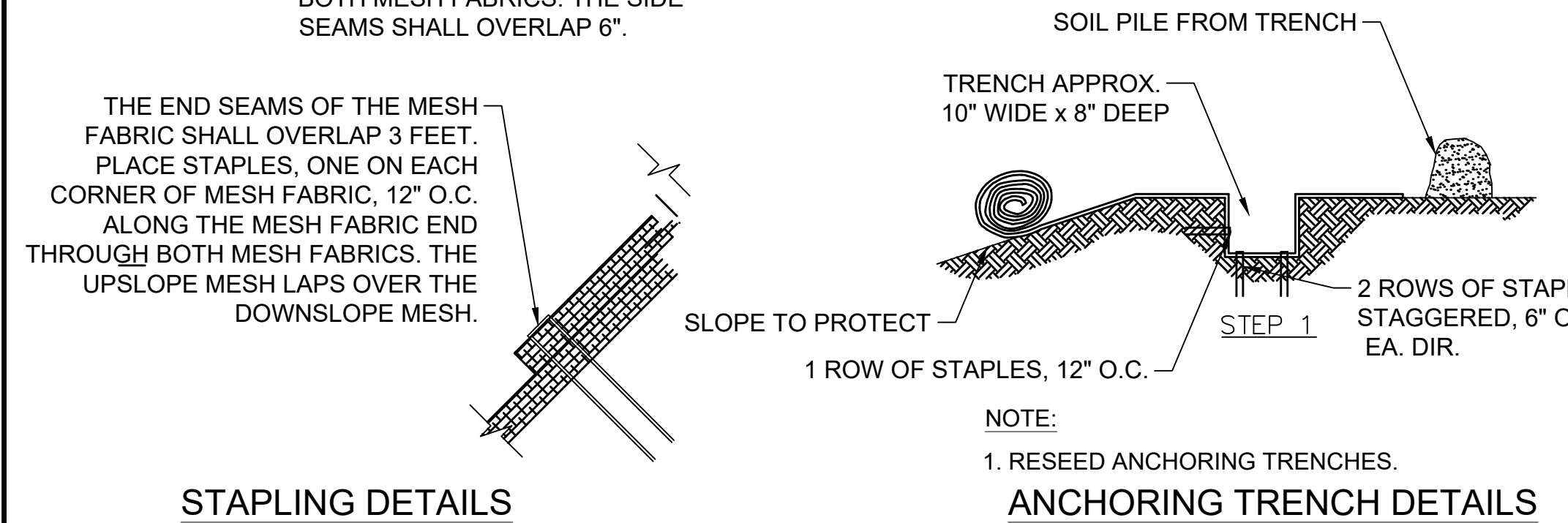
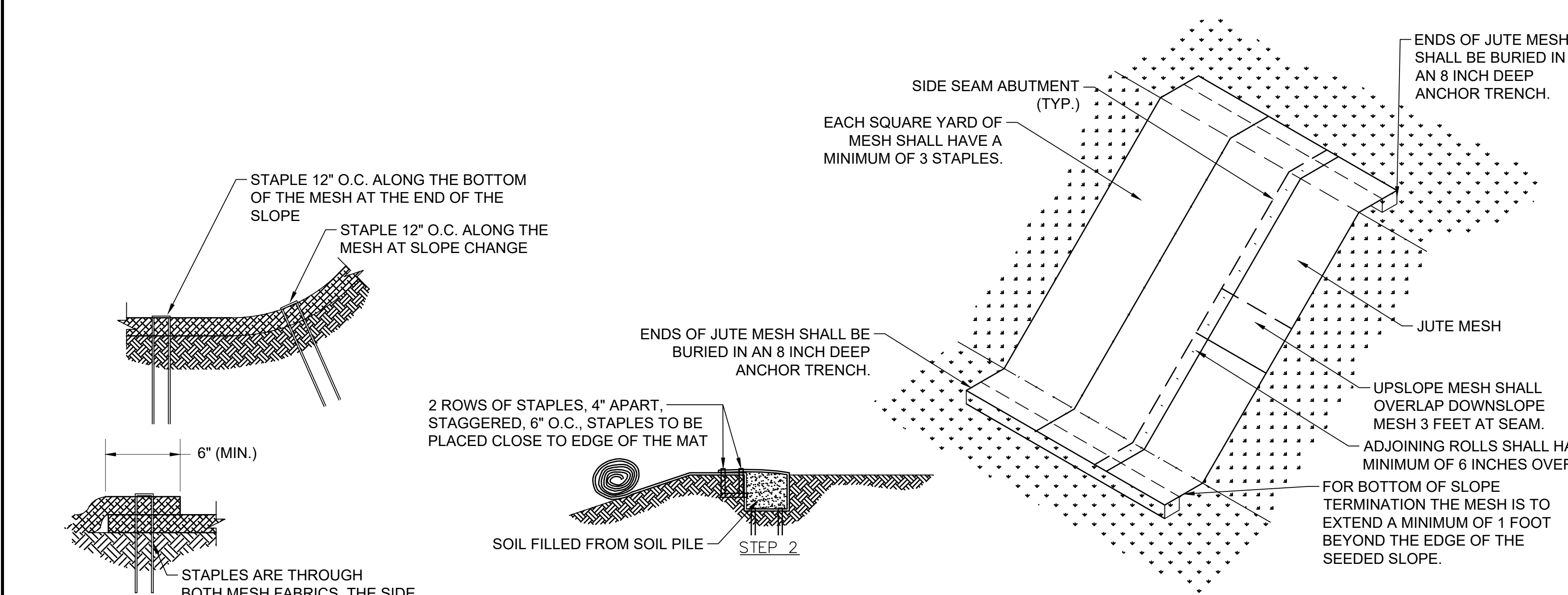




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LANDSCAPE AND WETLAND  
REPLICATION DETAILS

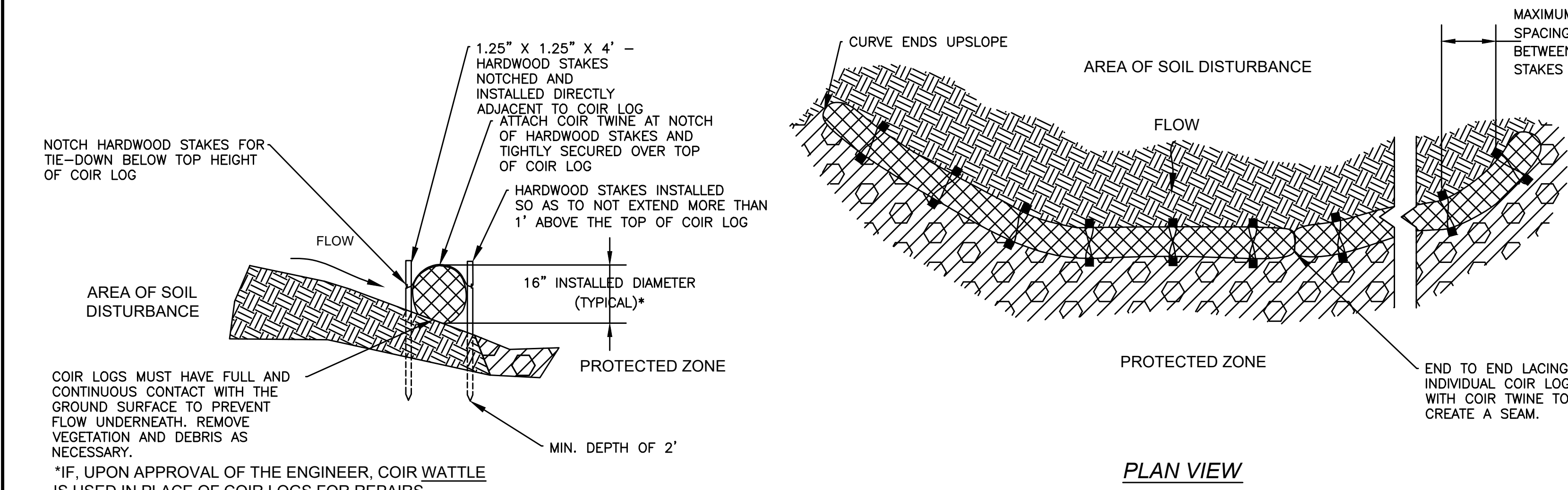
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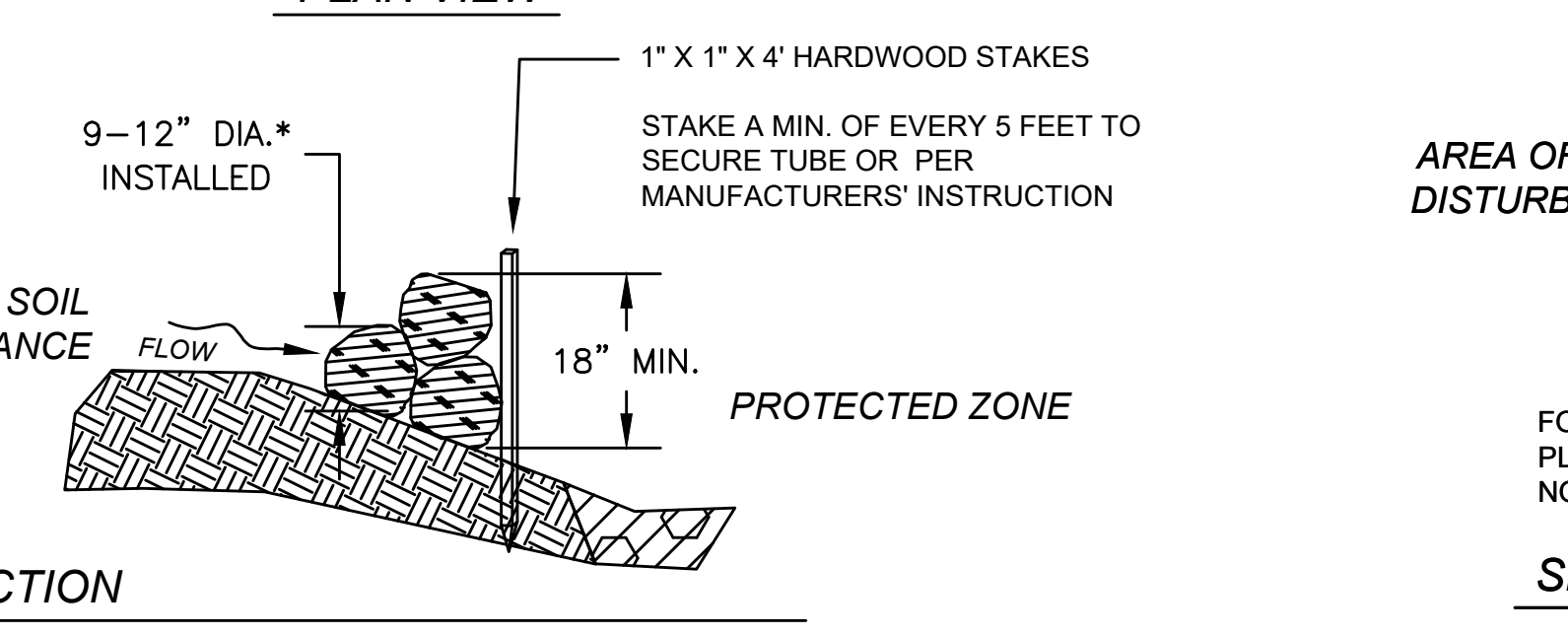
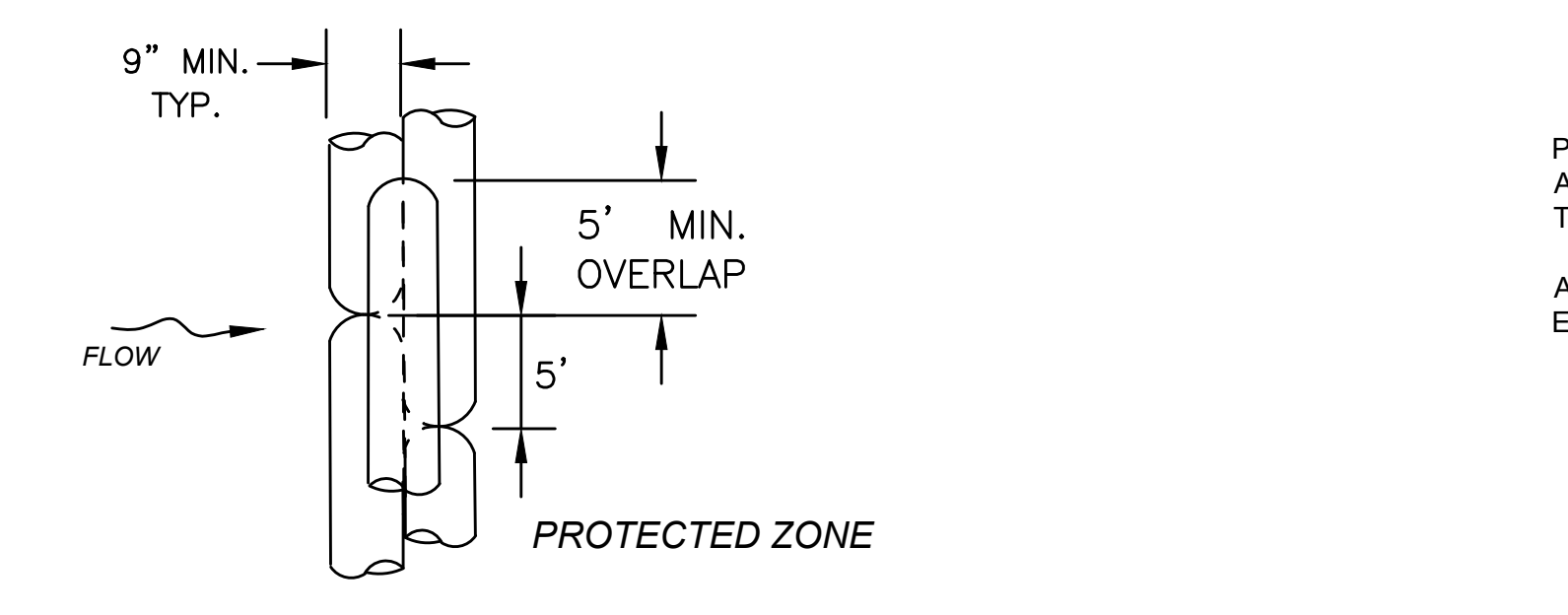
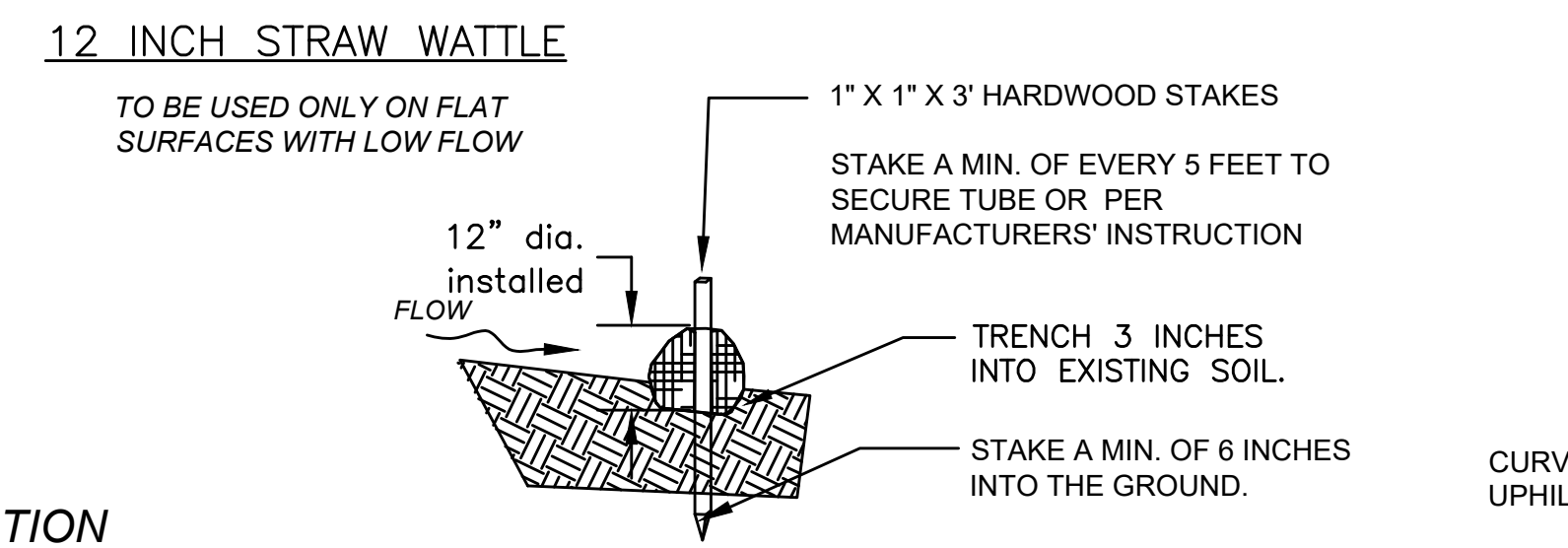
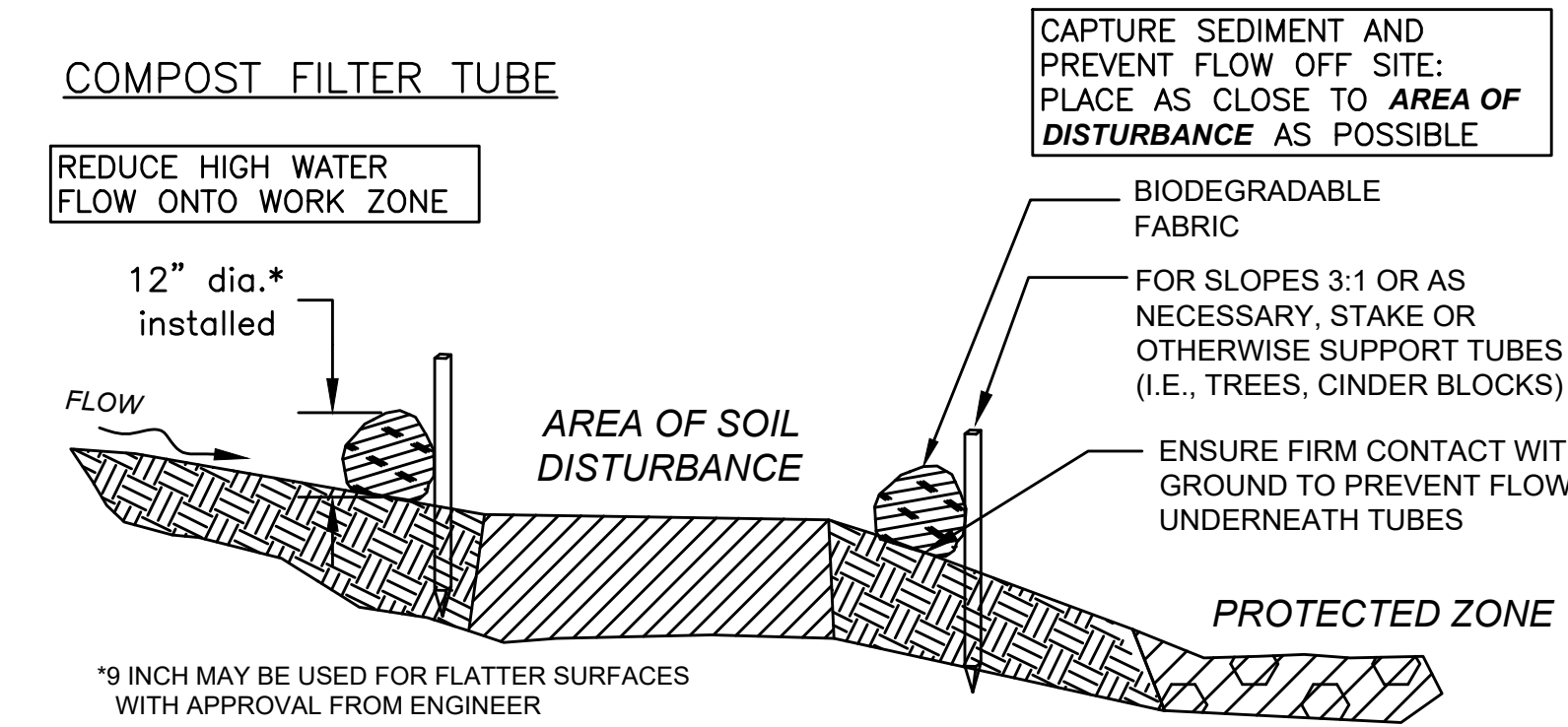
JUTE MESH FABRIC ON SLOPE

- NOTES:
- SEE MANUFACTURER'S STAPLE PATTERN GUIDE FOR DETAILS.
  - INSTALL JUTE MESH ON SLOPES GREATER THAN 3 FEET HORIZONTAL TO 1 FOOT VERTICAL AND WHERE ADDED STABILIZATION FOR EROSION CONTROL IS NEEDED.
  - JUTE MESH SHALL BE INSTALLED WITH CONTINUOUS CONTACT WITH THE SOIL.
  - AREAS WITH JUTE MESH SHALL BE SEEDED PRIOR TO THE INSTALLATION OF THE JUTE MESH.
  - STAPLES SHALL BE DRIVEN IN UNTIL THEIR TOPS ARE FLUSH WITH THE SOIL.
  - STAPLES SHALL BE 11 GAUGE STEEL 6 OR 9 INCHES IN LENGTH. IN AREAS THAT WILL BE MOWN FREQUENTLY EIGHT INCH WOOD STAKES SHALL BE USED TO ANCHOR MESH.
  - JUTE MESH SHALL BE BIODEGRADABLE.

1 JUTE MESH  
NOT TO SCALE

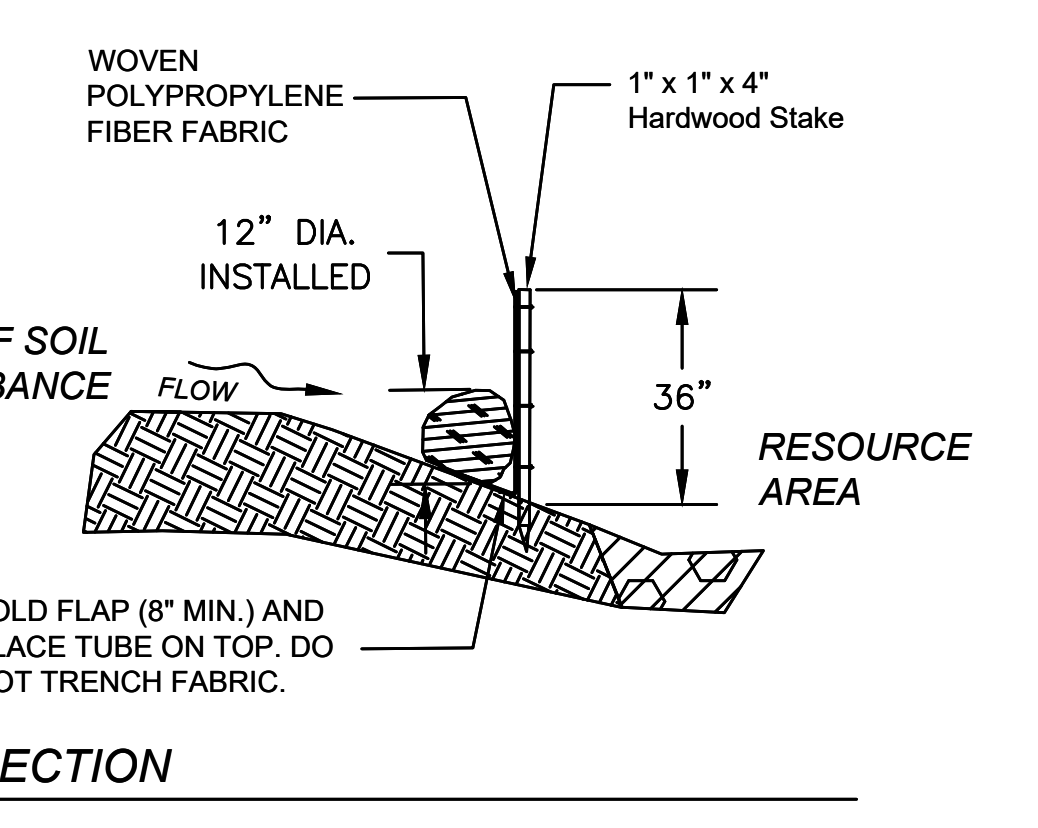
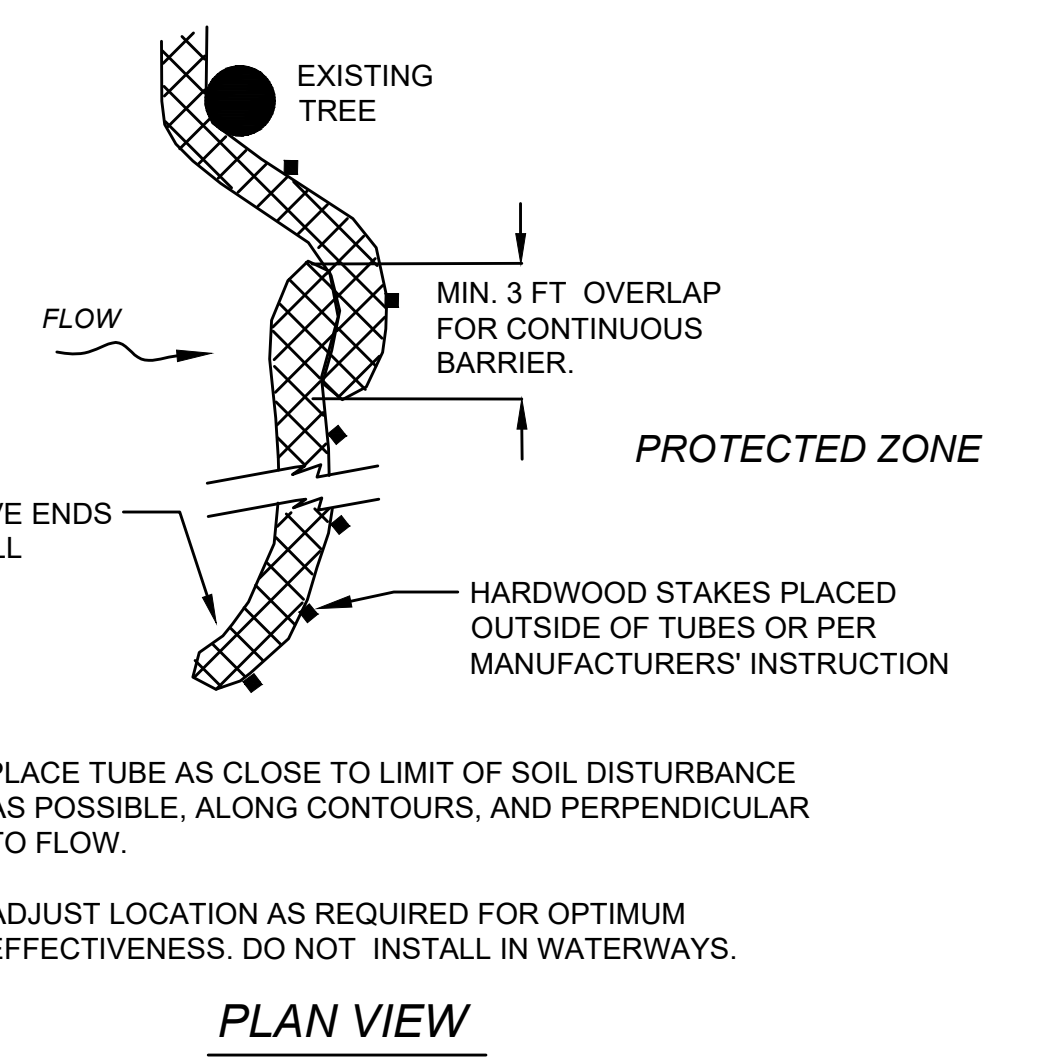


3 COIR FIBER ROLL  
NOT TO SCALE



COMPOST FILTER TUBE BERM (SLOPES 2:1 OR STEEPER)  
NOT TO SCALE

2 SEDIMENT CONTROL BARRIERS - COMPOST FILTER TUBE & STRAW WATTLES  
NOT TO SCALE



COMPOST FILTER TUBE & SILTY FENCE  
NOT TO SCALE


# TRAFFIC SIGN SUMMARY

**HARDWICK/NEW BRAINTREE  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	9	37
PROJECT FILE NO. 608851			

**FINAL AND TEMPORARY TRAFFIC SIGN SUMMARY SHEET**


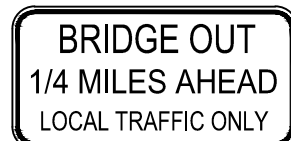












**TOTAL SQUARE FOOTAGE - 6.00 TOTAL POSTS - 2**

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			
W5-3	36	36		SEE STANDARD HIGHWAY SIGNS			2	YELLOW	BLACK	BLACK	1 X P5 2 TOTAL	3.00	6.00

# TEMPORARY TRAFFIC SIGN SUMMARY







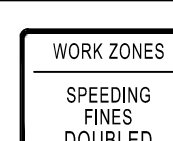
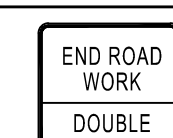

## DETOUR PLAN SIGN SUMMARY

**TOTAL SQUARE FOOTAGE - 262.10 TOTAL POSTS - 37**

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			
R11-3B(1)	60	30		SEE STANDARD HIGHWAY SIGNS			1	WHITE	BLACK	BLACK	MTD ON TYPE III BARRICADE	12.50	12.50
R11-3B(2)	60	30		SEE STANDARD HIGHWAY SIGNS			1	WHITE	BLACK	BLACK	MTD ON TYPE III BARRICADE	12.50	12.50
R11-3A	60	30		MUTCD STANDARD			5	WHITE	BLACK	BLACK	2 X P5 10 TOTAL	12.50	62.50
SP-1	60	10		BDR INSET/WIDTH: 0.38"/0.38" CORNER RADIUS: 1"			3	FLUORESCENT ORANGE	BLACK	BLACK	PLAQUE	4.17	12.50
W20-2C	36	36		SEE STANDARD HIGHWAY SIGNS			4	FLUORESCENT ORANGE	BLACK	BLACK	1 X P5 4 TOTAL	9.00	36.00
W16-8P	20	8		SEE STANDARD HIGHWAY SIGNS			21	FLUORESCENT ORANGE	BLACK	BLACK	PLAQUE	1.10	23.10
M4-8A	24	18		SEE STANDARD HIGHWAY SIGNS			2	FLUORESCENT ORANGE	BLACK	BLACK	1 X P5 2 TOTAL	3.00	6.00
M4-10L	48	18		SEE STANDARD HIGHWAY SIGNS			1	FLUORESCENT ORANGE	BLACK	BLACK	2 X P5 2 TOTAL	6.00	6.00
M4-10R	48	18		SEE STANDARD HIGHWAY SIGNS			1	FLUORESCENT ORANGE	BLACK	BLACK	2 X P5 2 TOTAL	6.00	6.00
M4-9AL	30	24		SEE STANDARD HIGHWAY SIGNS			3	FLUORESCENT ORANGE	BLACK	BLACK	1 X P5 3 TOTAL	5.00	15.00
M4-9AR	30	24		SEE STANDARD HIGHWAY SIGNS			3	FLUORESCENT ORANGE	BLACK	BLACK	1 X P5 3 TOTAL	5.00	15.00
M4-9L	30	24		SEE STANDARD HIGHWAY SIGNS			3	FLUORESCENT ORANGE	BLACK	BLACK	1 X P5 3 TOTAL	5.00	15.00
M4-9R	30	24		SEE STANDARD HIGHWAY SIGNS			3	FLUORESCENT ORANGE	BLACK	BLACK	1 X P5 3 TOTAL	5.00	15.00
M4-9V	30	24		SEE STANDARD HIGHWAY SIGNS			5	FLUORESCENT ORANGE	BLACK	BLACK	1 X P5 5 TOTAL	5.00	25.00

## ONE LANE ALTERNATING TRAFFIC SIGN SUMMARY

**TOTAL SQUARE FOOTAGE - 148.50 TOTAL POSTS - 20**

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			
MA-W20-7b	36	36		SEE STANDARD HIGHWAY SIGNS			2	FLUORESCENT ORANGE	BLACK	BLACK	1 X P5 2 TOTAL	9.00	18.00
W20-4	36	36		SEE STANDARD HIGHWAY SIGNS			2	FLUORESCENT ORANGE	BLACK	BLACK	1 X P5 2 TOTAL	9.00	18.00
W20-7	36	36		SEE STANDARD HIGHWAY SIGNS			2	FLUORESCENT ORANGE	BLACK	BLACK	1 X P5 2 TOTAL	9.00	18.00
R9-3	18	18		SEE STANDARD HIGHWAY SIGNS			2	WHITE	BLACK LOGO/RED CIRCLE	BLACK	1 X P5 2 TOTAL	2.25	4.50
R5-10C	24	12		SEE STANDARD HIGHWAY SIGNS			2	WHITE	BLACK	BLACK	1 X P5 2 TOTAL	2.00	4.00
R11-2C	48	30		SEE STANDARD HIGHWAY SIGNS			2	WHITE	BLACK	BLACK	MTD ON TYPE III BARRICADE	10.00	20.00
MA-R2-10a	48	36		SEE STANDARD HIGHWAY SIGNS			2	FLUORESCENT ORANGE / WHITE	BLACK	BLACK	2 X P5 2 TOTAL	12.00	24.00
MA-R2-10e	36	48		SEE STANDARD HIGHWAY SIGNS			2	FLUORESCENT ORANGE / WHITE	BLACK	BLACK	2 X P5 2 TOTAL	12.00	24.00
W20-1	36	36		SEE STANDARD HIGHWAY SIGNS			2	FLUORESCENT ORANGE	BLACK	BLACK	1 X P5 2 TOTAL	9.00	18.00

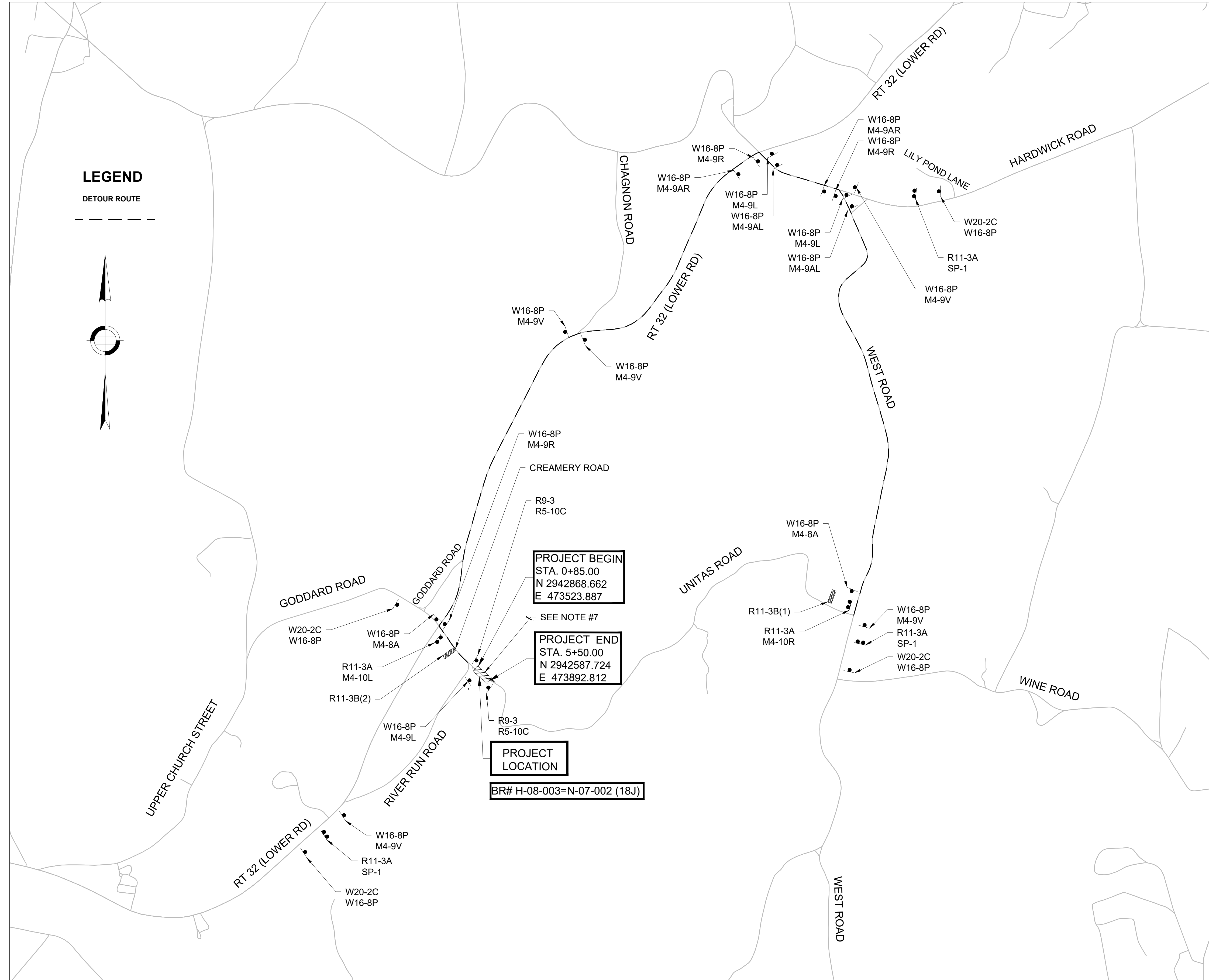
**DETOUR PLAN**  
DETOUR LENGTH = 3.7 MILES

NOT TO SCALE

**HARDWICK/NEW BRAINTREE  
CREAMERY ROAD**

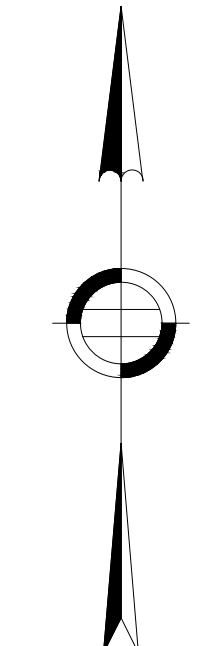
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	10	37
PROJECT FILE NO.		608851	

**TEMPORARY TRAFFIC CONTROL PLANS - 01**



**LEGEND**

DETOUR ROUTE



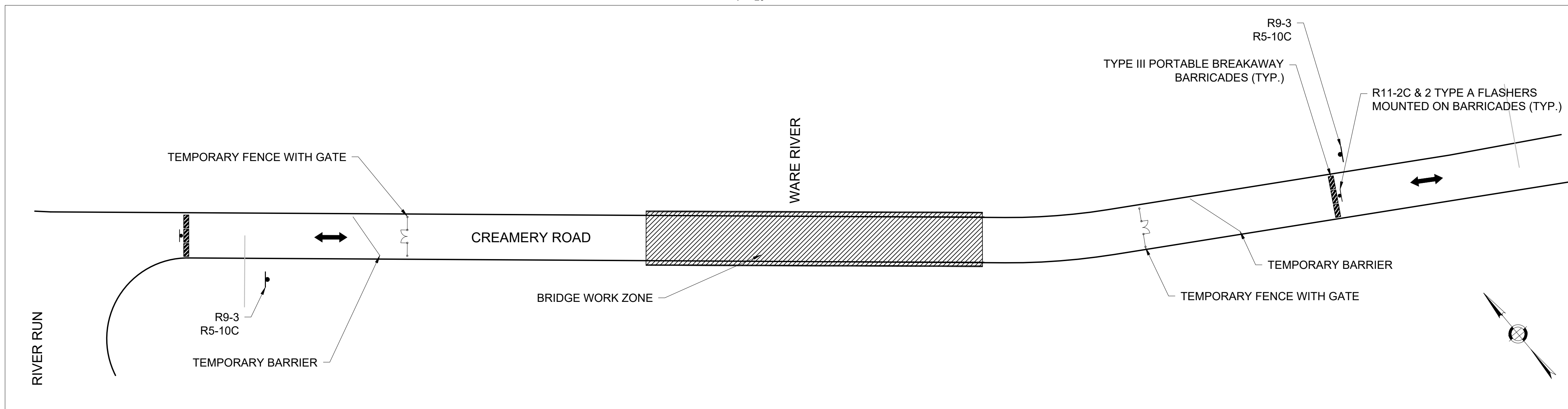
**NOTES:**

1. ALL DISTANCES MAY BE ADJUSTED TO FIT FIELD CONDITIONS, AS DIRECTED BY THE ENGINEER. HOWEVER, MINIMUM DISTANCES, WHERE INDICATED, SHOULD BE MAINTAINED.
2. ALL SIGNS SHALL BE BLACK LEGEND ON A REFLECTIVE ORANGE BACKGROUND, UNLESS OTHERWISE NOTED, AND IN ACCORDANCE WITH MUTCD & MASSDOT STANDARDS. ALL CONSTRUCTION SIGNS SHALL BE ATTACHED TO THEIR OWN INDEPENDENT SUPPORTS, UNLESS OTHERWISE NOTED.
3. THE CONTRACTOR MUST MAINTAIN ACCESS AND EGRESS AT ALL TIMES TO ALL PROPERTIES AND ROADWAYS ABUTTING THE WORK ZONE.
4. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY MUST PASS THE CRITERIA SET FORTH IN THE NCHRP 350 REPORT.
5. ALL SIGNS NOT APPLICABLE TO VARIOUS STAGES OF CONSTRUCTION SHALL BE REMOVED OR COVERED AS APPROVED BY THE ENGINEER.
6. THE CONTRACTOR SHALL SET BARRICADES, WARNING LIGHTS, AND OTHER PROTECTIVE DEVICES THAT ARE NECESSARY IN THE JUDGEMENT OF THE ENGINEER, FOR THE PROTECTION OF THE PUBLIC.
7. SEE TEMPORARY TRAFFIC CONTROL PLANS - 02 FOR ADDITIONAL INFORMATION FOR THE BRIDGE CLOSURE.



**BRIDGE CLOSURE**

1" = 20'



**HARDWICK/NEW BRAINTREE  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	11	37
PROJECT FILE NO.		608851	

**NOTES:**

- ALL DISTANCES MAY BE ADJUSTED TO FIT FIELD CONDITIONS, AS DIRECTED BY THE ENGINEER. HOWEVER, MINIMUM DISTANCES, WHERE INDICATED, SHOULD BE MAINTAINED.
- ALL SIGNS SHALL BE BLACK LEGEND ON A REFLECTIVE ORANGE BACKGROUND, UNLESS OTHERWISE NOTED, AND IN ACCORDANCE WITH MUTCD & MASSDOT STANDARDS. ALL CONSTRUCTION SIGNS SHALL BE ATTACHED TO THEIR OWN INDEPENDENT SUPPORTS, UNLESS OTHERWISE NOTED.
- THE CONTRACTOR MUST MAINTAIN ACCESS AND EGRESS AT ALL TIMES TO ALL PROPERTIES AND ROADWAYS ABUTTING THE WORK ZONE.
- SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY MUST PASS THE CRITERIA SET FORTH IN THE NCHRP 350 REPORT.
- ALL SIGNS NOT APPLICABLE TO VARIOUS STAGES OF CONSTRUCTION SHALL BE REMOVED OR COVERED AS APPROVED BY THE ENGINEER.
- ALL BARRICADES NEAR THE WORK AREA MUST HAVE TWO TYPE A FLASHERS MOUNTED ON THEM.
- THE CONTRACTOR SHALL SET BARRICADES, WARNING LIGHTS, AND OTHER PROTECTIVE DEVICES THAT ARE NECESSARY IN THE JUDGEMENT OF THE ENGINEER, FOR THE PROTECTION OF THE PUBLIC.

**TEMPORARY TRAFFIC CONTROL PLANS - 02**

**SUGGESTED WORK ZONE WARNING SIGN SPACING**

ROAD TYPE	DISTANCE BETWEEN SIGNS **		
	A	B	C
LOCAL OR LOW VOLUME ROADWAYS*	350	350	350
MOST OTHER ROADWAYS*	500	500	500
FREEWAYS AND EXPRESSWAYS*	1,000	1,500	2,640

THE IDEAL CAPACITY OF A MAJOR HIGHWAY IS GENERALLY CONSIDERED TO BE 1900 PASSENGER CARS PER HOUR PER LANE (PCPHPL). IN WORK ZONES ON A MULTI-LANE DIVIDED HIGHWAY, THE FOLLOWING VOLUME GUIDELINES HAVE BEEN SUGGESTED:

**MEASURED AVERAGE WORK ZONE CAPACITIES**

NUMBER OF LANES (EXISTING)	NUMBER OF LANES (TO TRAFFIC)	NUMBER OF STUDIES	AVERAGE CAPACITY	
			VPH	VPHPL
3	1	7	1,170	1,170
2	1	8	1,340	1,340
5	2	8	2,740	1,370
4	2	4	2,960	1,480
3	2	9	2,980	1,490
4	3	4	4,560	1,520

Source: Dudek, C., *Notes on Work Zone Capacity and Level of Service*. Texas Transportation Institute, Texas A&M University, College Station, Texas (1984)

BY OBTAINING HOURLY TRAFFIC COUNTS FOR A PARTICULAR ROADWAY (WITH A MINIMUM OF A 48-HOUR AUTOMATIC TRAFFIC RECORDER (ATR) COUNT), THIS WILL HELP TO DETERMINE AT WHAT TIMES OF THE DAY OR NIGHT A CERTAIN NUMBER OF LANES MAY BE CLOSED.

**LEGEND:**

- REFLECTORIZED PLASTIC DRUM OR 36" CONE
- P/F POLICE/FLAGGER DETAIL
- ▨ TYPE III BARRICADE
- CHANGEABLE MESSAGE SIGN
- ➔ ARROW BOARD
- ▨ WORK ZONE
- ➔ DIRECTION OF TRAFFIC
- ⊘ IMPACT ATTENUATOR
- ▭ MEDIAN BARRIER
- ⊘ MEDIAN BARRIER WITH WARNING LIGHTS
- 🚚 WORK VEHICLE
- ▨ TRUCK MOUNTED ATTENUATOR
- ➔ TRAFFIC OR PEDESTRIAN SIGNAL
- ⊘ SIGN

**NOTES:**

- ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS, UNLESS SUPERCEDED BY THESE PLANS.
- ALL SIGN LEGENDS, BORDERS, AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
- TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
- 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.
- SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, CHANNELIZING DEVICES, BARRIERS, AND CRASH ATTENUATORS 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).
- CONTRACTORS SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT, AND SIMILAR OPERATIONS.
- THE FIRST TEN PLASTIC DRUMS OF A TAPER SHALL BE MOUNTED WITH SEQUENTIAL FLASHING LIGHTS.
- THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE ENGINEER.
- DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
- MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.
- MINIMUM LANE WIDTH IS TO BE 11 FEET UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER.
- ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.

\* ROAD TYPE TO BE DETERMINED BY MASSDOT OFFICE OF TRANSPORTATION PLANNING.

\*\* DISTANCES ARE SHOWN IN FEET. THE COLUMN HEADINGS A, B, AND C ARE THE DIMENSIONS SHOWN IN THE DETAIL/ TYPICAL SETUP FIGURES. THE A DIMENSION IS THE DISTANCE FROM THE TRANSITION OR POINT OF RESTRICTION TO THE FIRST SIGN. THE B DIMENSION IS THE DISTANCE BETWEEN THE FIRST AND SECOND SIGNS. THE C DIMENSION IS THE DISTANCE BETWEEN THE SECOND AND THIRD SIGNS. (THE "THIRD" SIGN IS THE FIRST ONE TYPICALLY ENCOUNTERED BY A DRIVER APPROACHING A TEMPORARY TRAFFIC CONTROL (TTC) ZONE.)

THE "THIRD" SIGN ABOVE IS TYPICALLY REFERRED TO AS AN "ADVANCE WARNING" SIGN ON THE TTOP SETUPS. THESE ADVANCE WARNING SIGNS ARE LOCATED PRIOR TO THE PROJECT LIMITS ON ALL APPROACHES (I.E. THE W20-1 SERIES (ROAD WORK XX FT) SIGNS), AND USUALLY REMAIN FOR THE DURATION OF THE PROJECT. ADDITIONAL SIGNS (I.E. "RIGHT LANE CLOSED 1 MILE" AND "LEFT LANE CLOSED 1 MILE") HAVE BEEN SHOWN IN SOME FIGURES AS EXAMPLES OF REINFORCEMENT SIGN PLACEMENT BUT ARE USED IN RARE OCCASIONS.

THE FIRST AND SECOND WARNING SIGNS ABOVE ARE REFERRED TO AS THE OPERATIONAL (DAY-TO-DAY) WORK ZONE SIGNS AND MAY BE MOVED DEPENDING ON WHERE THE SPECIFIC ROADWAY WORK FOR THAT DAY IS LOCATED.

MA-R2-10a SIGNS SHALL BE PLACED BETWEEN THE SECOND AND THIRD SIGNS AS DESCRIBED ABOVE.

MA-R2-10a, MA-R2-10e, AND W20-1 SERIES SIGNS ARE TO BE INCLUDED ON ALL DETAILS/TYPICAL SETUPS.  
Based on: Table 6C-1 MUTCD LATEST EDITION

**STOPPING SIGHT DISTANCE AS A FUNCTION OF SPEED**

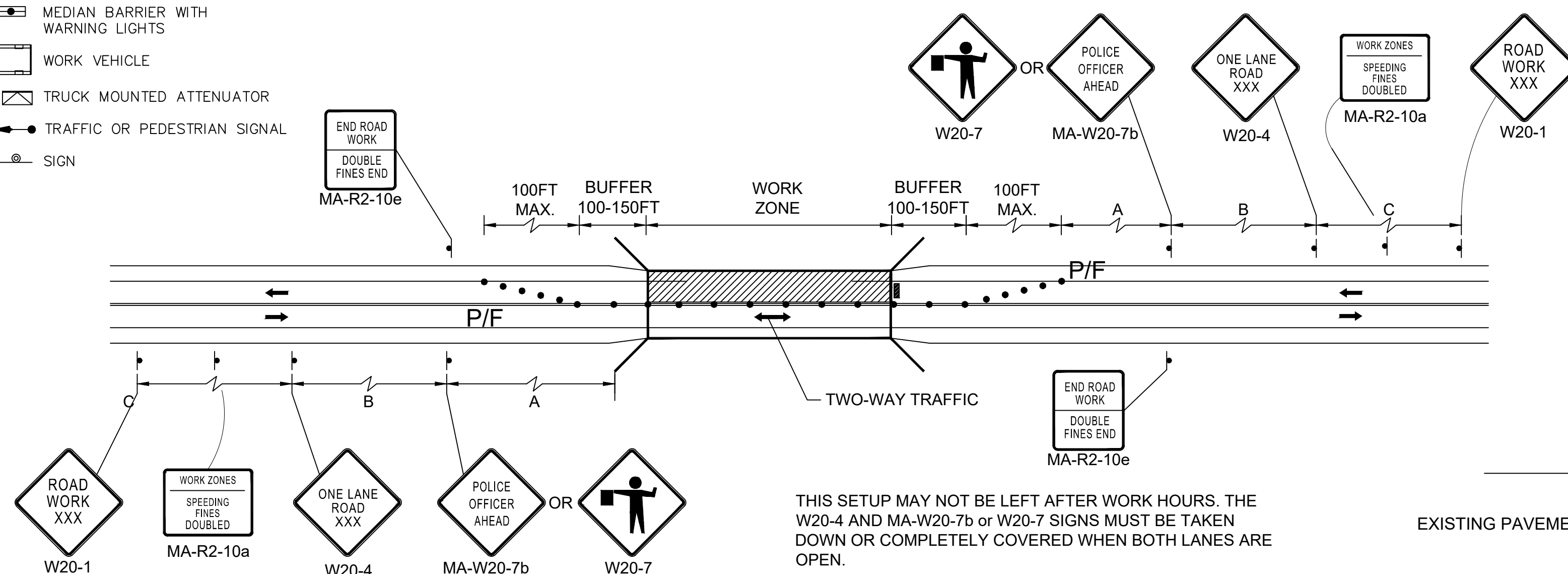
SPEED* (mph)	DISTANCE (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

\*POSTED SPEED, OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED

THESE VALUES MAY BE USED TO DETERMINE THE LENGTH OF LONGITUDINAL BUFFER SPACES.

THE DISTANCES IN THE ABOVE CHART REPRESENT THE MINIMAL VALUES FOR BUFFER SPACING.

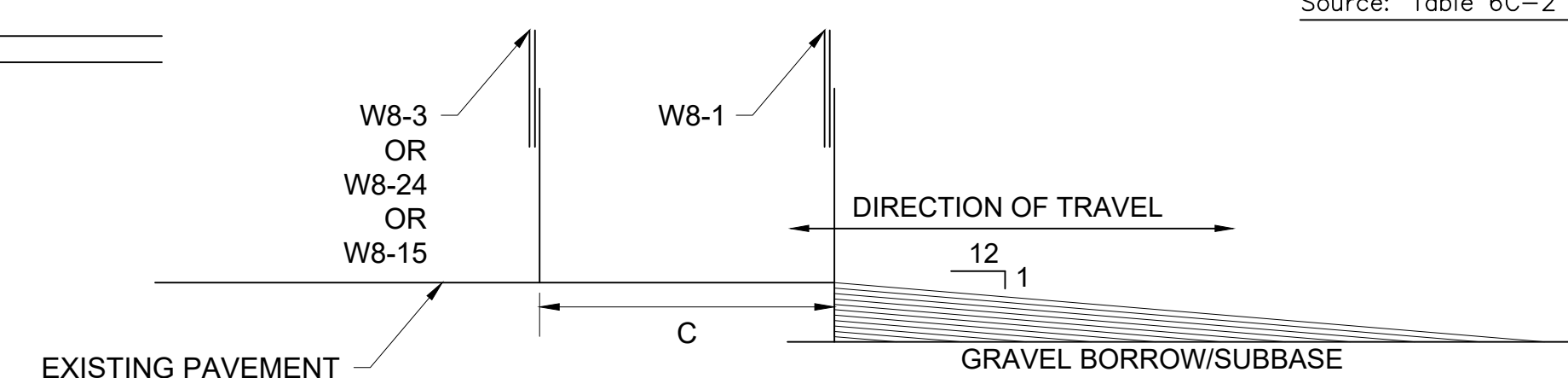
Source: Table 6C-2 MUTCD LATEST EDITION



**ONE LANE ALTERNATING TRAFFIC DETAIL (IF REQUIRED)**

NOT TO SCALE

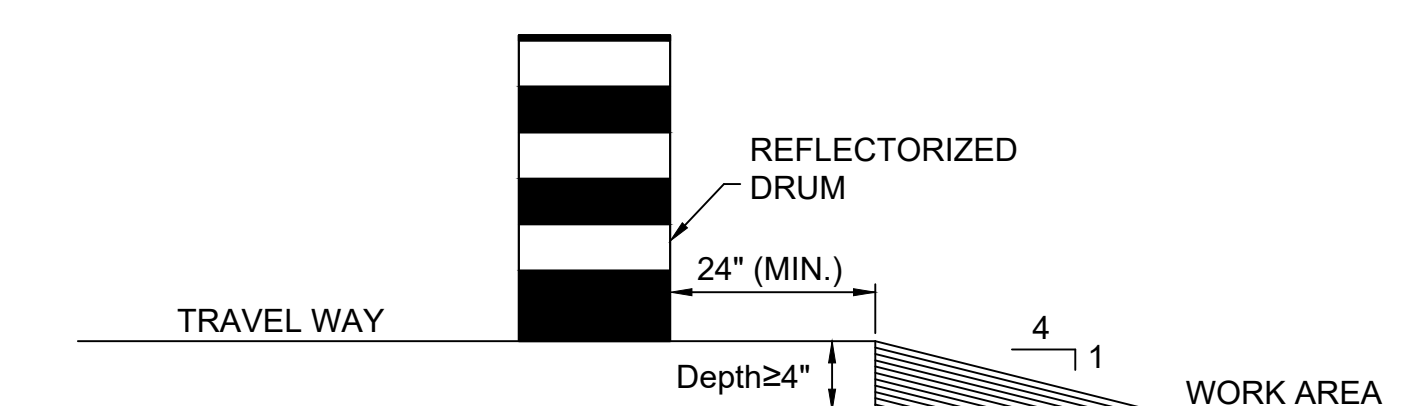
THIS SETUP MAY NOT BE LEFT AFTER WORK HOURS. THE W20-4 AND MA-W20-7b or W20-7 SIGNS MUST BE TAKEN DOWN OR COMPLETELY COVERED WHEN BOTH LANES ARE OPEN.



**LONGITUDINAL DROP OFF DETAIL**

NOT TO SCALE

\*INCREASE SLOPE RATIO FOR HIGHER SPEEDS



**LATERAL DROP-OFF DETAIL**

NOT TO SCALE

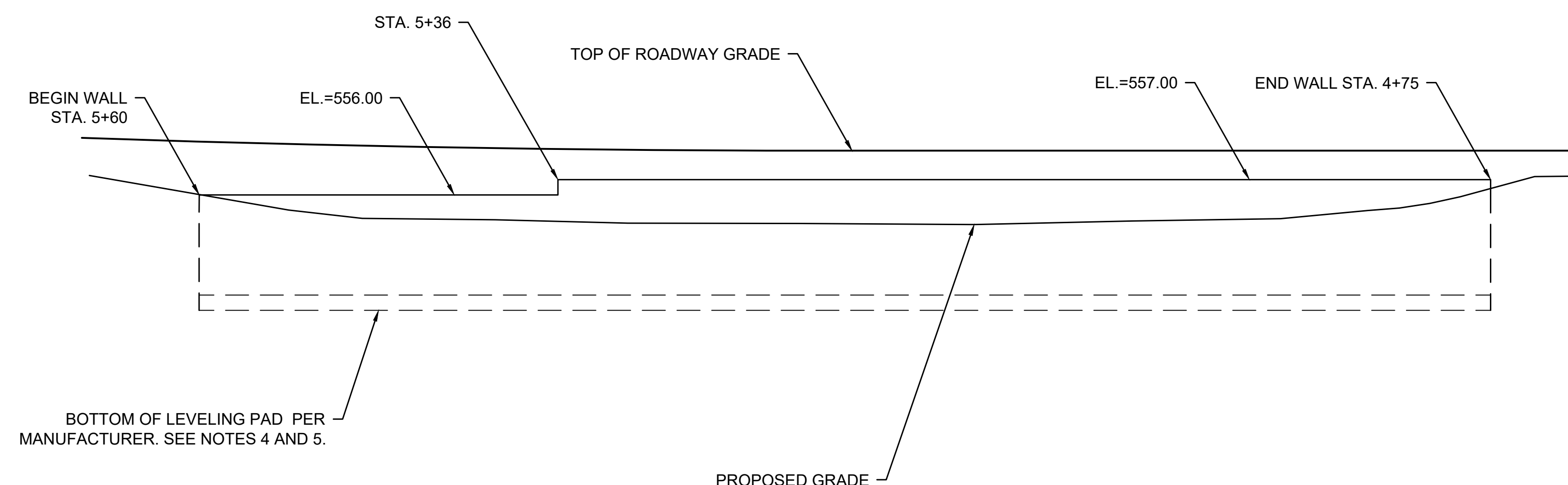
**HARDWICK/NEW BRAINTREE  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	12	37
PROJECT FILE NO.		608851	

**RETAINING WALL DETAILS**

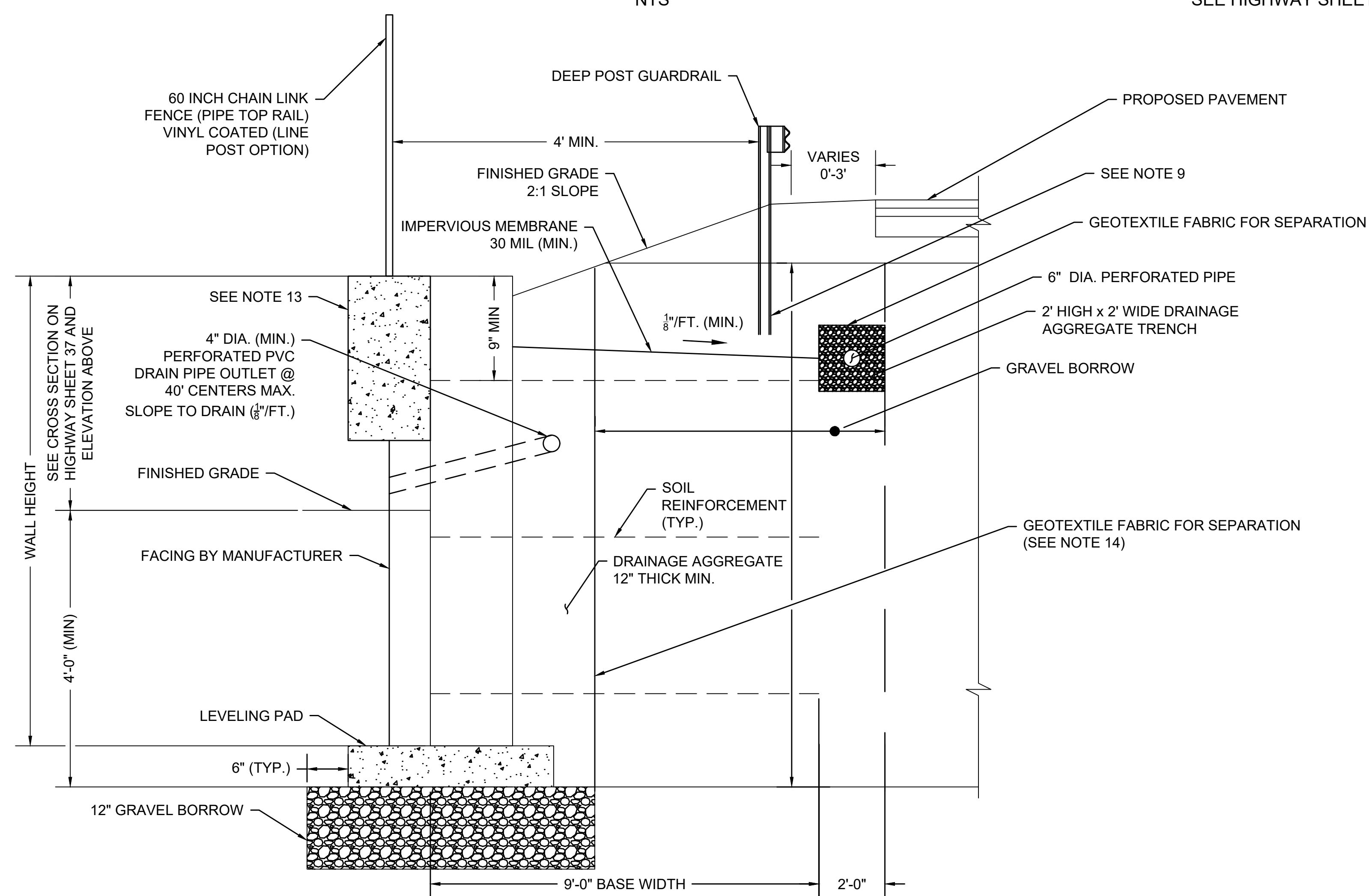
**NOTES:**

- REFER TO BRIDGE SHEET 4 FOR BORINGS.
- MECHANICALLY STABILIZED EARTH WALL TO BE PAID FOR UNDER ITEM NO. 996.31 - MECHANICALLY STABILIZED EARTH WALL. SEE SPECIAL PROVISION.
- SUPPORT OF EXCAVATION FOR THE CONSTRUCTION OF THE RETAINING WALL IS INCLUDED IN THE COST FOR ITEM NO. 996.31 - MECHANICALLY STABILIZED EARTH WALL.
- BOTTOM OF LEVELING PAD ELEVATIONS ARE BASED OFF OF MINIMUM 4 FEET DEPTH FROM GRADE AND OVER-EXCAVATION IF NECESSARY.
- OVER-EXCAVATION MAY BE REQUIRED TO REACH SUITABLE SUBGRADES. LEVELING PAD MUST SIT ON ALLUVIAL DEPOSITS (SAND AND GRAVEL). SEE BORING LOGS ON BRIDGE SHEET 4.
- THE CONTRACTOR SHALL PROVIDE COMPLETE DESIGN CALCULATIONS, SHOP DRAWINGS, AND SPECIFICATIONS IN ACCORDANCE WITH THE CONTRACT SPECIAL PROVISIONS.
- PLANS, ELEVATIONS, AND DETAILS SHOWN ON THE CONTRACT DRAWINGS ARE INTENDED TO INDICATE WALL LOCATIONS, LENGTHS, HEIGHTS, AND DETAILS COMMON TO THE WALL SYSTEM SELECTED. THE CONTRACTOR SHALL VERIFY THE WALL SYSTEM SELECTED WILL CONFORM TO THE REQUIRED ALIGNMENT AND DETAILS SHOWN.
- DESIGN FOR THE MSE WALL TO PROVIDE FOR FINISHED GRADE SLOPED BEHIND WALL AS SHOWN.
- AT AREAS OF GUARDRAIL POSTS, FOLLOW THE MANUFACTURER'S RECOMMENDATIONS AS TO NOT DAMAGE SOIL REINFORCEMENT.
- THE FACTORED BEARING PRESSURE = 0.92 KSF. THE FACTORED BEARING RESISTANCE = 5.10 KSF. THE FACTORED BEARING RESISTANCE IS THE PRODUCT OF THE NOMINAL BEARING RESISTANCE AND A RESISTANCE FACTOR OF 0.65.
- A MINIMUM SOIL REINFORCEMENT LENGTH OF 9 FEET IS RECOMMENDED BUT NOT LESS THAN 70% OF THE WALL HEIGHT IF SMALLER COMPACTION EQUIPMENT IS USED PER AASHTO LRFD SECTION C11.10.2.1.
- THE RETAINED SOIL UNIT WEIGHT = 120 PCF, THE RETAINED SOIL FRICTION ANGLE = 33 DEGREES, AND THE COHESION = 0 PSF.
- BASE FOR THE FENCE MOUNT SHOWN IS BASED ON THE PROPRIETARY SYSTEM OF THE REINFORCED EARTH COMPANY. THE ACTUAL SYSTEM MAY VARY BY MANUFACTURER. THE CONCRETE BASE, IF NECESSARY, IS INCLUDED IN THE COST OF ITEM NO. 996.31 - MECHANICALLY STABILIZED EARTH WALL.
- THE GEOTEXTILE FABRIC FOR SEPARATION IS INCLUDED IN THE COST OF ITEM NO. 996.31 - MECHANICALLY STABILIZED EARTH WALL.



**RETAINING WALL NORTH ELEVATION  
NTS**

FOR CONSTRUCTION PLANS:  
SEE HIGHWAY SHEET 4

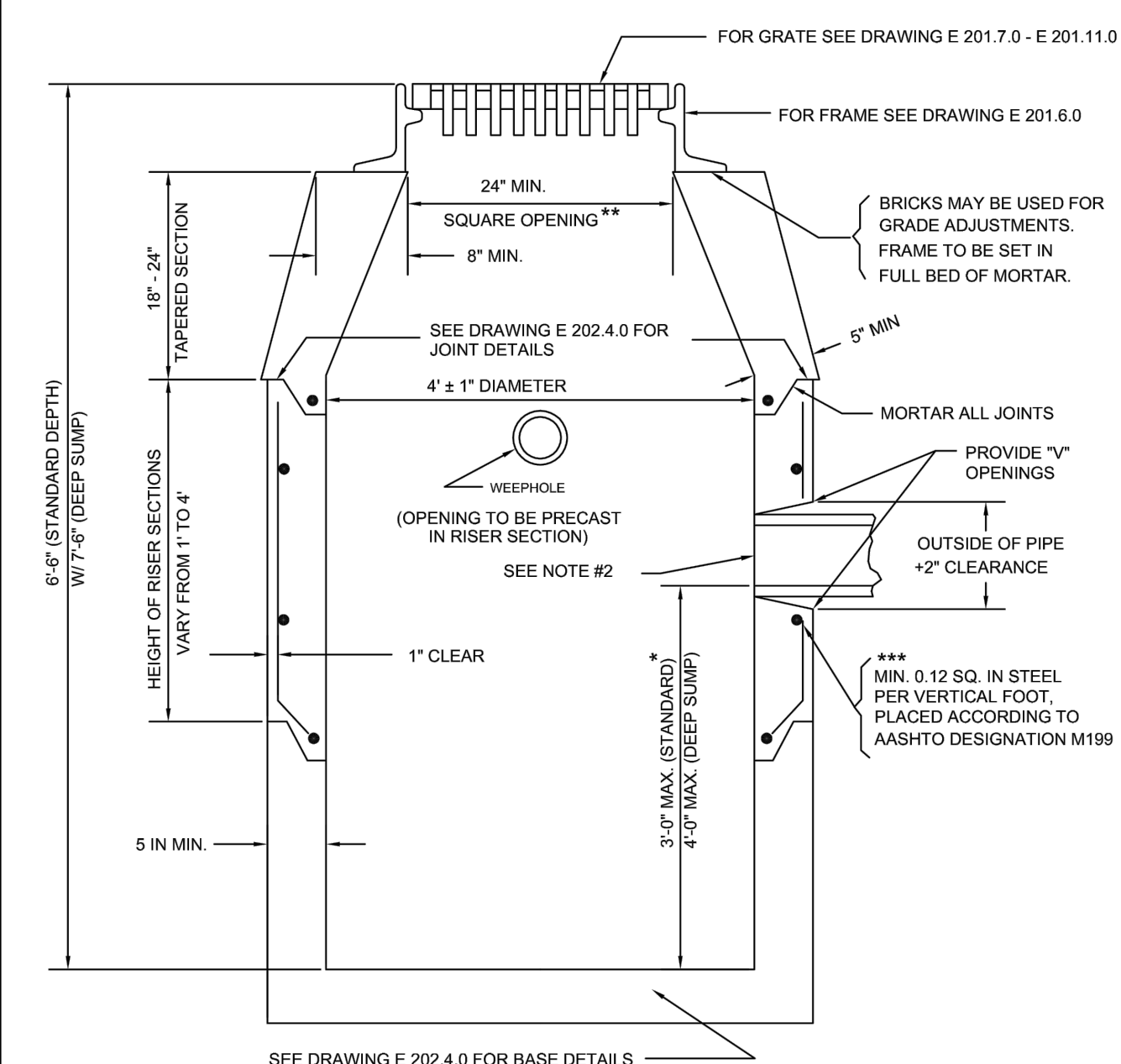


**MECHANICALLY STABILIZED EARTH WALL  
NTS**

**HARDWICK/NEW BRAINTREE  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	13	37
PROJECT FILE NO.		608851	

**CONSTRUCTION DETAILS**



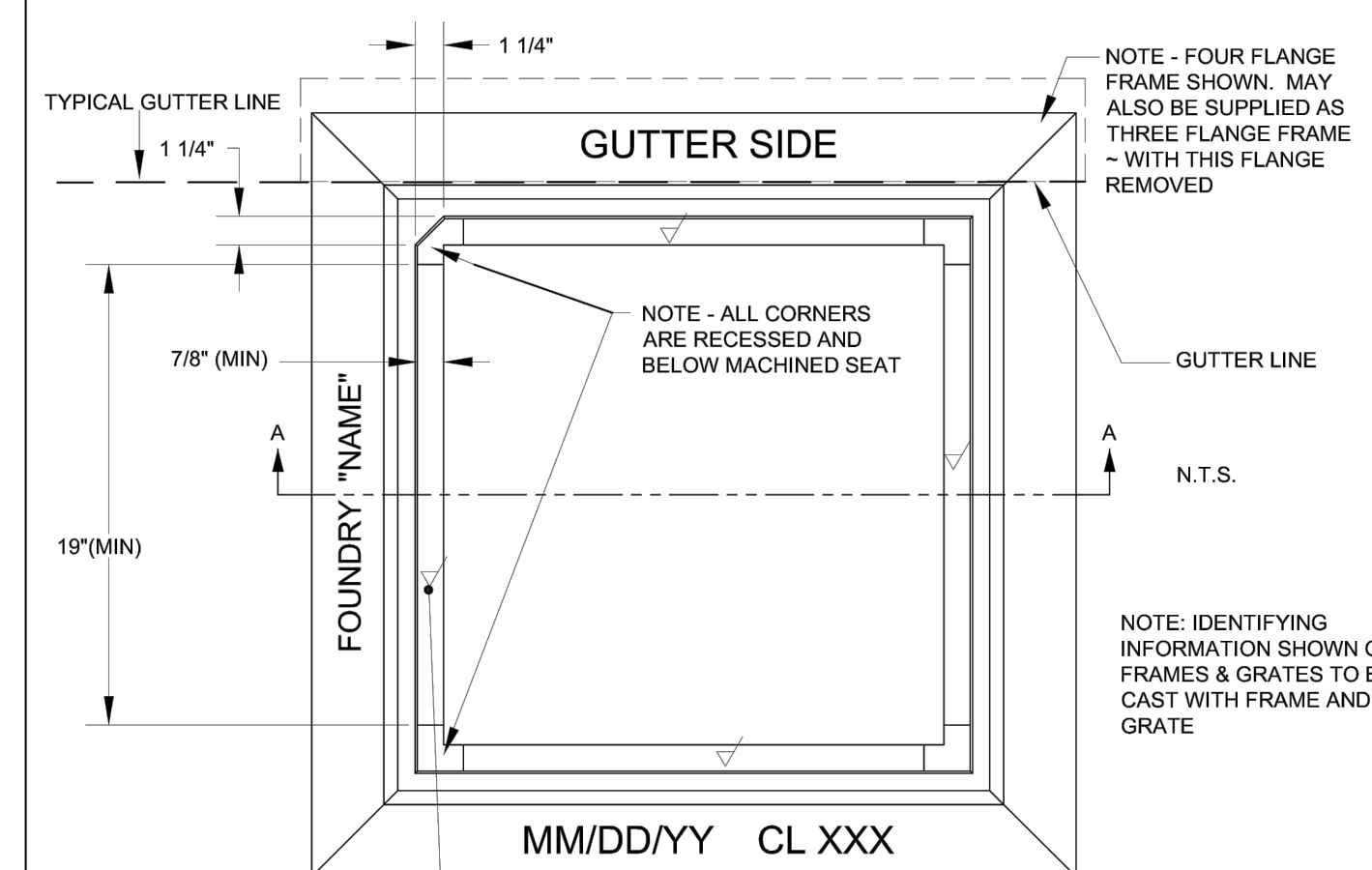
- NOTES:**
- MINIMUM DEPTH OF SUMP TO BE 2 FT
  - WHEN A CURB INLET IS INSTALLED, THE OPENING IS TO BE 24"x1" X 27"x1"
  - REINFORCING STEEL BASED ON A WALL THICKNESS OF 5"

- NOTES:**
- DETAILS NOT INDICATED ABOVE ARE TO BE SIMILAR TO THOSE SHOWN ON E 201.3.0
  - FACE OF PIPE FLUSH OR NOT TO PROJECT MORE THAN 4" FROM FACE OF WALL ALONG CENTERLINE OF PIPE.
  - FOR DESCRIPTION, MATERIALS AND CONSTRUCTION METHOD, SEE STANDARD SPECIFICATIONS.
  - ALL CONCRETE TO BE AIR ENTRAINED



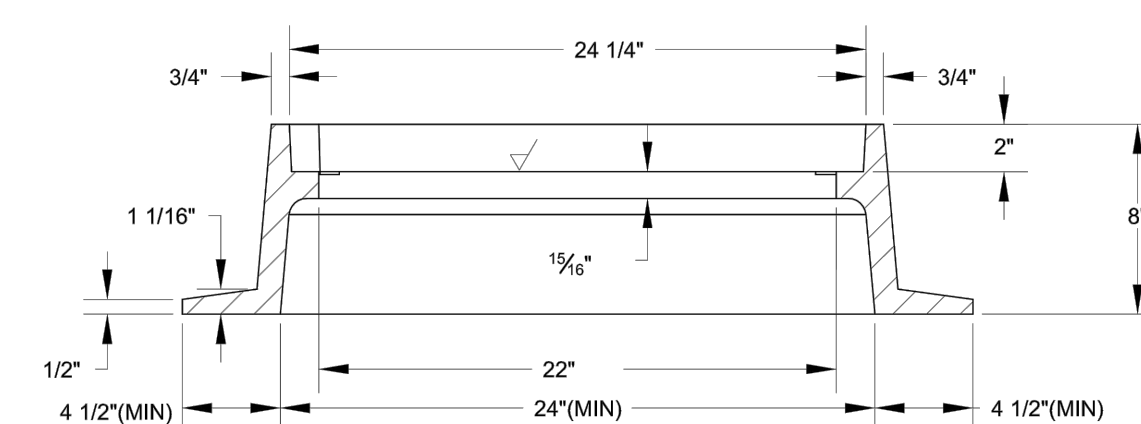
**PRECAST  
CATCH BASIN**

DATE OF ISSUE  
OCTOBER 2017  
DRAWING NUMBER  
**E 201.4.0**



**MACHINE TOLERANCES:**  
MACHINED SEATS (4) REQUIRED FLAT AND IN PLANE WITHIN .010" TOTAL INDICATOR READING

**CLASSIFICATION:**  
CAST IRON - SEE STANDARD SPECIFICATIONS WITH NO BLACK ASPHALT COATING ALLOWED



**WEIGHTS:**  
3-FLANGE FRAME 240 LBS. MIN  
4-FLANGE FRAME 270 LBS. MIN

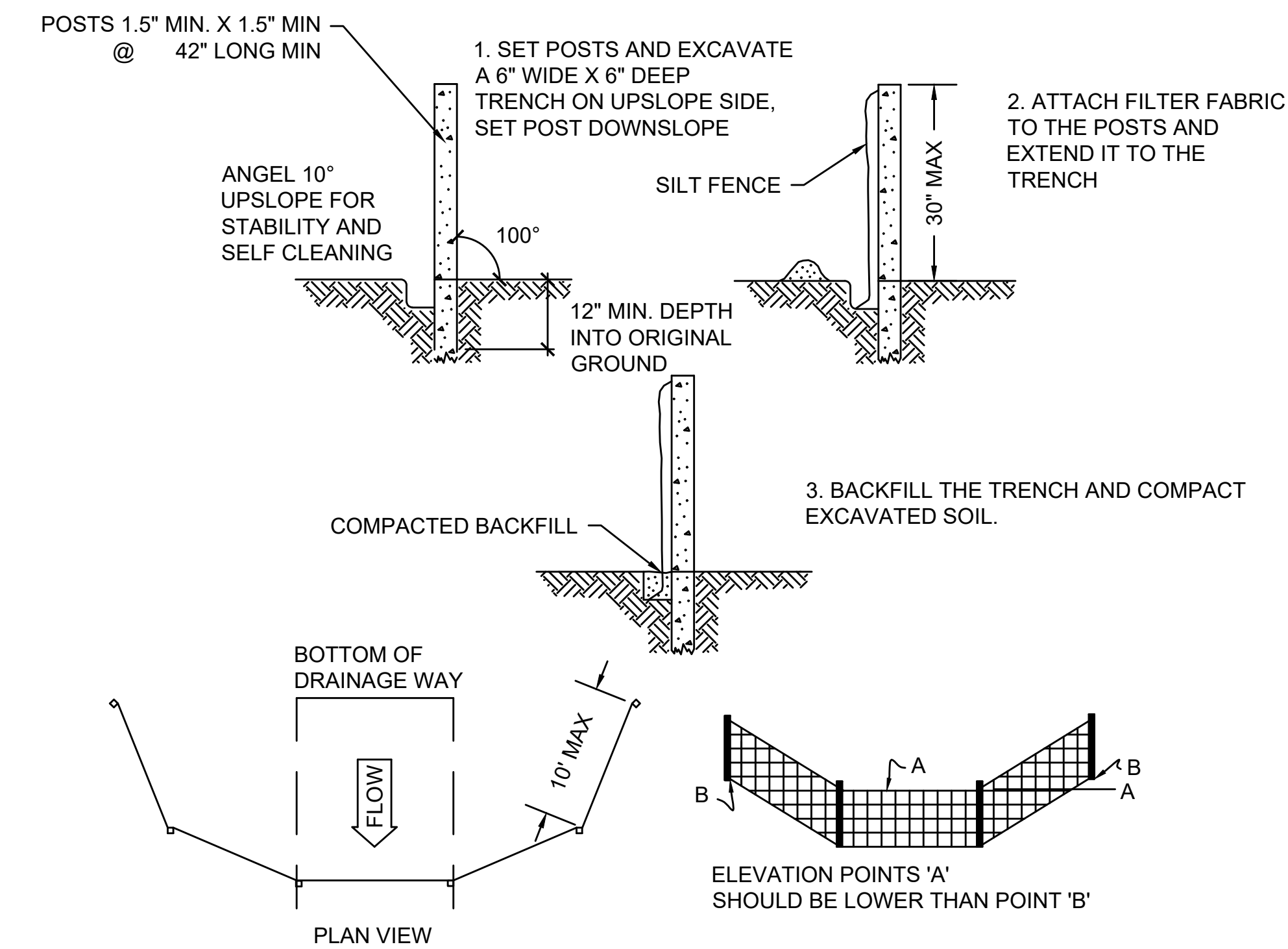
AASHTO HS 20 LOAD RATED

**CASTING TOLERANCES:**  
SHALL CONFORM TO AASHTO M306



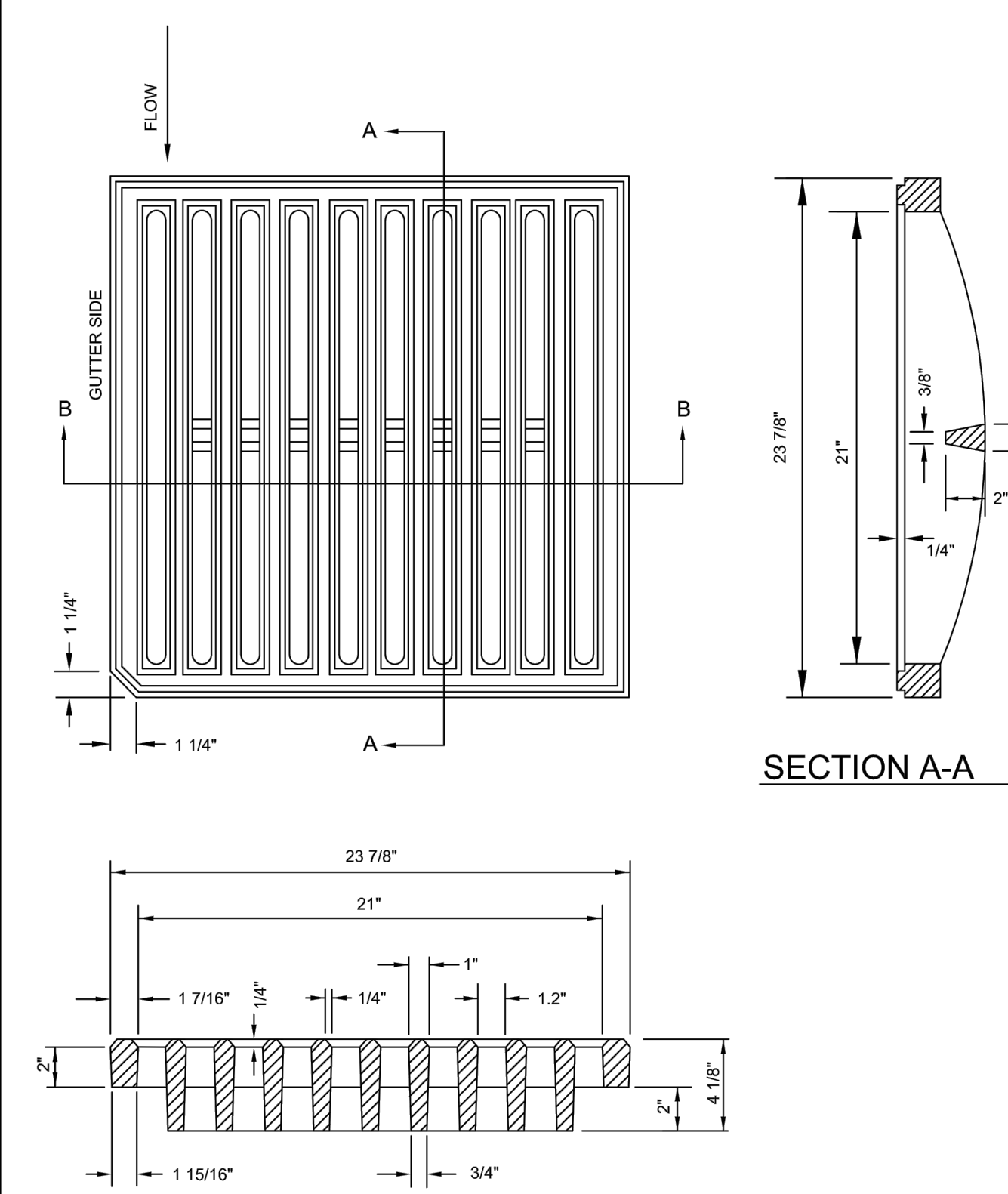
**CATCH BASIN FRAME**

DATE OF ISSUE  
OCTOBER 2017  
DRAWING NUMBER  
**E 201.6.0**

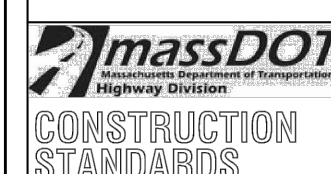


**SEDIMENTATION CONTROL SYSTEM**

N.T.S.

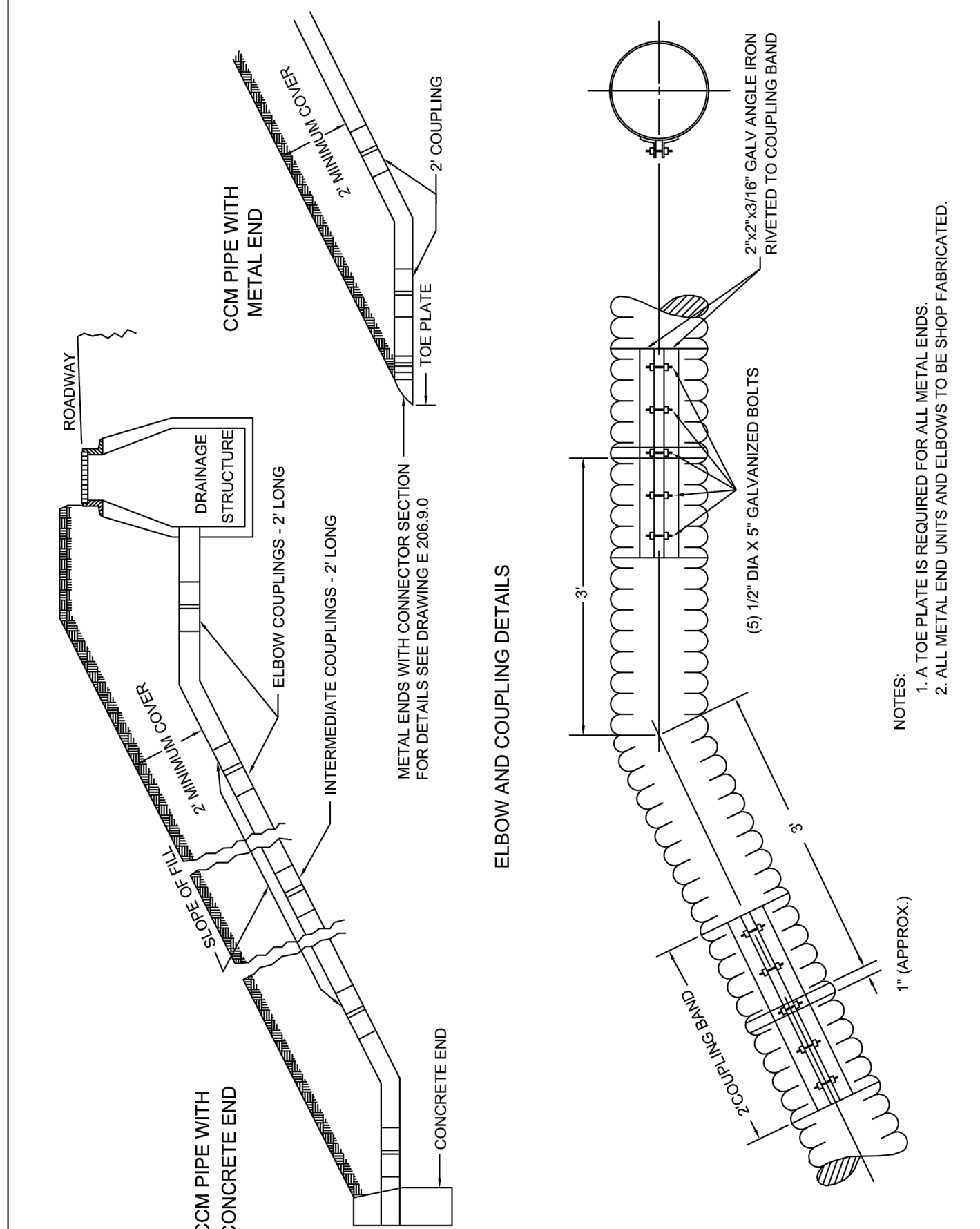


- NOTES:**
- MATERIAL - CAST IRON; SEE STANDARD SPECIFICATIONS
  - MINIMUM MASS - 210 LBS.



**DROP INLET GRATE**

DATE OF ISSUE  
OCTOBER 2017  
DRAWING NUMBER  
**E 201.11.0**

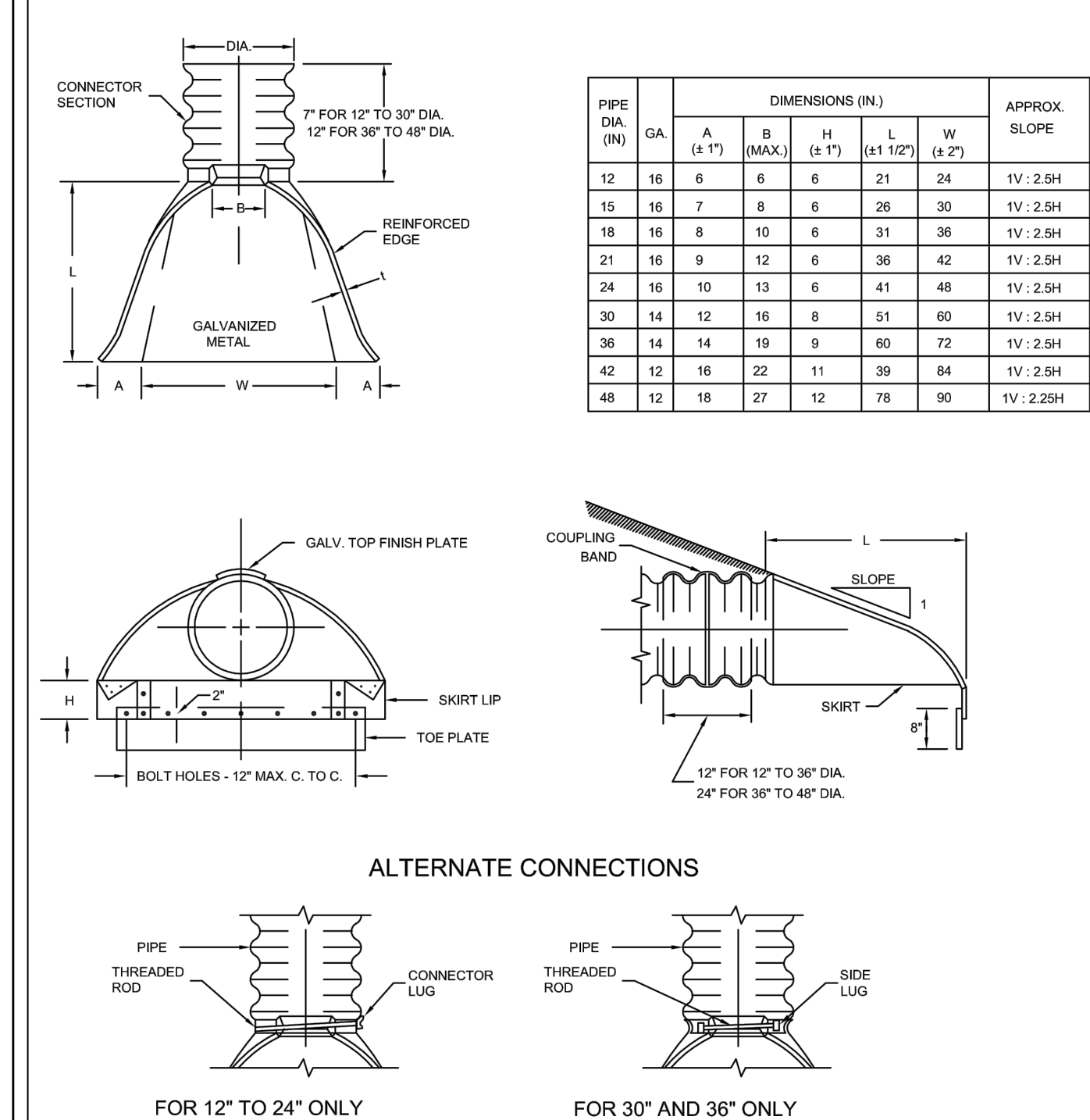


- NOTES:**
- TOE PLATE IS REQUIRED FOR ALL METAL ENDS.
  - ALL METAL END UNITS AND ELBOWS TO BE SHOP FABRICATED.

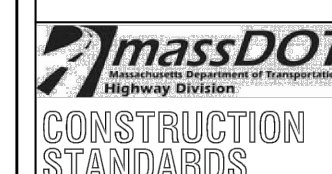


**CORRUGATED METAL PIPE  
UNDER FILL SLOPES**

DATE OF ISSUE  
OCTOBER 2017  
DRAWING NUMBER  
**E 206.3.0**



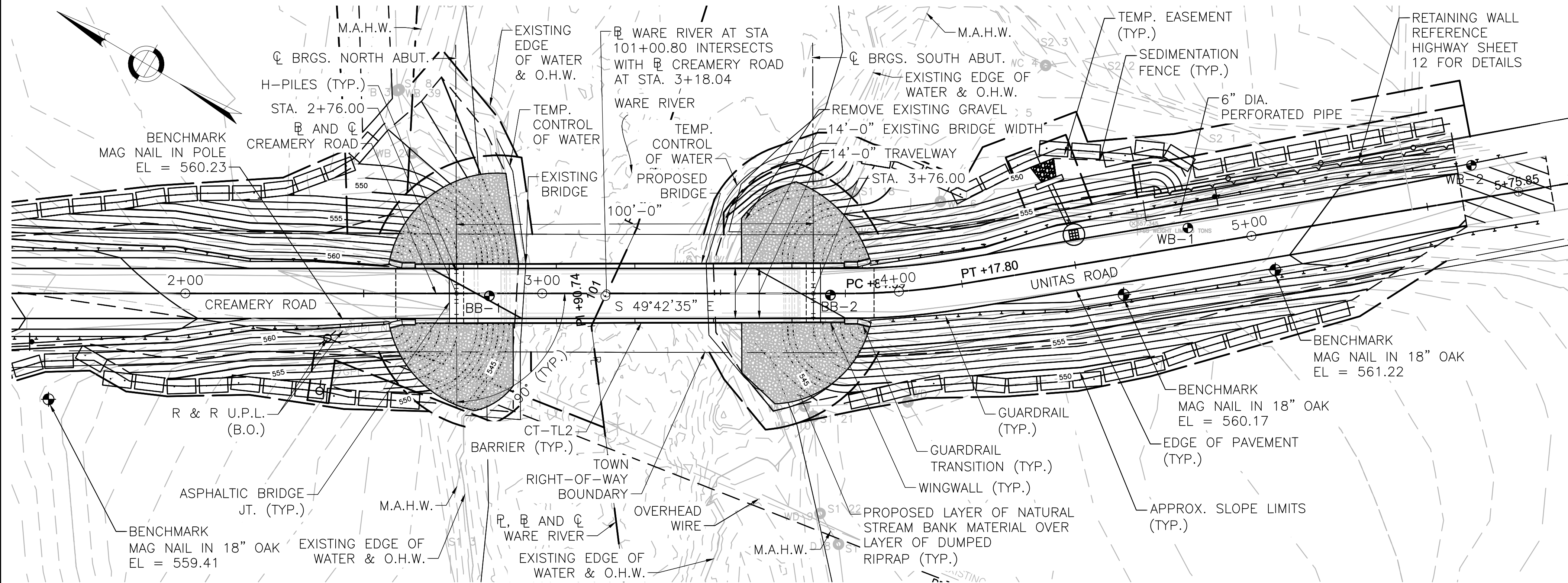
- NOTES:**
- TOE PLATE TO BE PUNCHED TO MATCH HOLES IN SKIRT LIP. 3/8" Ø GALVANIZED BOLTS TO BE FURNISHED. LENGTH OF TOE PLATE TO BE W+10" FOR 12" TO 30" DIA. PIPE AND W+22" FOR 36" TO 48" DIA.
  - SKIRT SECTION FOR 12" TO 24" DIA. PIPE TO BE MADE IN ONE PIECE. SKIRT SECTION FOR 12" TO 30" DIA. PIPE MAY BE MADE FROM TWO SHEETS JOINED BY RIVETING OR BOLTING ON CENTER LINE WITH 3/8" DIA. FASTENERS.
  - CONNECTOR SECTION, TOE PLATE AND SKIRT TO BE OF SAME THICKNESS METAL. EACH TO BE GALVANIZED AND COATED WITH A TAR BASE PAINT.
  - FOR DESCRIPTION, MATERIALS AND CONSTRUCTION METHOD, SEE LATEST STANDARD SPECIFICATIONS.



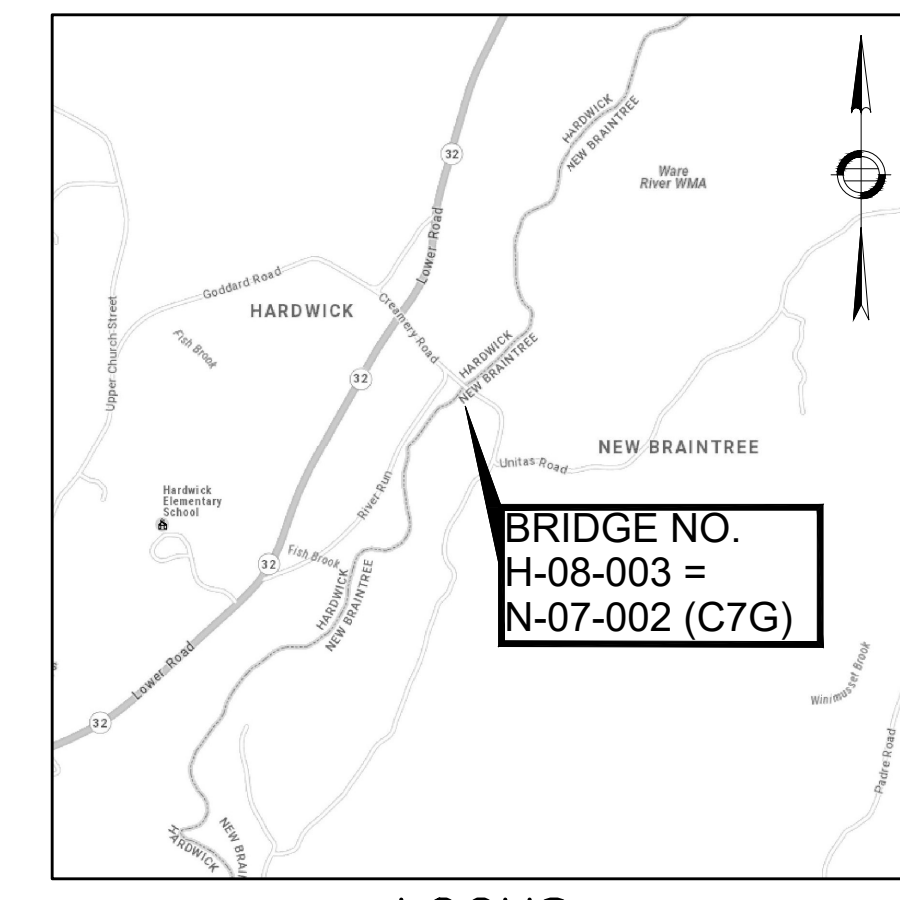
**STANDARD METAL END**

DATE OF ISSUE  
OCTOBER 2017  
DRAWING NUMBER  
**E 206.9.0**





**KEY PLAN**  
SCALE: 1" = 20'

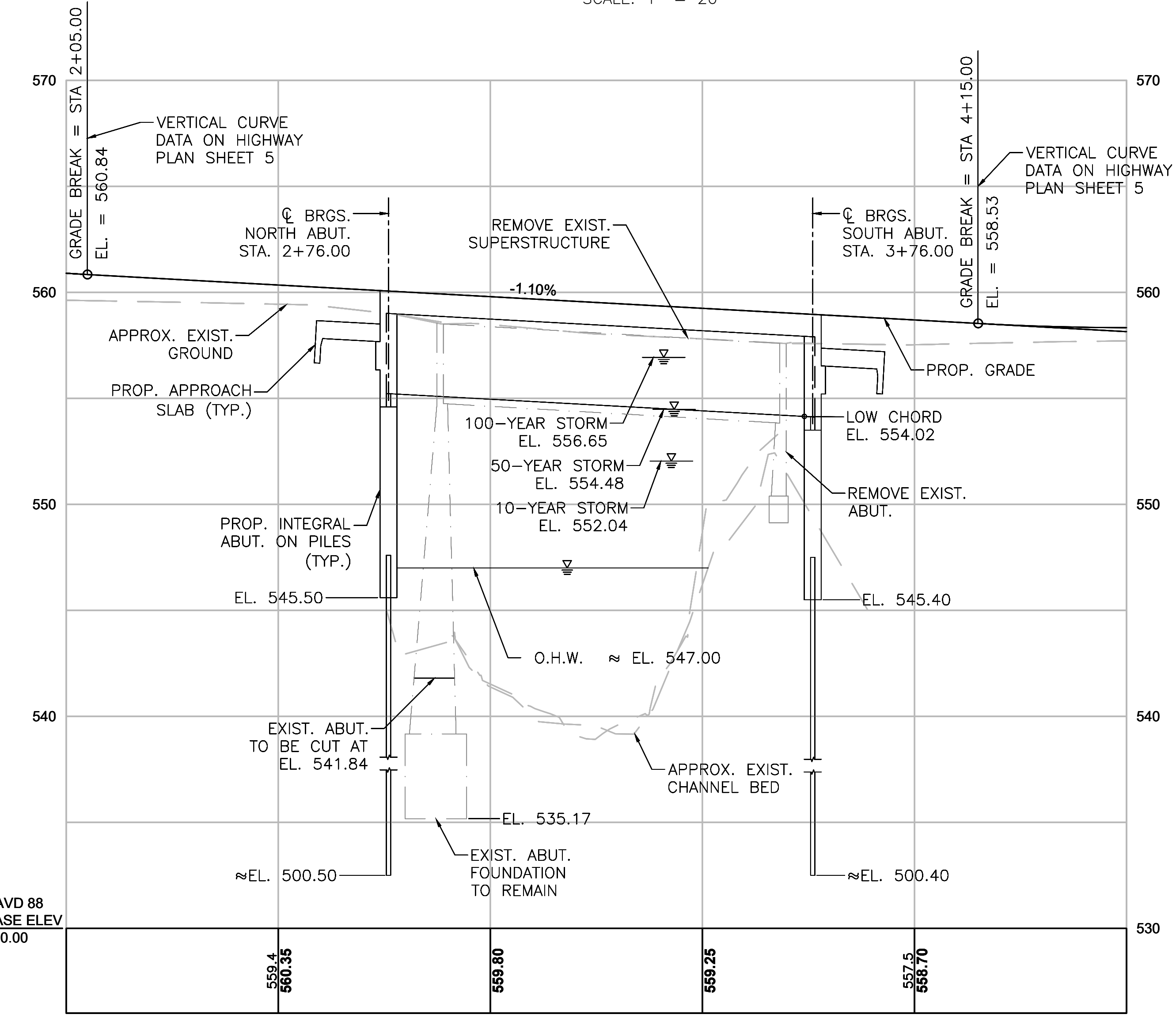


**LOCUS**  
SCALE: 1" = 2000'

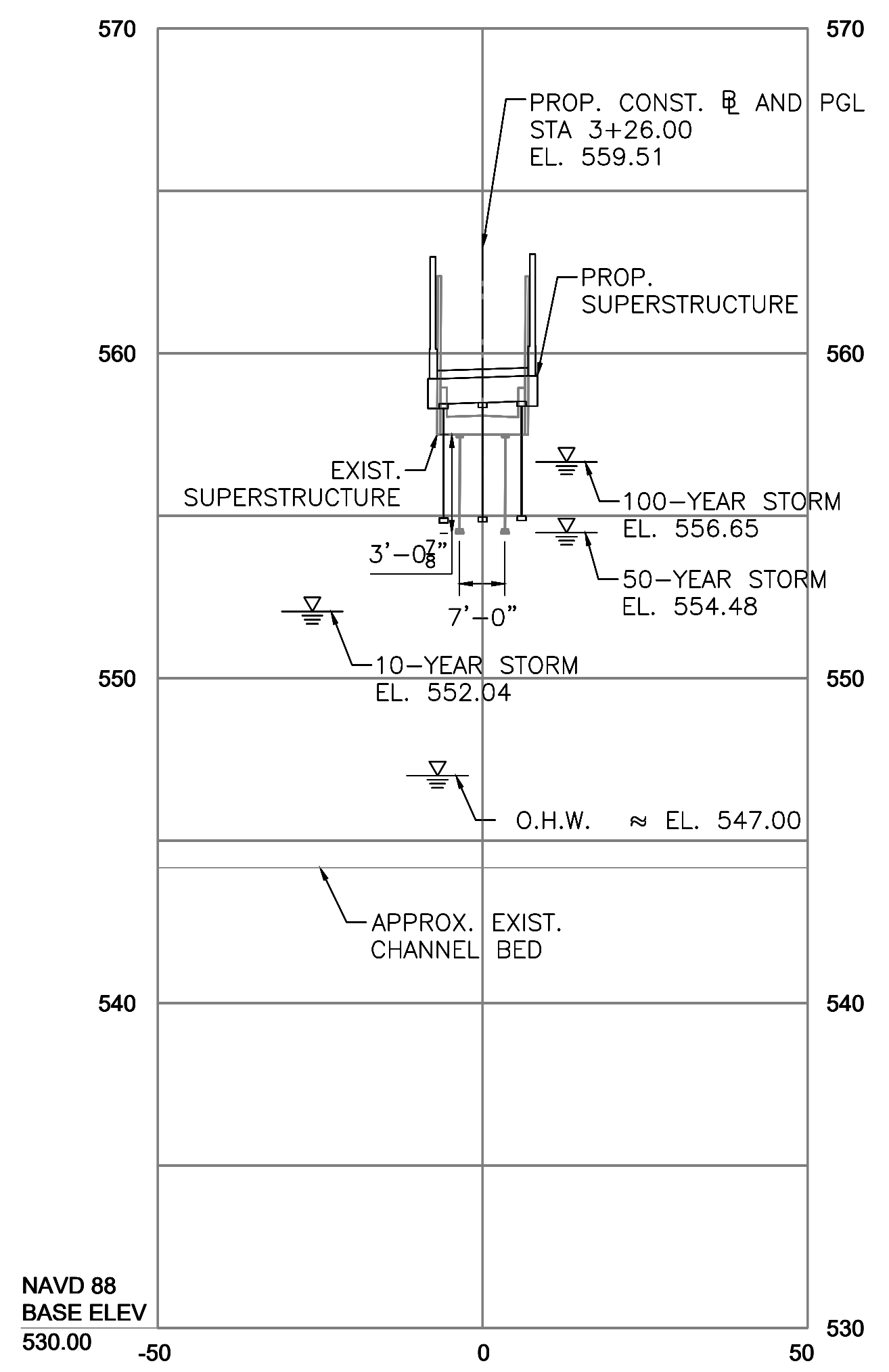
**HARDWICK-NEW BRAINTREE  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	14	37
PROJECT FILE NO.		608851	

**KEY PLAN, LOCUS & PROFILE**



**PROFILE - ALONG CONST. B & P.G.L.**  
SCALE: 1" = 20' HORIZ.  
1/4" = 1'-0" VERT.



**PROFILE - ALONG WARE RIVER**  
SCALE: 1" = 20' HORIZ.  
1/4" = 1'-0" VERT.

DRAWING INDEX	
DRAWING TITLE	SHEET NO.
KEY PLAN, LOCUS & PROFILE	1
GENERAL NOTES	2
BORING LOGS	3
BORING LOGS (CONTINUED)	4
GENERAL PLAN & ELEVATION	5
ABUTMENT PILE LAYOUT & REINFORCEMENT	6
NORTH ABUTMENT	7
SOUTH ABUTMENT	8
ABUTMENT SECTIONS	9
ABUTMENT REINFORCEMENT	10
TYPICAL WINGWALL SECTION	11
APPROACH SLAB & PEDESTAL DETAILS	12
HIGHWAY GUARDRAIL TRANSITION BASE DETAILS	13
FRAMING PLAN & DETAILS	14
CAMBER TABLE	15
CROSS FRAME DETAILS	16
BOLTED FIELD SPLICE DETAILS	17
TRANSVERSE SECTION & DECK DETAILS	18
JOINT & DECK DRAIN DETAILS	19
HIGHWAY GUARDRAIL TRANSITION DETAILS	20

Charles Packer  
220 NORWOOD PARK  
SOUTH, SUITE 201,  
NORWOOD, MA 02062

JUNE 29, 2024 ISSUED FOR CONSTRUCTION

**PROPOSED BRIDGE  
HARDWICK-NEW BRAINTREE  
CREAMERY ROAD  
OVER WARE RIVER**

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION  
HIGHWAY DIVISION  
10 PARK PLAZA BOSTON, MASS

Alexander K. Bardow, P.E. Digitally signed by Alexander K. Bardow, P.E. Date: 2024.07.16 11:22:38 -0400  
Carrie Lavallee, P.E. Digitally signed by Carrie Lavallee, P.E. Date: 2024.07.18 09:20:41 -0400

STATE BRIDGE ENGINEER CHIEF ENGINEER

**HARDWICK-NEW BRAintree  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	15	37
PROJECT FILE NO.		608851	

**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.

**MASSDOT BENCH MARK:**

MAG NAIL IN 18" OAK: ELEV = 559.41  
N = 2942796.18  
E = 473563.59

MAG NAIL IN POLE: ELEV = 560.23  
N = 2942759.12  
E = 473639.59

MAG NAIL IN 18" OAK: ELEV = 560.17  
N = 2942623.86  
E = 473812.19

MAG NAIL IN 18" OAK: ELEV = 561.22  
N = 2942601.57  
E = 473848.96

ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.

**DATE:**

TO BE PLACED ON THE INSIDE FACE OF THE NORTHEASTERN AND SOUTHWESTERN HIGHWAY GUARDRAIL TRANSITIONS. 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 HIGHWAY GUARDRAIL TRANSITION IS CONSTRUCTED. BOTH HIGHWAY GUARDRAIL TRANSITIONS SHALL FEATURE THE SAME DATE.

**MASSDOT SURVEY NOTES:**

ELECTRONIC SURVEY PERFORMED BY BL COMPANIES WAS USED IN THE PREPARATION OF THESE CONSTRUCTION PLANS.

**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. THE CONTRACTOR SHALL BE PREPARED TO PRE-DRILL THROUGH POTENTIAL OBSTRUCTIONS, AS DEFINED IN ITEMS 944.2 AND 944.3 IN THE SPECIAL PROVISIONS. IT IS UP TO THE MEANS AND METHODS OF THE CONTRACTOR TO REMOVE OBSTRUCTIONS AND KEEP THE HOLE FROM COLLAPSING. CASING MAY BE NEEDED TO KEEP THE PRE-DRILL HOLE FROM COLLAPSING. ADDITIONALLY, THE CONTRACTOR SHALL PROVIDE CASING AT THE DISCRETION OF THE RESIDENT 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:**

5000 PSI, 3/4" IN., 685 HP CEMENT CONCRETE SHALL BE PROVIDED FOR THE DECK, CAST IN PLACE DIAPHRAGMS, ABUTMENT STEMS, PEDESTALS, WINGWALL STEMS, APPROACH SLABS AND PRECAST HIGHWAY GUARDRAIL TRANSITIONS.

5000 PSI, 3/8" IN., 710 HP CEMENT CONCRETE SHALL BE PROVIDED FOR THE CT-TL2 BARRIER.

**REINFORCEMENT:**

REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 31 GRADE 60. 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"	19"	23"
2. 12" OF CONCRETE BELOW BAR	20"	25"	30"
3. EPOXY COATED BARS, COVER < 3d <sub>b</sub> , OR CLEAR SPACING < 6d <sub>b</sub>	23"	29"	34"
4. COATED BARS, ALL OTHER CASES	18"	23"	27"
5. CONDITION 2 AND 3	26"	32"	39"
6. CONDITION 2 AND 4	24"	30"	36"

NOTE: BARS ARE TO BE EPOXY COATED

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

**MEMBRANE WATERPROOFING:**

ALL MEMBRANE WATERPROOFING USED ON BRIDGE DECKS SHALL BE MEMBRANE WATERPROOFING FOR BRIDGE DECKS - SPRAY APPLIED.

**EXISTING BRIDGE PLANS:**

PLANS FOR EXISTING BRIDGE (H-08-003), DATED AUGUST 1961 MAY BE SEEN AT THE OFFICE OF PLANS AND RECORDS, MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, 10 PARK PLAZA, BOSTON, MASSACHUSETTS. DIMENSIONS AND DETAILS OF THE EXISTING STRUCTURE ARE NOT GUARANTEED AND SHALL BE VERIFIED BY THE CONTRACTOR.

**BRIDGE DEMOLITION:**

THE DEMOLITION OF THE BRIDGE IS PAID UNDER PAY ITEM 115.1. SEE SPECIAL PROVISION.

THE DISPOSAL OF THE WOOD RAILINGS IS PAID FOR UNDER "DISPOSAL OF TREATED WOOD PRODUCTS."

ESTIMATED BRIDGE QUANTITIES		
ITEMS	UNITS	QUANTITY
DEMOLITION OF BRIDGE NO. H-08-003=N-07-002 (18J)	LS	1
BRIDGE EXCAVATION	CY	530
CLASS B ROCK EXCAVATION	CY	110
GRAVEL BORROW FOR BRIDGE FOUNDATION	CY	150
CRUSHED STONE	TON	170
CRUSHED STONE FOR BRIDGE FOUNDATIONS	TON	20
DISPOSAL OF TREATED WOOD PRODUCTS	TON	3
SUPERPAVE BRIDGE SURFACE COURSE - 9.5 (SSC-B - 9.5)	TON	60
SUPERPAVE BRIDGE PROTECTIVE COURSE - 9.5 (SPC-B - 9.5)	TON	20
GEOTEXTILE FABRIC FOR PERMANENT EROSION CONTROL	SY	530
STEEL PILE HP 12 X 84	FT	380
PRE-DRILLING FOR PILES	FT	210
DRILLING FOR PILE OBSTRUCTIONS	FT	23
DYNAMIC LOAD TEST BY CONTRACTOR	EA	4
PILE SHOES	EA	8
DUMPED RIPRAP	TON	490
STREAMBED/BANK RESTORATION	TON	390
CONTROL OF WATER - STRUCTURE NO. H-08-003=N-07-002 C7G	LS	1
BRIDGE STRUCTURE, BRIDGE NO. H-08-003=N-07-002 C7G	LS	1
MECHANICALLY STABILIZED EARTH WALL	SY	75

**TRAFFIC DATA**

	ROADWAY OVER	ROADWAY UNDER
DESIGN YEAR	2025	
AVERAGE DAILY TRAFFIC - PRESENT	100	
AVERAGE DAILY TRAFFIC - DESIGN YEAR	107	
DESIGN HOURLY VOLUME	11	
DIRECTIONAL DISTRIBUTION	50%	
TRUCK PERCENTAGE - AVERAGE DAY	6%	
TRUCK PERCENTAGE - PEAK HOUR	6%	
DESIGN SPEED	25 MPH	
DIRECTIONAL DESIGN HOURLY VOLUME	6	

**SEISMIC DESIGN CRITERIA**

DESIGN RETURN PERIOD:	1,000 YRS
<b>DESIGN SPECTRA</b>	
As	0.097
SDs	0.213
SD1	0.093
SITE CLASS	D
SEISMIC DESIGN CATEGORY (SDC)	A

**HYDRAULIC DESIGN DATA**

DRAINAGE AREA (SQ. MILES)	148
DESIGN FLOOD DISCHARGE (C.F.S.)	3,690
DESIGN FLOOD FREQUENCY (YEARS)	10
DESIGN FLOOD VELOCITY (F.P.S.)	5.8
DESIGN FLOOD ELEVATION (FEET, NAVD)	552.04
<b>BASE (100-YEAR) FLOOD DATA</b>	
BASE FLOOD DISCHARGE (C.F.S.)	7,820
BASE FLOOD ELEVATION (FEET, NAVD)	556.65
<b>DESIGN AND CHECK SCOUR DATA</b>	
DESIGN SCOUR FLOOD EVENT RETURN FREQUENCY (YEARS)	25
DESIGN FLOOD ABUTMENT SCOUR DEPTH (FEET)	1.38
DESIGN FLOOD PIER SCOUR DEPTH (FEET)	N/A
CHECK SCOUR FLOOD EVENT RETURN FREQUENCY (YEARS)	50
CHECK FLOOD ABUTMENT SCOUR DEPTH (FEET)	1.13
CHECK FLOOD PIER SCOUR DEPTH (FEET)	N/A
<b>FLOOD OF RECORD</b>	
DISCHARGE (C.F.S.)	~18,300
FREQUENCY (IF KNOWN, YEARS)	>500
MAXIMUM ELEVATION (FEET, NAVD)	N/A
DATE (MM/YYYY)	09/1938
HISTORY OF ICE FLOES	N/A
EVIDENCE OF SCOUR AND EROSION	6 FEET

**TEMPORARY WATER CONTROL  
DESIGN DATA**

DESIGN FLOOD DISCHARGE (C.F.S.)	1,780
DESIGN FLOOD FREQUENCY (YEARS)	2
DESIGN FLOOD VELOCITY (F.P.S.)	3.9
DESIGN FLOOD ELEVATION (FEET, NAVD)	549.04

JUNE 29, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	



**HARDWICK-NEW BRAINTREE  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	16	37
PROJECT FILE NO.		608851	

**BORING LOGS**

**BORING BB-1:**

Drilling Method		Sampler	Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time (hours)
Type Casing		Split Spoon	01/11/19	00:00	13.2	41	69.3	0
Size ID (in.)		4	01/11/19	00:00	12.8	41	74.9	0

Blow Count	Soil	Percentage	Non-Soil	NOTES
1-5	S-1	10	0.5-2	7
6-10	S-2	9	2-4	7
11-15	S-3	9	4-6	9
16-20	S-4	8	6-8	23
21-25	S-5	7	8-10	9
26-30	S-6	13	10-12	7
31-35	S-7	8	14-16	10
36-40	S-8	8	18-21	7
41-45	S-9	10	24-26	9

BOT. NORTH ABUT.  
EL. 545.50

**BORING BB-1 (CONTINUED):**

Drilling Method		Sampler	Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time (hours)
Type Casing		Split Spoon	01/11/19	00:00	13.2	41	69.3	0
Size ID (in.)		4	01/11/19	00:00	12.8	41	74.9	0

Blow Count	Soil	Percentage	Non-Soil	NOTES
26	S-10	8	29-31	31
27				16
28				11
29				19
30	S-11	9	34-36	13
31				10
32				20
33				13
34	S-12	17	39-40.8	45
35				44
36				60.0*
37				52
38				60.0*
39	S-13	0	44-44	60.0*
40				60.0*
41				60.0*
42				60.0*
43				60.0*
44	S-14	21	49-51	46
45				44
46				60.0*
47				60.0*
48				60.0*
49				60.0*
50				60.0*

BOT. SOUTH ABUT.  
EL. 545.40

**BORING BB-1 (CONTINUED):**

Drilling Method		Sampler	Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time (hours)
Type Casing		Split Spoon	01/11/19	00:00	13.2	41	69.3	0
Size ID (in.)		4	01/11/19	00:00	12.8	41	74.9	0

Blow Count	Soil	Percentage	Non-Soil	NOTES
51				47
52				30
53				26
54	S-15	15	54-56	34
55				29
56				26
57				26
58				30
59	S-16	14	58-60.3	59
60				50
61				60.0*
62				60.0*
63				60.0*
64	S-17	10	64-65.3	8
65				10
66				60.0*
67				60.0*
68				60.0*
69	S-18	3	69-69.4	60.0*
70				60.0*
71				60.0*
72				60.0*
73				60.0*
74	S-19	11	74-74.9	50
75				50

APPROX. PILE TIP  
NORTH ABUT.  
EL. 500.50

**BORING BB-1 (CONTINUED):**

Drilling Method		Sampler	Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time (hours)
Type Casing		Split Spoon	01/11/19	00:00	13.2	41	69.3	0
Size ID (in.)		4	01/11/19	00:00	12.8	41	74.9	0

Blow Count	Soil	Percentage	Non-Soil	NOTES
76				76
77				77
78				78
79				79
80				80
81				81
82				82
83				83
84				84
85				85
86				86
87				87
88				88
89				89
90				90
91				91
92				92
93				93
94				94
95				95
96				96
97				97
98				98
99				99
100				100

APPROX. PILE TIP  
SOUTH ABUT.  
EL. 500.40

**BORING BB-2:**

Drilling Method		Sampler	Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time (hours)
Type Casing		Split Spoon	01/14/19	00:00	12.2	24	79	0
Size ID (in.)		5	01/14/19	00:00	12.2	24	79	0

Blow Count	Soil	Percentage	Non-Soil	NOTES
1	S-1	12	0.5-2	13
2				20
3	S-2	13	3-4	4
4				4
5	S-3	4	4-6	4
6				6
7	S-4	13	6-8	7
8				7
9	S-5	6	8-10	13
10				13
11	S-6	10	10-12	2
12				2
13				6
14	S-7	4	14-16	6
15				4
16				3
17				4
18				4
19	S-8	14	18-21	18
20				24
21				23
22				23
23				23
24	S-9	17	24-26	10
25				9

BOT. SOUTH ABUT.  
EL. 545.40

**BORING BB-2 (CONTINUED):**

Drilling Method		Sampler	Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time (hours)
Type Casing		Split Spoon	01/14/19	00:00	12.2	24	79	0
Size ID (in.)		5	01/14/19	00:00	12.2	24	79	0

Blow Count	Soil	Percentage	Non-Soil	NOTES
26				14
27				11
28				14
29				11
30	S-10	15	29-31	5
31				7
32				10
33				10
34	S-11	12	34-36	11
35				9
36				9
37				9
38				9
39	S-12	15	39-41	12
40				13
41				18
42				20
43				20
44	S-13	15	44-46	18
45				14
46				24
47				18
48				18
49	S-14	18	49-50.8	34
50				35

APPROX. PILE TIP  
SOUTH ABUT.  
EL. 500.40

**BORING BB-2 (CONTINUED):**

Drilling Method		Sampler	Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time (hours)
Type Casing		Split Spoon	01/14/19	00:00	12.2	24	79	0
Size ID (in.)		5	01/14/19	00:00	12.2	24	79	0

Blow Count	Soil	Percentage	Non-Soil	NOTES
51				60.4*
52				60.4*
53				60.4*
54	S-15	18	54-56	41
55				51
56				57
57				49
58				49
59	S-16	11	59-59.8	53
60				60.0*
61				60.0*
62				60.0*
63				60.0*
64	S-17	11	64-64.8	45
65				45
66				60.0*
67				60.0*
68				60.0*
69	S-18	5	69-69.4	60.0*
70				60.0*
71				60.0*
72				60.0*
73				60.0*
74	S-19	5	74-74.4	60.0*
75				60.0*

APPROX. PILE TIP  
SOUTH ABUT.  
EL. 500.40

**BORING NOTES:**

- LOCATION OF BORINGS SHOWN ON THE PLAN THUS: BB-1 AND BB-2
- 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 1/8" I.D. SPLIT SPOON SAMPLER 6" USING A 140 POUND WEIGHT FALLING 30".
- BORING SAMPLES ARE STORED AT NOBIS ENGINEERING, INC. LOCATED AT 585 MIDDLESEX STREET IN LOWELL, MA. THE CONTRACTOR MAY EXAMINE THE SOIL SAMPLES BY CONTACTING NOBIS ENGINEERING.
- BORINGS WERE MADE IN JANUARY 2019.
- BORINGS WERE MADE BY NORTHERN DRILL SERVICES OF NORTHBOROUGH, MASSACHUSETTS AND OBSERVED AND RECORDED BY NOBIS ENGINEERING, INC. OF LOWELL, MASSACHUSETTS.
- THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.

JUNE 29, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

608851\_BRI-14-33(H-08-003-N07-002).DWG Plotted on 16-Jul-2024 9:36:AM 29-June-2024 608851 Structural Submittal (SF)

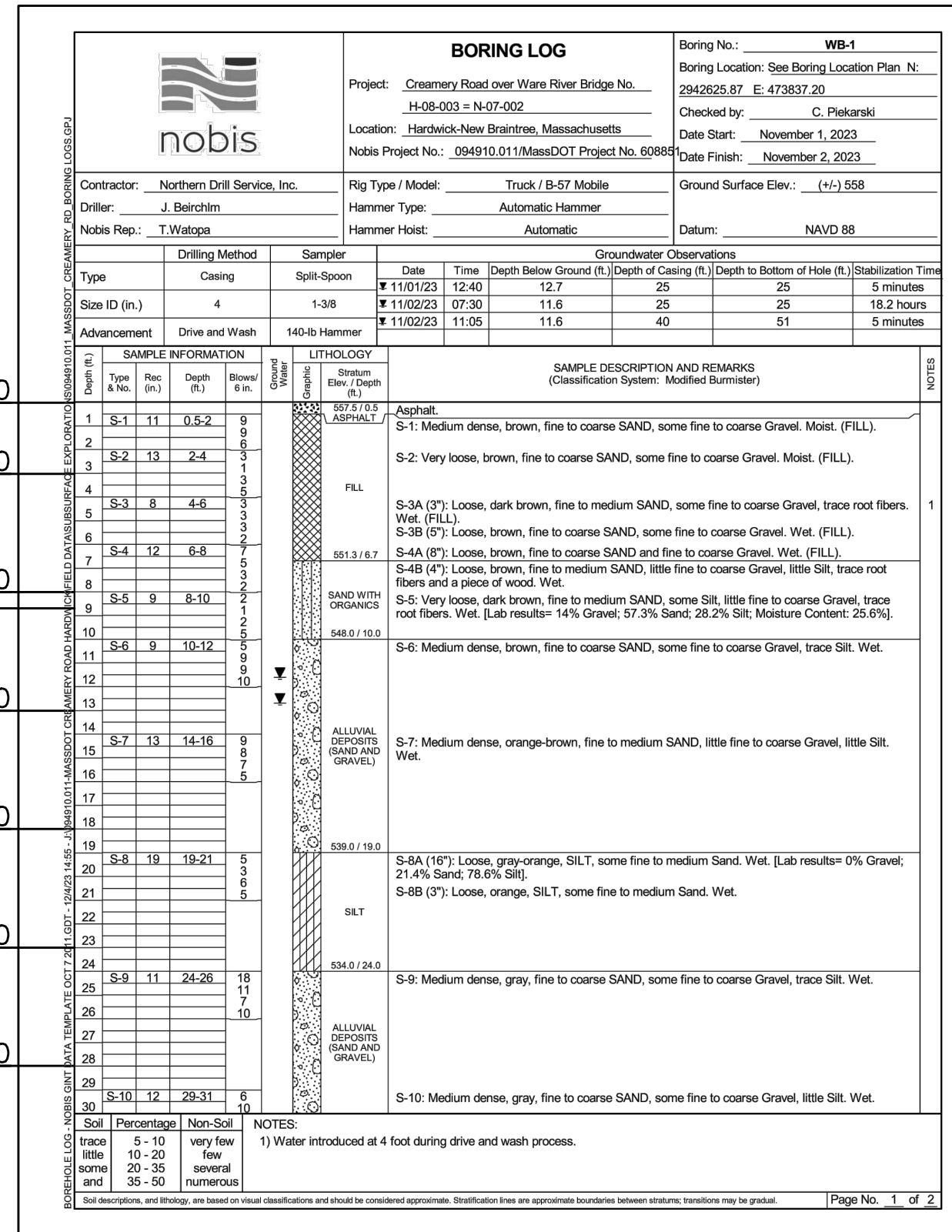


**HARDWICK-NEW BRAINTREE  
CREAMERY ROAD**

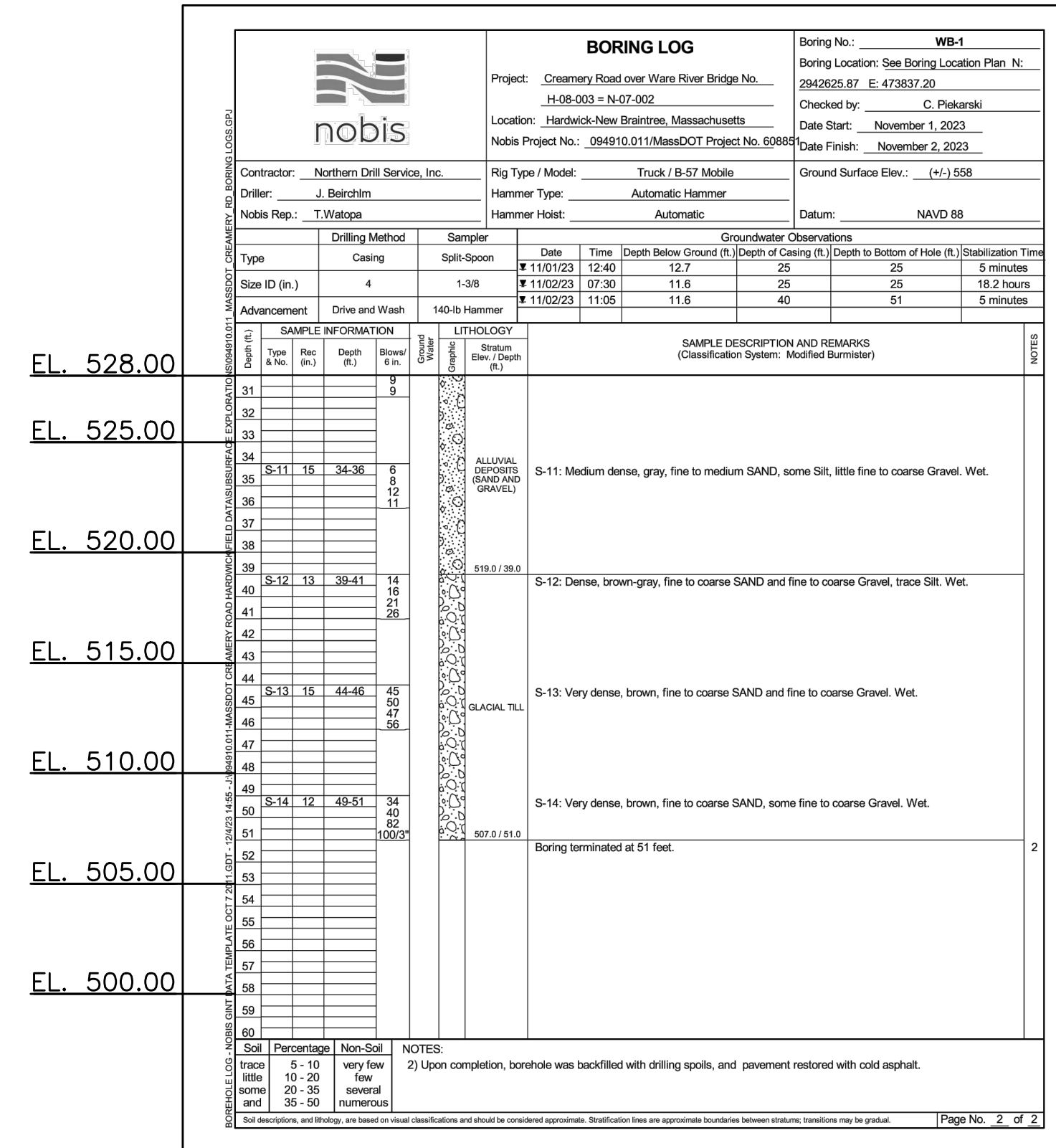
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	17	37
PROJECT FILE NO.		608851	

**BORING LOGS (CONTINUED)**

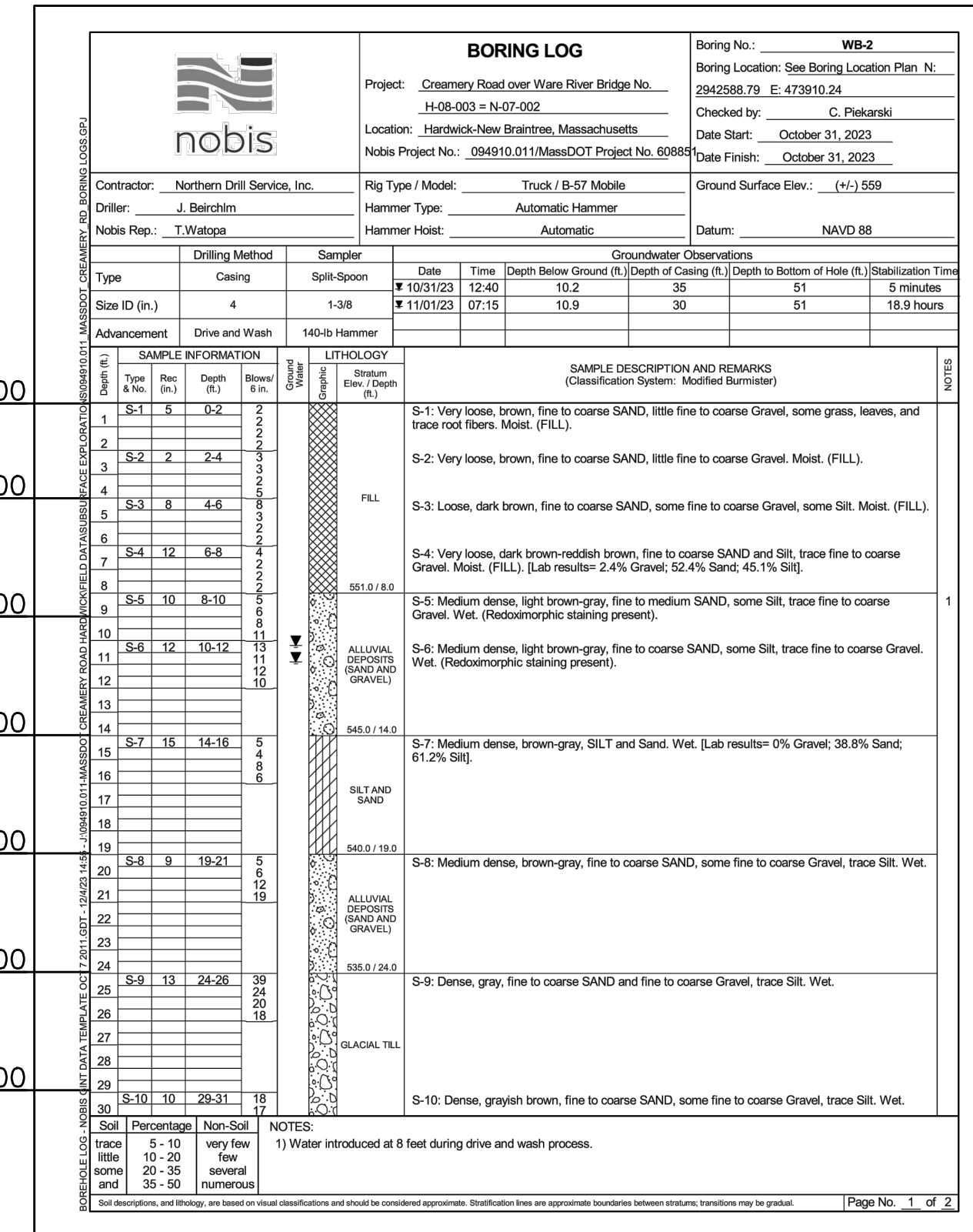
**BORING WB-1:**



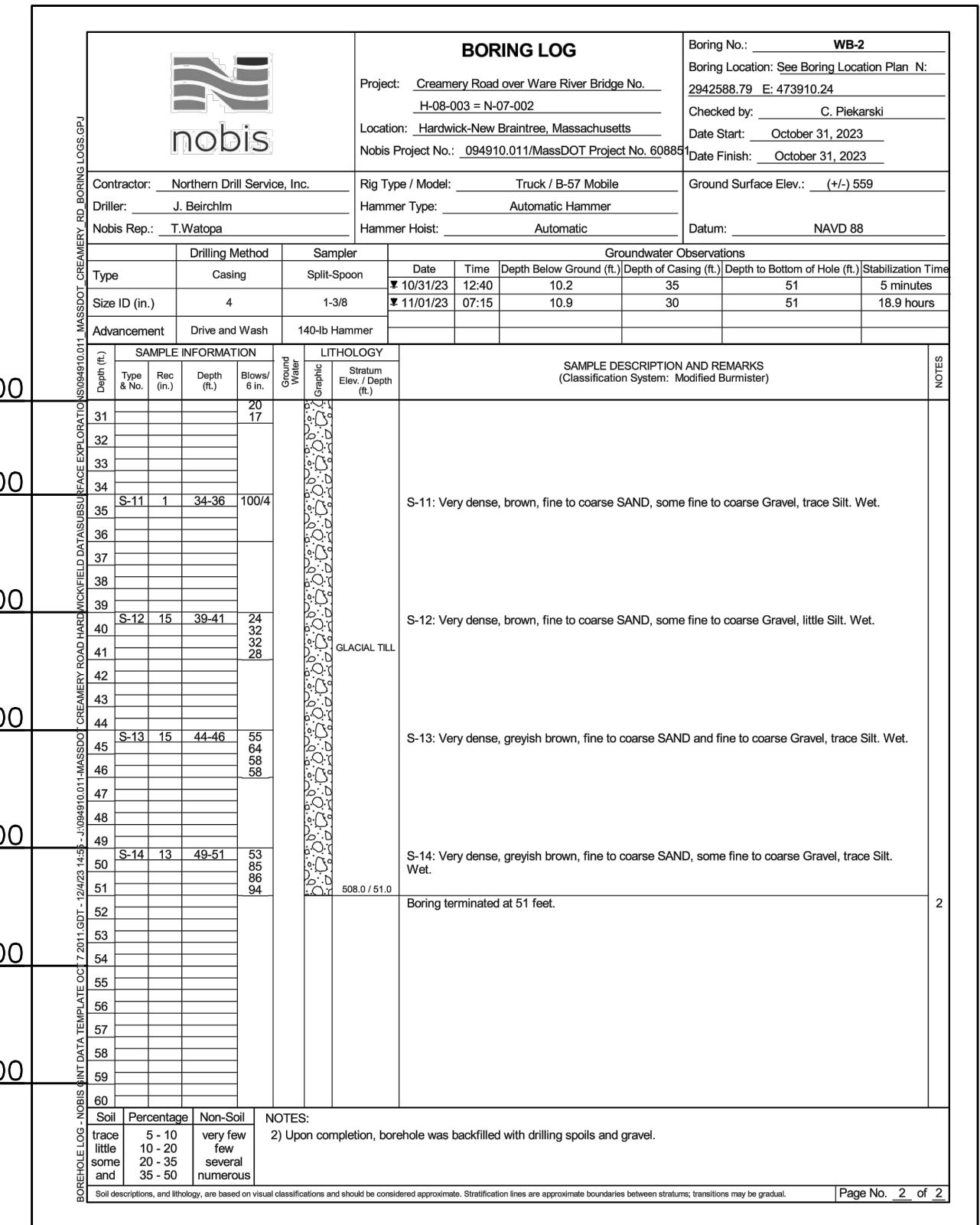
**BORING WB-1 (CONTINUED):**



**BORING WB-2:**



**BORING WB-2 (CONTINUED):**



BOT. RETAINING WALL  
 EL. 549.40

**BORING NOTES:**

1. LOCATION OF BORINGS SHOWN ON THE PLAN THUS: WB-1 AND WB-2
2. 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.
3. 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.
4. FIGURES IN COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A 1 1/8" I.D. SPLIT SPOON SAMPLER 6" USING A 140 POUND WEIGHT FALLING 30".
5. BORING SAMPLES ARE STORED AT NOBIS ENGINEERING, INC. LOCATED AT 585 MIDDLESEX STREET IN LOWELL, MA. THE CONTRACTOR MAY EXAMINE THE SOIL SAMPLES BY CONTACTING NOBIS ENGINEERING.
6. BORINGS WERE MADE IN OCTOBER AND NOVEMBER 2023.
7. BORINGS WERE MADE BY NORTHERN DRILL SERVICES OF NORTHBOROUGH, MASSACHUSETTS AND OBSERVED AND RECORDED BY NOBIS ENGINEERING, INC. OF LOWELL, MASSACHUSETTS.
8. THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.

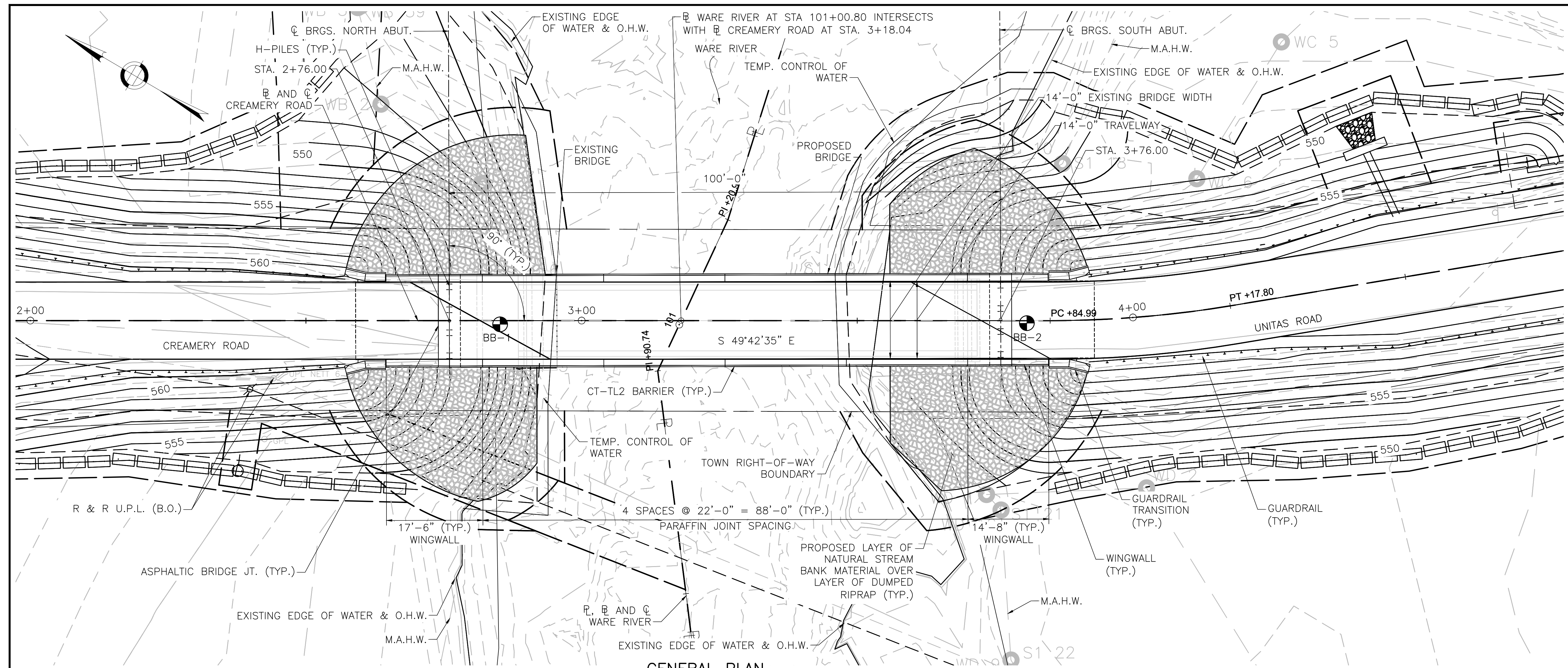
JUNE 29, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

608851\_BRF14-33(H-08-003=N-07-002).DWG Plotted on 16-Jul-2024 9:35 AM 29-June-2024 608851 Structural Submittal (SF)

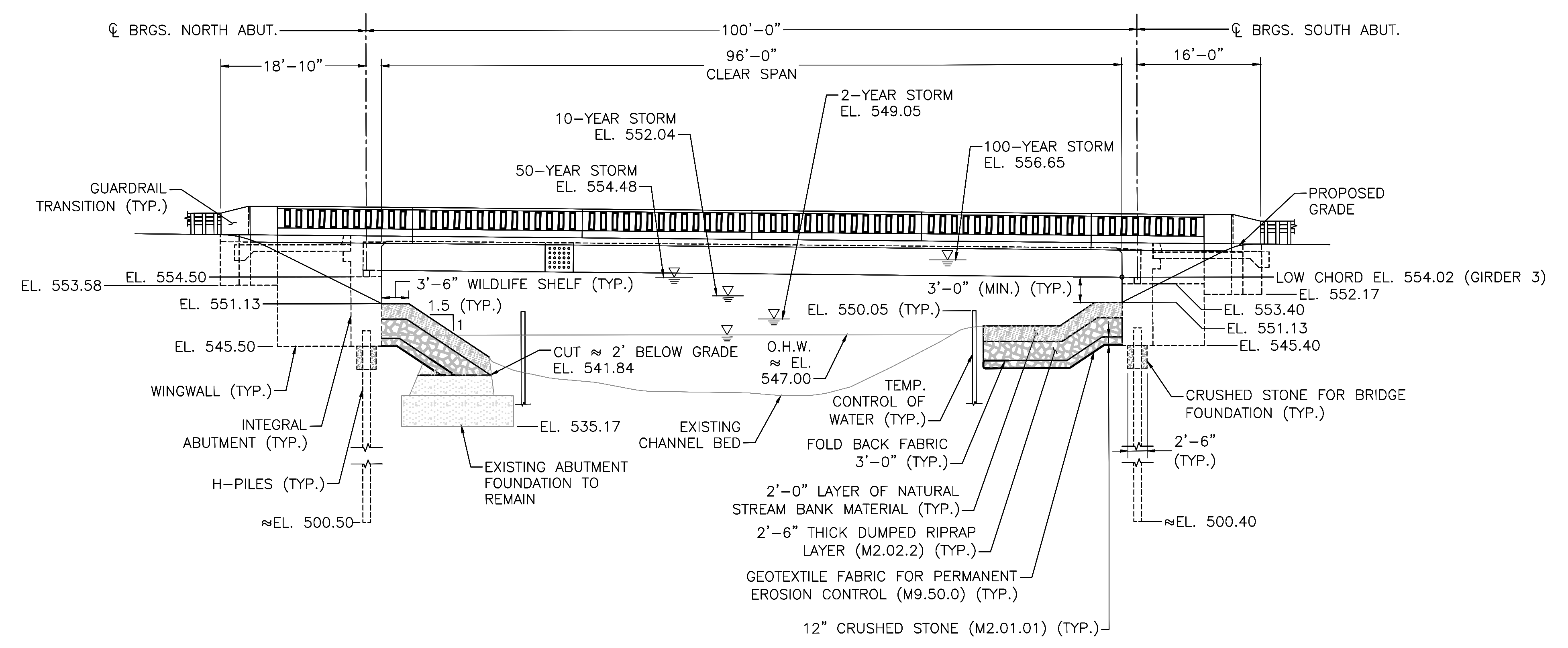
**HARDWICK-NEW BRAintree  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	18	37
PROJECT FILE NO.		608851	

**GENERAL PLAN & ELEVATION**



**GENERAL PLAN**  
SCALE: 1" = 10'



**WEST ELEVATION**  
SCALE: 1" = 10'

JUNE 29, 2024	ISSUED FOR CONSTRUCTION
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AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
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608851\_BRF14-33(H-08-003=N-07-002).DWG Plotted on 15-Jul-2024 11:22 AM 29-June-2024 608851 Structural Submittal (SF)



STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	19	37
PROJECT FILE NO.		608851	

**ABUTMENT PILE LAYOUT & REINFORCEMENT**

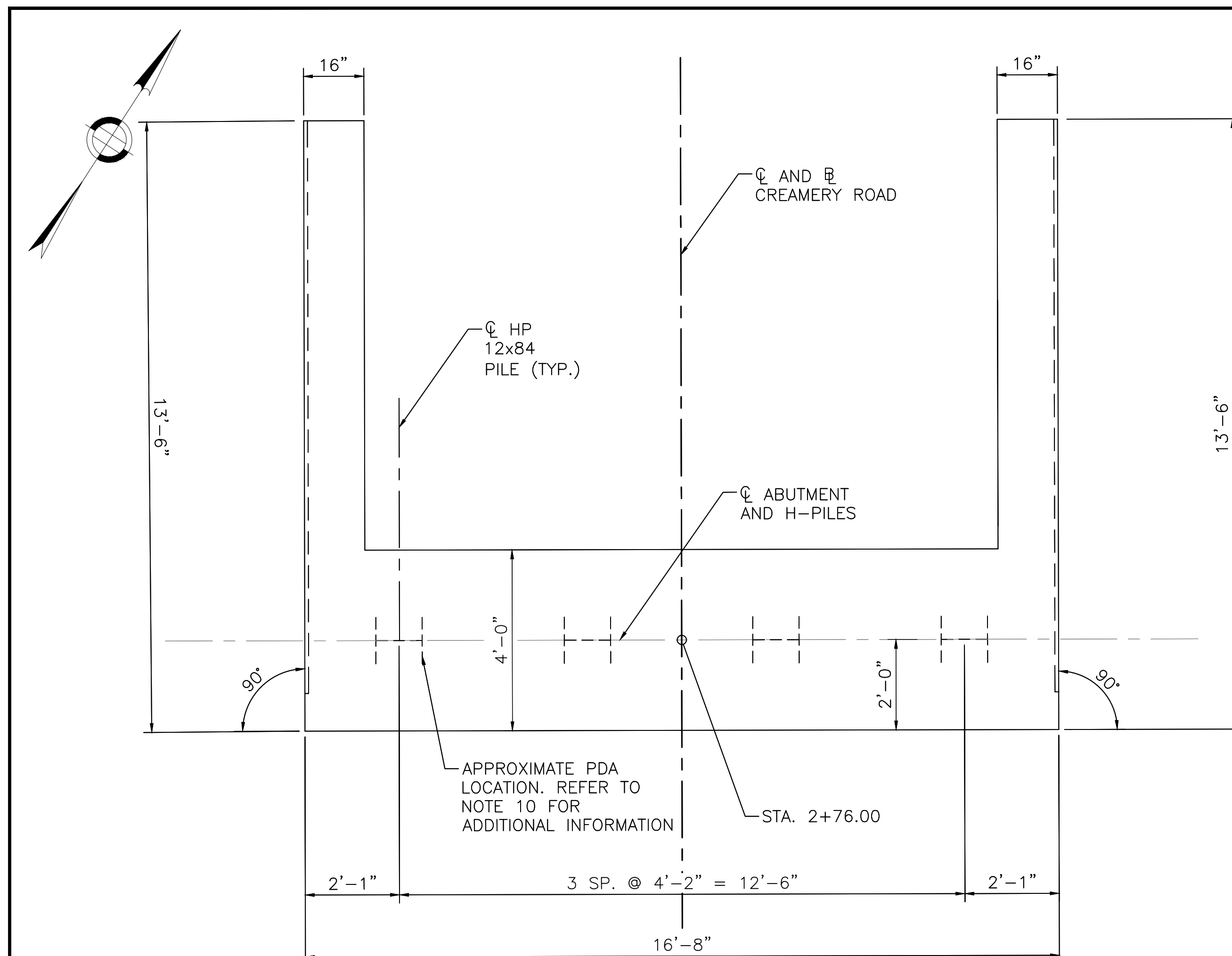
**INTEGRAL ABUTMENT PILE NOTES:**

1. A TRENCH WITH A DEPTH OF 3'-0" AND A MINIMUM WIDTH OF 2'-6" SHALL BE CONSTRUCTED DIRECTLY BELOW THE BOTTOM OF THE PILE CAP ELEVATION. AFTER THE PILES ARE DRIVEN, THE TRENCH SHALL BE FILLED WITH CRUSHED STONE (M2.01.6).
2. ALL PILE SPLICES SHALL BE BUTT JOINTS MADE USING COMPLETE JOINT PENETRATION WELDS. THERE SHALL BE NO SPLICES WITHIN THE TOP 20 FEET OF PILE. SPLICE WELDS SHALL BE 100% INSPECTED USING UT.
3. PILES SHALL CONFORM TO AASHTO M270 GRADE 50.
4. HEAVY DUTY PILE SHOES SHALL BE INSTALLED ON THE TIPS OF ALL PILES. PREFABRICATED PILE SHOES MAY BE USED IF APPROVED BY THE ENGINEER.
5. THE FACTORED AXIAL DESIGN LOAD PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS PER PILE IS 237 KIPS AS PER STRENGTH I LIMIT STATE AND 241 KIPS AS PER STRENGTH V LIMIT STATE.
6. THE FACTORED STRUCTURAL RESISTANCE PER PILE IS 615 KIPS AND IS THE PRODUCT OF THE NOMINAL STRUCTURAL RESISTANCE OF 1230 KIPS AND A RESISTANCE FACTOR OF 0.5.
7. THE FACTORED GEOTECHNICAL PILE RESISTANCE IS 258 KIPS AND IS THE PRODUCT OF THE NOMINAL GEOTECHNICAL RESISTANCE OF 575 KIPS AND A RESISTANCE FACTOR OF 0.45. THE ESTIMATED TIP ELEVATION IS AT EL. 500.50 FEET FOR THE NORTH ABUTMENT PILES AND EL. 500.40 FEET FOR THE SOUTH ABUTMENT PILES.
8. THE MINIMUM REQUIRED TIP ELEVATION FOR FIXITY IS AT EL. 512.50 FEET FOR THE NORTH ABUTMENT PILES AND EL. 512.40 FEET FOR THE SOUTH ABUTMENT PILES REGARDLESS OF THE PERFORMANCE TESTING OUTLINED BELOW.
7. DETERMINATION OF THE DRIVEN PILE RESISTANCE, PILE DRIVING CRITERIA, AND PILE INTEGRITY SHALL BE PERFORMED ON AT LEAST 1 PILE PER ABUTMENT USING DYNAMIC TESTING WITH A RESISTANCE FACTOR OF 0.65. PILES SHALL BE INSTALLED TO ACHIEVE A FACTORED DRIVEN RESISTANCE EQUAL TO OR GREATER THAN THE FACTORED AXIAL DESIGN LOAD. A RE-STRIKE TEST WITH A PDA AND CAPWAP ANALYSIS IS RECOMMENDED TO BE COMPLETED ON PREVIOUSLY TESTED PILES A MINIMUM 48 HOURS AFTER INSTALLATION TO VERIFY THAT PILES HAVE BEEN DRIVEN TO THE REQUIRED GEOTECHNICAL DRIVING RESISTANCE.
8. THE CONTRACTOR SHALL SUBMIT A PILE SCHEDULE, PILE INSTALLATION, AND PILE DRIVING/TESTING PLAN FOR REVIEW AND APPROVAL OF THE ENGINEER.
9. AFTER PILE DRIVING IS COMPLETE THE CONTRACTOR SHALL SUBMIT PILE DRIVING LOGS INCLUDING THE FINAL TIP ELEVATIONS AND THE RESULTS OF ANY DYNAMIC OR STATIC LOAD TESTING. SIGNIFICANT DEVIATIONS SHALL BE NOTED AS REVISIONS ON THE CONSTRUCTION DRAWINGS.
10. THE PDA TEST LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR TO SELECT THE EXACT LOCATION(S) OF THE PDA TESTS WITH APPROVAL BY THE ENGINEER.
11. THE CONTRACTOR SHALL BE PREPARED TO PRE-DRILL THROUGH POTENTIAL OBSTRUCTIONS (E.G. COBBLES/BOULDERS), AS DEFINED IN ITEM 944.2 IN THE SPECIAL PROVISIONS FROM THE PROPOSED PILE CAP BOTTOM ELEVATIONS DOWN TO 28 FEET BELOW BOTTOM OF PILE CAP ELEVATIONS. IT IS UP TO THE MEANS AND METHODS OF THE CONTRACTOR TO REMOVE OBSTRUCTIONS AND KEEP THE HOLE FROM COLLAPSING. CASING MAY BE NEEDED TO KEEP THE PRE-DRILL HOLE FROM COLLAPSING. ADDITIONALLY, THE CONTRACTOR SHALL PROVIDE CASING AT THE DISCRETION OF THE RESIDENT ENGINEER.

**REQUIRED PILE LOCATION TOLERANCES:**

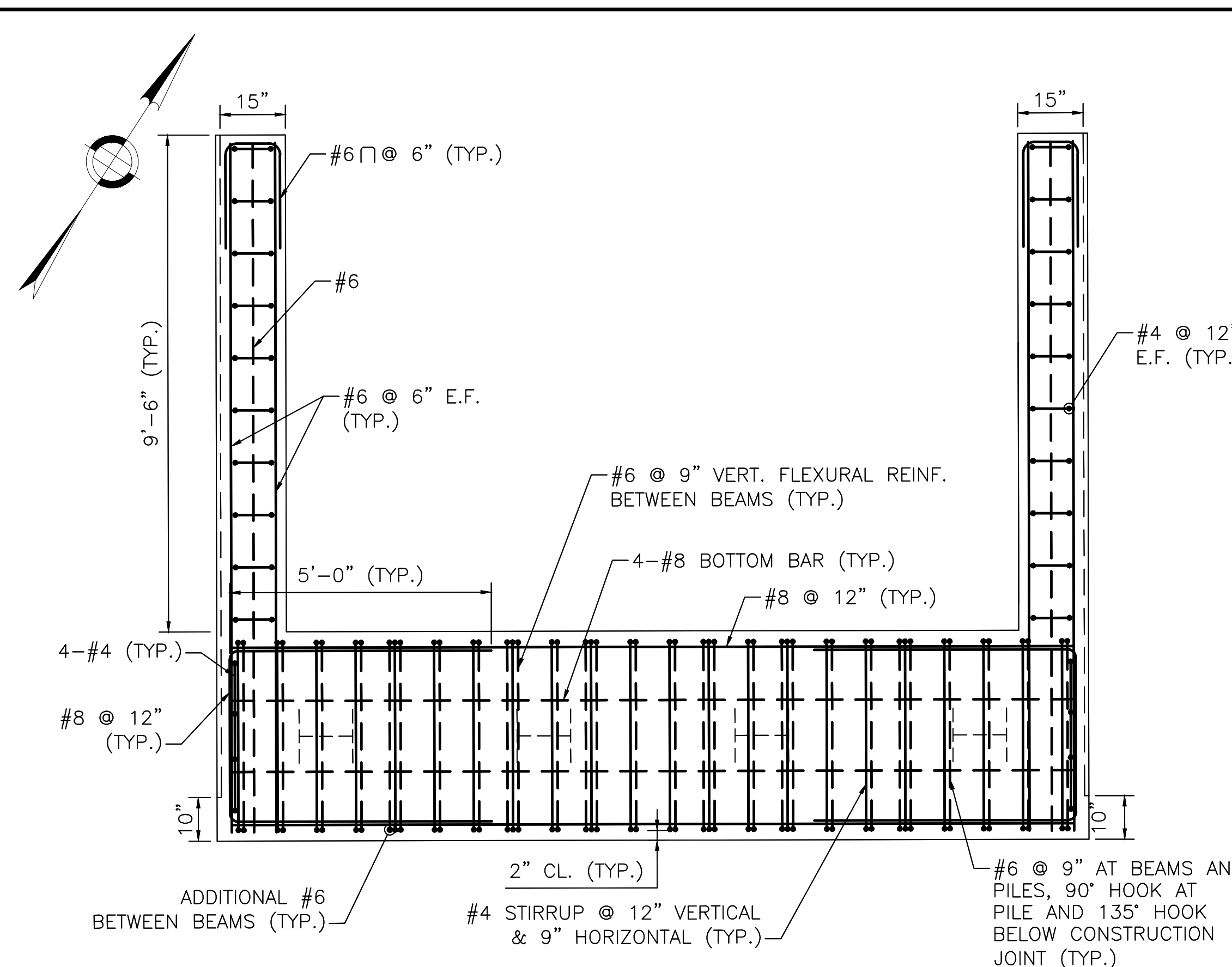
1. CONFORMANCE TO THE FOLLOWING TOLERANCES IS OF EXTREME IMPORTANCE TO FOUNDATIONS OF THIS TYPE.
2. PRIOR TO DRIVING, EACH ABUTMENT PILE SHALL BE HELD BY TEMPLATE TO WITHIN 1" OF PLAN LOCATION.
3. AFTER EACH ABUTMENT PILE IS DRIVEN, THE TOP OF THE PILE SHALL BE WITHIN 3" OF PLAN LOCATION.

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USE ONLY PRINTS OF LATEST DATE	



**NORTH ABUTMENT PILE LAYOUT**

SCALE: 1/2" = 1'-0"

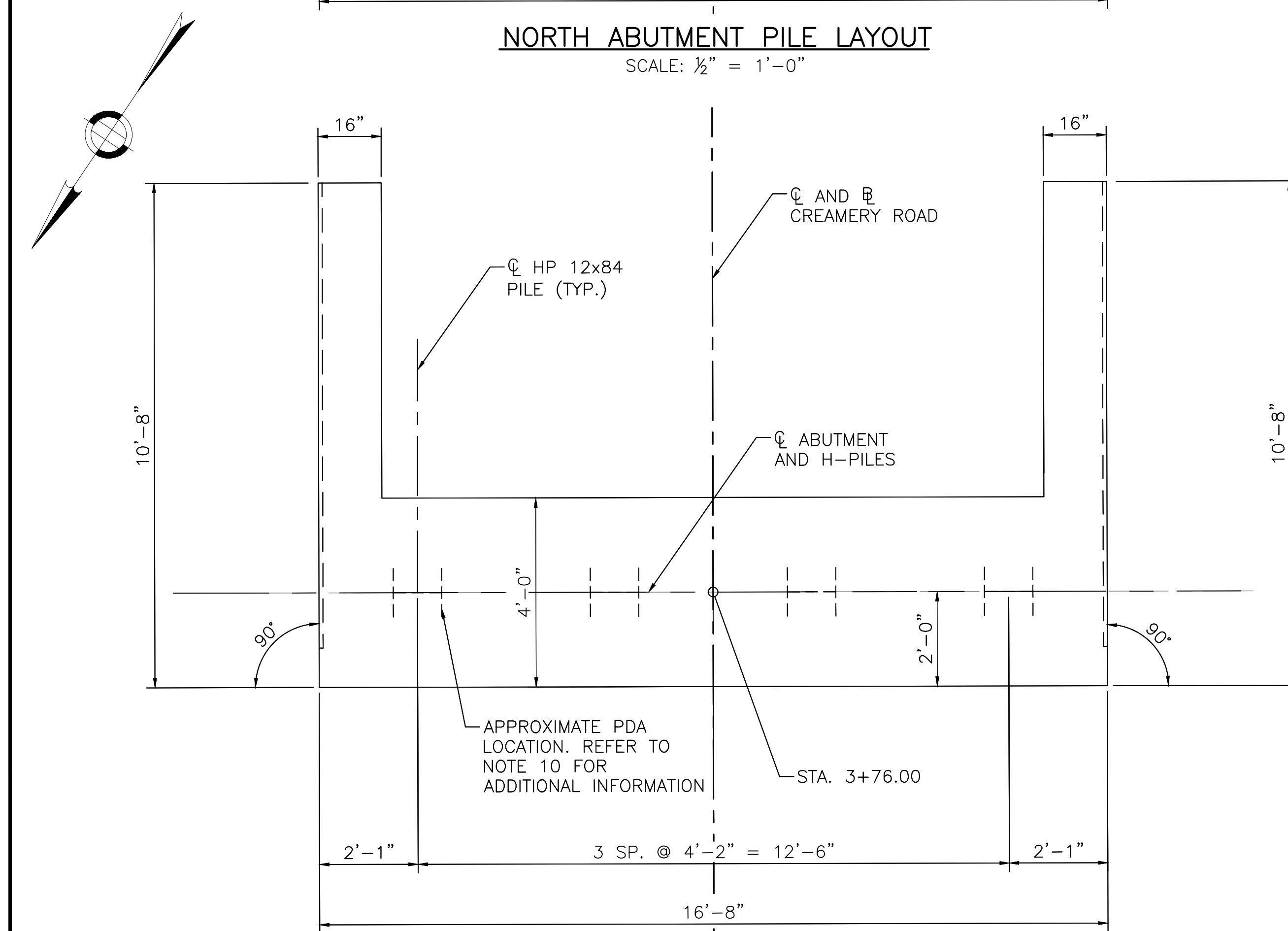


**NOTES:**

1. SECTION IS TAKEN BELOW CAP TOP LONGITUDINAL REINFORCEMENT AT BRIDGE SEAT CONSTRUCTION JOINT.
2. SEE SHEET 9 FOR REINFORCEMENT CONSTRUCTION NOTES.

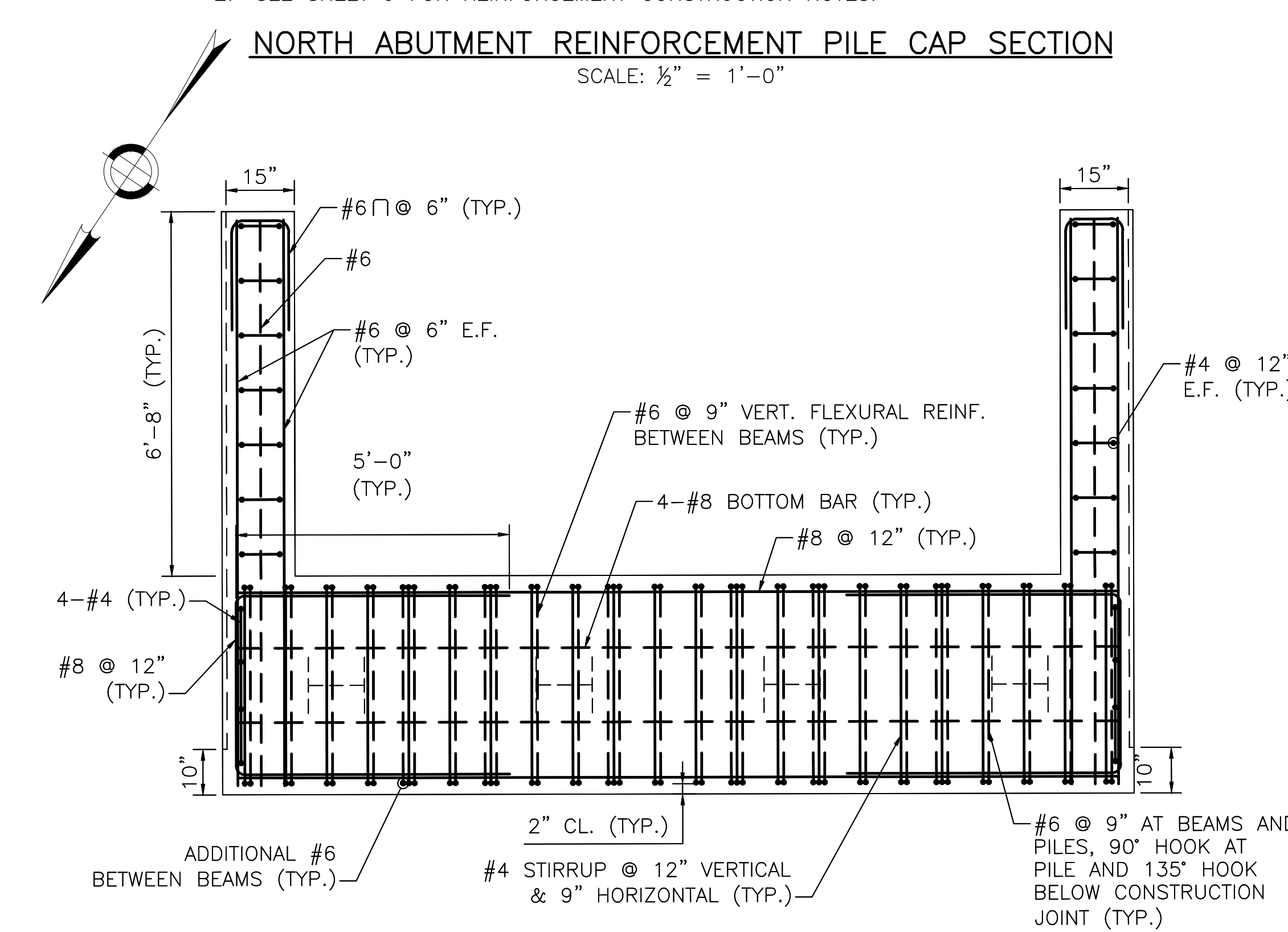
**NORTH ABUTMENT REINFORCEMENT PILE CAP SECTION**

SCALE: 1/2" = 1'-0"



**SOUTH ABUTMENT PILE LAYOUT**

SCALE: 1/2" = 1'-0"



**NOTES:**

1. SECTION IS TAKEN BELOW CAP TOP LONGITUDINAL REINFORCEMENT AT BRIDGE SEAT CONSTRUCTION JOINT.
2. SEE SHEET 9 FOR REINFORCEMENT CONSTRUCTION NOTES.

**SOUTH ABUTMENT REINFORCEMENT PILE CAP SECTION**

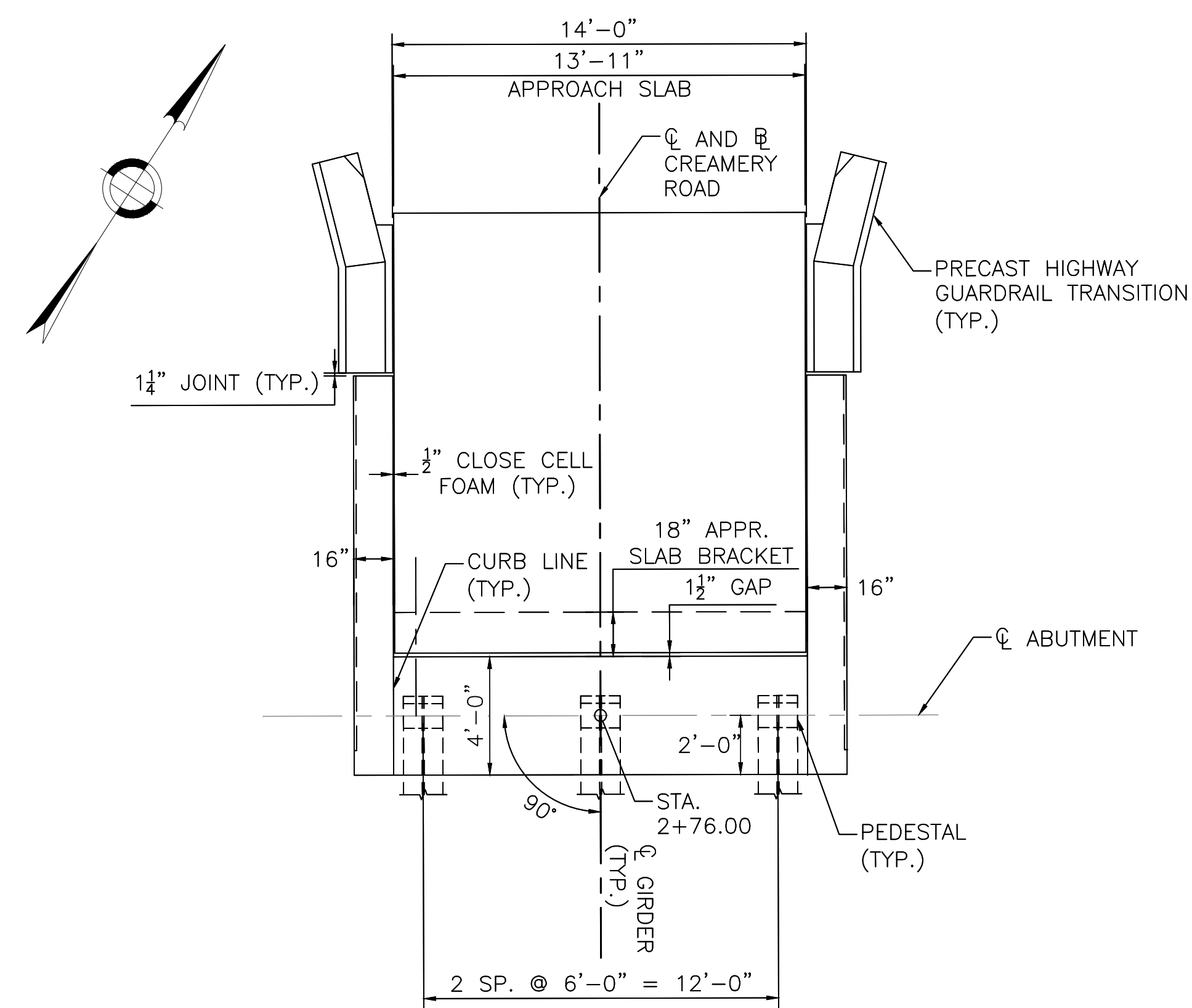
SCALE: 1/2" = 1'-0"



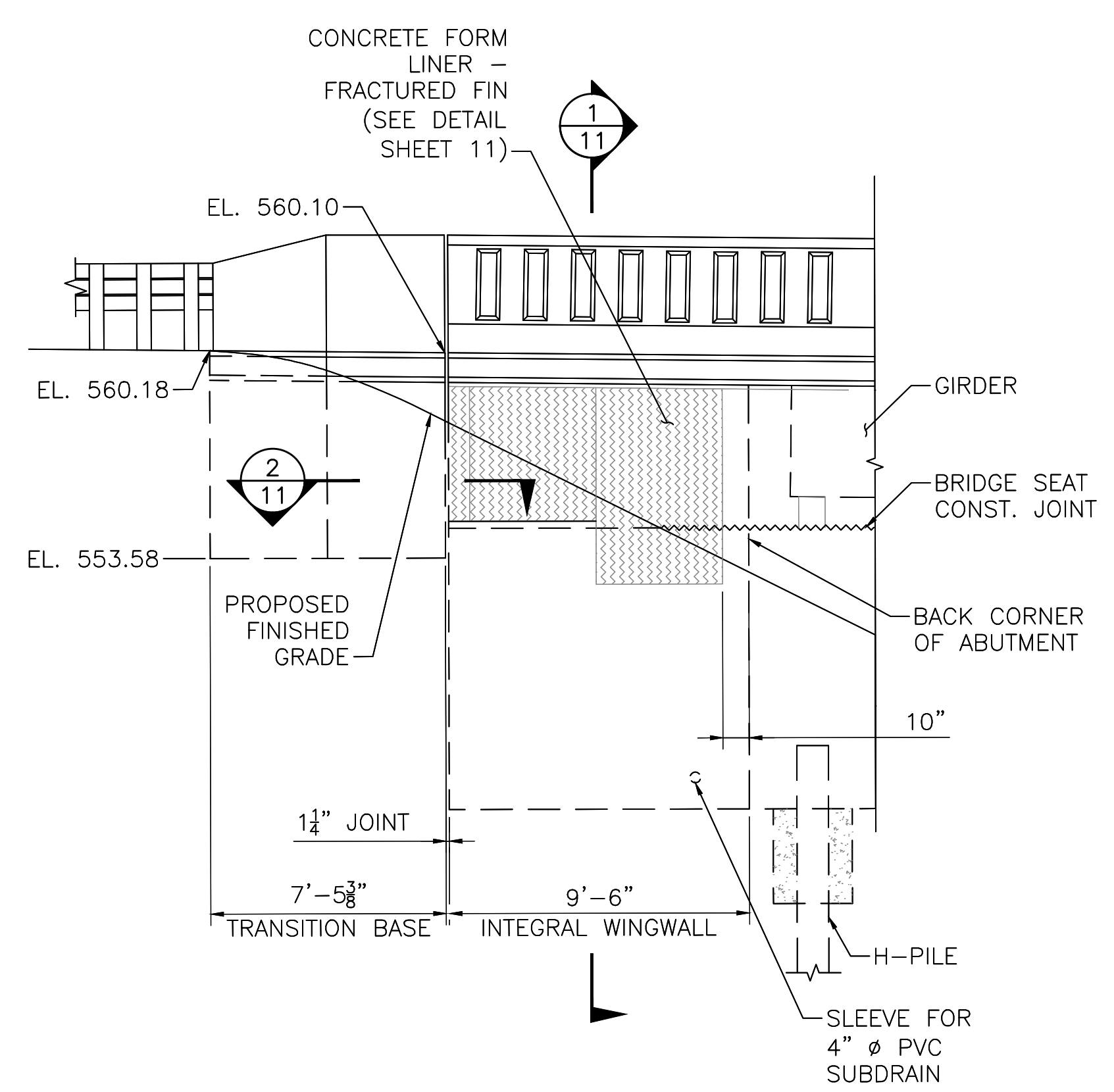
**HARDWICK-NEW BRAINTREE  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	20	37
PROJECT FILE NO.		608851	

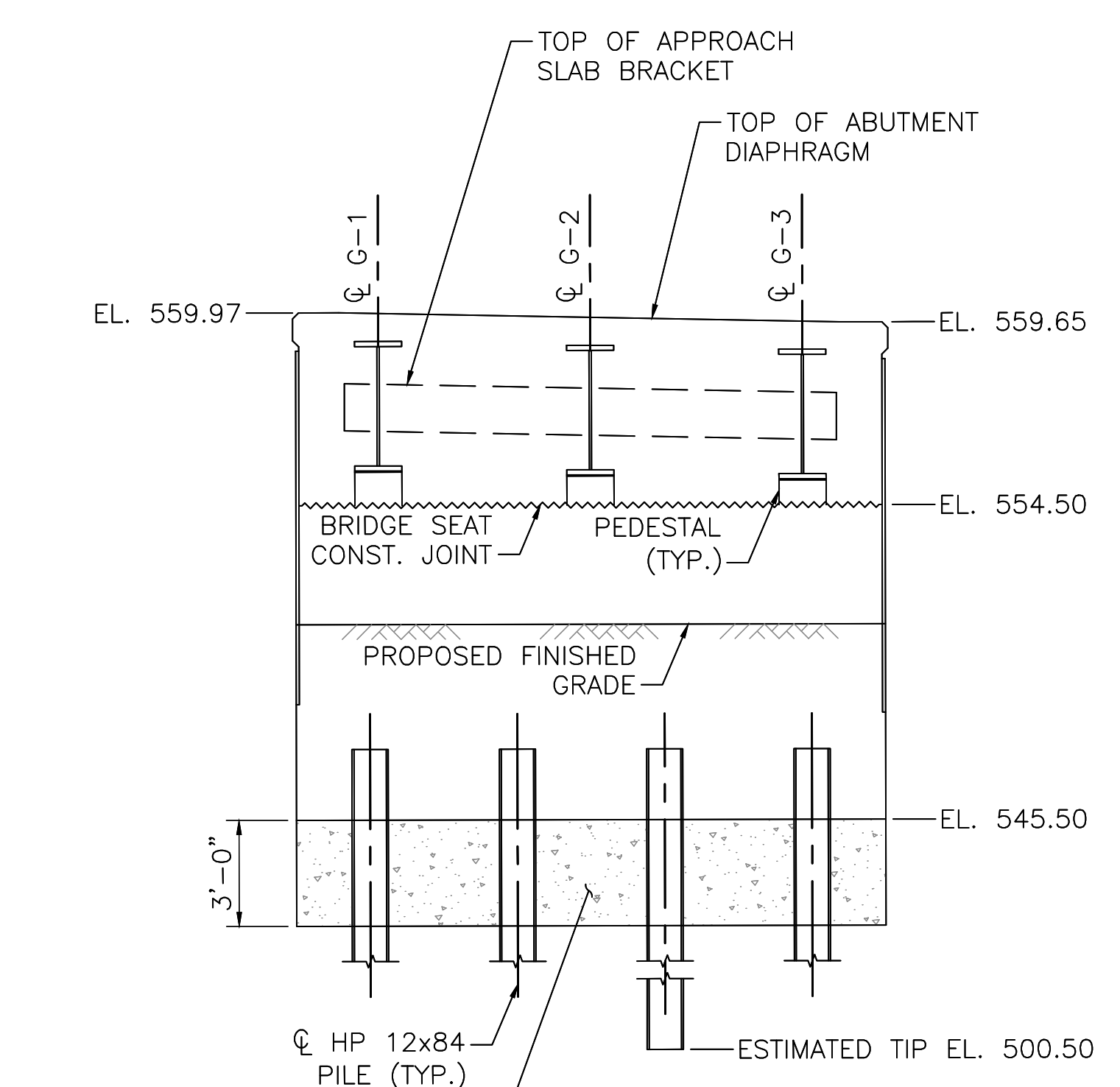
**NORTH ABUTMENT**



**NORTH ABUTMENT PLAN**  
SCALE: 1/4" = 1'-0"



**NORTHWEST WINGWALL ELEVATION**  
SCALE: 1/4" = 1'-0"



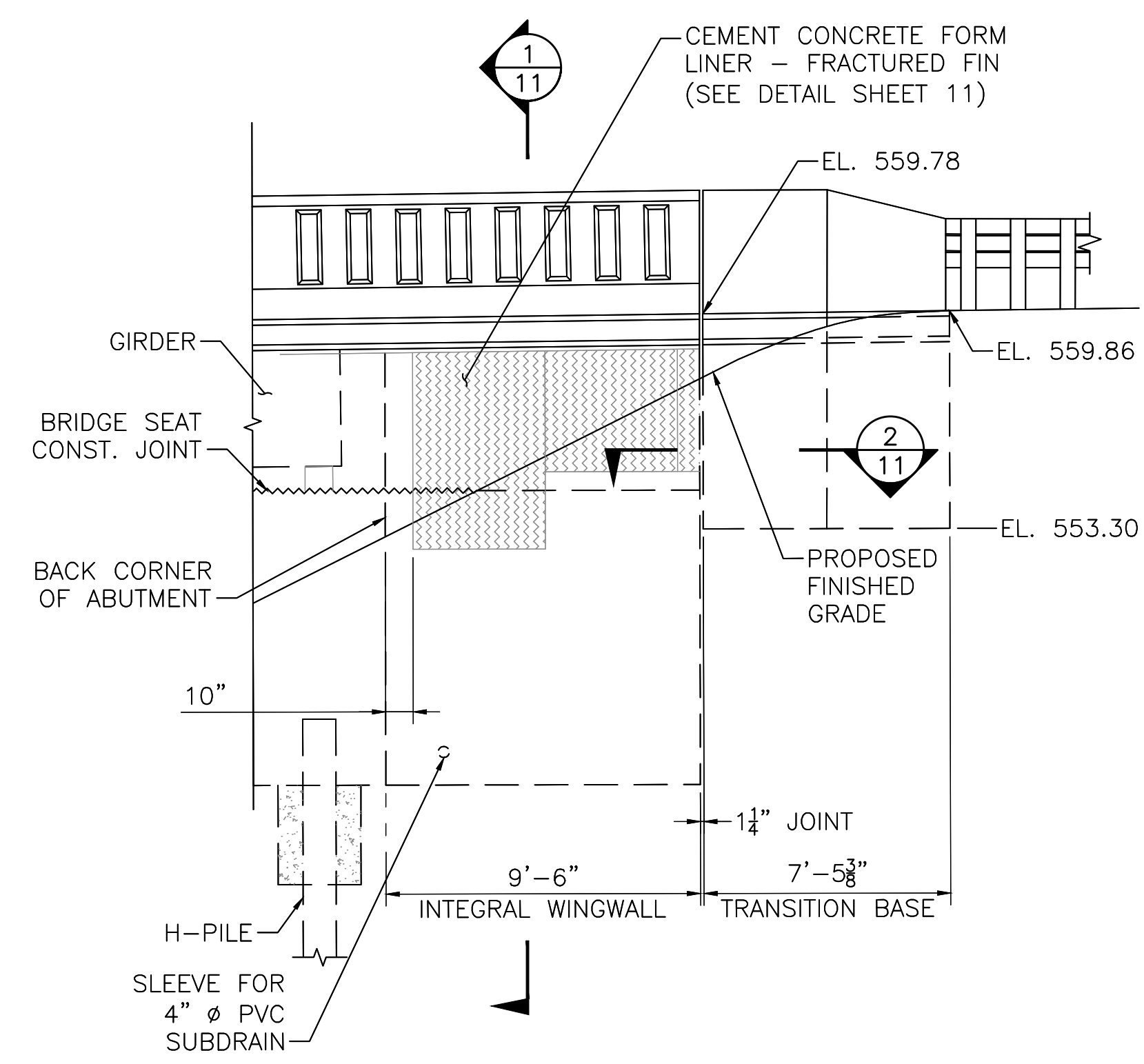
3'-0" DEEP x 2'-6" WIDE TRENCH FILLED WITH CRUSHED STONE FOR BRIDGE FOUNDATION (M2.01.7) AFTER DRIVING PILE (TYP.)

TOP OF PEDESTAL ELEVATIONS		
G-1	G-2	G-3
555.31	555.19	555.07

ESTIMATED TIP EL. 500.50

- NOTES:**
- ALL ELEVATIONS ARE SHOWN AT ABUTMENT CENTERLINE.
  - DETAILS ABOVE DECK LEVEL AND INDEPENDENT WINGWALLS OMITTED FOR CLARITY.
  - ELEVATIONS DO NOT INCLUDE ERECTION PAD THICKNESS.

**NORTH ABUTMENT ELEVATION**  
SCALE: 1/4" = 1'-0"



**NORTHEAST WINGWALL ELEVATION**  
SCALE: 1/4" = 1'-0"

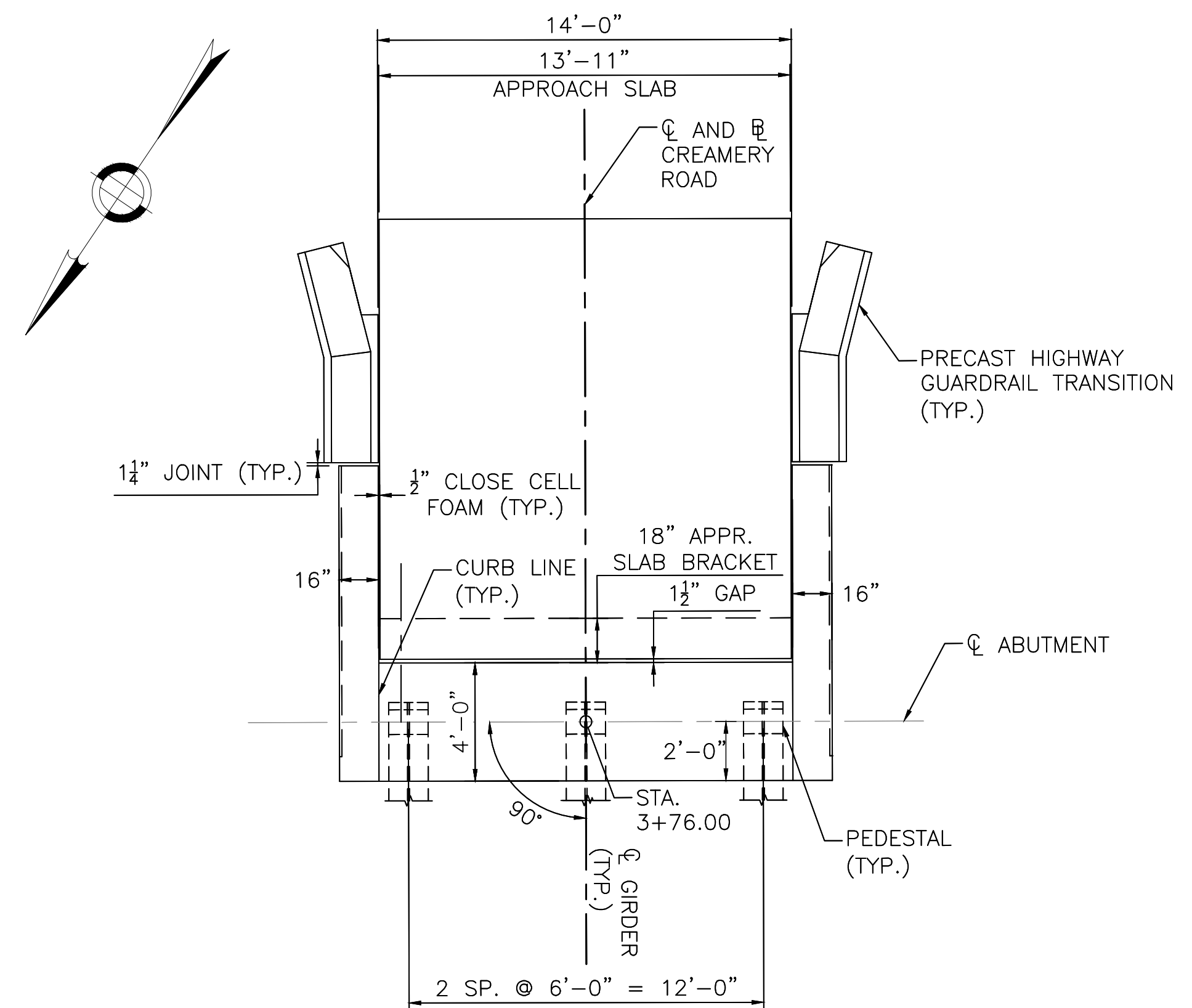
JUNE 29, 2024	ISSUED FOR CONSTRUCTION
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AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
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608851\_BR14-33(H-08-003=N-07-002).DWG Plotted on 15-Jul-2024 11:24 AM 29-June-2024 608851 Structural Submittal (SF)

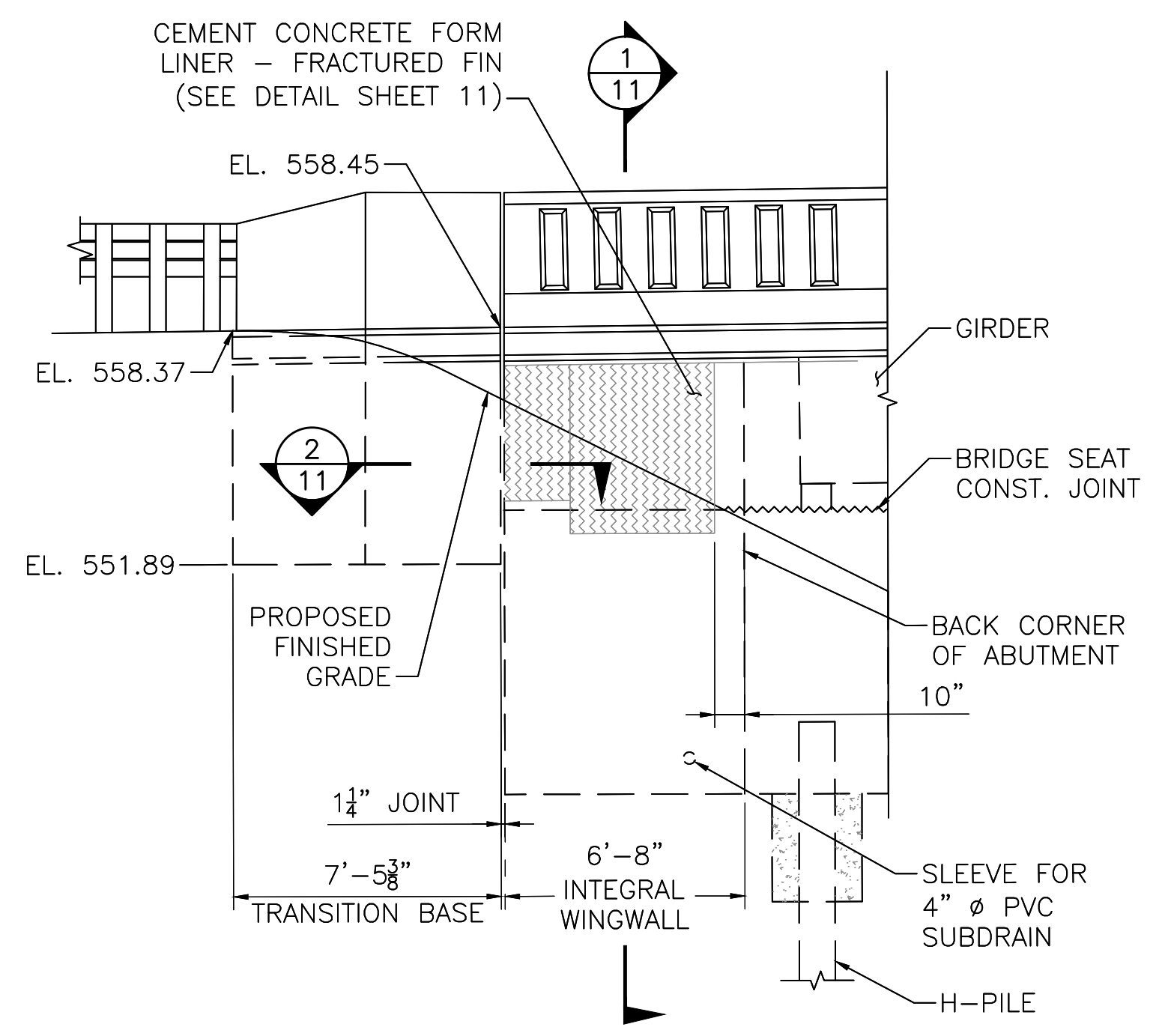
**HARDWICK-NEW BRAINTREE  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	21	37
PROJECT FILE NO.		608851	

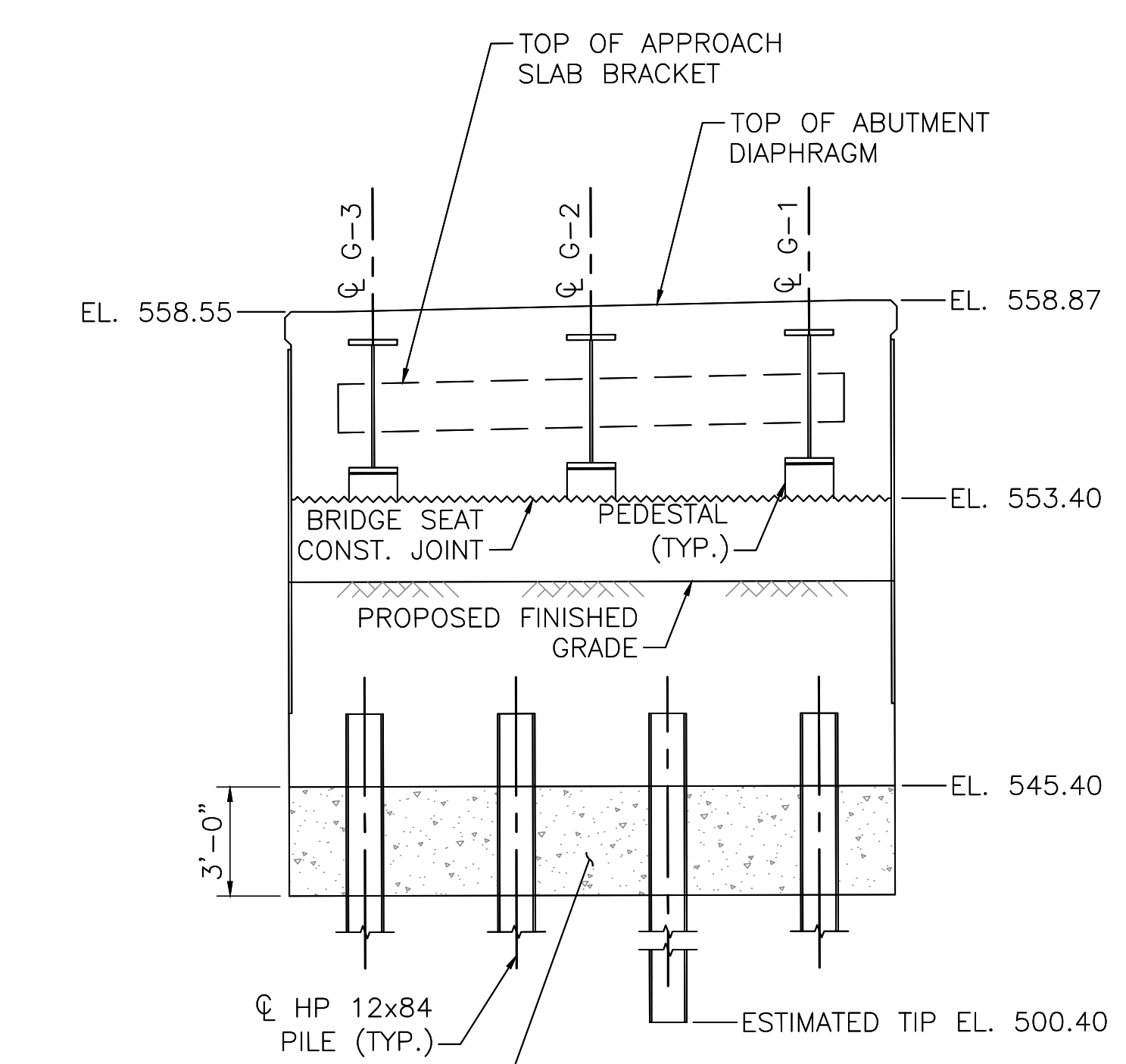
**SOUTH ABUTMENT**



**SOUTH ABUTMENT PLAN**  
SCALE: 1/4" = 1'-0"



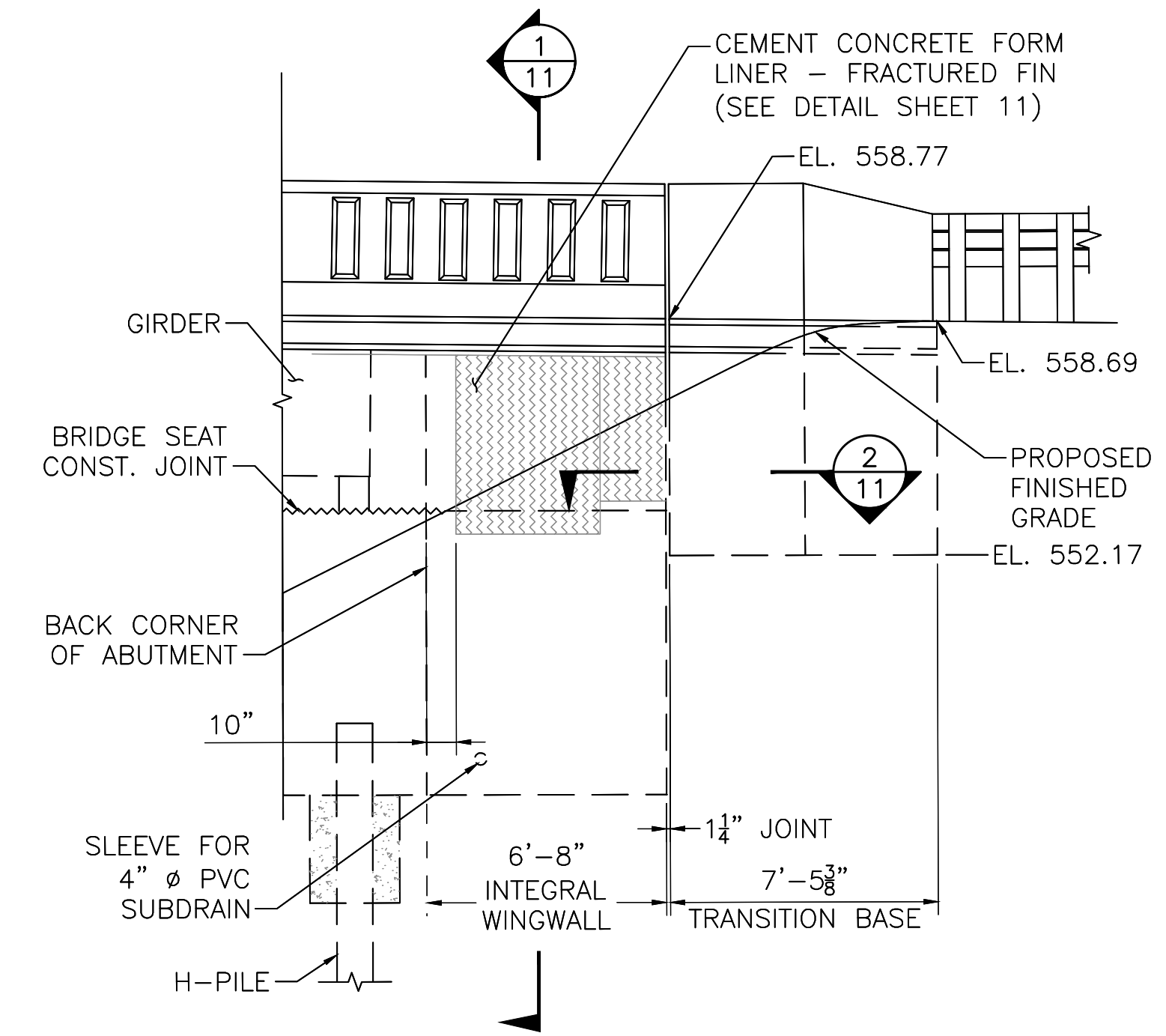
**SOUTHEAST WINGWALL ELEVATION**  
SCALE: 1/4" = 1'-0"



TOP OF PEDESTAL ELEVATIONS		
G-1	G-2	G-3
554.21	554.09	553.97

- NOTES:**
- ALL ELEVATIONS ARE SHOWN AT ABUTMENT CENTERLINE.
  - DETAILS ABOVE DECK LEVEL AND INDEPENDENT WINGWALLS OMITTED FOR CLARITY.
  - ELEVATIONS DO NOT INCLUDE ERECTION PAD THICKNESS.

**SOUTH ABUTMENT ELEVATION**  
SCALE: 1/4" = 1'-0"



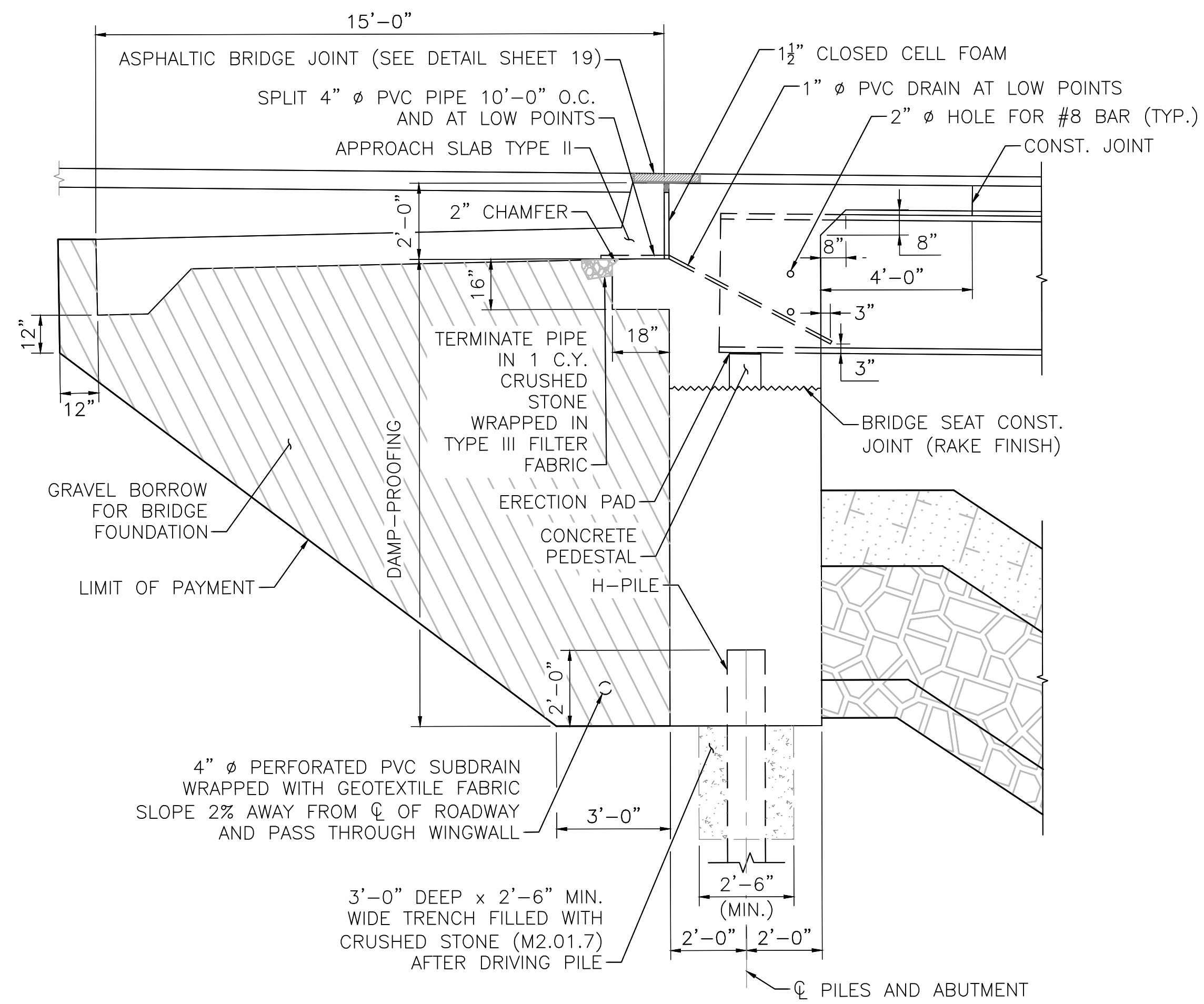
**SOUTHWEST WINGWALL ELEVATION**  
SCALE: 1/4" = 1'-0"

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608851\_BR14-33(H-08-003=N-07-002).DWG Plotted on 15-Jul-2024 11:25 AM 29-June-2024 608851 Structural Submittal (SF)

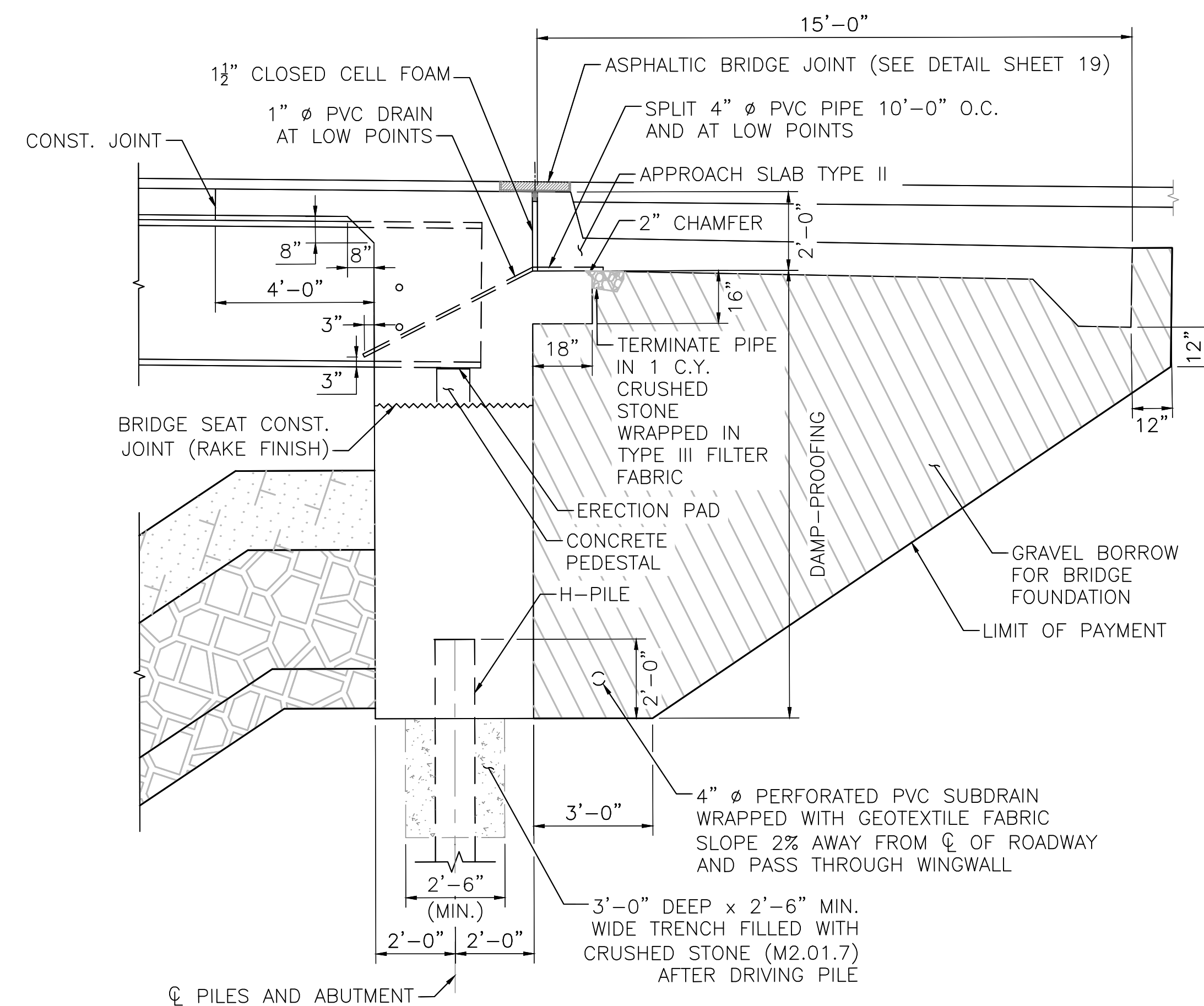
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	22	37
PROJECT FILE NO.			608851

**ABUTMENT SECTIONS**



**NORTH ABUTMENT SECTION**

SCALE: 3/8" = 1'-0"

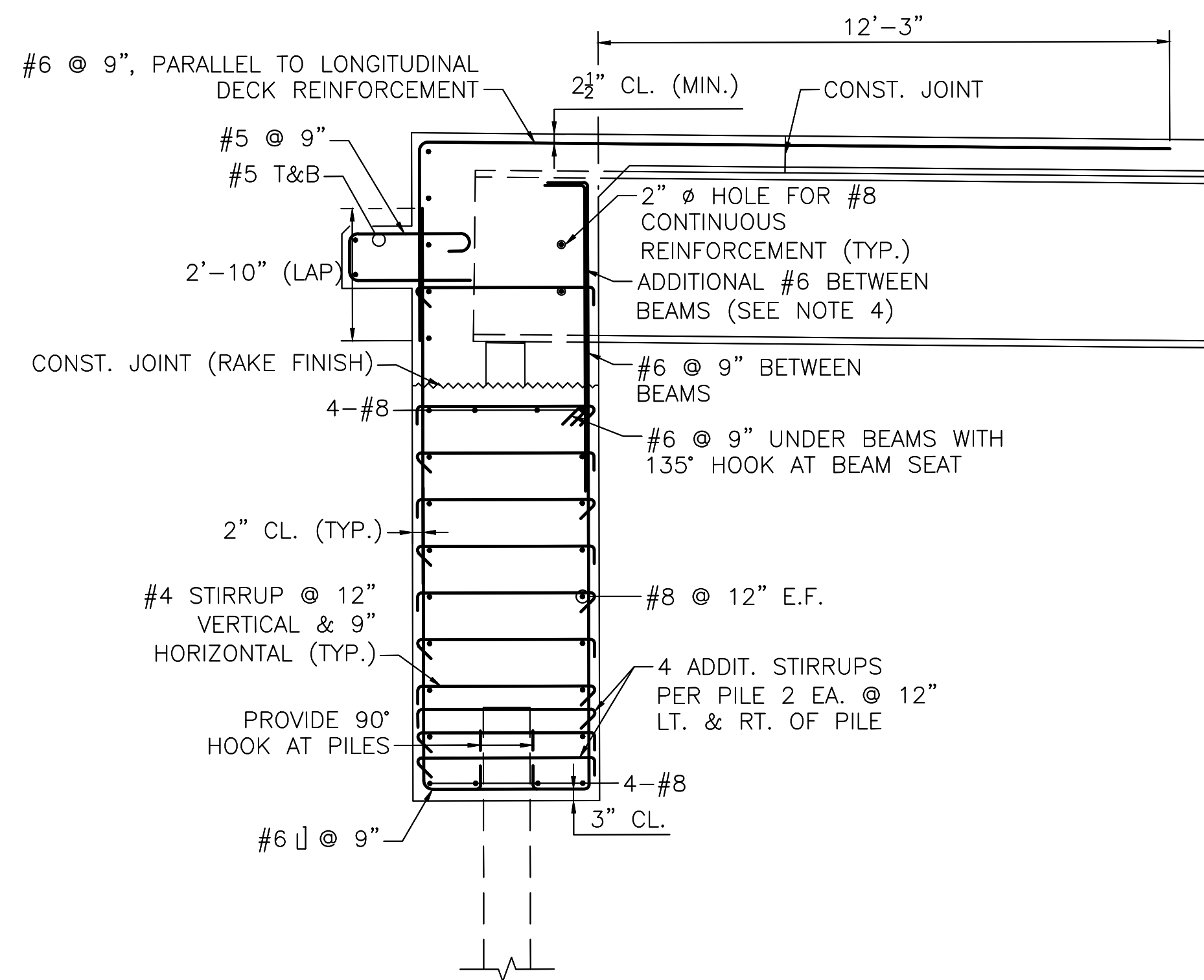


**SOUTH ABUTMENT SECTION**

SCALE: 3/8" = 1'-0"

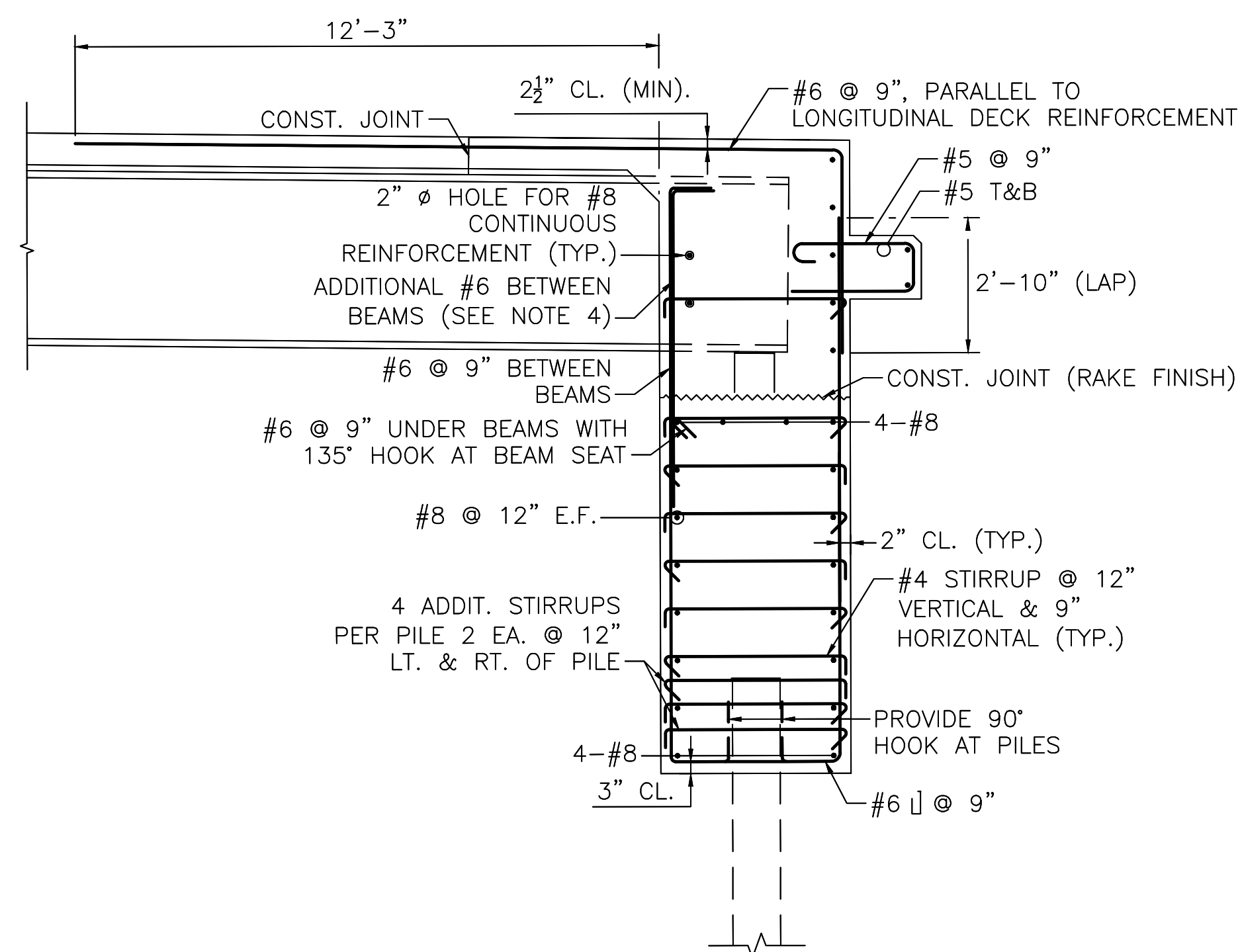
**NOTES:**

1. ALL REINFORCEMENT SHALL BE EPOXY COATED.
2. DECK SLAB REINFORCEMENT NOT SHOWN FOR CLARITY. CONTINUE DECK SLAB REINFORCEMENT TO BACK OF ABUTMENT.
3. ALL CONCRETE SHALL CONTAIN SUPERPLASTICIZER TO ENSURE ADEQUATE CONSOLIDATION.
4. THE NUMBER OF ADDITIONAL #6 BARS BETWEEN BEAMS SHALL BE EQUAL TO THE NUMBER OF #6 BARS WHICH ARE TERMINATED UNDERNEATH THE BEAM IN A 135° HOOK.
5. BOTH ABUTMENTS SHALL BE BACKFILLED SIMULTANEOUSLY. NO MORE THAN TWO (2) FEET OF DIFFERENTIAL BACKFILL HEIGHT SHALL BE PERMITTED. BACKFILLING SHALL NOT BEGIN UNTIL THE ABUTMENT AND DECK CONSTRUCTION IS COMPLETE.
6. BRIDGE DECK SLAB SHALL BE PLACED IN ACCORDANCE WITH THE PLACEMENT SEQUENCE SHOWN ON THE CONSTRUCTION DRAWINGS REFERENCED ON SHEET 18.
7. THE CONTRACTOR MAY PLACE THE ENTIRE DECK IN ONE CONTINUOUS OPERATION WITHOUT CONSTRUCTION JOINTS WITH THE APPROVAL OF THE ENGINEER, PROVIDED THAT THE INITIAL SET ( $f'_c = 5000$  PSI) OF ALL CONCRETE DOES NOT OCCUR UNTIL AFTER THE COMPLETION OF THE PLACEMENT. AN APPROVED RETARDER SHALL BE USED, WHEN NECESSARY, TO RETAIN THE WORKABILITY OF THE CONCRETE. IF MULTIPLE PLACEMENTS ARE MADE, A MINIMUM OF 72 HOURS SHALL PASS BETWEEN PLACEMENTS.



**NORTH ABUTMENT REINFORCEMENT**

SCALE: 3/8" = 1'-0"



**SOUTH ABUTMENT REINFORCEMENT**

SCALE: 3/8" = 1'-0"

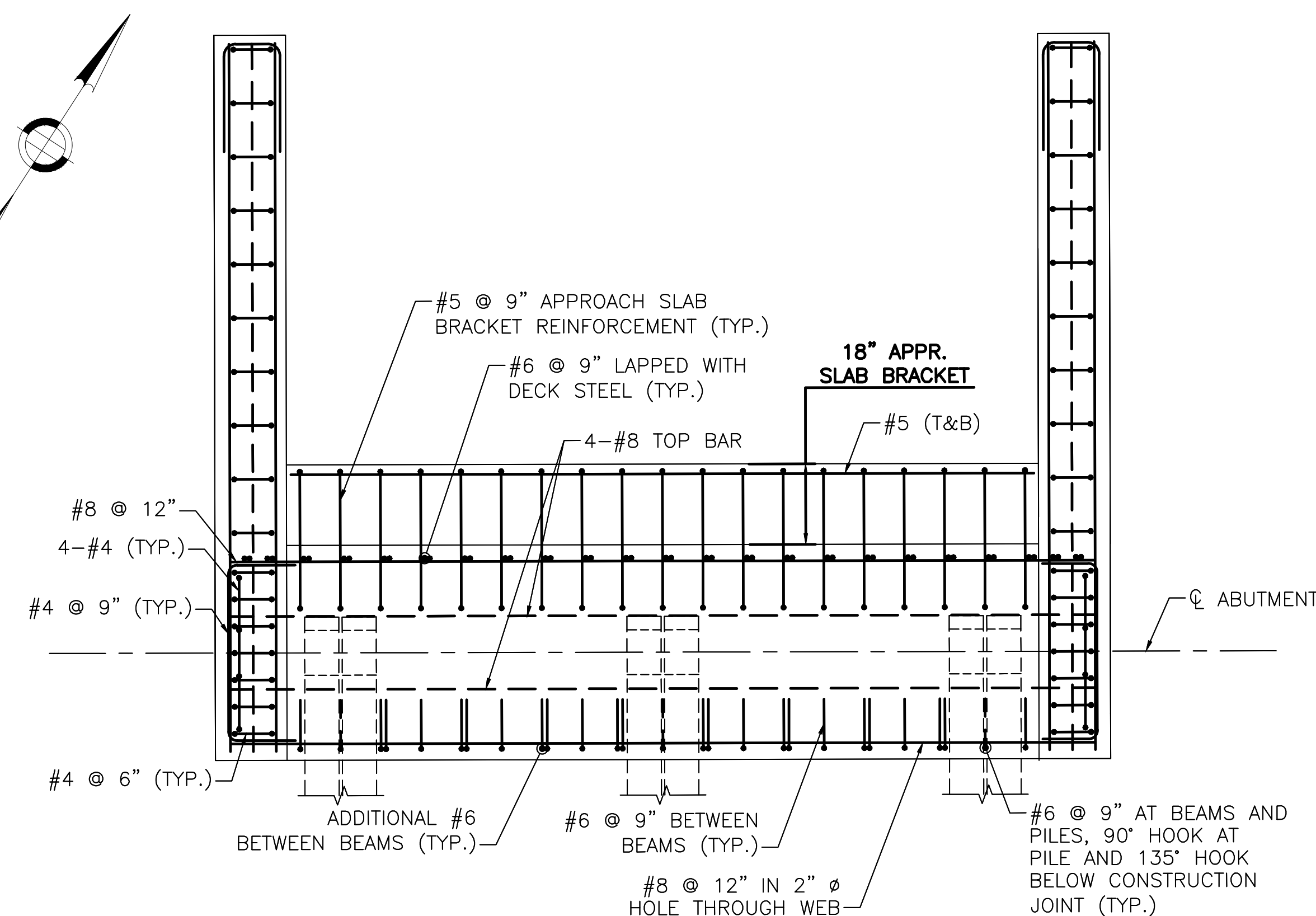
JUNE 29, 2024	ISSUED FOR CONSTRUCTION
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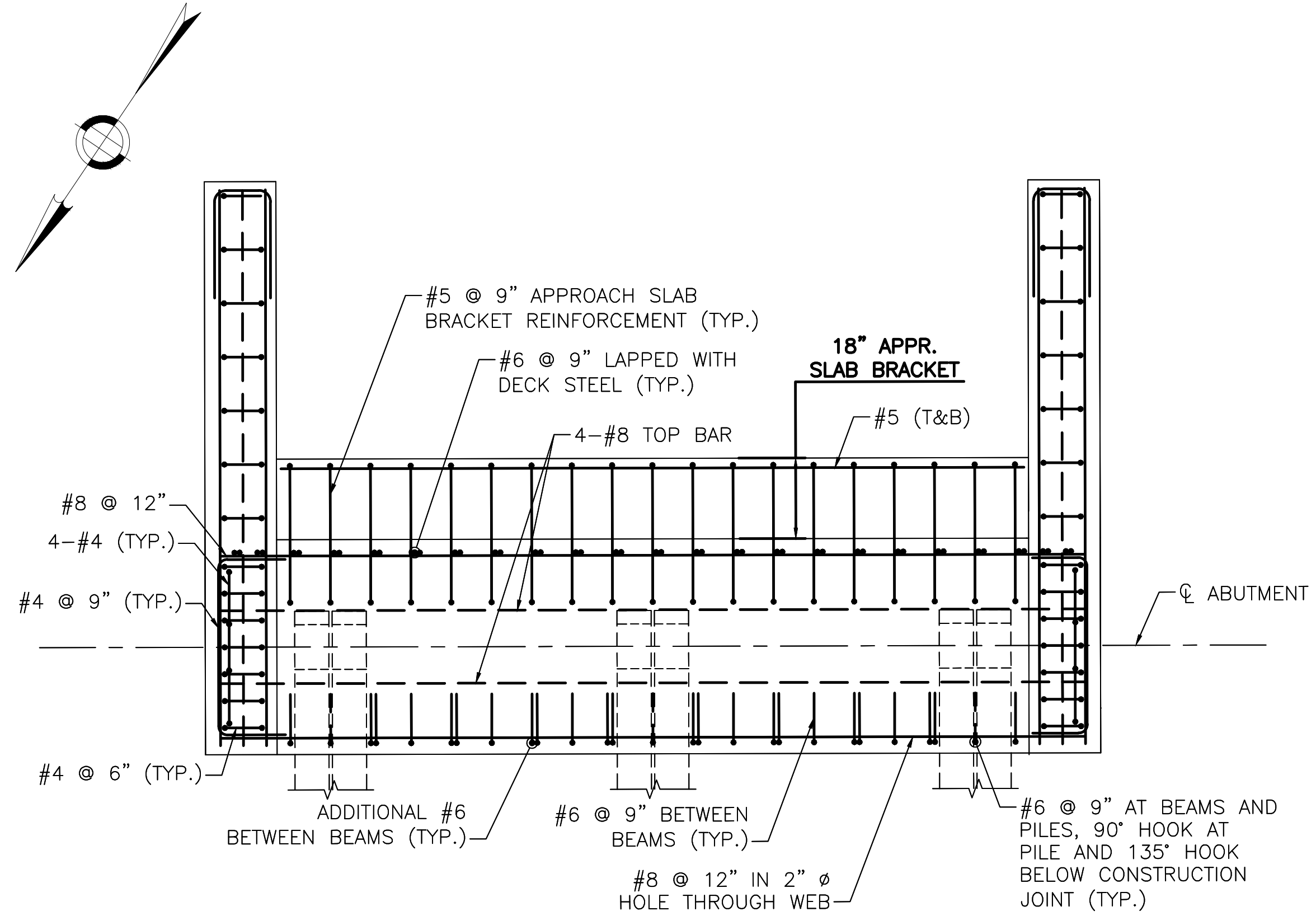
**HARDWICK-NEW BRAINTREE  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	23	37
PROJECT FILE NO.		608851	

**ABUTMENT REINFORCEMENT**

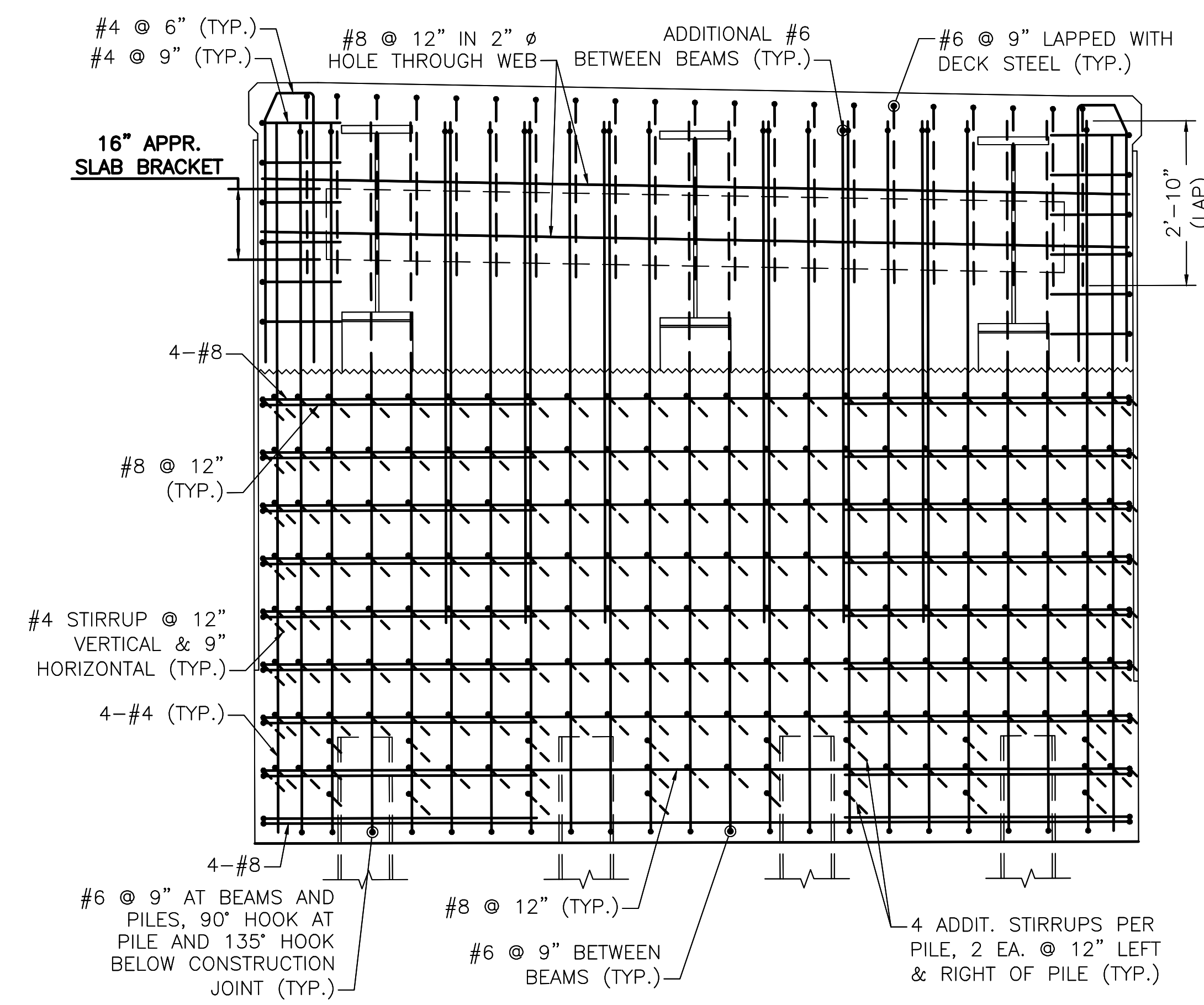


**NORTH ABUTMENT REINFORCEMENT DIAPHRAGM SECTION**  
SCALE: 1/2" = 1'-0"

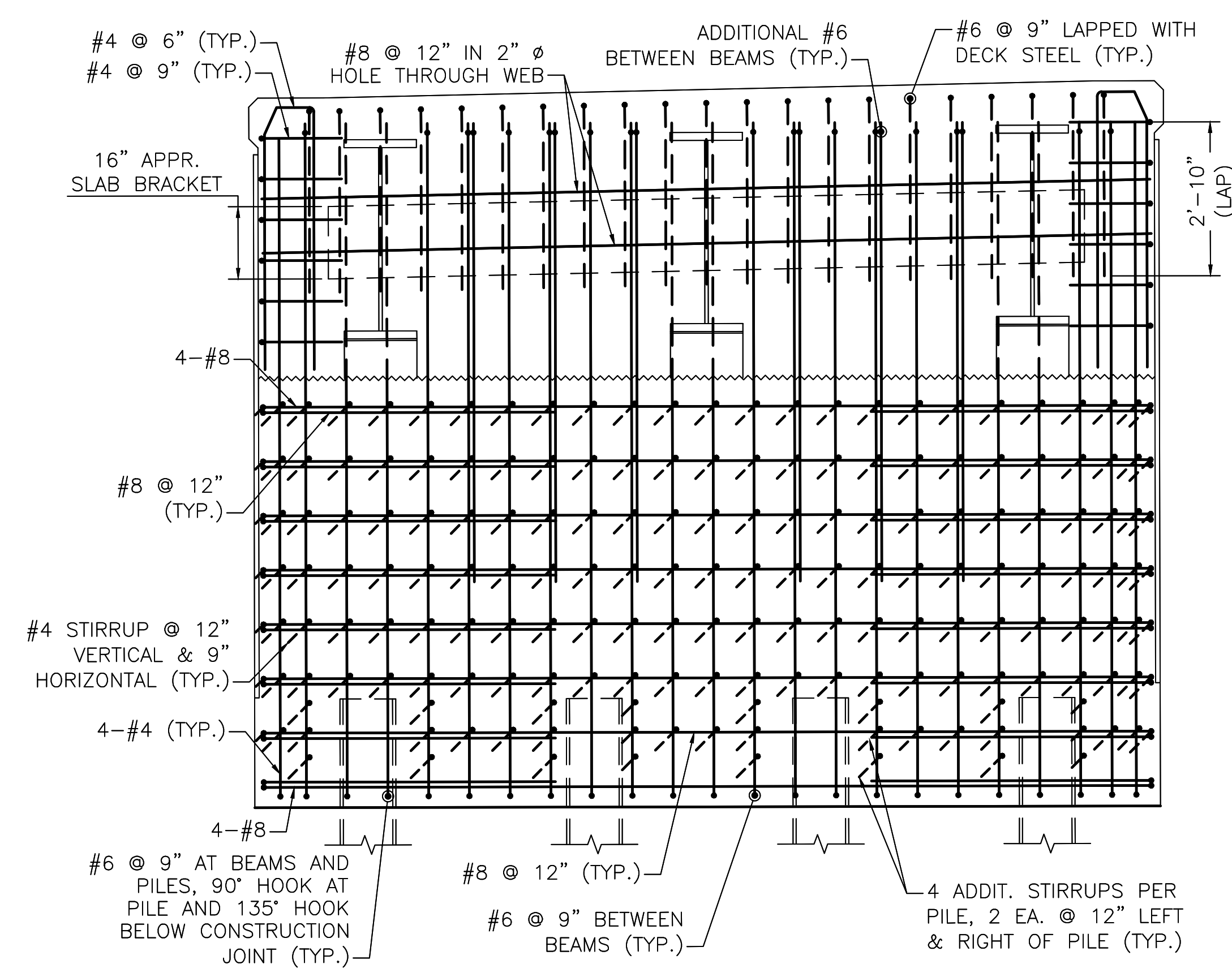


**SOUTH ABUTMENT REINFORCEMENT DIAPHRAGM SECTION**  
SCALE: 1/2" = 1'-0"

**NOTE:**  
1. SEE SHEET 9 FOR REINFORCEMENT CONSTRUCTION NOTES.



**NORTH ABUTMENT REINFORCEMENT VERTICAL SECTION**  
SCALE: 1/2" = 1'-0"



**SOUTH ABUTMENT REINFORCEMENT VERTICAL SECTION**  
SCALE: 1/2" = 1'-0"

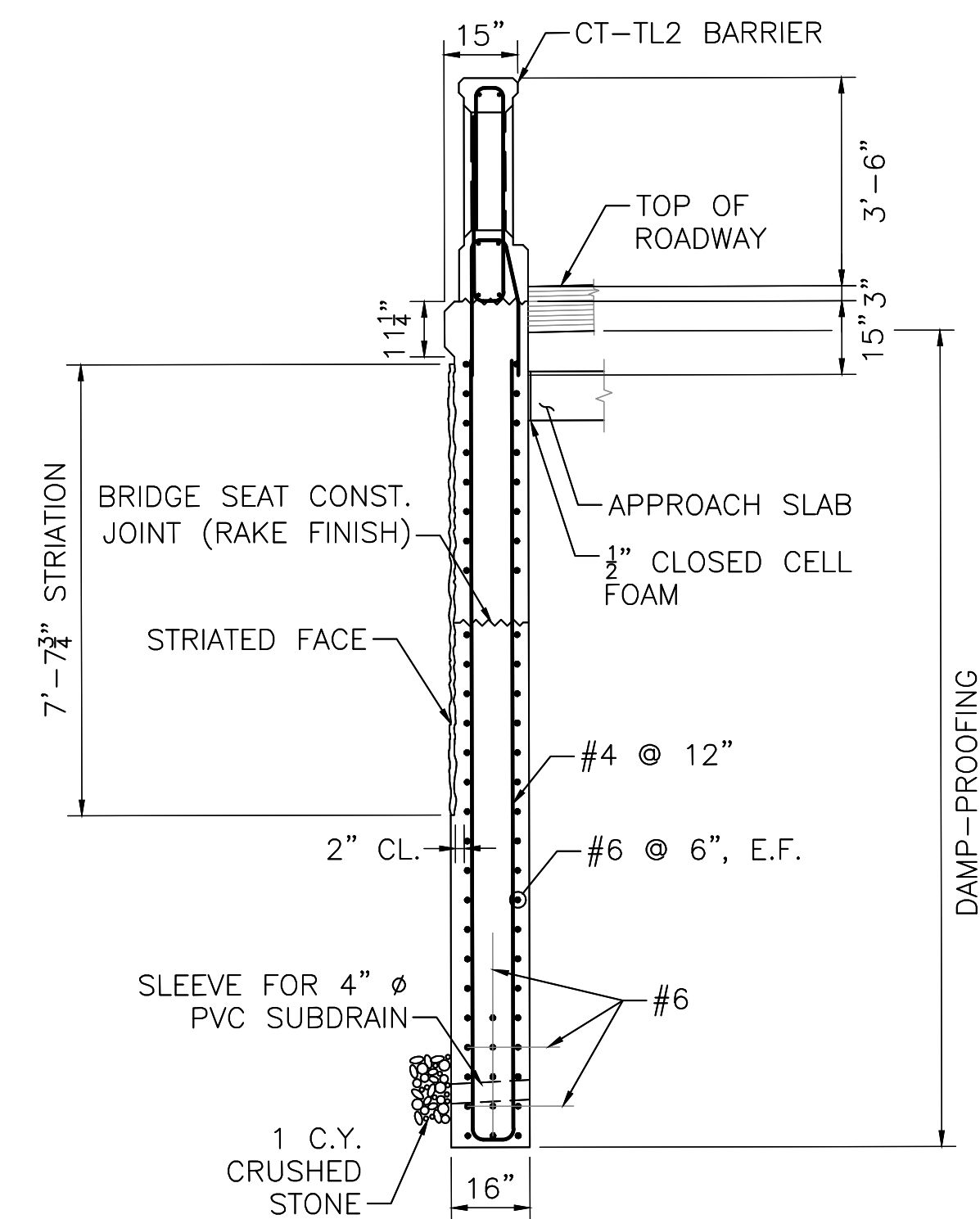
JUNE 29, 2024	ISSUED FOR CONSTRUCTION
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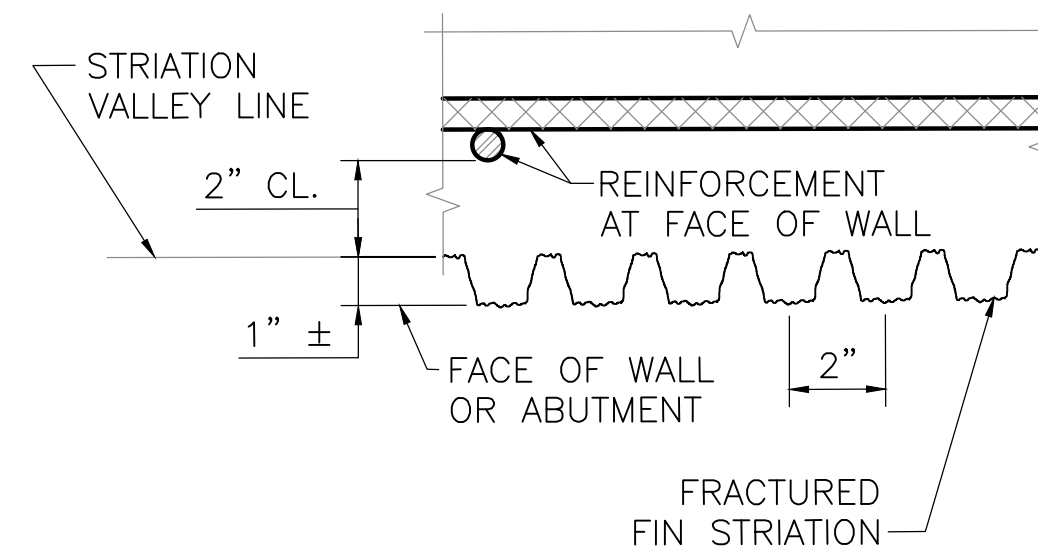
**HARDWICK-NEW BRAintree  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	24	37
PROJECT FILE NO.		608851	

**TYPICAL WINGWALL SECTION**

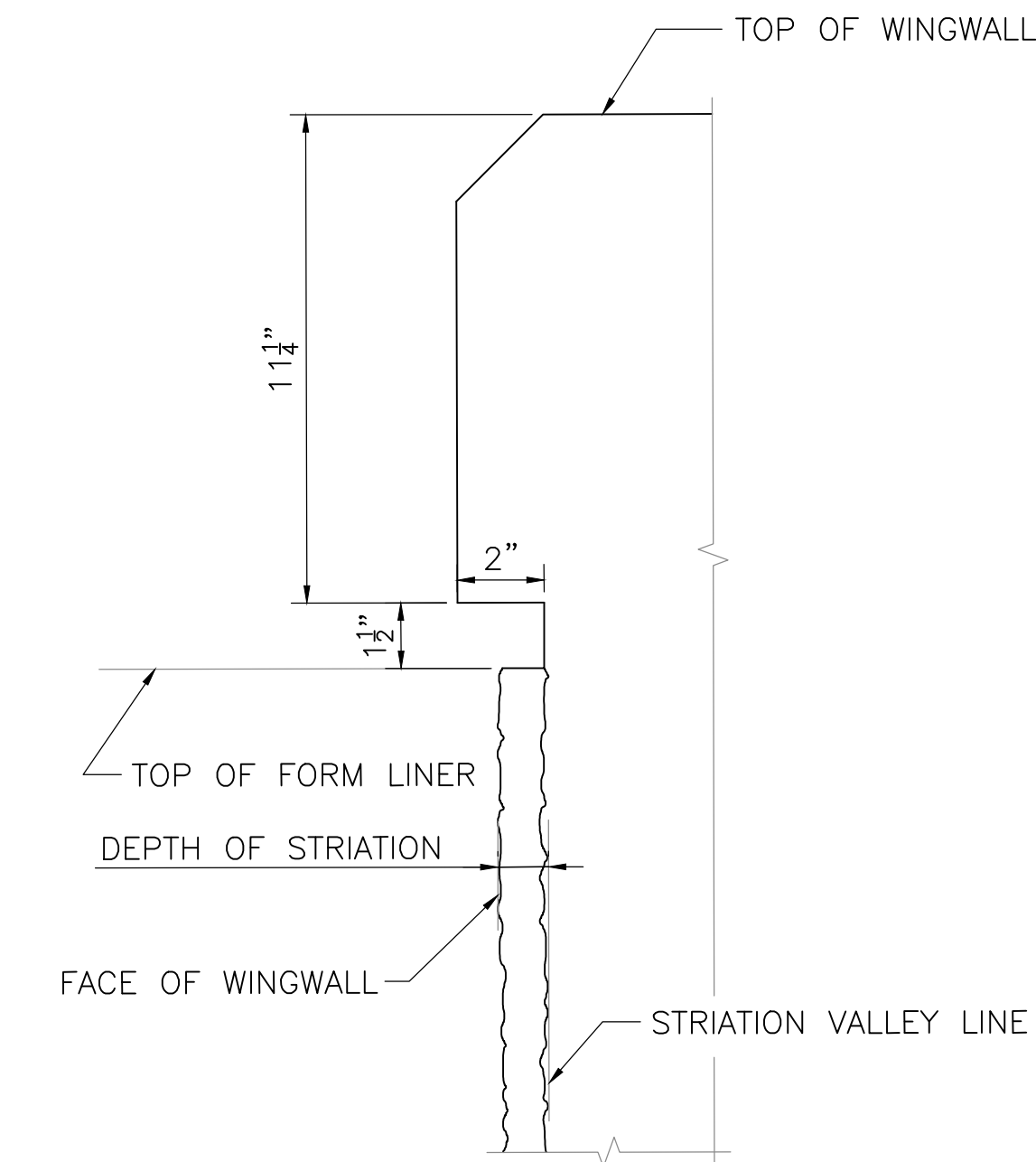


**SECTION 1**  
**TYPICAL WINGWALL SECTION**  
SCALE: 3/8" = 1'-0"

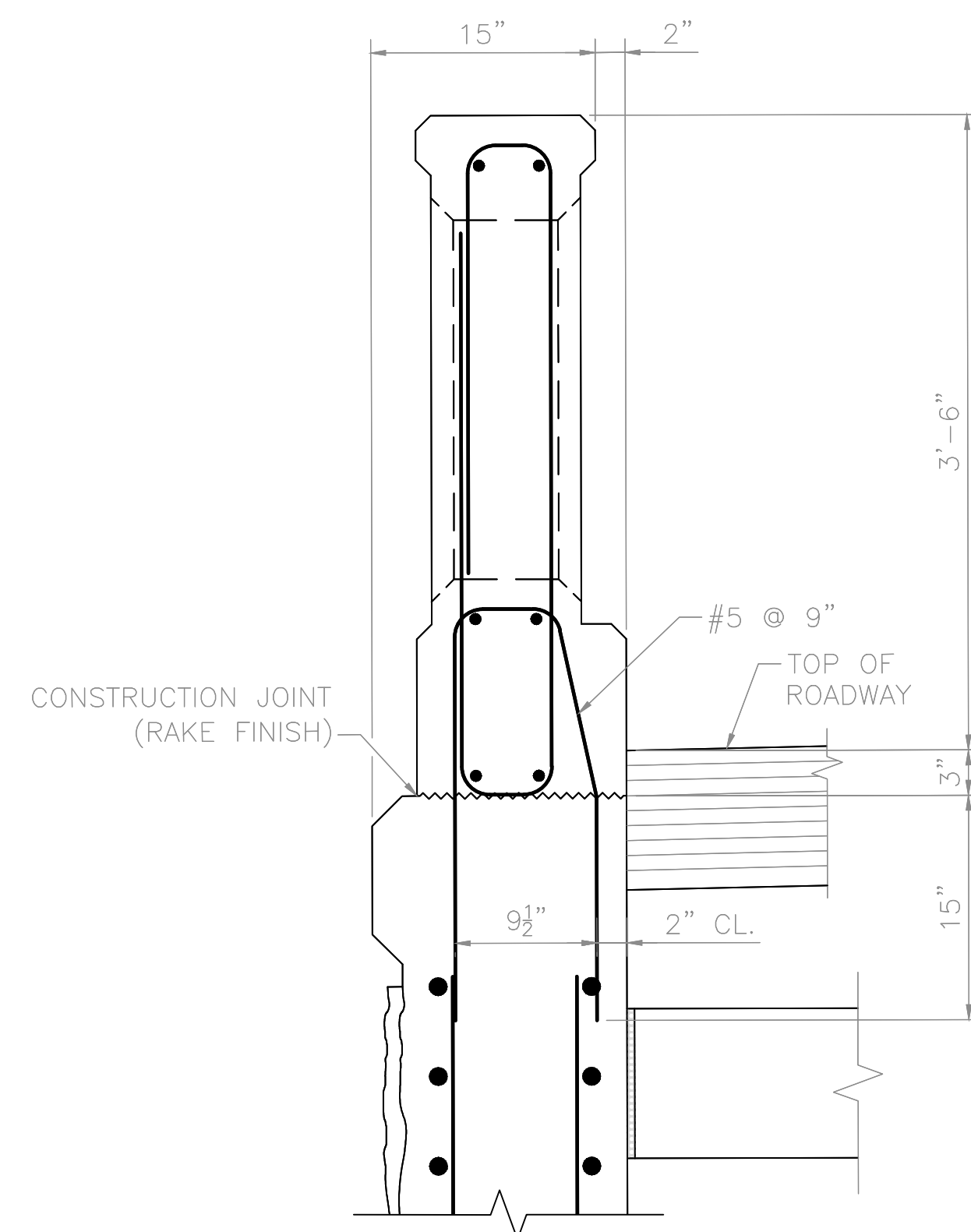


- NOTES:**
1. THE CONTRACTOR SHALL MAKE SURE THAT THE STRIATION FINS ARE PLUMB AND LINED UP VERTICALLY FROM PANEL TO PANEL FOR THE FULL HEIGHT OF THE WALL.
  2. THE HORIZONTAL JOINT MAY BE OMITTED IF THE CONTRACTOR CAN DEMONSTRATE THAT THE FORM LINER PANELS CAN BE INSTALLED END TO END WITHOUT CREATING A VISIBLE SEAM IN THE FINAL CAST CONCRETE.
  3. THIS ITEM IS PAID FOR UNDER "CEMENT CONCRETE FORM LINER - FRACTURED FIN."

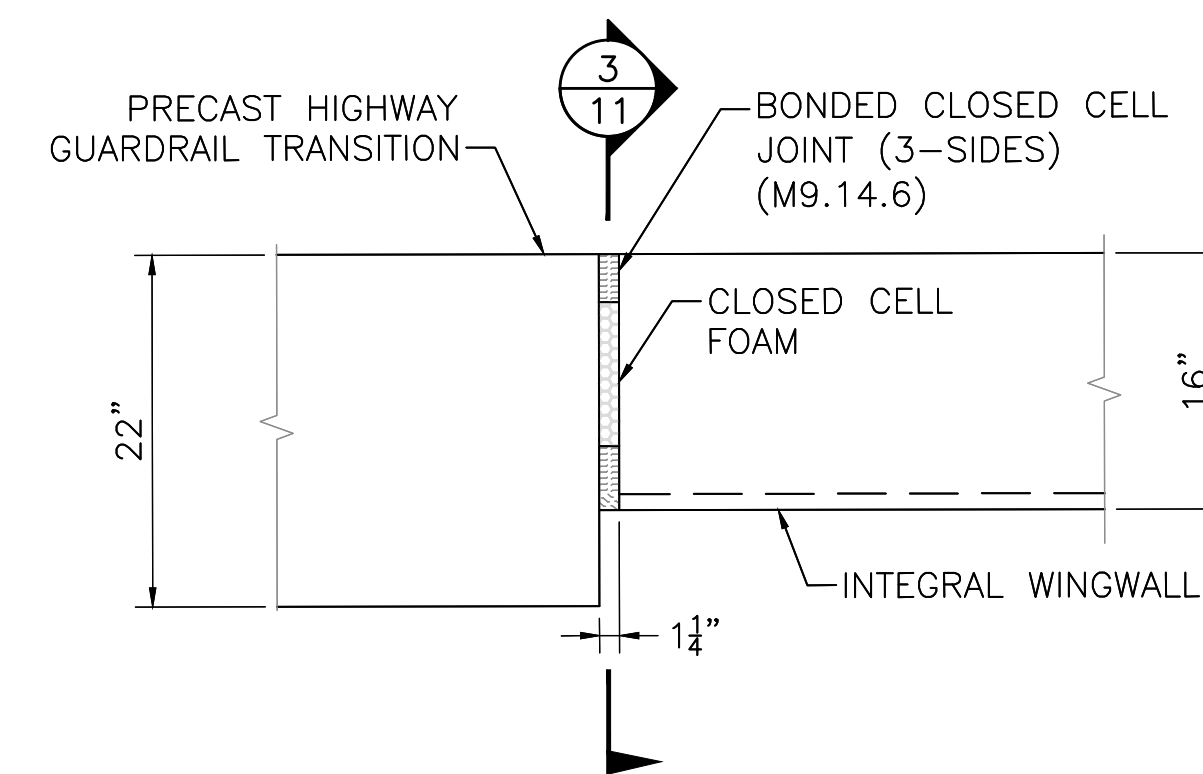
**TYPICAL STRIATION DETAIL**  
SCALE: 3" = 1'-0"



**DETAIL AT TOP OF WINGWALL**  
SCALE: 3" = 1'-0"

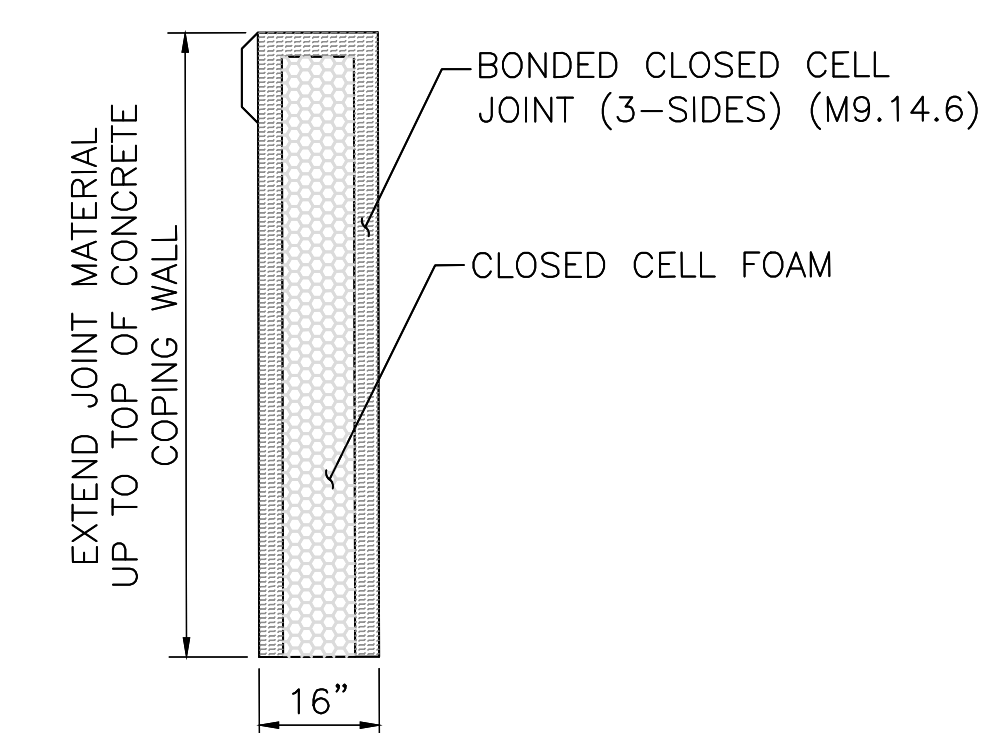


**TOP OF WINGWALL AT SAFETY CURB**  
SCALE: 1" = 10'-0"



**NOTE:**  
REINFORCEMENT NOT SHOWN FOR CLARITY

**SECTION 2**  
**PLAN VIEW OF MOVEMENT JOINT AT GUARDRAIL TRANSITION**  
SCALE: 1" = 1'-0"



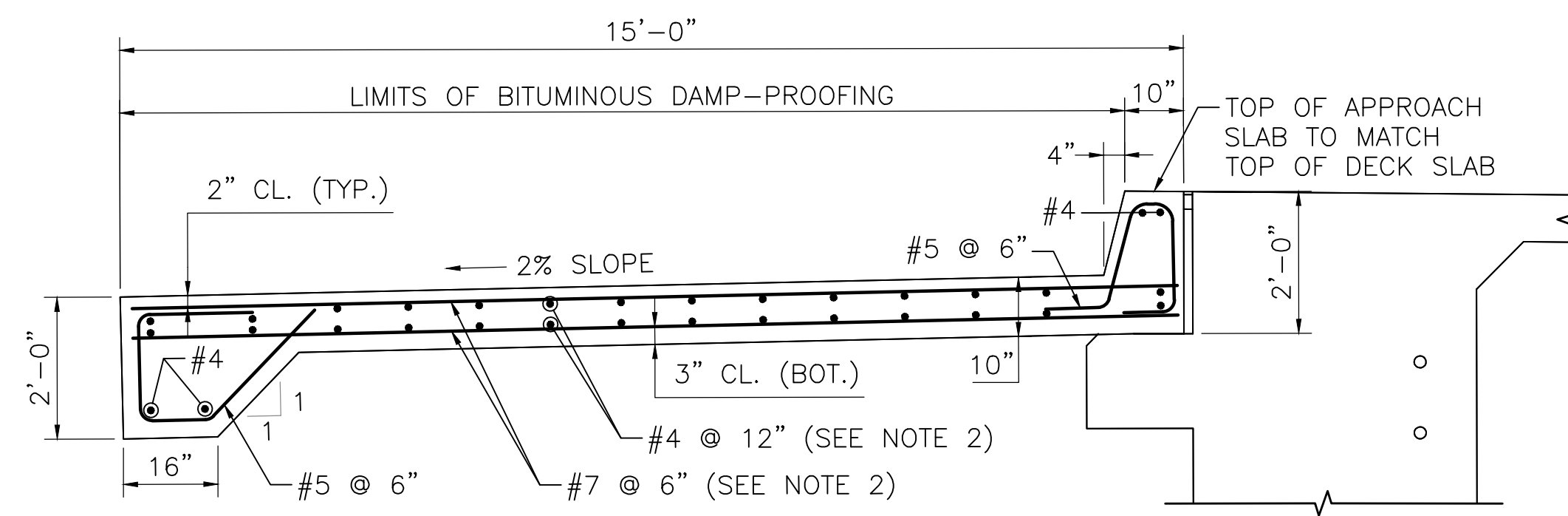
**SECTION 3**  
SCALE: 1/2" = 1'-0"

DATE	DESCRIPTION
JUNE 29, 2024	ISSUED FOR CONSTRUCTION
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AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

**HARDWICK-NEW BRAintree  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	25	37
PROJECT FILE NO.		608851	

**APPROACH SLAB & PEDESTAL DETAILS**

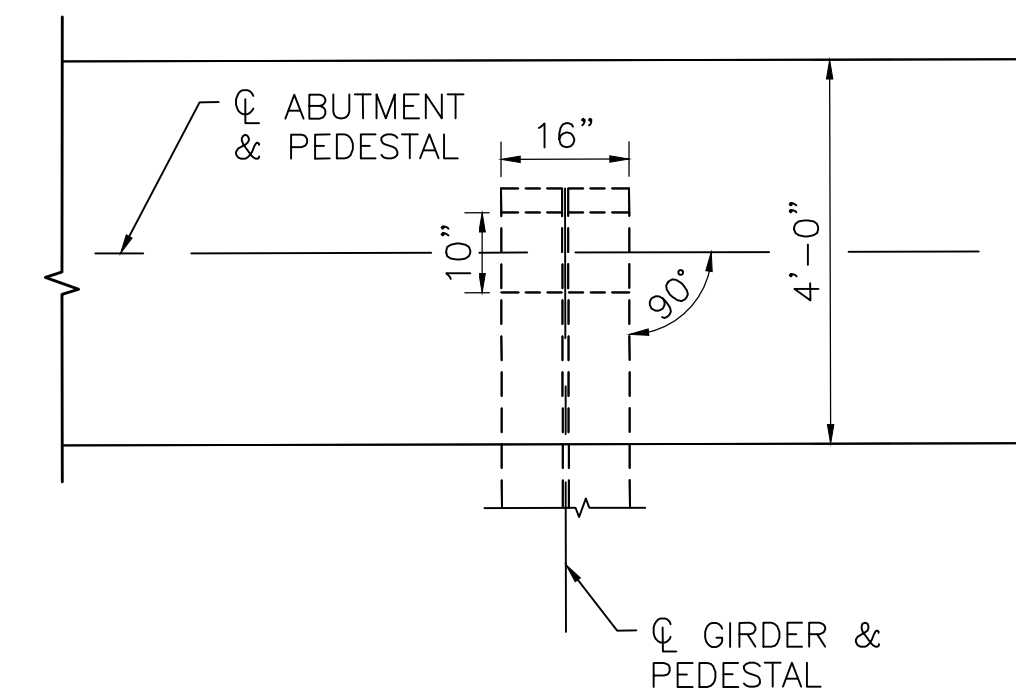


**NOTES:**

1. APPROACH SLAB TO BE 5000 PSI,  $\frac{3}{4}$  IN, 685 HP CEMENT CONCRETE.
2. PLACE LONGITUDINAL REINFORCEMENT PARALLEL TO CENTERLINE OF CONSTRUCTION.  
PLACE TRANSVERSE REINFORCEMENT PARALLEL TO ABUTMENT.

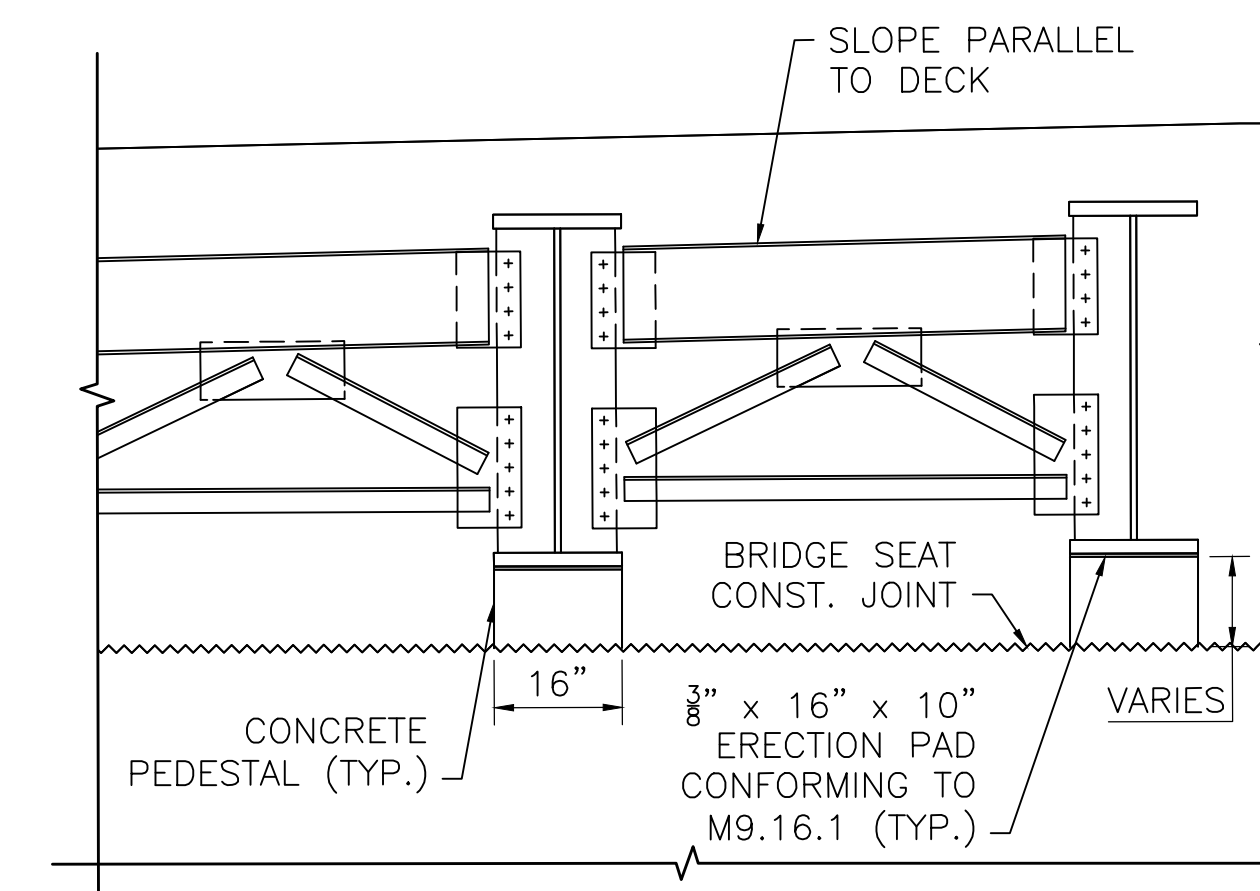
**TYPICAL APPROACH SLAB DETAIL**

SCALE:  $\frac{1}{2}$ " = 1'-0"



**PEDESTAL PLAN DETAIL**

SCALE:  $\frac{1}{2}$ " = 1'-0"



**PEDESTAL ELEVATION DETAIL**

SCALE:  $\frac{1}{2}$ " = 1'-0"

JUNE 29, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

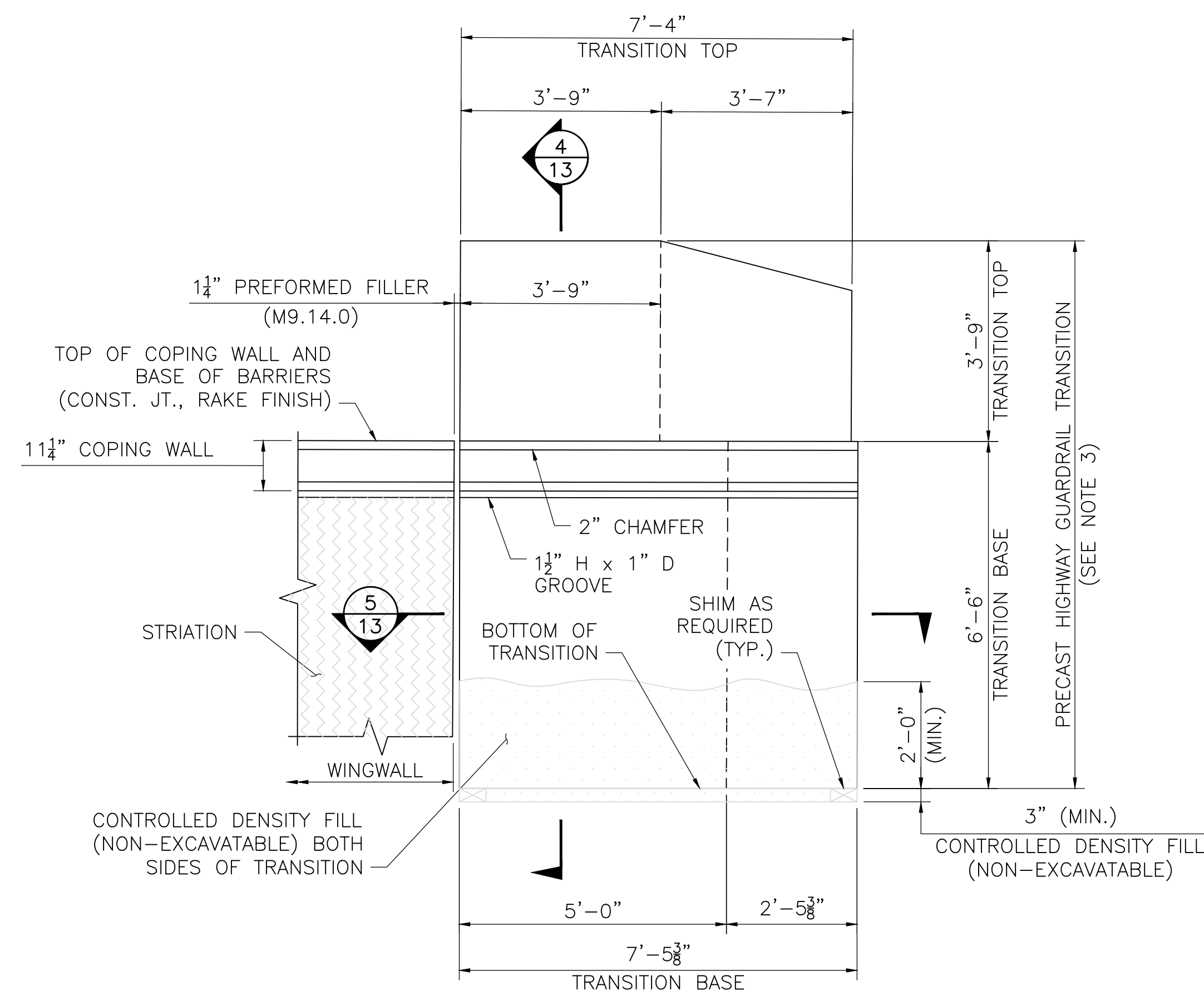


STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	26	37
PROJECT FILE NO.		608851	

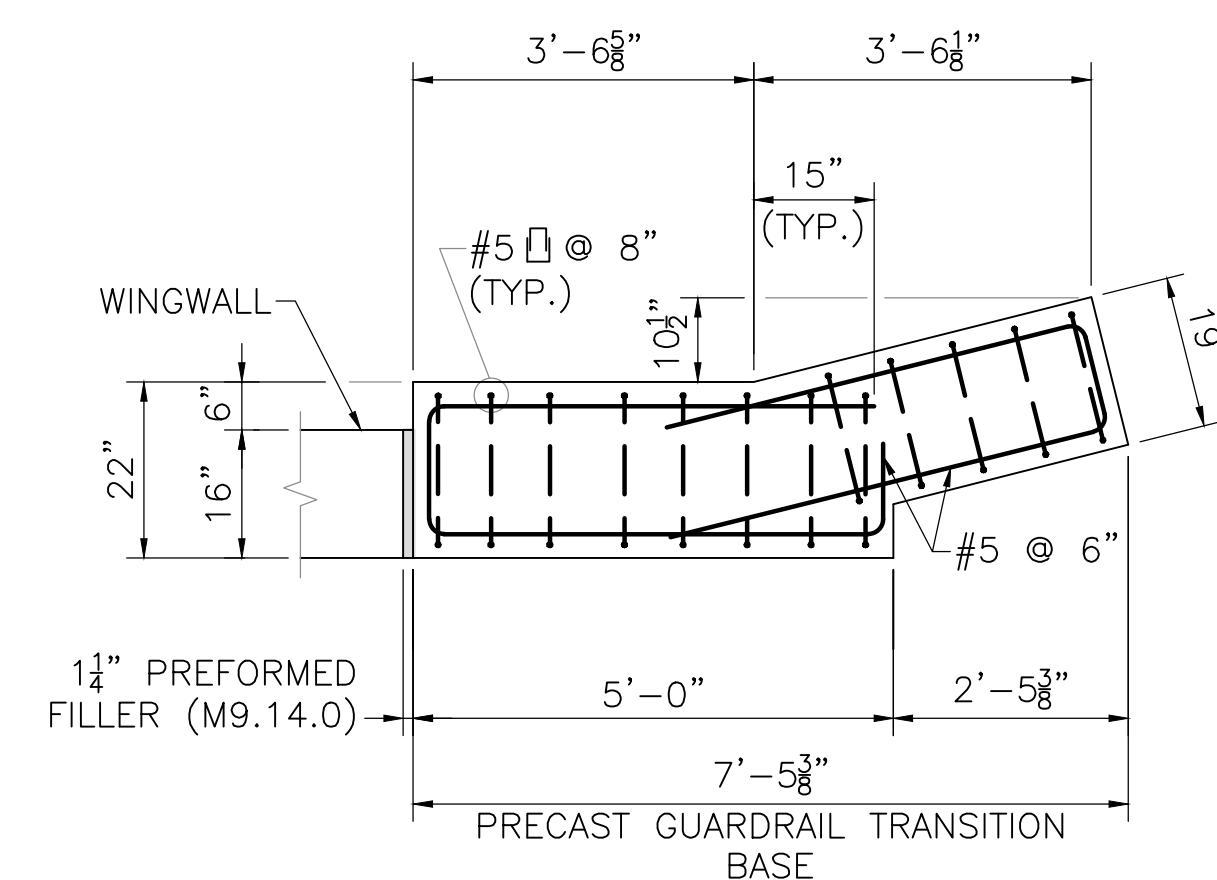
HIGHWAY GUARDRAIL TRANSITION BASE DETAILS

NOTES:

- 1 1/2" H x 1" D GROOVE. ALIGN WITH GROOVE AT TOP OF STRIATIONS.
- REINFORCEMENT OF THE TRANSITION TOP IS NOT SHOWN FOR CLARITY AND CAN BE FOUND ON THE HIGHWAY GUARDRAIL TRANSITION SHEET.
- PRECAST GUARDRAIL TRANSITION SHALL BE 5000 PSI, 3/4" IN, 685 HP CEMENT CONCRETE.
- GRAVEL BORROW SHALL BE PLACED AND THOROUGHLY COMPACTED TO THE GRADE OF 3" (MIN.) BELOW THE INTENDED BOTTOM OF PRECAST GUARDRAIL TRANSITION BASE AND TO A HEIGHT OF 2'-0" (MIN.) ON ALL SIDES OF THE TRANSITION BASE TO FORM A TRENCH IN WHICH TO SET THE TRANSITION. WHERE NO GRAVEL BORROW IS REQUIRED BELOW THE BASE, IT SHALL BE PLACED ON UNDISTURBED SOIL.
- CONTRACTOR SHALL SET THE PRECAST GUARDRAIL TRANSITION TO THE REQUIRED ELEVATION AND ALIGNMENT, AND BACKFILL PRECAST GUARDRAIL TRANSITION WITH CONTROLLED DENSITY FILL (NON-EXCAVATABLE) TO THE ELEVATION SHOWN.



ELEVATION

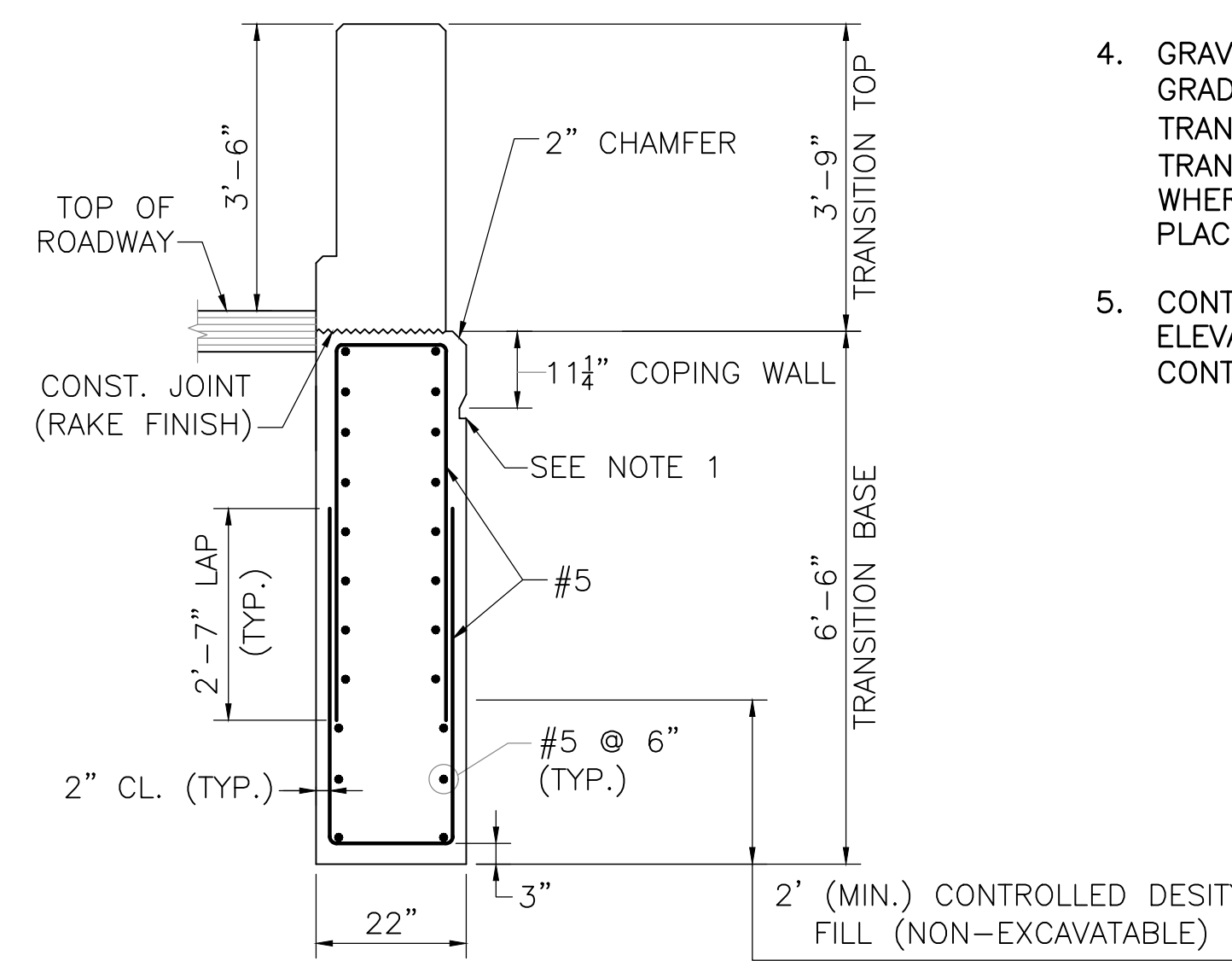


NOTE:  
WINGWALL REINFORCEMENT AND STRIATIONS  
NOT SHOWN FOR CLARITY.

SECTION 5

GUARDRAIL TRANSITION BASE DETAILS AT SAFETY CURB

SCALE: 1/2" = 1'-0"



SECTION 4

DATE	DESCRIPTION
JUNE 29, 2024	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

**HARDWICK-NEW BRAINTREE  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	27	37
PROJECT FILE NO.		608851	

**FRAMING PLAN & DETAILS**

**STRUCTURAL STEEL NOTES:**

- ALL STEEL SHALL CONFORM TO AASHTO M270, GRADE 50.
- ALL BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F3125 EXCEPT AS NOTED OTHERWISE. ALL NUTS SHALL MEET THE REQUIREMENTS OF ASTM A635 AND ALL WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F436. ALL BOLTS, NUTS, AND WASHERS SHALL BE MECHANICALLY GALVANIZED IN ACCORDANCE WITH ASTM B695, CLASS 50, TYPE 1.
- WELDING DETAILS, PROCEDURES, AND TESTING METHODS SHALL CONFORM TO THE AASHTO/AWS D1.5: 2020 - BRIDGE WELDING CODE, UNLESS OTHERWISE NOTED ON THE PLANS.
- ALL WEB TO BEARING STIFFENER, AND BEARING STIFFENER TO FLANGE WELDS SHALL BE INSPECTED BY THE MAGNETIC PARTICLE METHOD.
- MULTIPLE-PASS WELDS INSPECTED BY THE MAGNETIC PARTICLE METHOD (MT) SHALL HAVE EACH PASS OR LAYER INSPECTED AND ACCEPTED BEFORE PROCEEDING TO THE NEXT PASS OR LAYER, AS DETERMINED BY THE ENGINEER.
- ALL BUTT WELDS IN THE WEB AND TOP AND BOTTOM FLANGES SHALL BE COMPLETELY RADIOGRAPHED AND SHALL BE FINISHED SMOOTH AND FLUSH WITH THE BASE METAL IN ALL SURFACES BY GRINDING IN THE DIRECTION OF APPLIED STRESS, LEAVING SURFACES FREE FROM DEPRESSIONS. CHIPPING MAY BE USED PROVIDED IT IS FOLLOWED BY SUCH GRINDING.
- BUTT WELD DETAILS SHALL CONFORM TO AWS SPECIFICATIONS.
- THE CONTRACTOR SHALL TAKE PROPER PRECAUTIONS TO ENSURE STABILITY OF ALL STRUCTURAL ELEMENTS UNTIL THE TOTAL STRUCTURE IS IN BEARING.
- COST OF LEVELING BOLTS AND NUTS ARE CONSIDERED INCIDENTAL AND SHALL BE PAID FOR UNDER THE BRIDGE LUMP SUM COST.
- GIRDERS SHALL BE METALIZED WITH A WIRE TYPE OF ZINC-ALUMINUM WITH A 9-12 MILS THICKNESS WITH A SEALER FOR THE INTERIOR GIRDER AND AN 8-11 MILS THICKNESS WITH A THREE COAT SYSTEM FOR THE EXTERIOR GIRDERS (FEDERAL STANDARD CODE 34115). SEALANT WILL NOT BE USED AT THE SPLICE LOCATION.
- CROSS FRAMES, UTILITY SUPPORTS, AND BOTTOM LATERAL BRACING ELEMENTS THAT ARE COMPOSED OF NON-WEATHERING STEELS SHALL BE HOT DIPPED GALVANIZED.

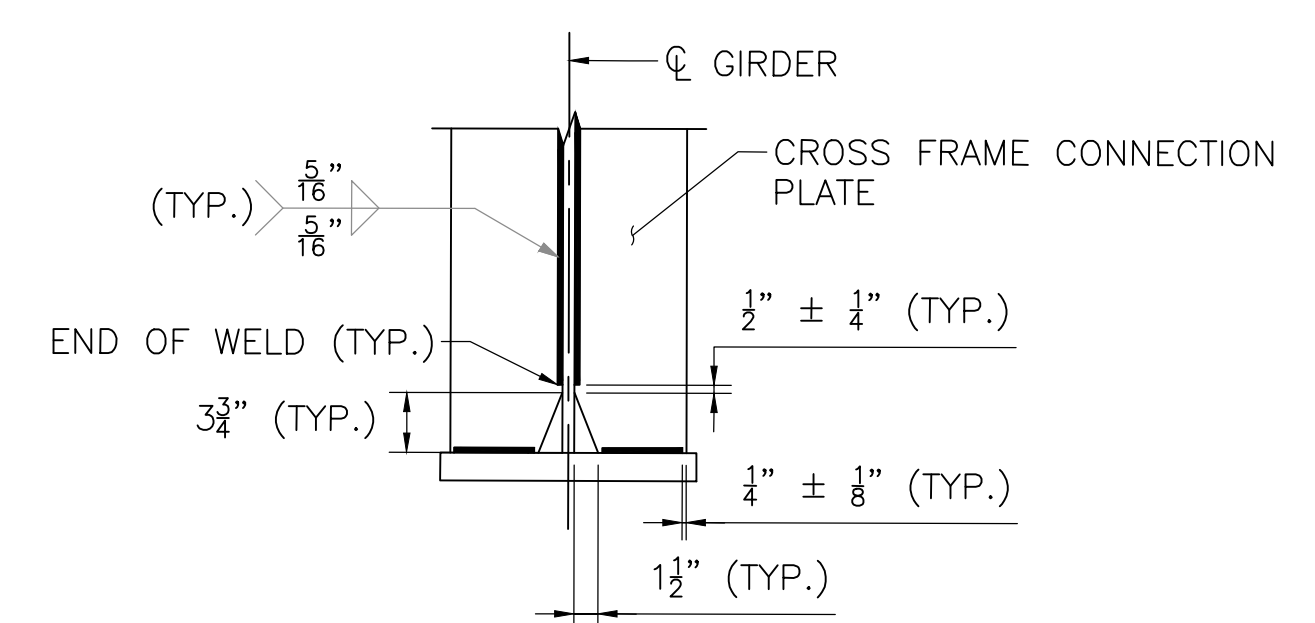
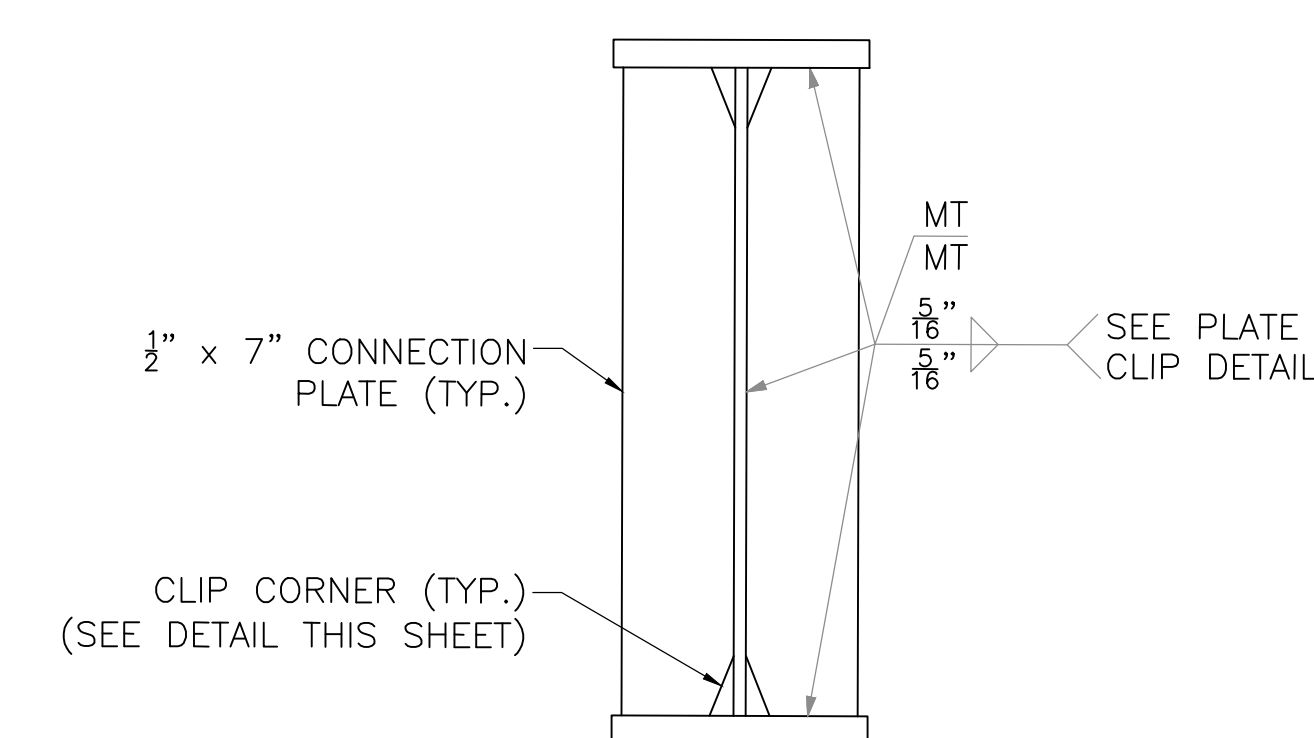
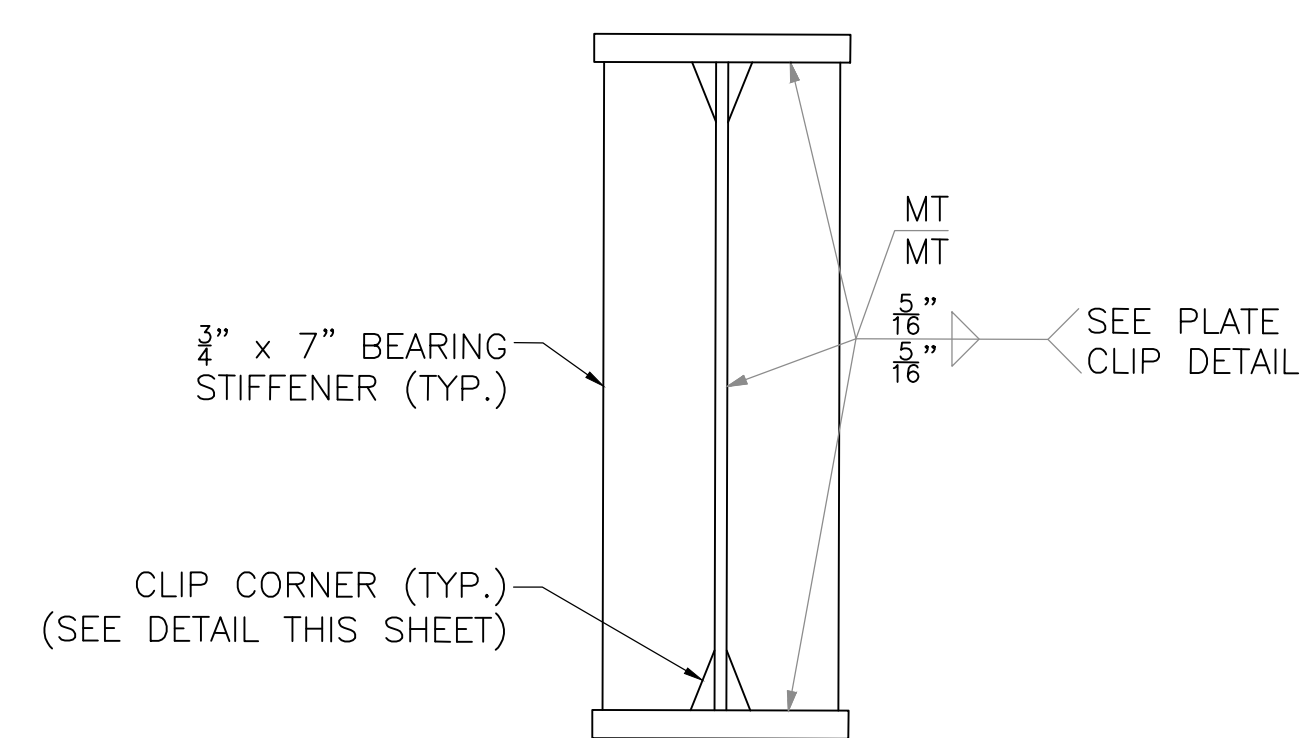
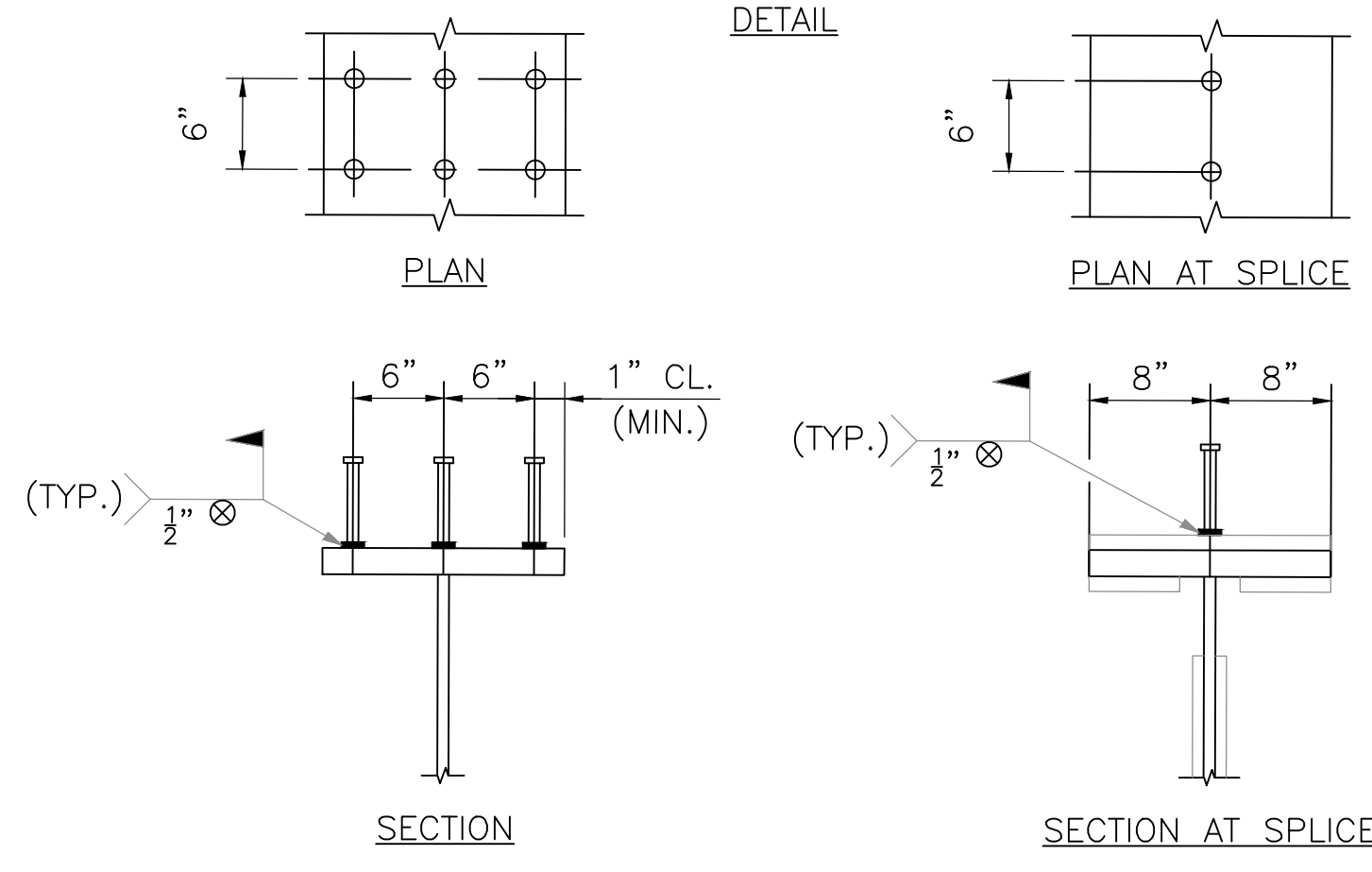
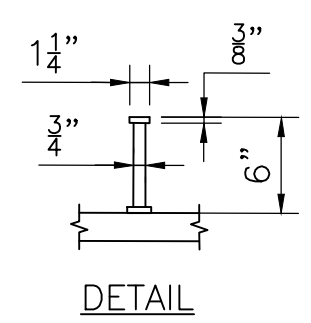
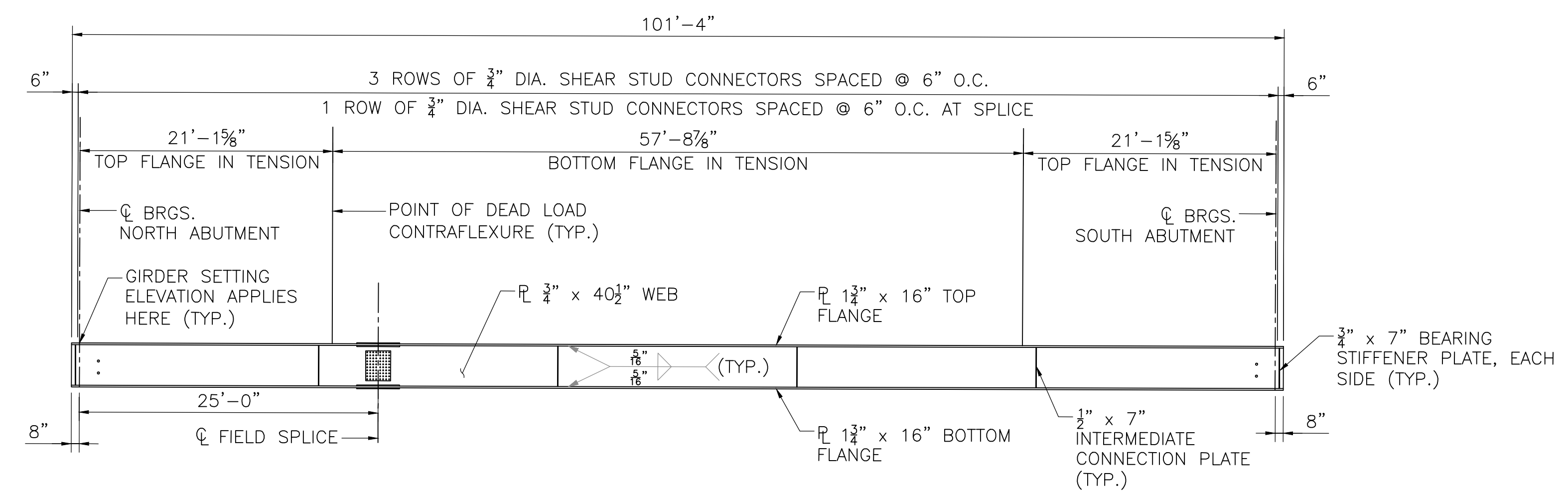
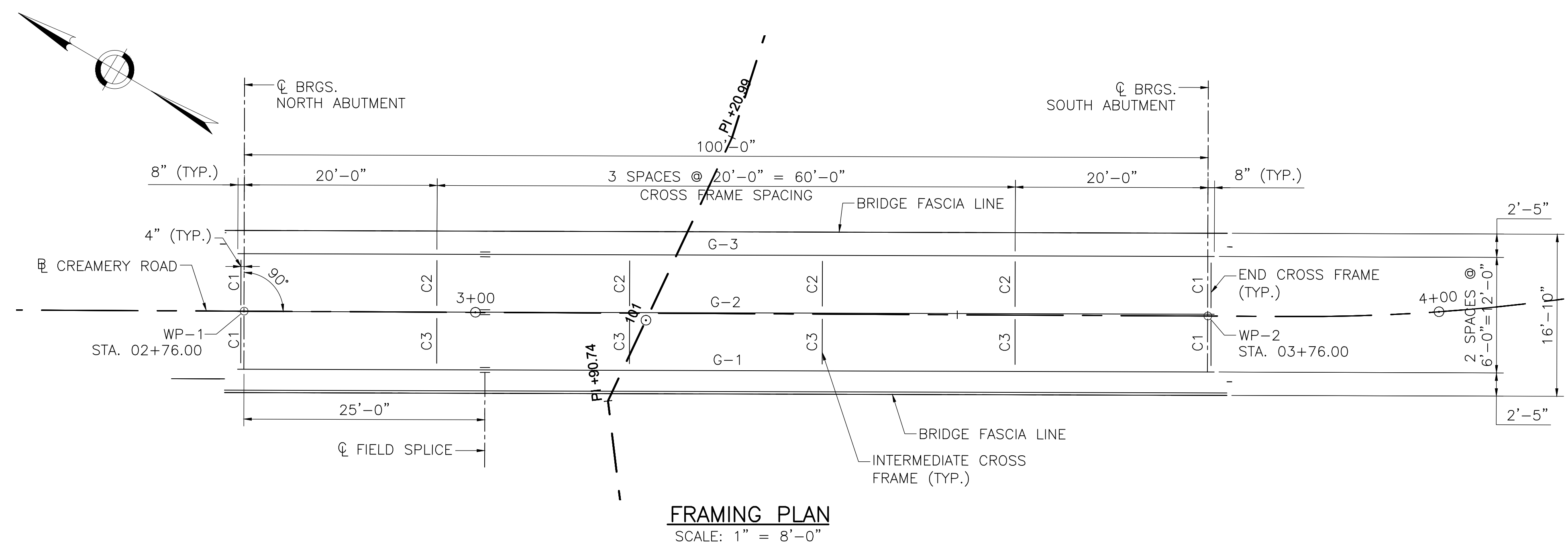
GIRDER & BRGS. POINT COORDINATES		
DESCRIPTION	NORTHING	EASTING
NORTH ABUT.-G1	2942740.54	473667.69
NORTH ABUT.-G2	2942745.12	473669.56
NORTH ABUT.-G3	2942749.71	473673.43
SOUTH ABUT.-G1	2942676.03	473742.12
SOUTH ABUT.-G2	2942680.61	473745.99
SOUTH ABUT.-G3	2942680.61	473749.68

WORKING POINT COORDINATES		
DESCRIPTION	NORTHING	EASTING
WP-1	2942745.14	473669.59
WP-2	2942680.47	473745.87

GIRDER (SETTING) ELEVATION		
APPLIES AT CL OF BEARING OF TOP FLANGE		
GIRDER	N. ABUTMENT	S. ABUTMENT
G-1	559.01	557.91
G-2	558.89	557.79
G-3	558.77	557.67

**FRAMING PLAN NOTES:**

- C1 = TYPICAL END CROSS FRAME  
C2 = TYPICAL INTERMEDIATE CROSS FRAME  
C3 = TYPICAL UTILITY CROSS FRAME
- SEE SHEET 16 FOR CROSS FRAME DETAILS.
- THE MAIN LOAD CARRYING MEMBERS ARE GIRDERS G1 THROUGH G3.
- CONNECTION PLATES AND ENDS OF GIRDERS SHALL BE PLUMB AFTER APPLICATION OF FULL DEAD LOADS.
- ALL INTERMEDIATE CROSS FRAMES AND CONNECTION PLATES SHALL BE PERPENDICULAR TO THE CENTER OF THE GIRDERS.
- SEE SHEET 15 FOR CAMBER TABLE.
- ALL DIMENSIONS ARE HORIZONTAL AND MEASURED ALONG THE CENTERLINE OF THE WEB. ALL GIRDERS ARE PARALLEL TO THE BASELINE.
- BEARING STIFFENER PLATE AT BOTTOM FLANGE SHALL BE MILLED FOR TIGHT FIT AND WELDED WITH  $\frac{5}{16}$ " FILLET WELDS BOTH SIDES OF PLATE.



**NOTE:**  
AT STIFFENER LOCATIONS, MODIFY THE PLATE ATTACHMENT TO THE FLANGES AS SHOWN IN THE TYPICAL STIFFENER ATTACHMENTS ON SHEET 14

**NOTE:**  
 $\frac{7}{8}$ "  $\phi$  STUDS MAY BE SUBSTITUTED FOR  $\frac{3}{4}$ "  $\phi$  STUDS BY ADJUSTING THE PITCH TO PROVIDE AN EQUIVALENT CROSS-SECTIONAL AREA PER FOOT.

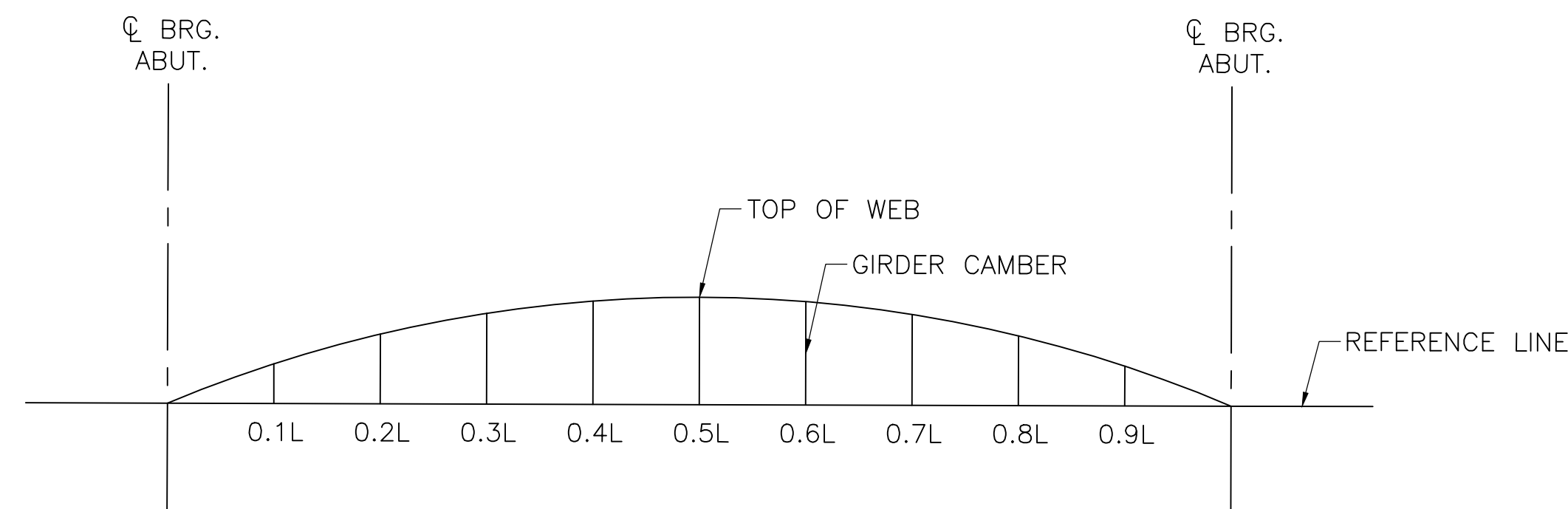
JUNE 29, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
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AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

608851\_BRI14-33(H-08-003=N-07-002).DWG Plotted on 15-Jul-2024 11:31 AM 29-June-2024 608851 Structural Submittal (SF)

HARDWICK-NEW BRAintree  
CREAMERY ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	28	37
PROJECT FILE NO.		608851	

CAMBER TABLE



CAMBER DIAGRAM  
N.T.S.

CAMBER TABLE (INCHES)												
GIRDER		SPAN NO. 1										
		CL BRG. ABUT.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	CL BRG. ABUT.
G-1	STEEL DL DEFLECTION	0.00	0.27	0.50	0.69	0.81	0.85	0.81	0.69	0.50	0.27	0.00
	CONC. DL DEFLECTION	0.00	0.59	1.12	1.54	1.80	1.89	1.80	1.54	1.12	0.59	0.00
	S.D.L. DEFLECTION	0.00	0.05	0.15	0.26	0.34	0.37	0.34	0.26	0.15	0.05	0.00
	VERT. CURVE CAMBER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ADDITIONAL CAMBER	0.00	0.13	0.25	0.38	0.50	0.63	0.50	0.38	0.25	0.13	0.00
	TOTAL CAMBER (NEAREST 1/8")	0.00	1.00	2.00	2.875	3.50	3.75	3.50	2.875	2.00	1.00	0.00
G-2	STEEL DL DEFLECTION	0.00	0.27	0.51	0.70	0.82	0.86	0.82	0.70	0.51	0.27	0.00
	CONC. DL DEFLECTION	0.00	0.57	1.07	1.47	1.72	1.81	1.72	1.47	1.07	0.57	0.00
	S.D.L. DEFLECTION	0.00	0.05	0.07	0.11	0.15	0.16	0.15	0.11	0.07	0.05	0.00
	VERT. CURVE CAMBER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ADDITIONAL CAMBER	0.00	0.13	0.25	0.38	0.50	0.63	0.50	0.38	0.25	0.13	0.00
	TOTAL CAMBER (NEAREST 1/8")	0.00	1.00	1.875	2.625	3.25	3.50	3.25	2.625	1.875	1.00	0.00
G-3	STEEL DL DEFLECTION	0.00	0.27	0.50	0.69	0.81	0.85	0.81	0.69	0.50	0.27	0.00
	CONC. DL DEFLECTION	0.00	0.59	1.12	1.54	1.80	1.89	1.80	1.54	1.12	0.59	0.00
	S.D.L. DEFLECTION	0.00	0.05	0.15	0.26	0.34	0.37	0.34	0.26	0.15	0.05	0.00
	VERT. CURVE CAMBER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ADDITIONAL CAMBER	0.00	0.13	0.25	0.38	0.50	0.63	0.50	0.38	0.25	0.13	0.00
	TOTAL CAMBER (NEAREST 1/8")	0.00	1.00	2.00	2.875	3.50	3.75	3.50	2.875	2.00	1.00	0.00

CAMBER NOTES:

- STRUCTURAL STEEL DEAD LOAD DEFLECTION INCLUDES WEIGHT OF GIRDER AND CROSS FRAMES.
- CONCRETE DECK DEAD LOADS INCLUDE CONCRETE SLAB, HAUNCHES, AND STAY-IN-PLACE FORMS.
- COMPOSITE DEAD LOAD DEFLECTION INCLUDES THE CONCRETE BARRIER AND BITUMINOUS CONCRETE WEARING SURFACE.
- TOTAL CAMBER APPLIES TO THE TOP OF THE WEB AND IS MEASURED FROM THE CAMBER REFERENCE LINE.
- THE CAMBER REFERENCE LINE IS THE STRAIGHT LINE CONNECTING THE TOP OF WEB FROM CENTERLINE TO CENTERLINE OF BEARINGS FROM THE NORTH TO SOUTH ABUTMENT.
- THE CONTRACTOR SHALL VERIFY THESE CAMBERS PRIOR TO CONSTRUCTION OF THE DECK.

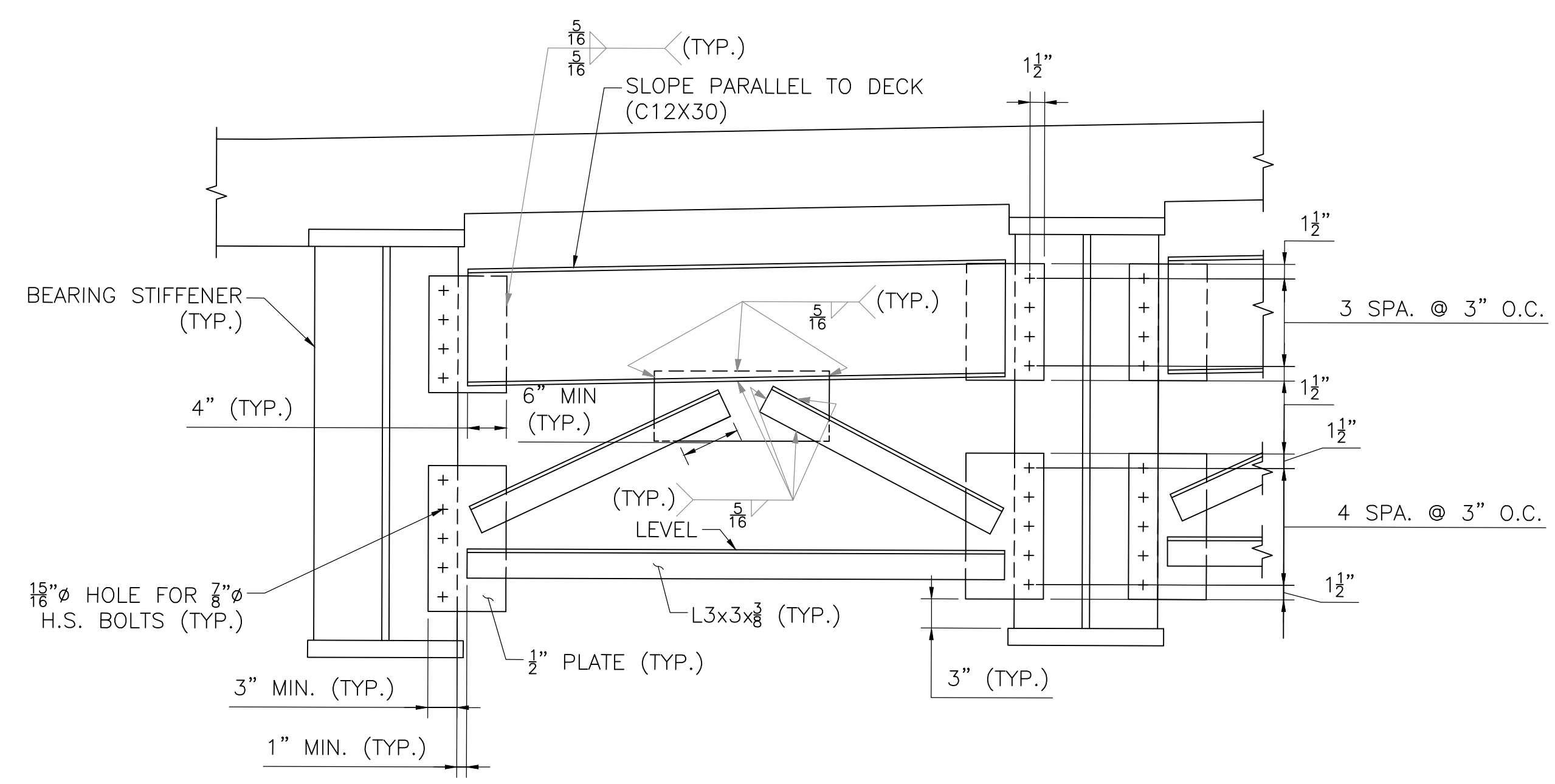
JUNE 29, 2024	ISSUED FOR CONSTRUCTION
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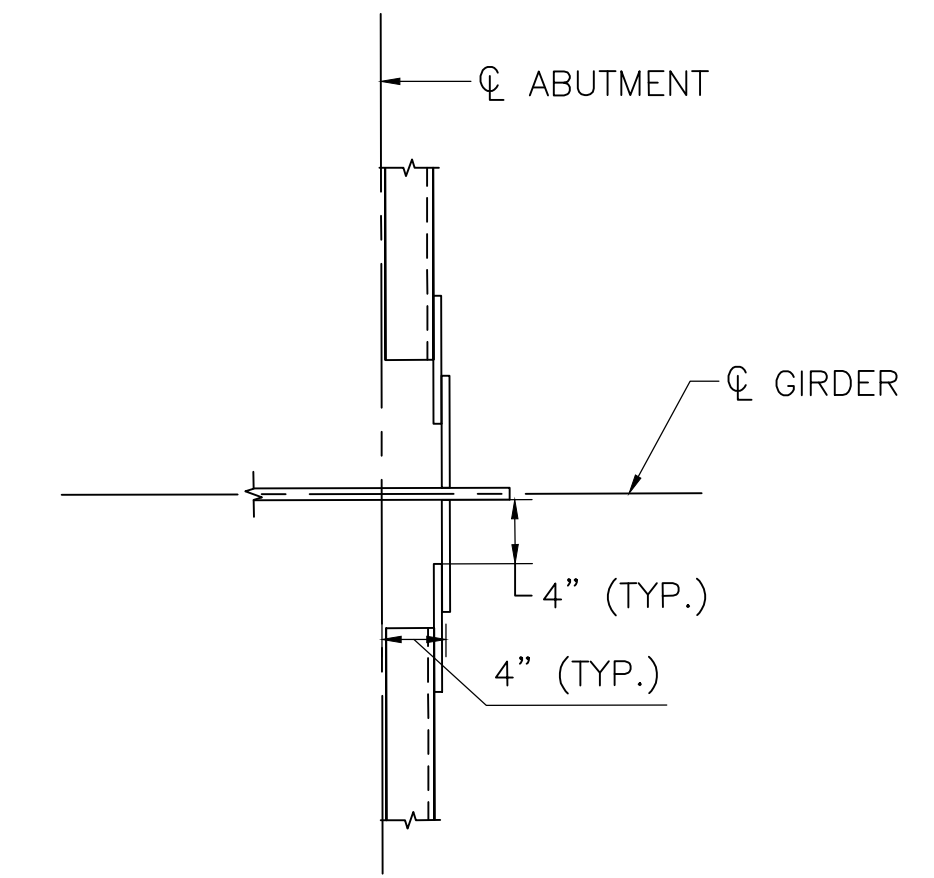
**HARDWICK-NEW BRAINTREE  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	29	37
PROJECT FILE NO.		608851	

**CROSS FRAME DETAILS**



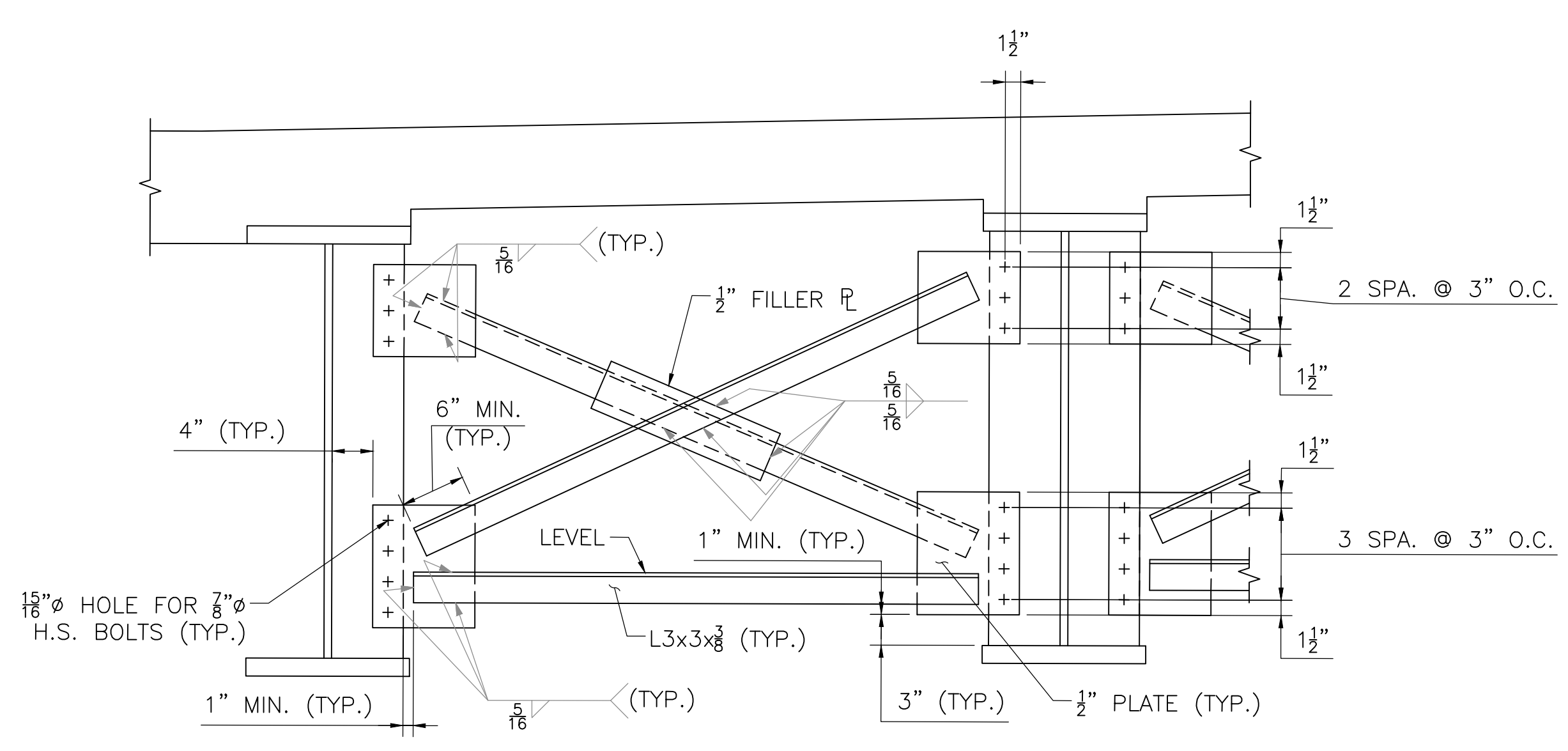
**END CROSS FRAME C1 DETAIL**  
SCALE: 1" = 1'-0"



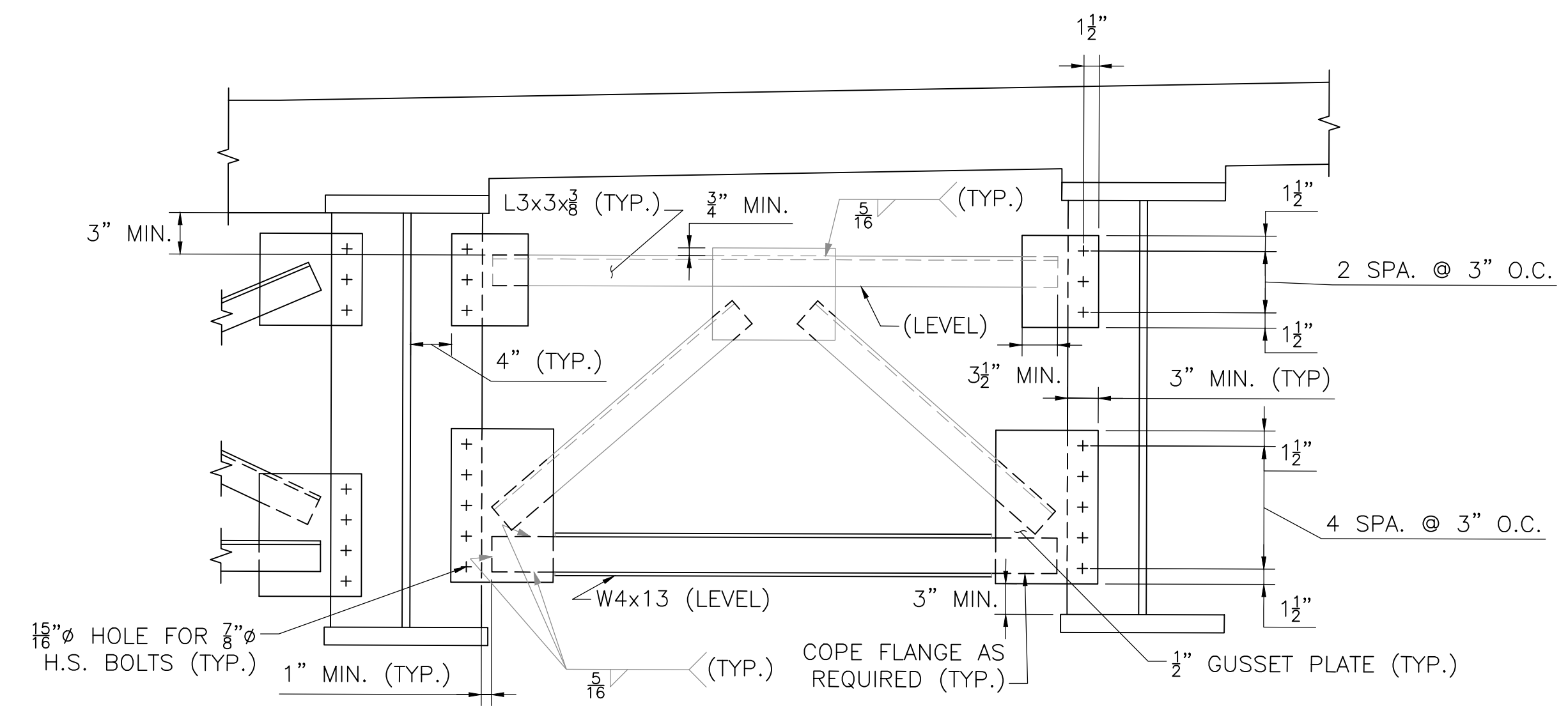
**END CROSS FRAME LAYOUT PLAN**  
SCALE: 1/2" = 1'-0"

**NOTES:**

1. SEE CLIP DETAIL ON SHEET 14.
2. TERMINATE FILLET WELDS 1/2" SHORT OF ALL PLATE EDGES.
3. ALL BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F3125. ALL BOLTS, NUTS, AND WASHERS SHALL BE MECHANICALLY GALVANIZED IN ACCORDANCE WITH ASTM B695, CLASS 50, TYPE I.



**INTERMEDIATE CROSS FRAME C2 DETAIL**  
SCALE: 1" = 1'-0"



**INTERMEDIATE UTILITY CROSS FRAME C3 DETAIL**  
SCALE: 1" = 1'-0"

JUNE 29, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

608851\_BR14-33(H-08-003=N-07-002).DWG Plotted on 15-Jul-2024 11:32 AM 29-June-2024 608851 Structural Submittal (SF)

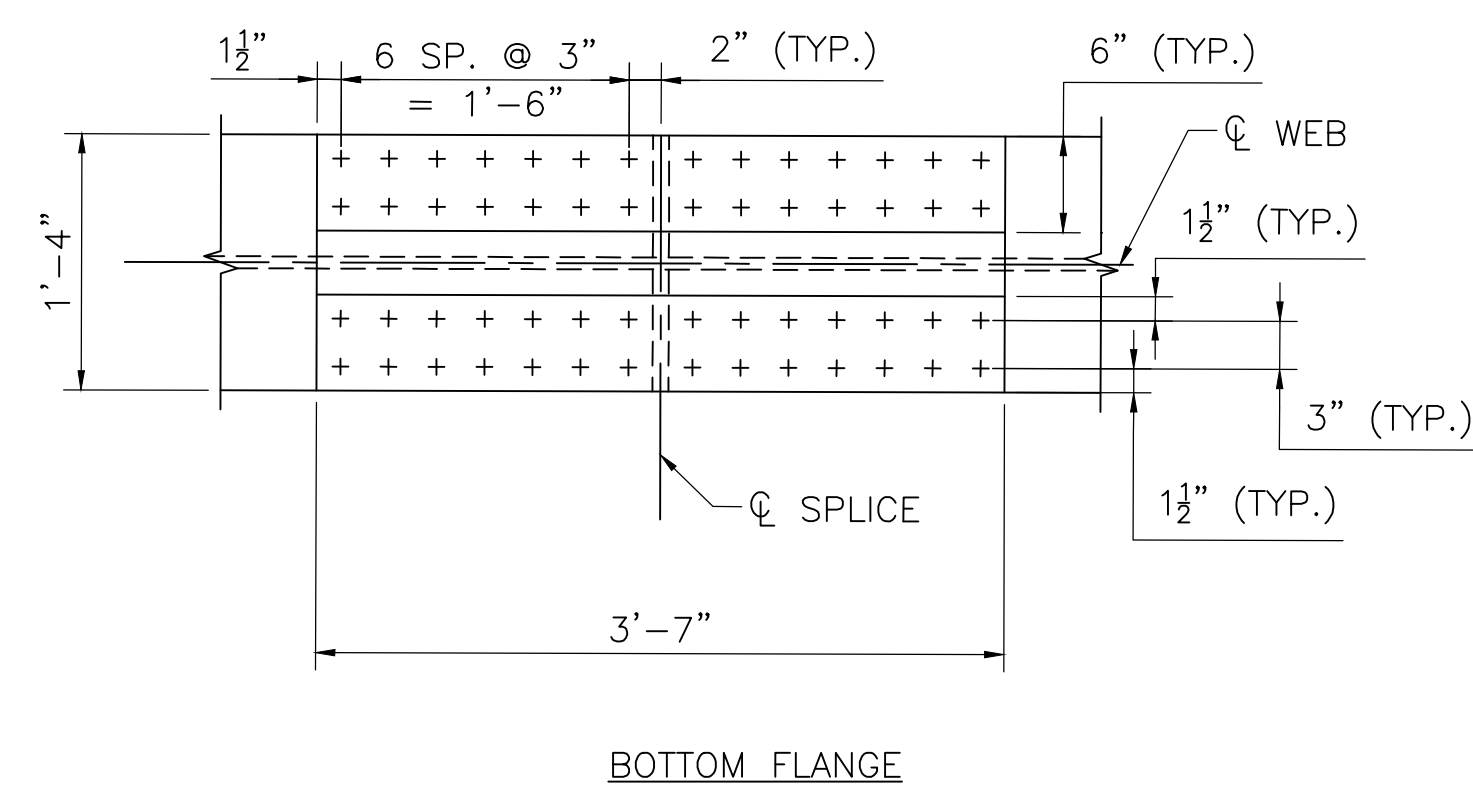
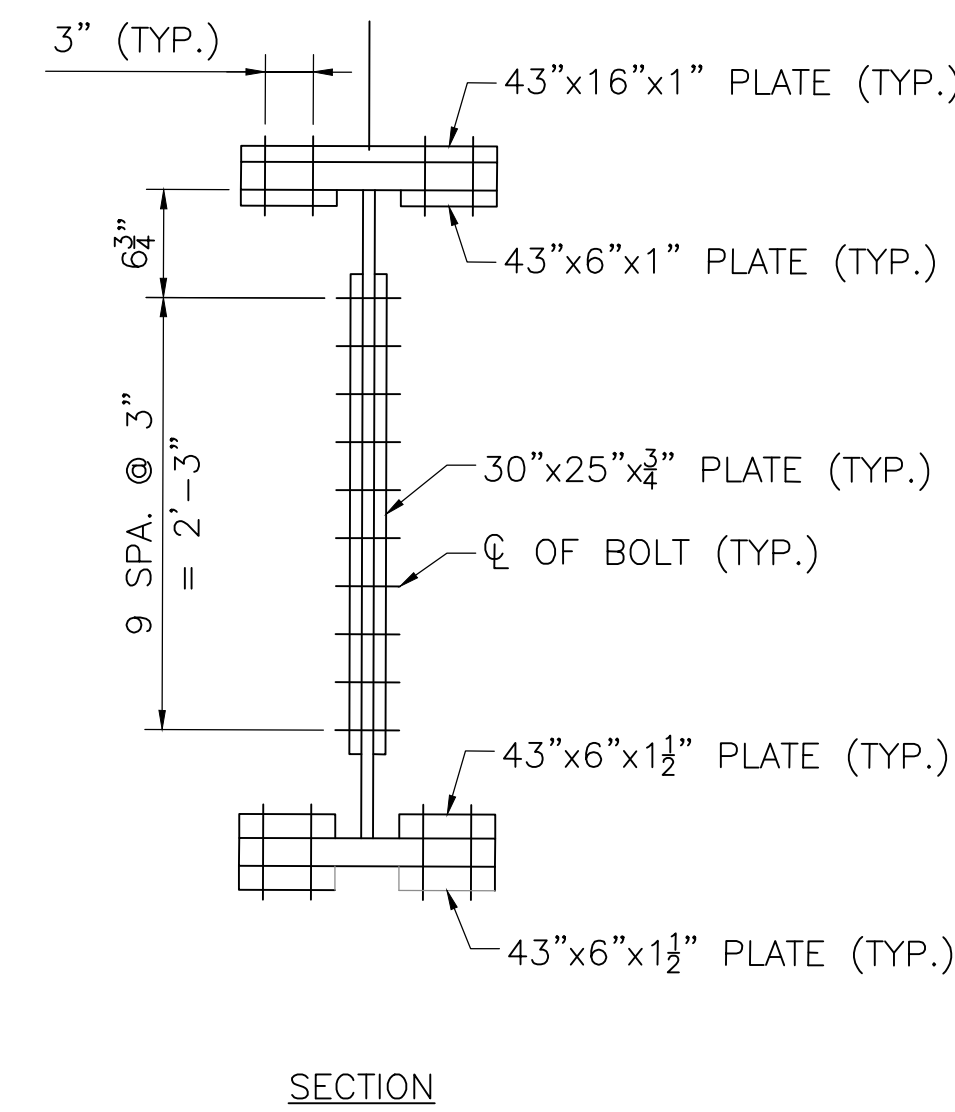
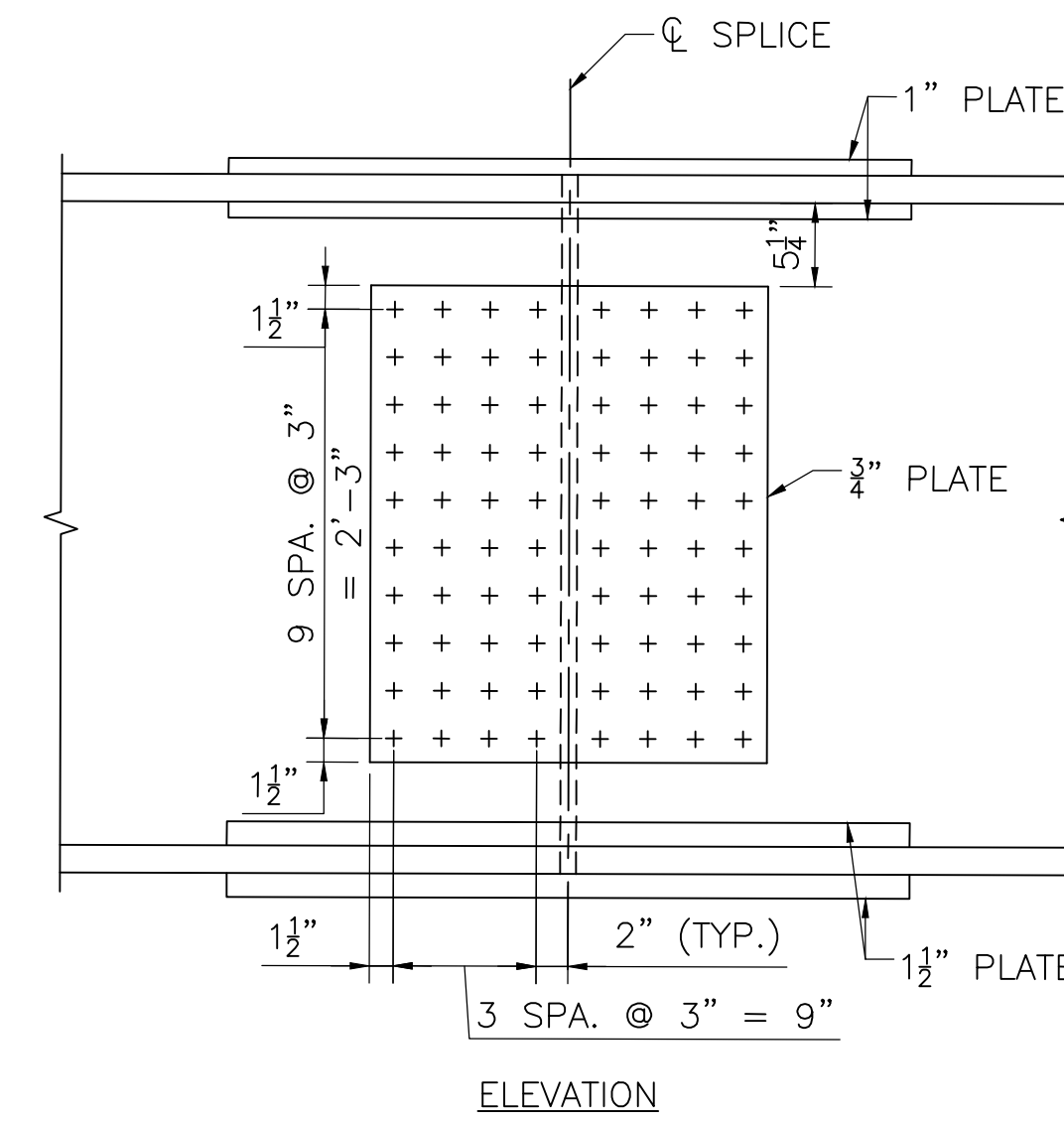
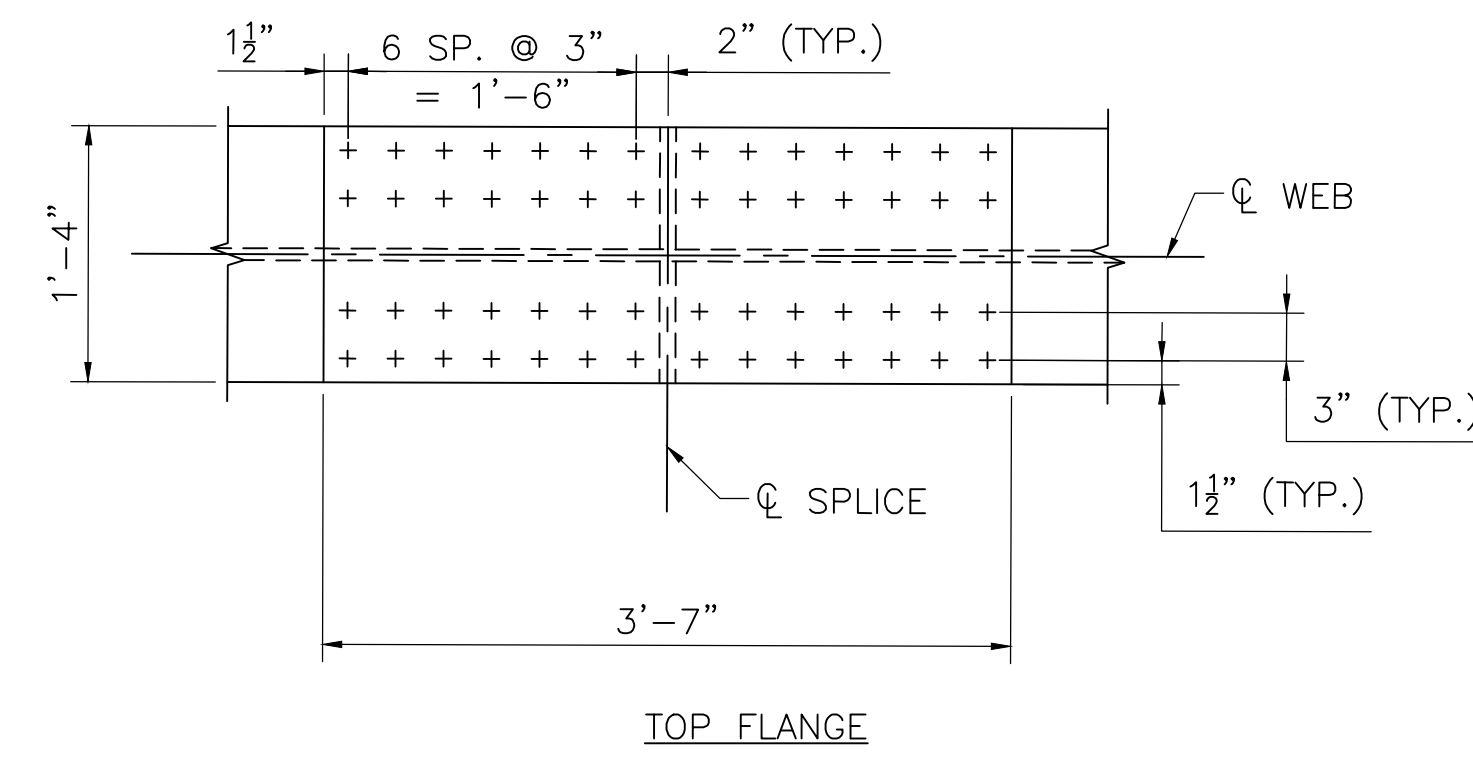
**HARDWICK-NEW BRAINTREE  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	30	37
PROJECT FILE NO.		608851	

**BOLTED FIELD SPLICE DETAILS**

**NOTES:**

- BOLTED FIELD SPLICES SHALL BE CONSIDERED SLIP CRITICAL CONNECTIONS WITH CLASS C FAYING SURFACES.
- + DENOTES  $\frac{7}{8}$ "  $\phi$  ASTM A325 HIGH STRENGTH BOLT IN  $\frac{13}{16}$ "  $\phi$  HOLE.
- THICKNESS DIFFERENCES OF  $\frac{1}{16}$ " OR LESS DO NOT REQUIRE FILLER PLATES.
- ONE ROW OF STUD SHEAR CONNECTORS SHALL BE PLACED ALONG THE CENTERLINE OF THE TOP FLANGE SPLICE PLATE.
- GIRDERS SHALL BE METALIZED WITH A WIRE TYPE OF ZINC-ALUMINUM WITH A 8-12 MILS THICKNESS WITH A SEALER AND THREE COAT SYSTEM. SEALANT WILL NOT BE USED AT THE SPLICE LOCATION.



**BOLTED FIELD SPLICE DETAILS**  
SCALE: 1" = 1'-0"

JUNE 29, 2024	ISSUED FOR CONSTRUCTION
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**HARDWICK-NEW BRAINTREE  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	31	37
PROJECT FILE NO.			608851

**TRANSVERSE SECTION & DECK DETAILS**

**DECK NOTES:**

- ROADWAY DECK SLAB SHALL BE 5000 PSI, 3/4" IN, 685 HP CEMENT CONCRETE.
- LONGITUDINAL REINFORCEMENT SHALL BE PLACED PARALLEL TO THE CL OF CONSTRUCTION. TRANSVERSE (PRIMARY) REINFORCEMENT SHALL BE PLACED PERPENDICULAR TO THE CL OF CONSTRUCTION.
- ALL REINFORCEMENT AND SUPPORT DEVICES IN THE DECK SHALL BE COATED.
- THE FINISHED SURFACE OF BRIDGE DECK SHALL BE SMOOTH AND WITHOUT ANY PROJECTIONS THAT COULD PUNCTURE THE MEMBRANE WATERPROOFING OR DEPRESSIONS THAT COULD RETAIN WATER.
- ALL REINFORCEMENT SHALL HAVE 2-INCH CLEAR COVER UNLESS OTHERWISE NOTED.
- EXPOSED EDGES OF CONCRETE SHALL BE BEVELED 1"x1", UNLESS DIMENSIONED OTHERWISE.

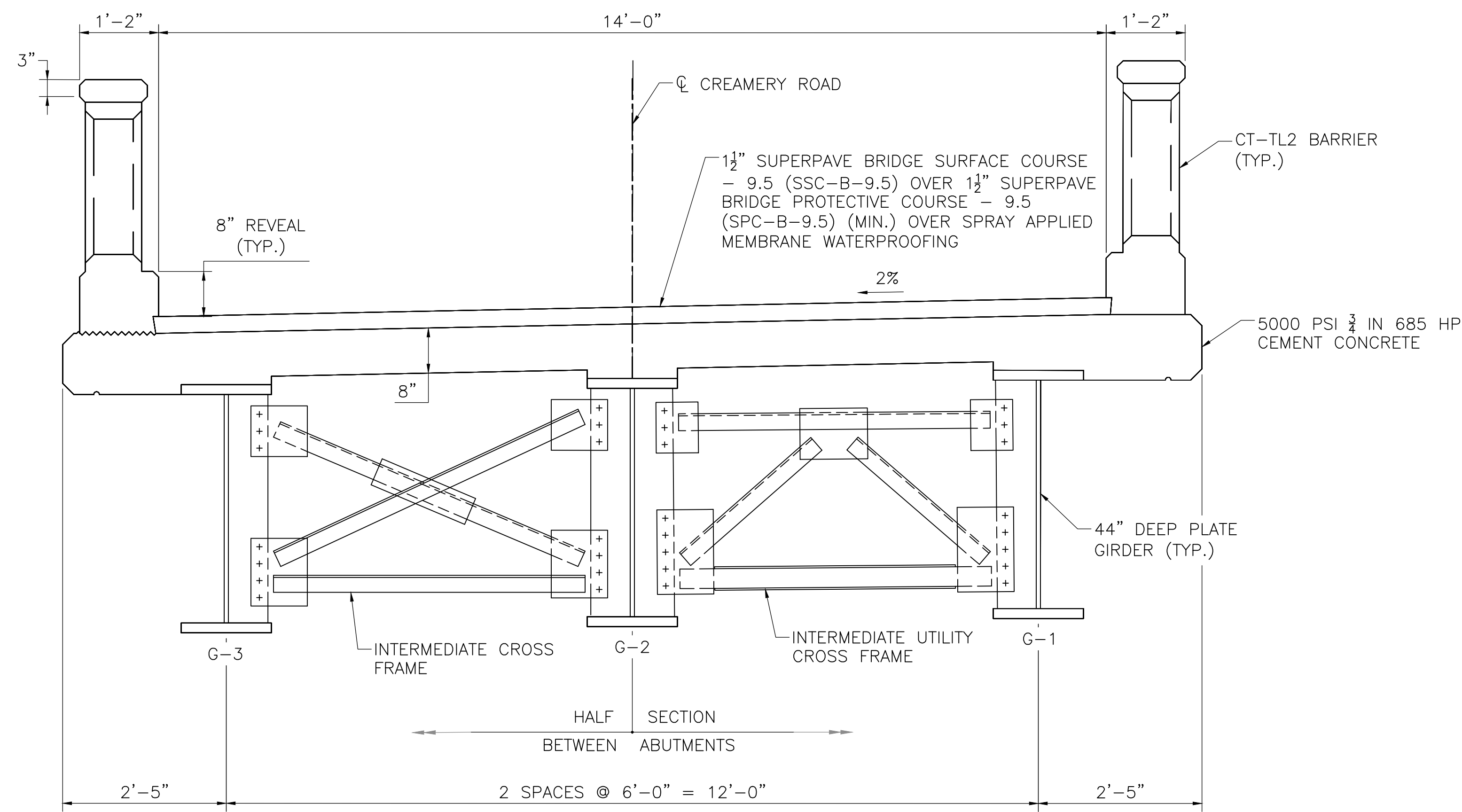
BEAM NO.	TOP OF FORM ELEVATIONS FOR DECK SLAB PRIOR TO PLACEMENT OF CONCRETE										
	CL BRG.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	CL BRG.
G1	559.26	559.21	559.15	559.08	559.00	558.90	558.78	558.64	558.49	558.33	558.16
G2	559.14	559.08	559.02	558.94	558.86	558.76	558.64	558.50	558.36	558.20	558.04
G3	559.02	558.97	558.91	558.84	558.76	558.66	558.54	558.40	558.25	558.09	557.92

**NOTE:**

AFTER THE BEAMS ARE ERECTED BUT BEFORE THE FORMS ARE BUILT, ELEVATIONS ON TOP OF THE FLANGE OF THE BEAMS ARE TO BE OBTAINED AT THE POINTS INDICATED IN THE TABLE. THE DIFFERENCE BETWEEN THE ELEVATIONS OBTAINED AND THOSE SHOWN IN THE TABLE GIVES THE ACTUAL BLOCKING DISTANCE FROM THE TOP OF BEAM TO THE BOTTOM OF SLAB AT CENTERLINE OF BEAM.

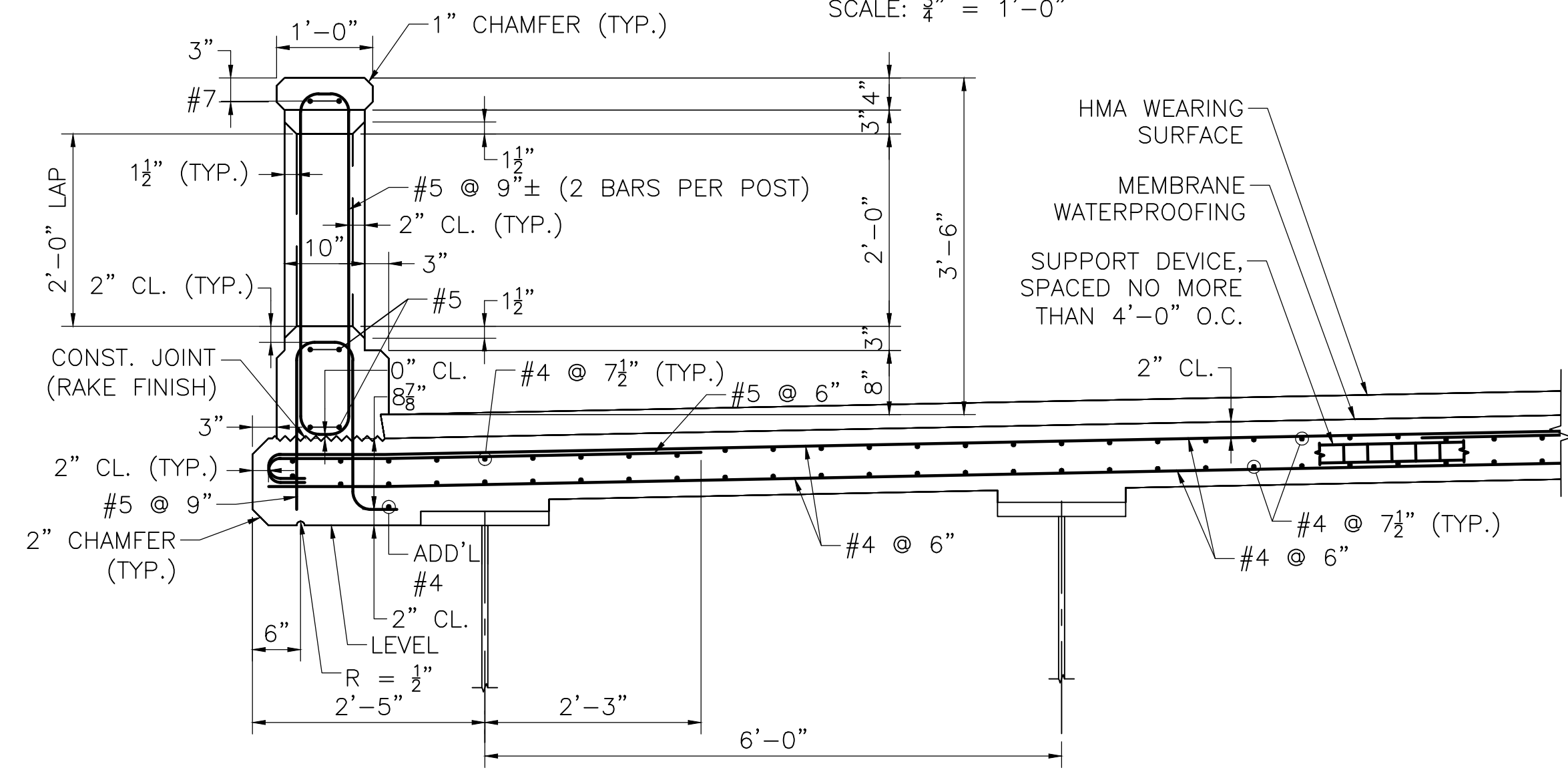
**S.I.P. FORM NOTES:**

- FOR 2" S.I.P. FORM, SET BOTTOM OF FORM 1" BELOW ELEVATION GIVEN IN TABLE. FOR 3" S.I.P. FORM, SET BOTTOM OF FORM 1 1/2" BELOW TABLE ELEVATIONS.
- FORM ENDS SHALL BE CRIMPED CLOSED IN A TAPERED MANNER. SEPARATE END CLOSURE PIECES WILL NOT BE ALLOWED.
- SUPPORT ANGLES SHALL BE PLACED IN THE "LEG DOWN" POSITION WHERE POSSIBLE. WHERE "LEG UP" POSITION IS NECESSARY, THE UPPER MOST PORTION OF THE ANGLE SHALL NOT PROJECT MORE THAN 1" ABOVE THE TOP FLANGE OF COVER PLATE. THE CONTRACTORS SHALL HAVE AN ASSORTMENT OF ANGLES OF VARIOUS SIZES AVAILABLE ON THE SITE TO CONFORM TO THIS REQUIREMENT.
- ALL MAIN STEEL REINFORCEMENT IN THE LOWER MAT SHALL BE CENTERED OVER THE VALLEY OF THE S.I.P. FORM.
- CONTRACTOR SHALL DESIGN AND DETAIL ALL ELEMENTS OF THE FORMING SYSTEM AND SHALL SUBMIT TO THE ENGINEER FOR APPROVAL.
- IN CASES WHERE STANDARD 2" OR 3" DEEP S.I.P. FORMS DO NOT SATISFY DESIGN REQUIREMENTS AN ALTERNATIVE FORMING SYSTEM CONSISTING OF DEEPER S.I.P. FORMS OR REMOVABLE FORMS SHALL BE DESIGNED AND DETAILED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR APPROVAL. THE DESIGN THICKNESS OF THE SLAB SHALL NOT BE REDUCED.



**PROPOSED TYPICAL SECTION**

SCALE: 3/4" = 1'-0"

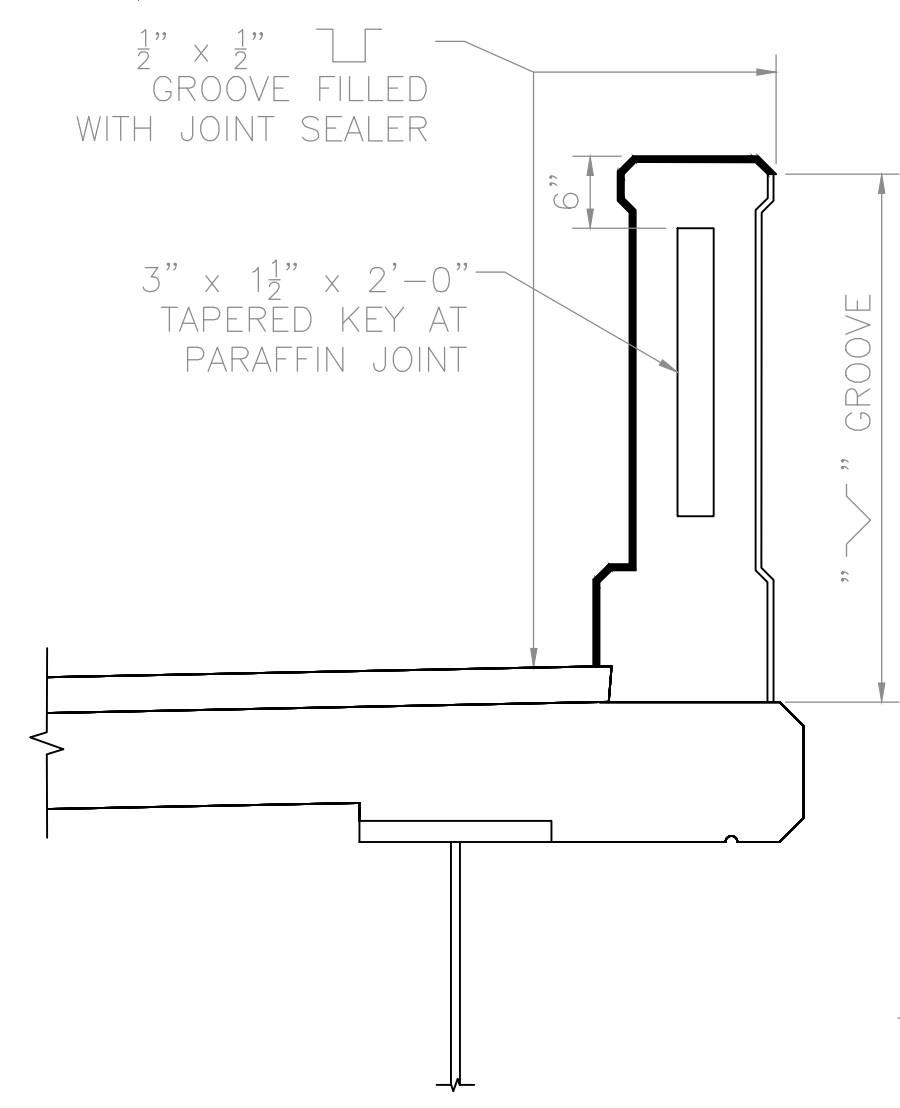


**SAFETY CURB SECTION**

SCALE: 3/4" = 1'-0"

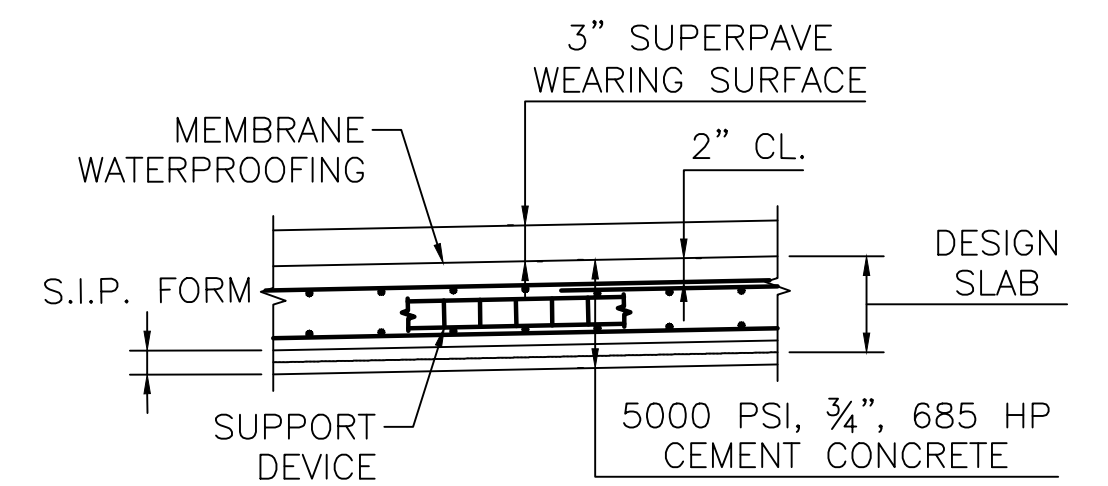
**TYPICAL DECK REINFORCEMENT**

SCALE: 3/4" = 1'-0"



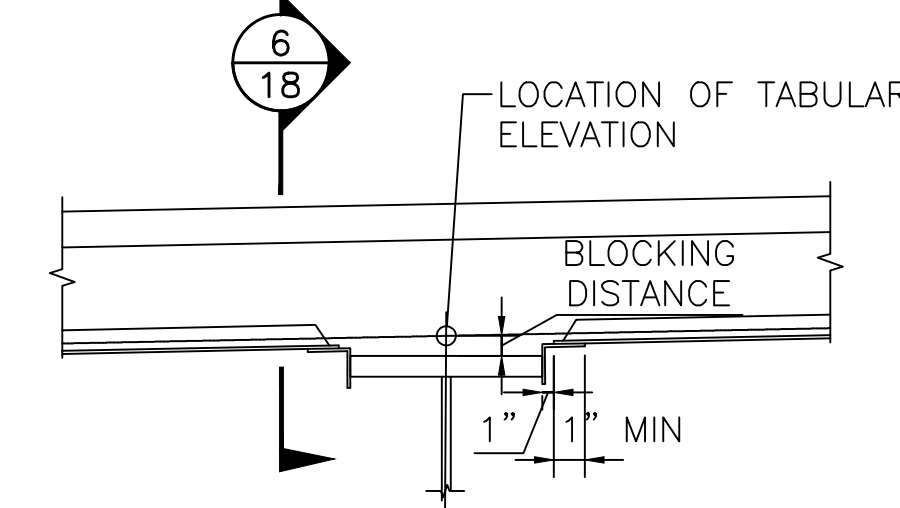
**PARAFFIN JOINT DETAILS**

SCALE: 3/4" = 1'-0"



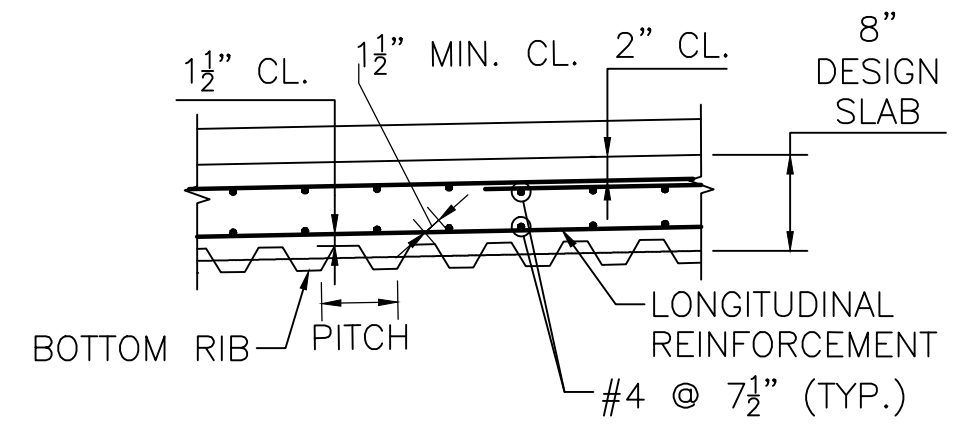
**SUPERPAVE WEARING SURFACE DETAIL**

SCALE: 3/4" = 1'-0"



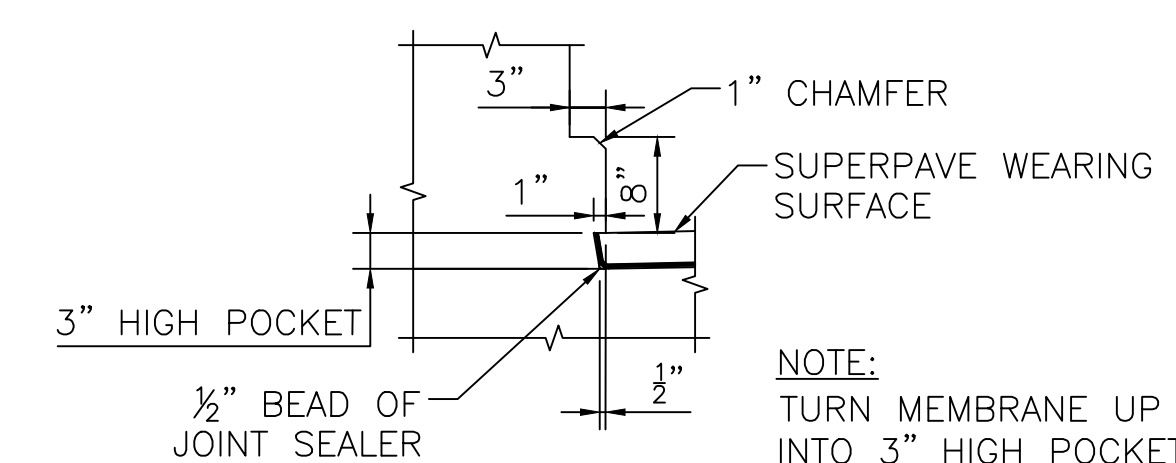
**HAUNCH DETAIL AT NON-TENSION FLANGE AREA**

SCALE: 3/4" = 1'-0"



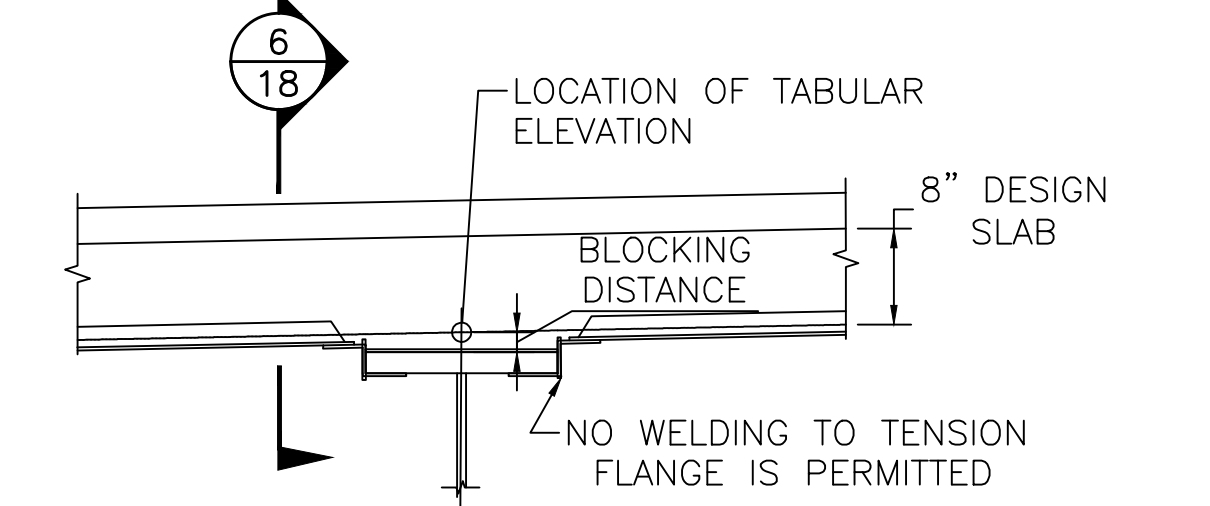
**SECTION 6**

SCALE: 3/4" = 1'-0"



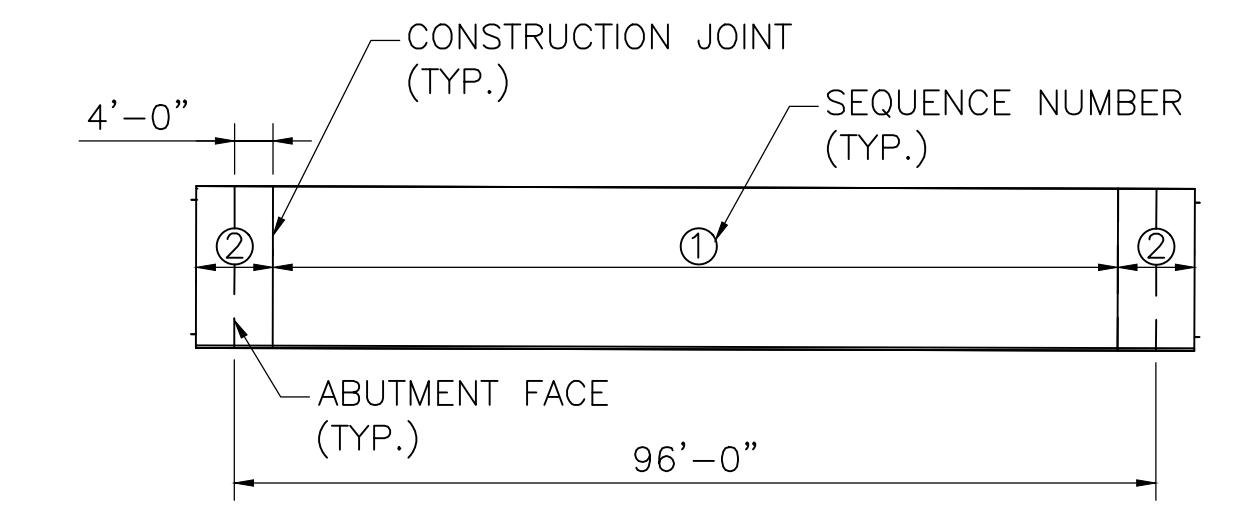
**FACE OF SAFETY CURB DETAIL**

SCALE: 3/4" = 1'-0"



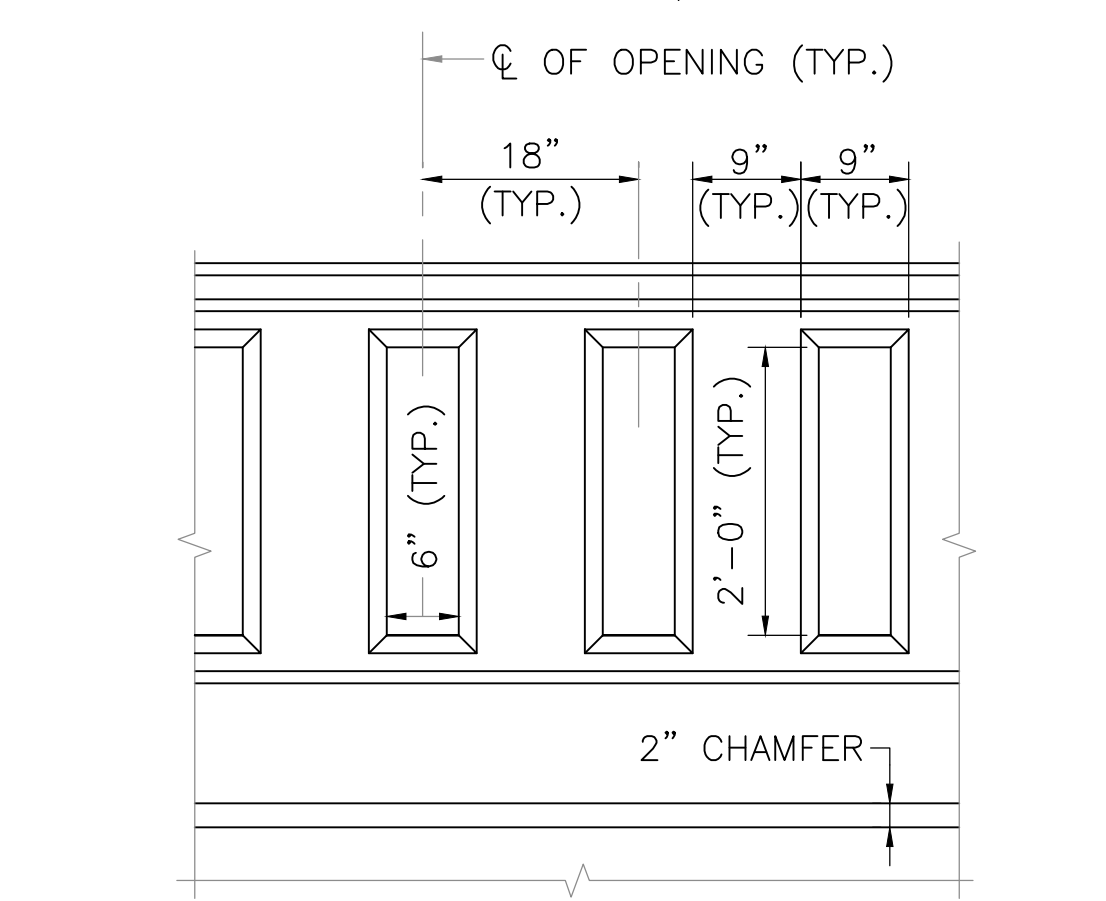
**HAUNCH DETAIL AT TENSION FLANGE AREA**

SCALE: 3/4" = 1'-0"



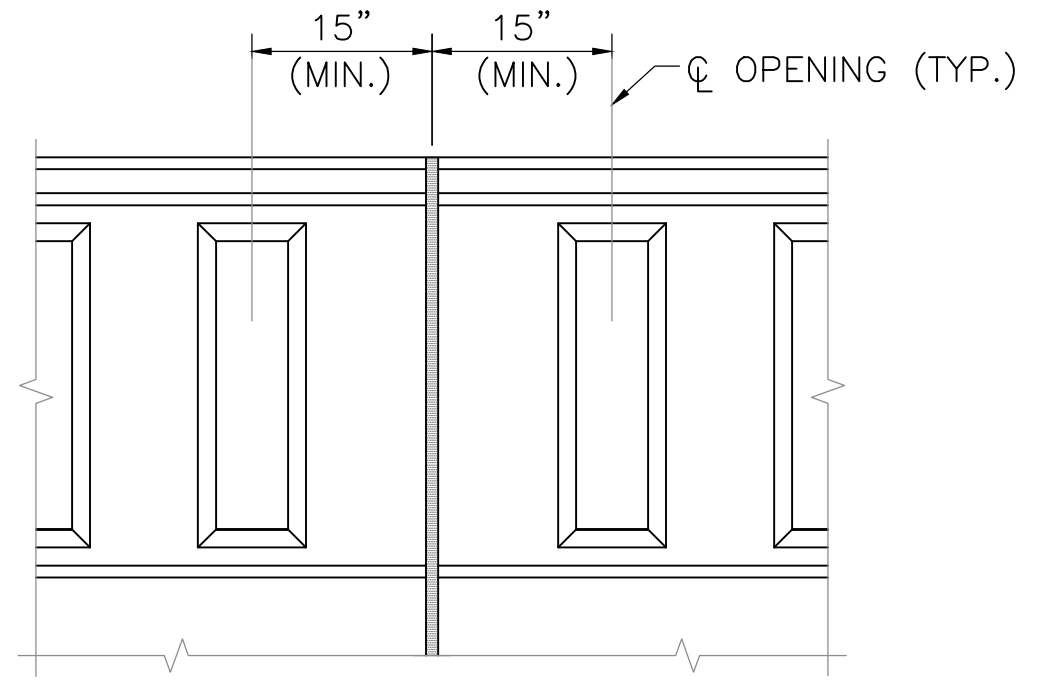
**DECK PLACEMENT SEQUENCE**

SCALE: 1" = 20'-0"



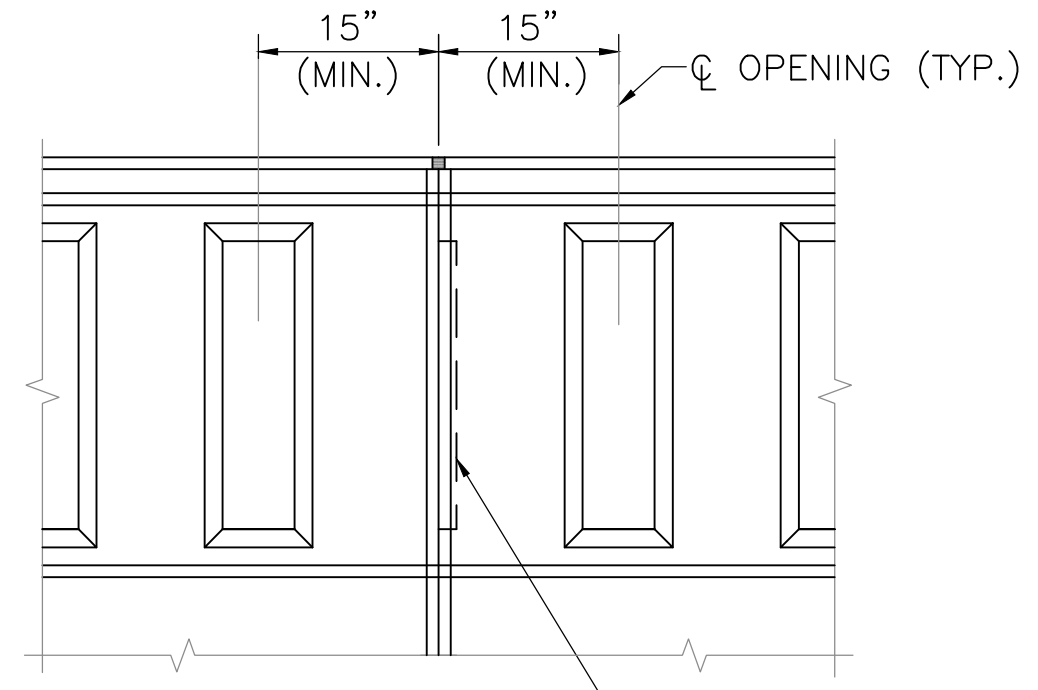
**EXTERIOR CT-TL2 BARRIER ELEVATION**

SCALE: 3/4" = 1'-0"



**EXPANSION JOINT**

SCALE: 3/4" = 1'-0"



**PARAFFIN JOINT**

SCALE: 3/4" = 1'-0"

NOTE: TURN MEMBRANE UP INTO 3" HIGH POCKET.

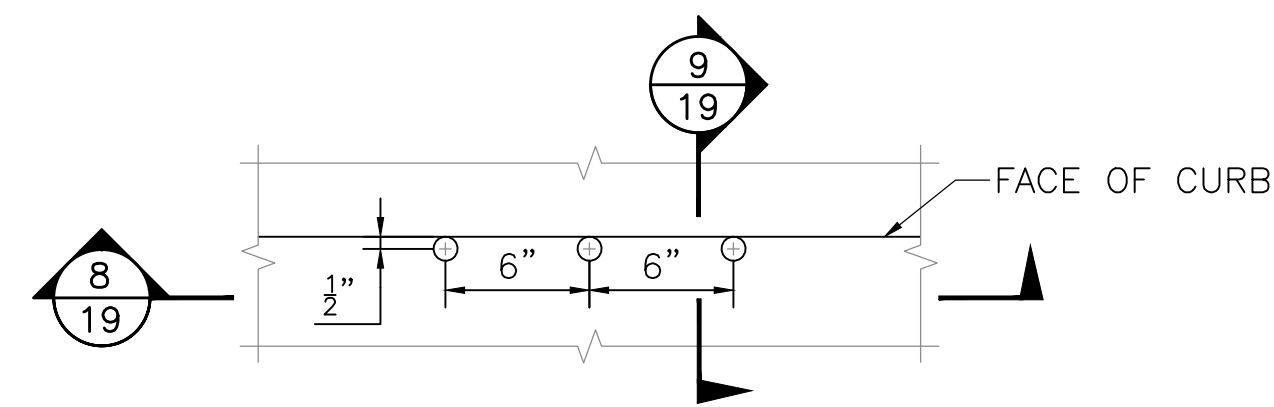
JUNE 29, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

608851\_BR14-33(H-08-003=N-07-002).DWG Plotted on 15-Jul-2024 11:36 AM 29-June-2024 608851 Structural Submittal (SF)



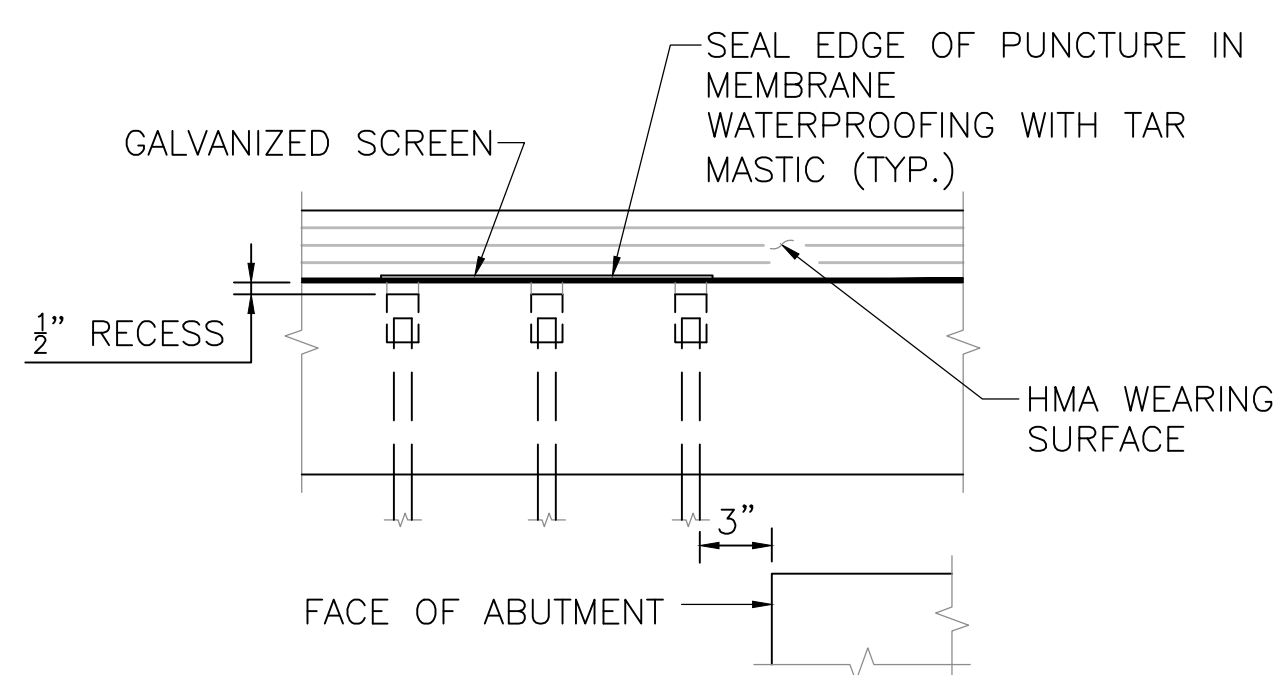
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	32	37
PROJECT FILE NO.		608851	

**JOINT & DECK DRAIN DETAILS**



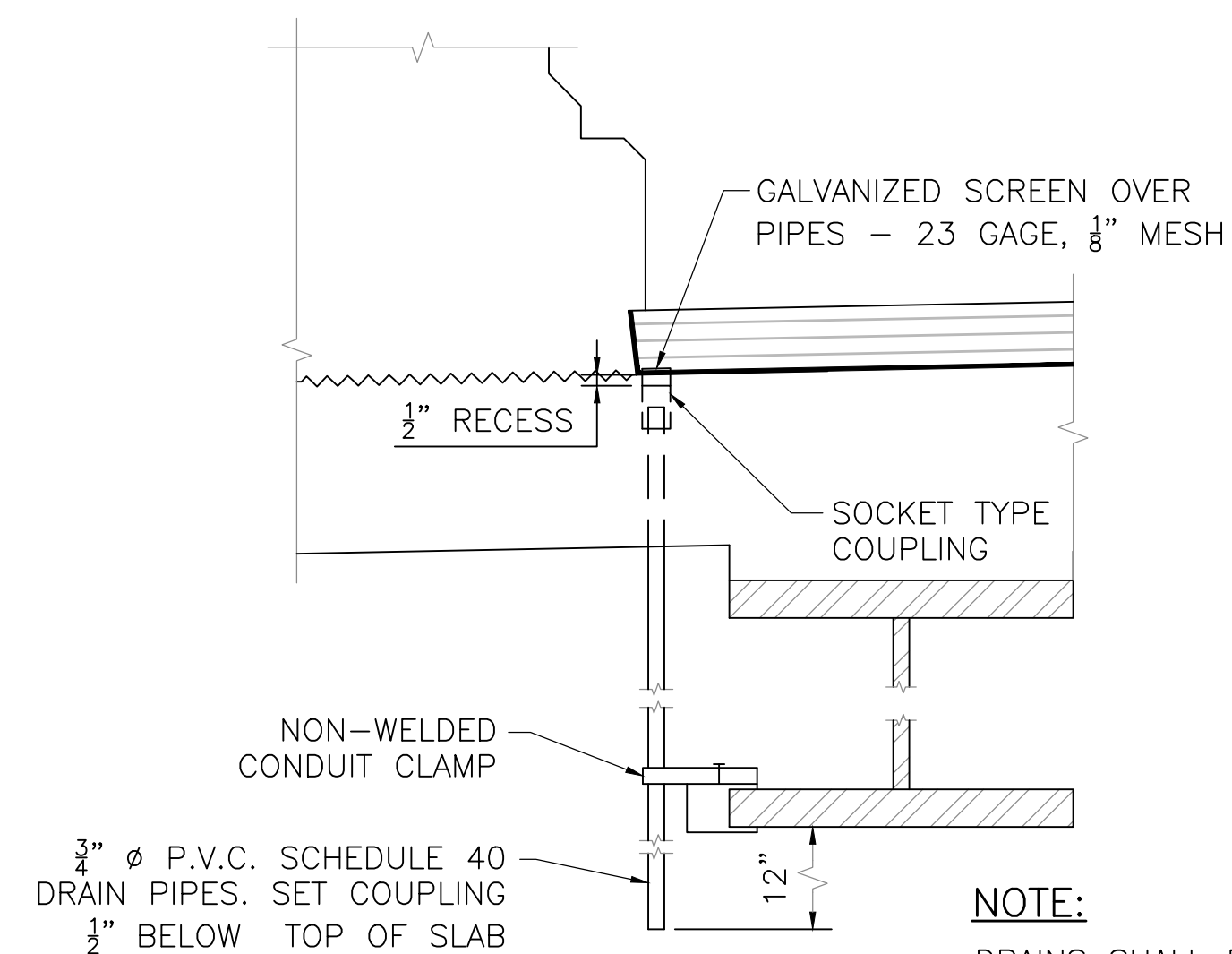
**DECK DRAIN PIPE PLAN**

SCALE: 1 1/2" = 1'-0"



**SECTION 8**

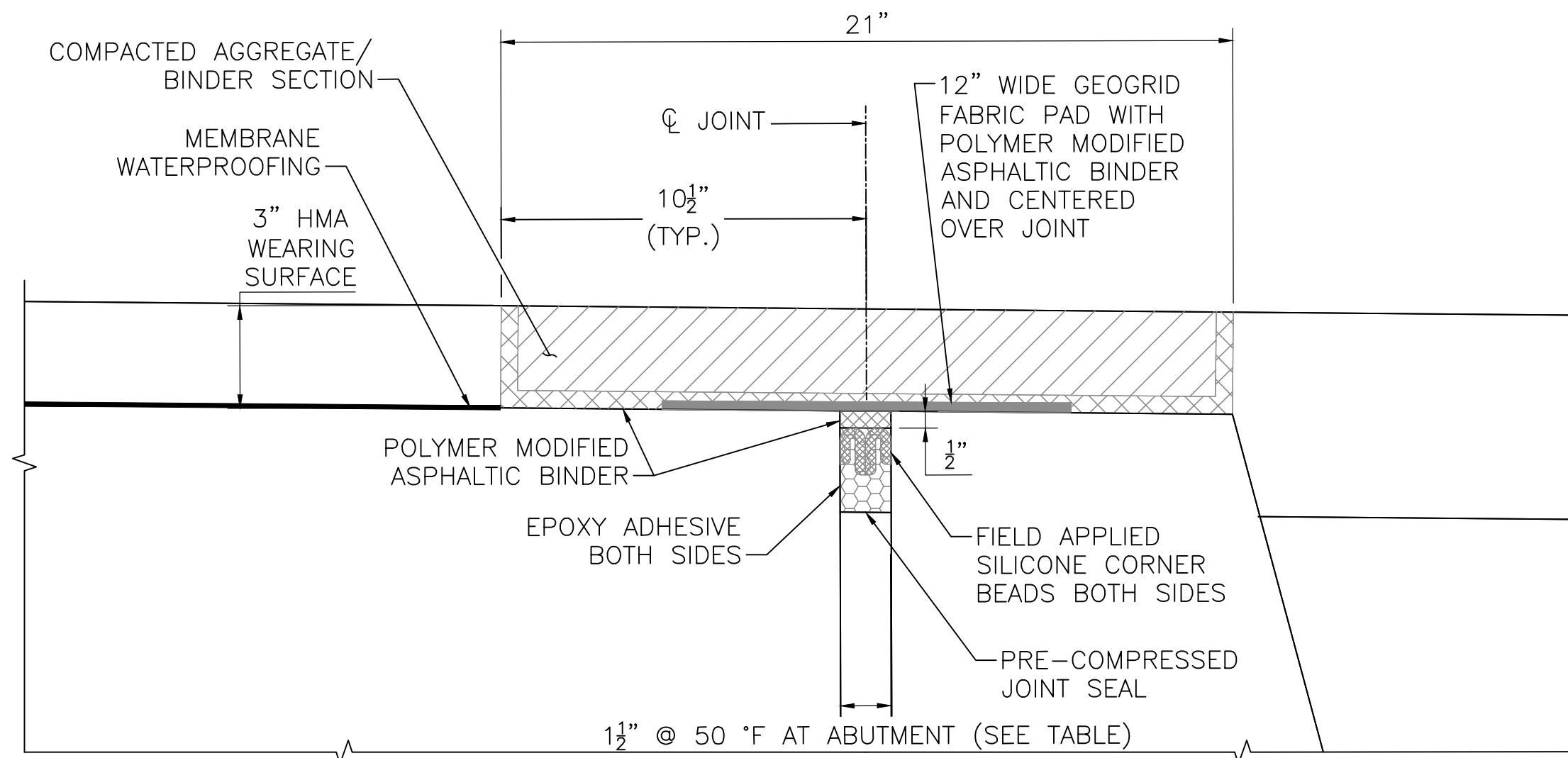
SCALE: 1 1/2" = 1'-0"



**SECTION 9**

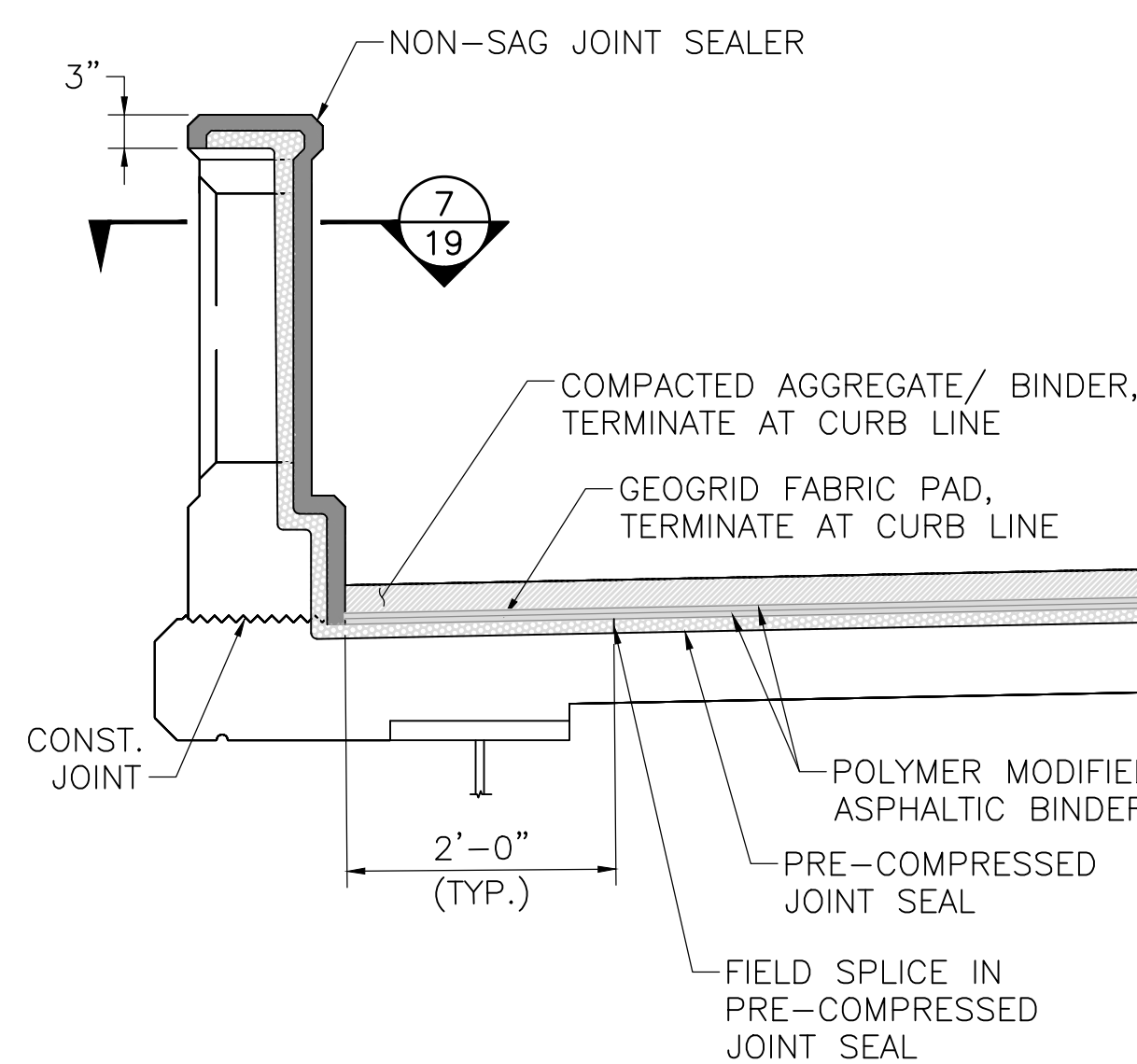
SCALE: 1 1/2" = 1'-0"

**NOTE:**  
DRAINS SHALL BE LOCATED AT ALL ROADWAY JOINTS AND/OR LOW POINT OF VERTICAL CURVE.



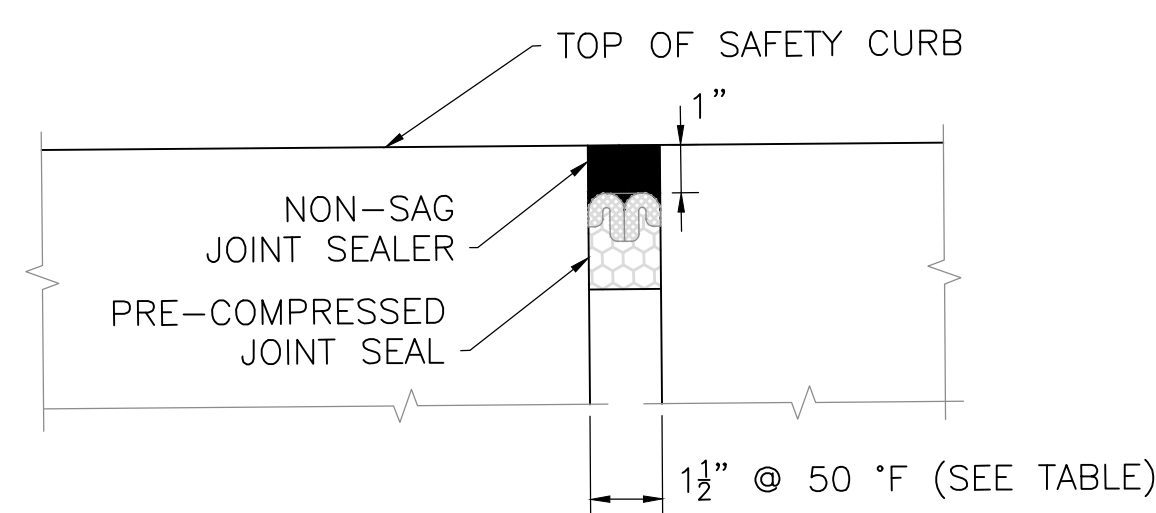
**ASPHALTIC BRIDGE JOINT DETAIL**

SCALE: 3" = 1'-0"



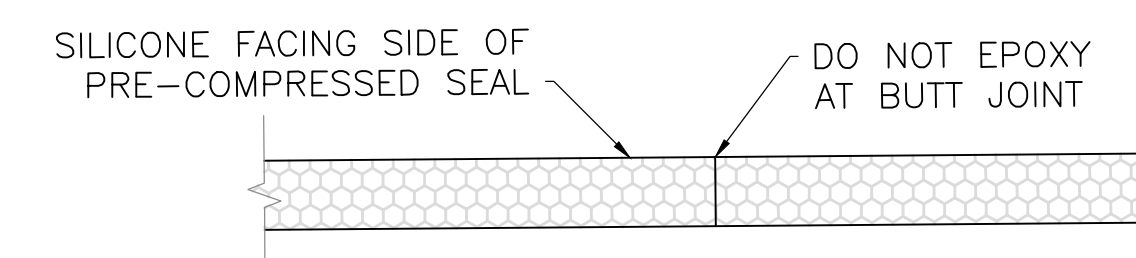
**JOINT DETAIL AT CT-TL2 BARRIER**

SCALE: 3/4" = 1'-0"



**SECTION 7**

SCALE: 3" = 1'-0"



**FIELD SPlice**

N.T.S.

**ASPHALTIC BRIDGE JOINT CONSTRUCTION NOTES:**

- CENTER 19" WIDE STRIP OF ROOFING FELT OVER THE JOINT LOCATION.
- SPRAY WATERPROOFING MEMBRANE AND PLACE HMA WEARING SURFACE UNIFORMLY ACROSS THE DECK AND JOINT LOCATIONS.
- SAW CUT AND REMOVE THE HMA WEARING SURFACE AND MEMBRANE WATERPROOFING TO THE LIMITS REQUIRED.
- THE JOINT OPENING SHALL BE FREE OF ALL CONTAMINANTS SUCH AS GREASE DUST AND DIRT. PRIOR TO JOINT SYSTEM INSTALLATION, THE JOINT WALL SHALL BE BLOWN CLEAN WITH OIL-FREE COMPRESSED AIR AND WIPE CLEAN WITH A CLEAN WET CLOTH TO THE BOTTOM OF PRE-COMPRESSED SEAL MATERIAL PLUS 1" TO REMOVE ANY DUST REMAINING. THE SUBSTRATE PREP SHALL FOLLOW THE ICRI CONCRETE SURFACE PROFILE STANDARDS TO ACHIEVE A SURFACE PROFILE OF CSP 2 (MIN.) OR 3 (PREFERRED) IN ORDER TO ACCEPT THE JOINT SYSTEM.
- INSTALL THE PRE-COMPRESSED SEAL JOINT SYSTEM PER MANUFACTURER'S RECOMMENDATIONS.
- COAT THE SURFACES OF THE BLOCKOUT AND THE REMAINING JOINT OPENING WITH THE POLYMER MODIFIED ASPHALTIC BINDER.
- CENTER THE 12" WIDE GEOGRID FABRIC PAD SATURATED WITH POLYMER MODIFIED ASPHALTIC BINDER AND PLACE IT OVER THE JOINT.
- PLACE COMPACTED AGGREGATE/BINDER TO FILL ALL VOIDS AND OBTAIN A FINAL AND EVEN SURFACE WITH THE ADJACENT WEARING SURFACE.
- IT IS NOT NECESSARY TO CONSTRUCT THE JOINT AT MEAN TEMPERATURE, HOWEVER, THE MANUFACTURER SHOULD BE CONSULTED FOR INSTALLATION GUIDELINES FOR EXTREME CLIMATE CONDITIONS.
- THE PRE-COMPRESSED SEAL JOINT SYSTEM SHALL BE CONTINUOUS THROUGH BARRIERS AS APPROPRIATE TO THE CONDITIONS AT HAND. CONTINUITY OF THE SEAL SHALL BE ACHIEVED THROUGH THE USE OF FACTOR-FABRICATED UNIVERSAL OR CUSTOM TRANSITIONS SUPPLIED BY THE PRE-COMPRESSED JOINT SEAL MANUFACTURER. THE FIELD SPlice OF THE PRE-COMPRESSED SEAL SHALL BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

**FIELD SPlice NOTES:**

- ONCE THE JOINT IS CLEANED AND PREPARED, APPLY EPOXY ALONG THE LENGTH OF THE INNER JOINT FACES.
- CUT EACH PIECE OF PRE-COMPRESSED SEAL TO BE JOINED 3/8" LONGER THAN NEEDED.
- INSTALL ONE PIECE OF PRE-COMPRESSED SEAL WITH THE JOINING END SLIGHTLY STICKING OUT OF THE JOINT.
- INSTALL THE OTHER PIECE OF PRE-COMPRESSED SEAL WITH THE JOINING END SLIGHTLY STICKING OUT OF THE JOINT.
- APPLY LIQUID SILICONE ON THE FACE OF THE PRE-COMPRESSED SEAL, ALONG THE SILICONE EDGE.
- MAKE SURE THERE IS NO EPOXY AT THE BUTT OR FACE OF INTERSECTING PRE-COMPRESSED SEAL PIECES. FIRMLY PRESS THE JOINING ENDS INTO THE JOINT AND AGAINST ONE ANOTHER.

NORTH/SOUTH ABUTMENT	
TEMPERATURE (°F)	JOINT OPENING (INCH)
10	1 1/2
20	1 5/8
30	1 3/4
40	1 3/4
50	1 1/2
60	1 1/2
70	1 1/2
80	1 1/2

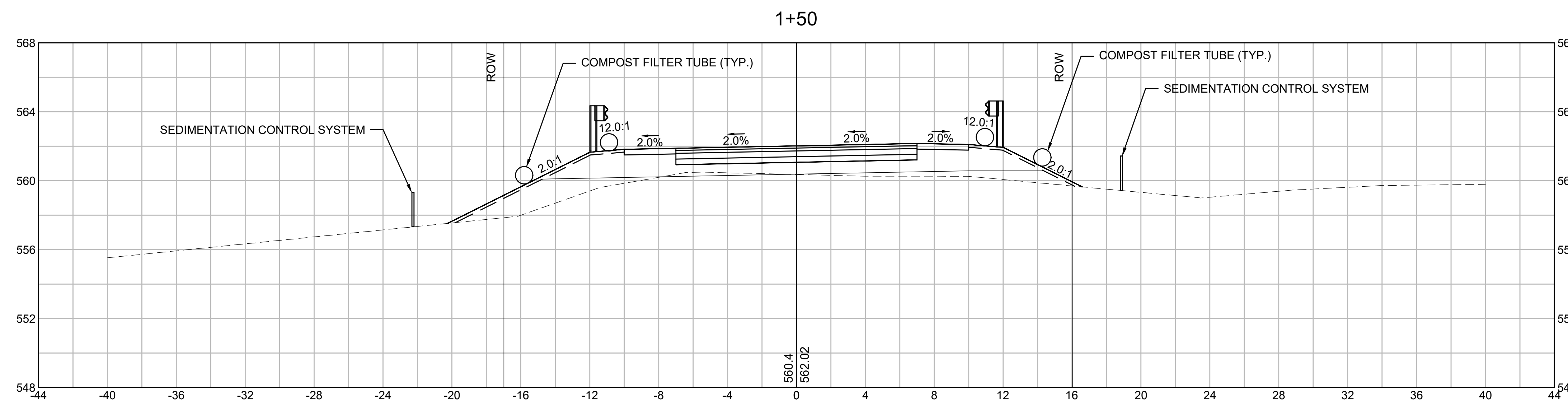
JUNE 29, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	



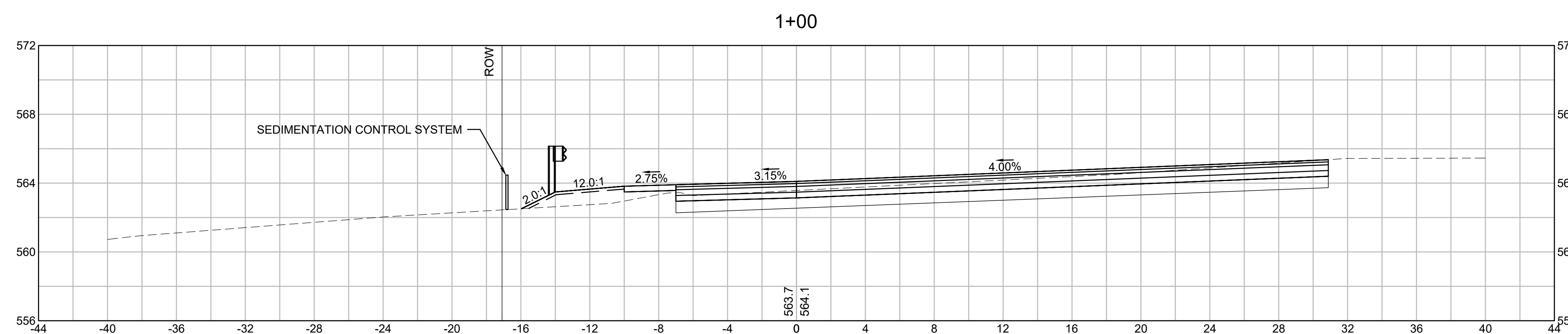
**HARDWICK/NEW BRAINTREE  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	34	37
PROJECT FILE NO.		608851	

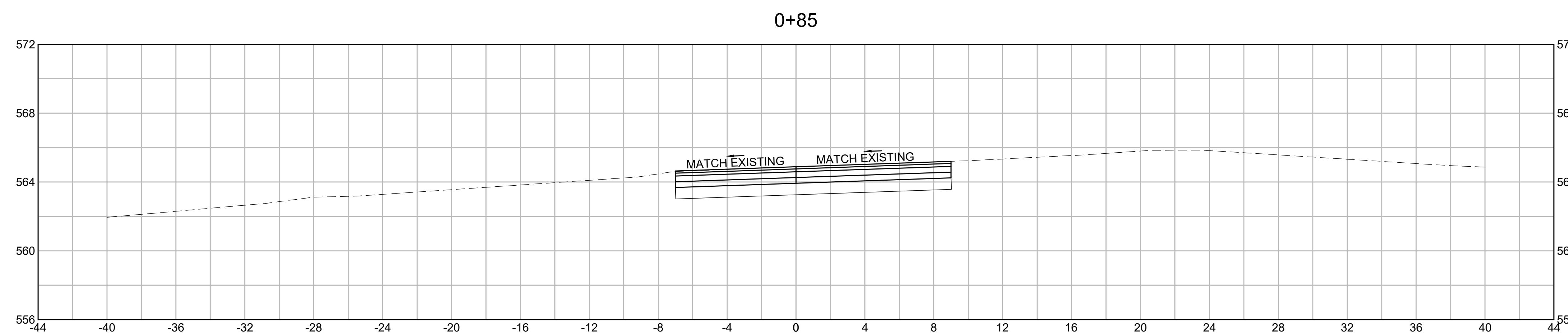
**CROSS SECTIONS**



CUT: 0.92 SF  
FILL: 14.44 SF



CUT: 15.79 SF  
FILL: 4.63 SF



CUT: 25.91 SF  
FILL: 0.00 SF

NOTES:  
1. COMPOST FILTER TUBE SHALL BE PAID FOR UNDER ITEM 767.121 - SEDIMENT CONTROL BARRIER.

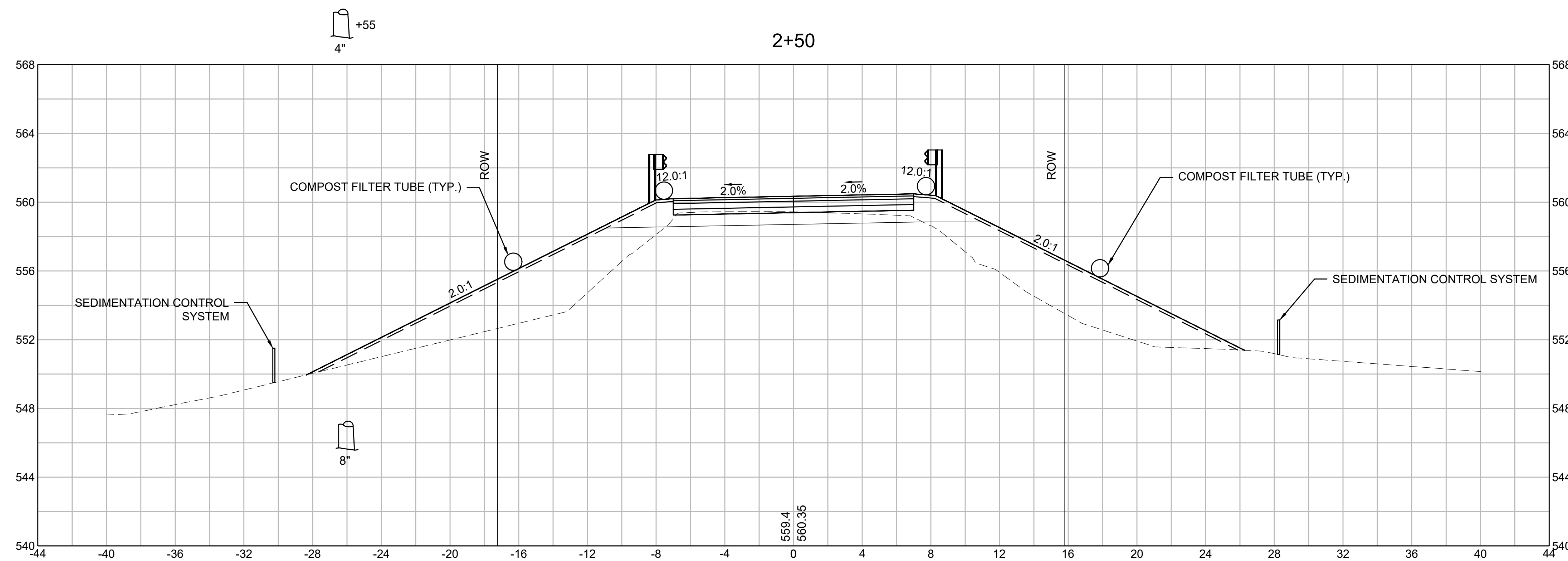




**HARDWICK/NEW BRAINTREE  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	35	37
PROJECT FILE NO.		608851	

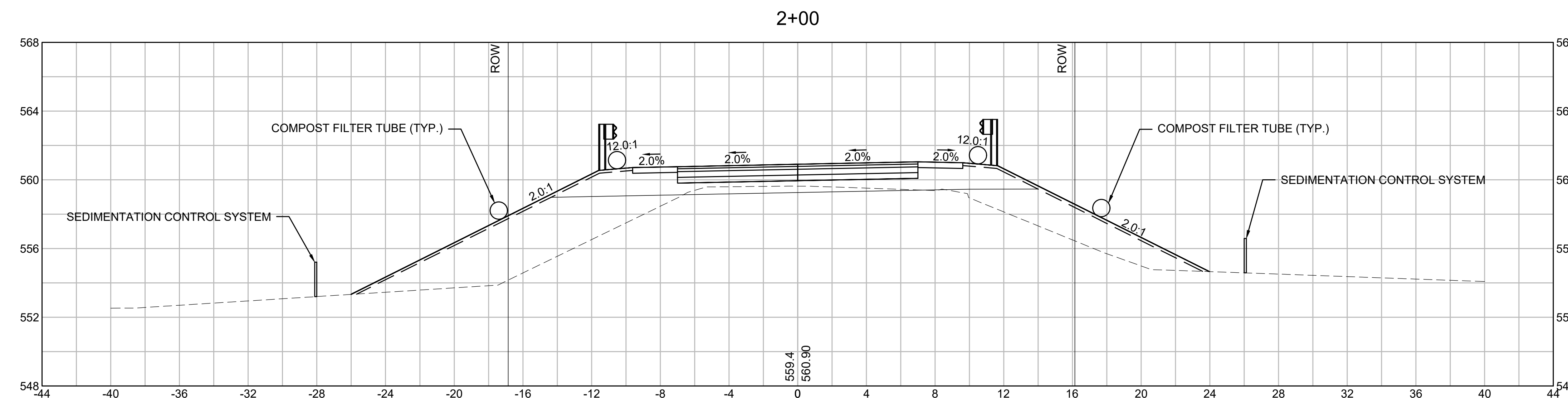
**CROSS SECTIONS**



CUT: 9.55 SF  
FILL: 75.30 SF

+20 18"  
+35 6"  
+47 12"  
+47 42"

+39  
UT



CUT: 3.79 SF  
FILL: 59.38 SF

+65 8"  
+73 8"  
+83 12"  
+83 12"  
+87 8"  
+92 8"

NOTES:  
1. COMPOST FILTER TUBE SHALL BE PAID FOR UNDER ITEM 767.121 - SEDIMENT CONTROL BARRIER.

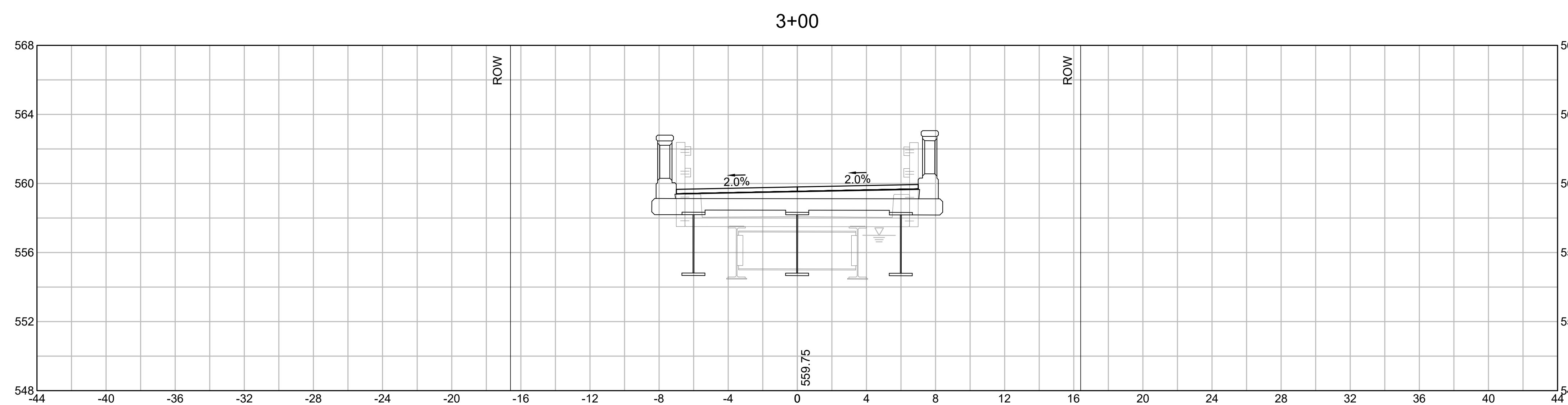
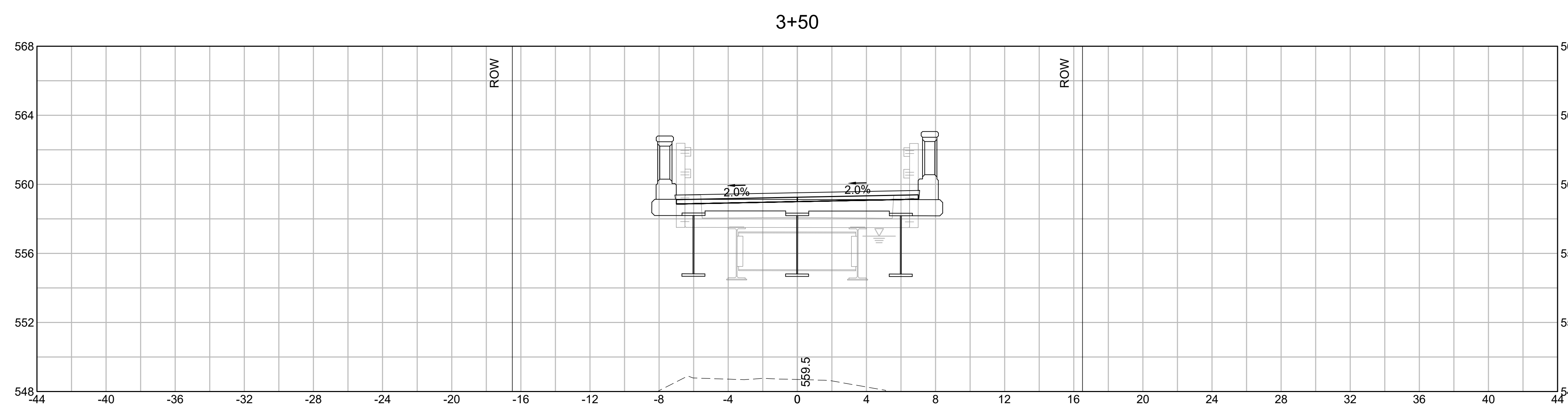
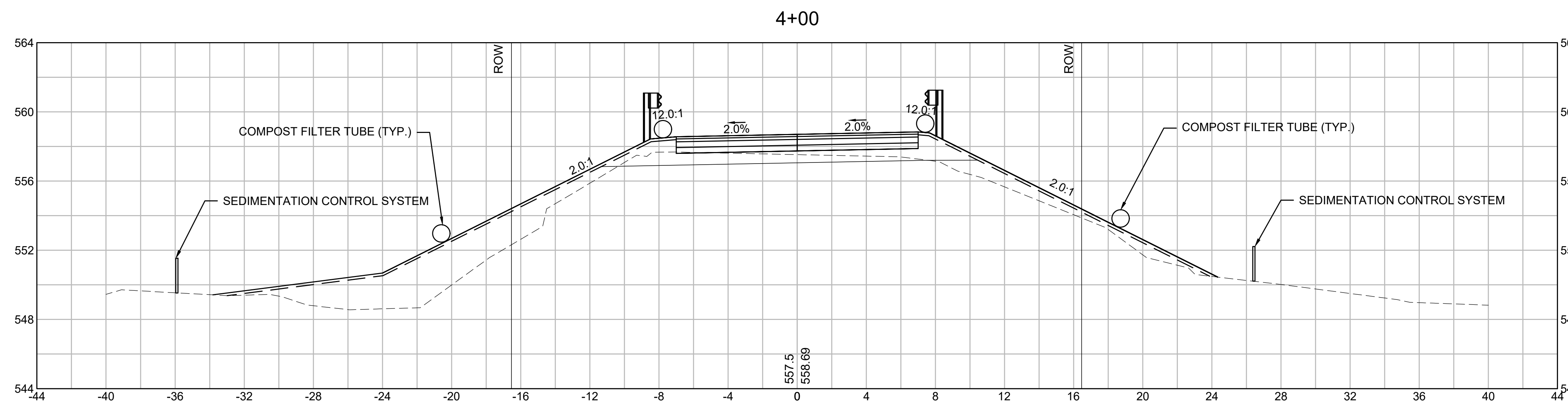
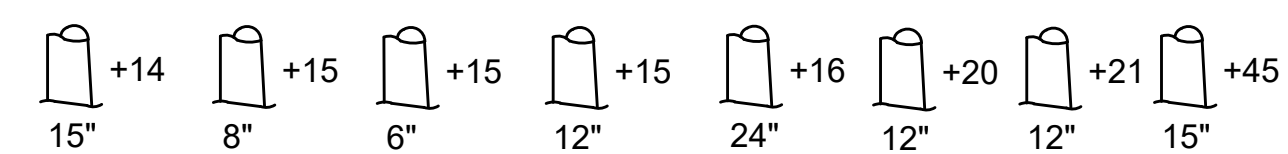


**HARDWICK/NEW BRAINTREE  
CREAMERY ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	36	37
PROJECT FILE NO.		608851	

**CROSS SECTIONS**

CUT: 8.54 SF  
FILL: 35.14 SF



NOTES:  
1. COMPOST FILTER TUBE SHALL BE PAID FOR UNDER ITEM 767.121 - SEDIMENT CONTROL BARRIER.



**HARDWICK/NEW BRAINTREE  
CREAMERY ROAD**

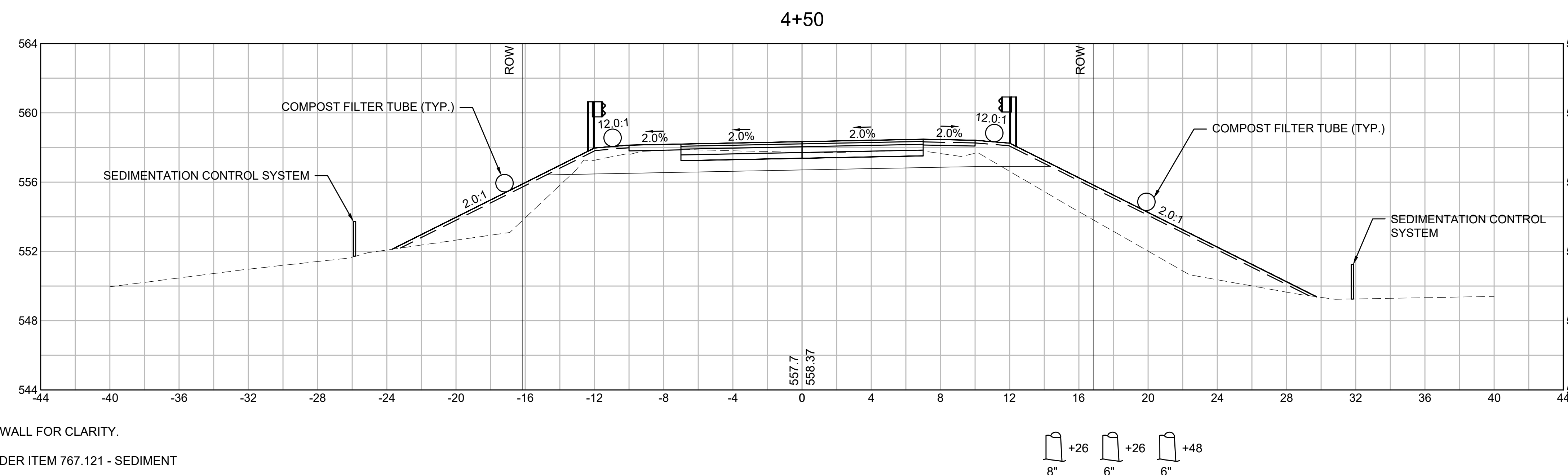
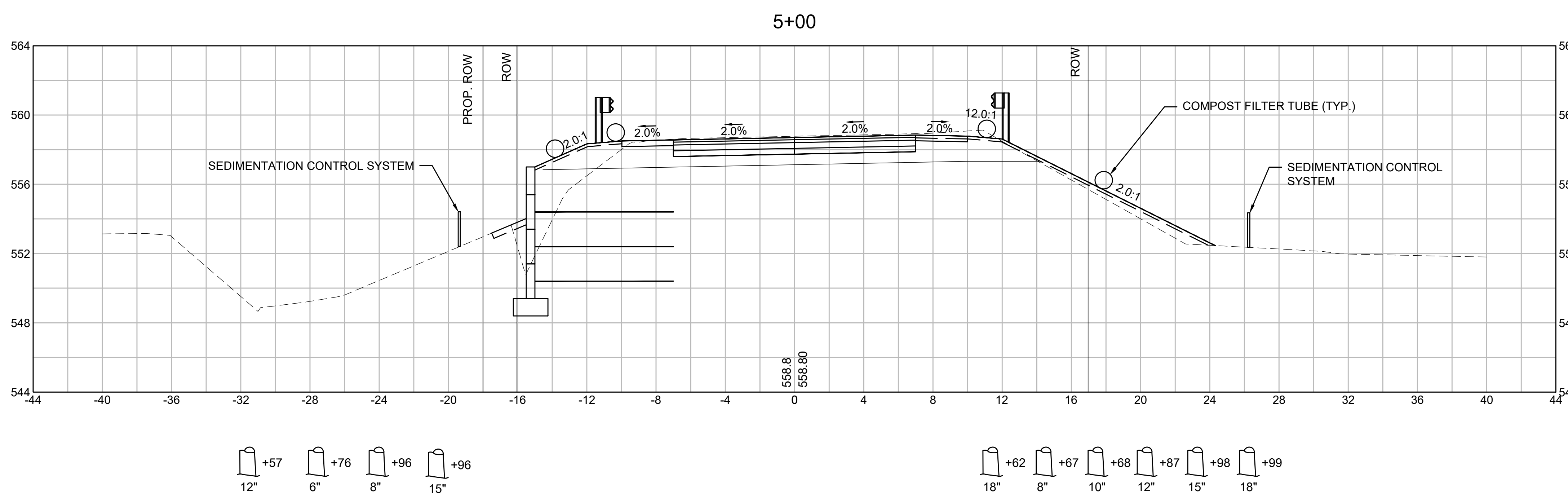
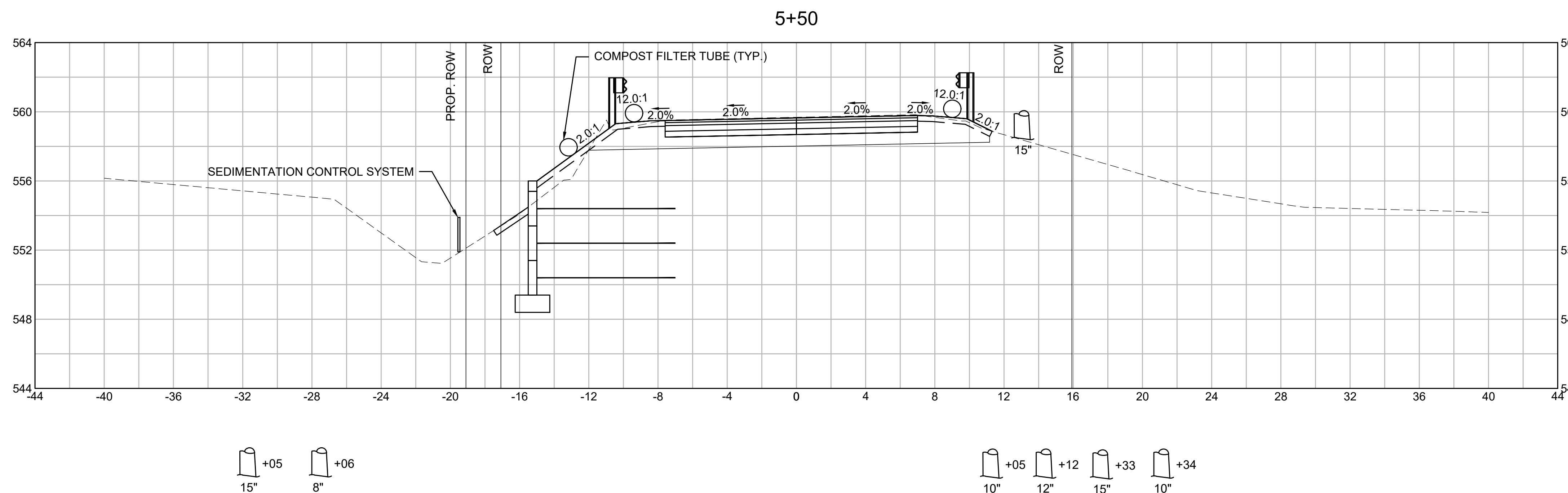
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFS(BR-OFF)-003S(750)X	37	37
PROJECT FILE NO.		608851	

**CROSS SECTIONS**

CUT: 35.25 SF  
FILL: 1.89 SF

CUT: 38.37 SF  
FILL: 9.78 SF

CUT: 24.38 SF  
FILL: 37.71 SF



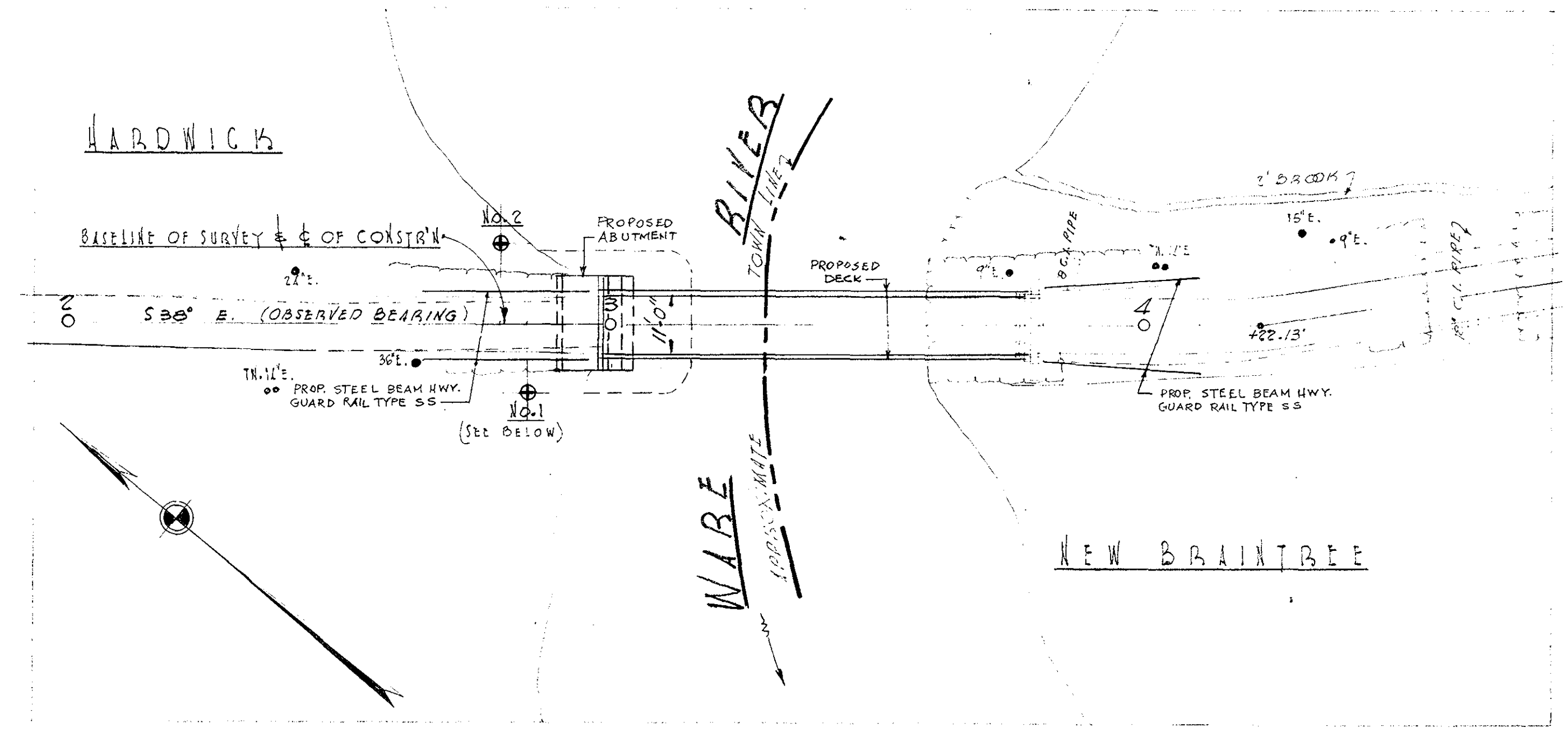
**NOTES:**

- CHAIN LINK FENCE NOT SHOWN ON RETAINING WALL FOR CLARITY. SEE SHEET 3 FOR LIMITS OF FENCING.
- COMPOST FILTER TUBE SHALL BE PAID FOR UNDER ITEM 767.121 - SEDIMENT CONTROL BARRIER.





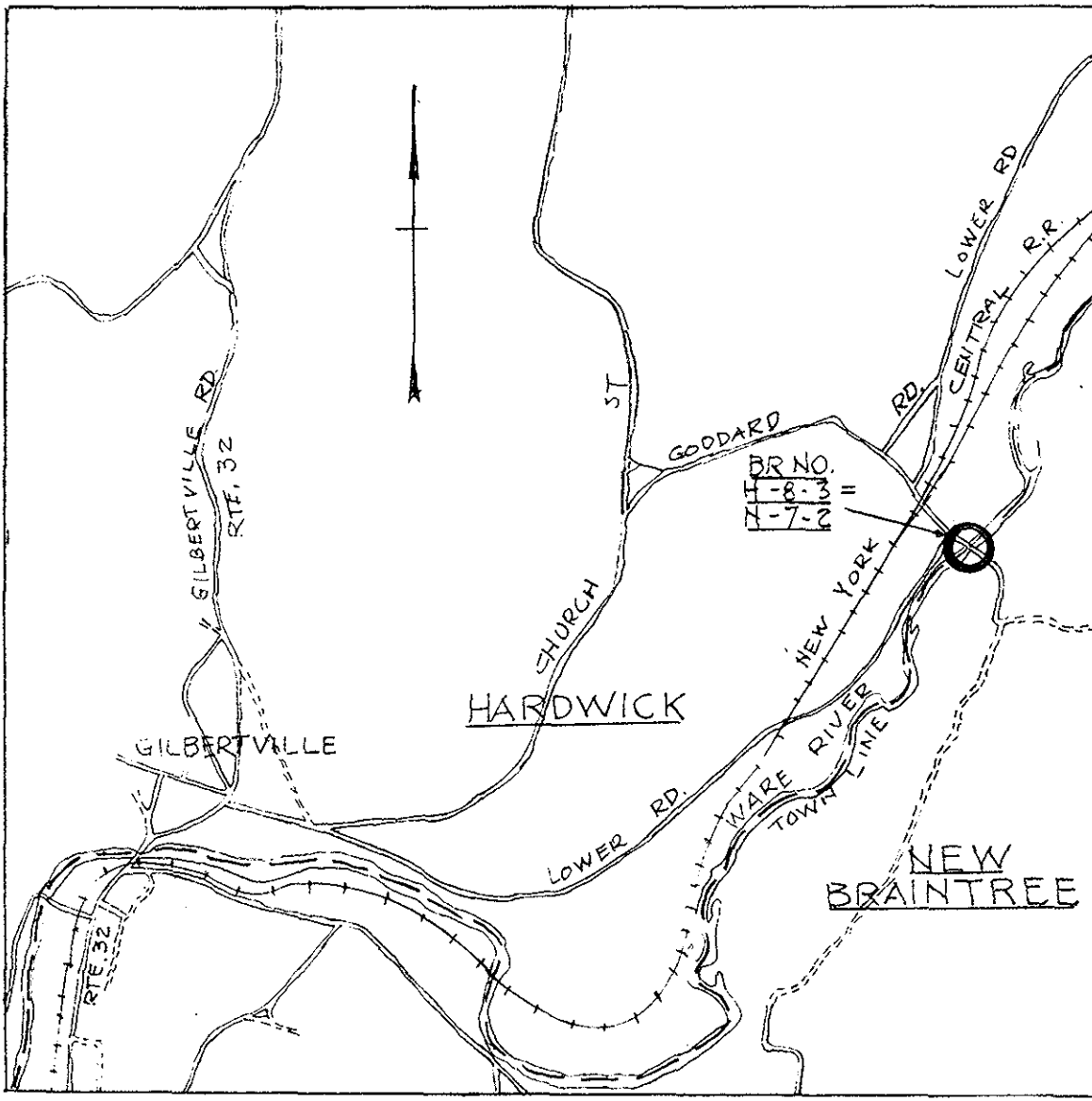
PUB. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	MASS.		19		



TEST PITS

1	DUG TO ELEVATION 78.7 COMPACT, COARSE, BODY GRAVEL.
2	DUG TO ELEVATION 78.9 COMPACT, COARSE, BODY GRAVEL.

PLAN  
SCALE 1"=20'-0"



LOCUS PLAN  
SCALE 1"=2000'

GENERAL NOTES

FOUNDATIONS: MAY BE ALTERED, IF NECESSARY, TO SUIT CONDITIONS ENCOUNTERED IN CONSTRUCTION.

REINFORCEMENT: ALL REINFORCING STEEL BARS SHALL CONFORM TO A.S.T.M. SPECIFICATION A-306. UNLESS OTHERWISE SHOWN ON THE PLANS, REINFORCING BARS SHALL BE LAPPED 20 DIAMETERS TO MAKE A SPLICE, EXCEPT THAT MAIN REINFORCING BARS NEAR THE TOP OF SLABS AND BEAMS HAVING MORE THAN 12 INCHES OF CONCRETE UNDER THE BARS SHALL BE LAPPED 35 DIAMETERS TO MAKE A SPLICE.

BORING NOTES: LOCATIONS OF BORINGS SHOWN ON KEY PLAN THUS: No. 2. BORINGS TAKEN FOR PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW NATURE OF MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION. FIGURES IN COLUMNS INDICATE BLOWS PER FOOT ON 14" I.D. SAMPLING SPOON PRODUCED BY 30 INCH FALL OF 140 POUND HAMMER. BORING SAMPLES MAY BE SEEN AT THE DEPARTMENT'S LABORATORY IN THE MAINTENANCE BUILDING ON ROUTE No. 9 IN WELLESLEY.

DESIGN: IN ACCORDANCE WITH THE CURRENT SPECIFICATIONS OF THE A.S.T.M. FOR H15-44 LOADING.

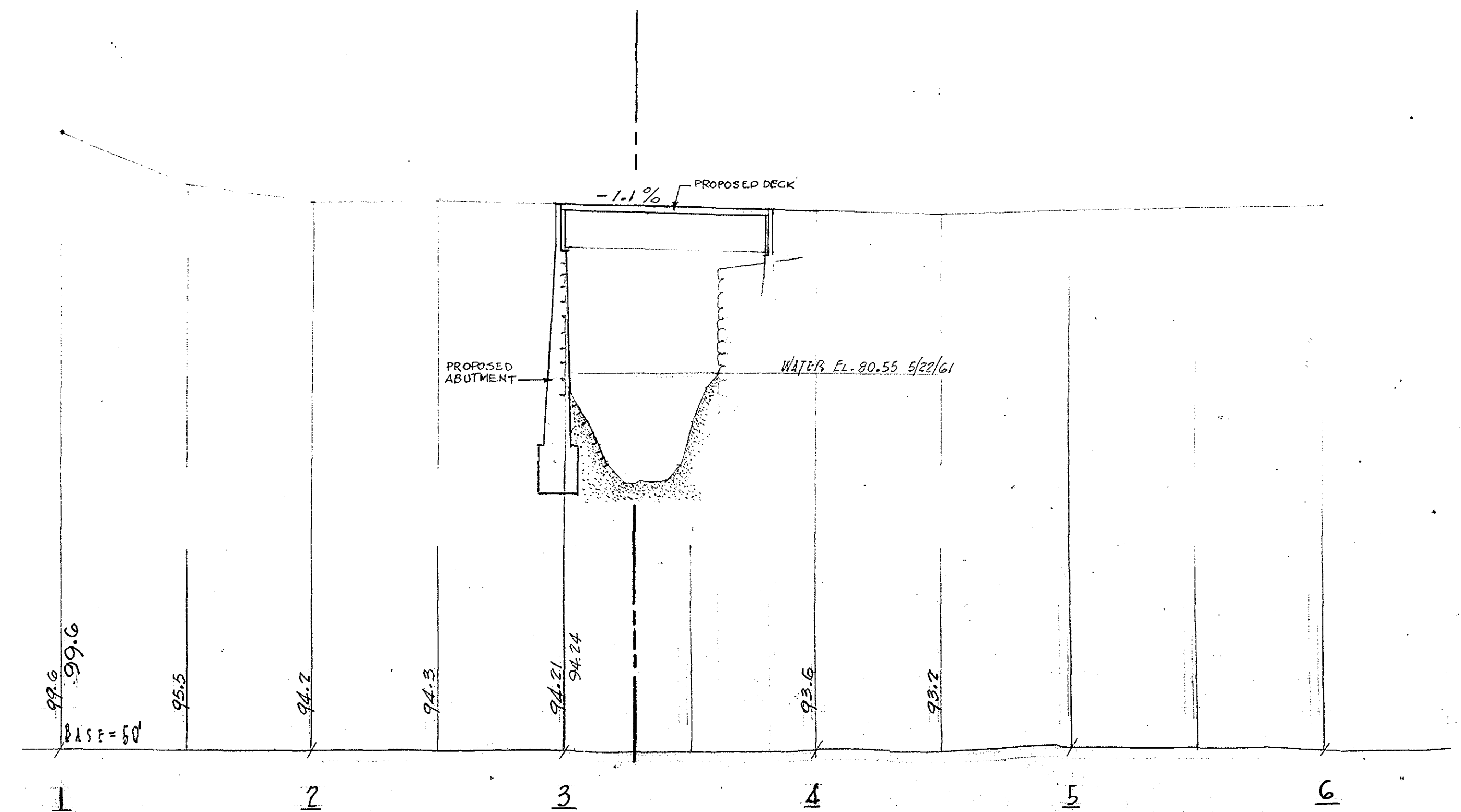
DIMENSIONS: ALL DIMENSIONS AND DETAILS SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AND SHALL BE AS SHOWN ON THE PLANS BY THE CONTRACTOR.

BENCH MARK: STA. 0+73.32B LT. VERTICAL SPIKE IN FOOT OF 12" ELN IN BACK, EL. 100.00.

ESTIMATED QUANTITIES

NOT GUARANTEED

CLEARING SITE	1	L.S.
ROADWAY EARTH EXCAVATION	10	C.Y.
BRIDGE EXCAVATION	250	C.Y.
CLASS B ROCK EXCAVATION	10	C.Y.
GRAVEL BORROW	60	C.Y.
PAINTING EXISTING STRUCT. STEEL	1	L.S.
JACKING EXISTING STRUCT. STEEL	1	L.S.
REMOVAL OF PRESENT SUPERSTRUCTURE	1	L.S.
STONE MAS. WALLS REM. & REB. (DRY)	40	C.Y.
STEEL BEAM HIGHWAY GUARD TYPE 55	120	L.F.
BRIDGE STRUCTURE (H-8-3-N-7-2)	1	L.S.



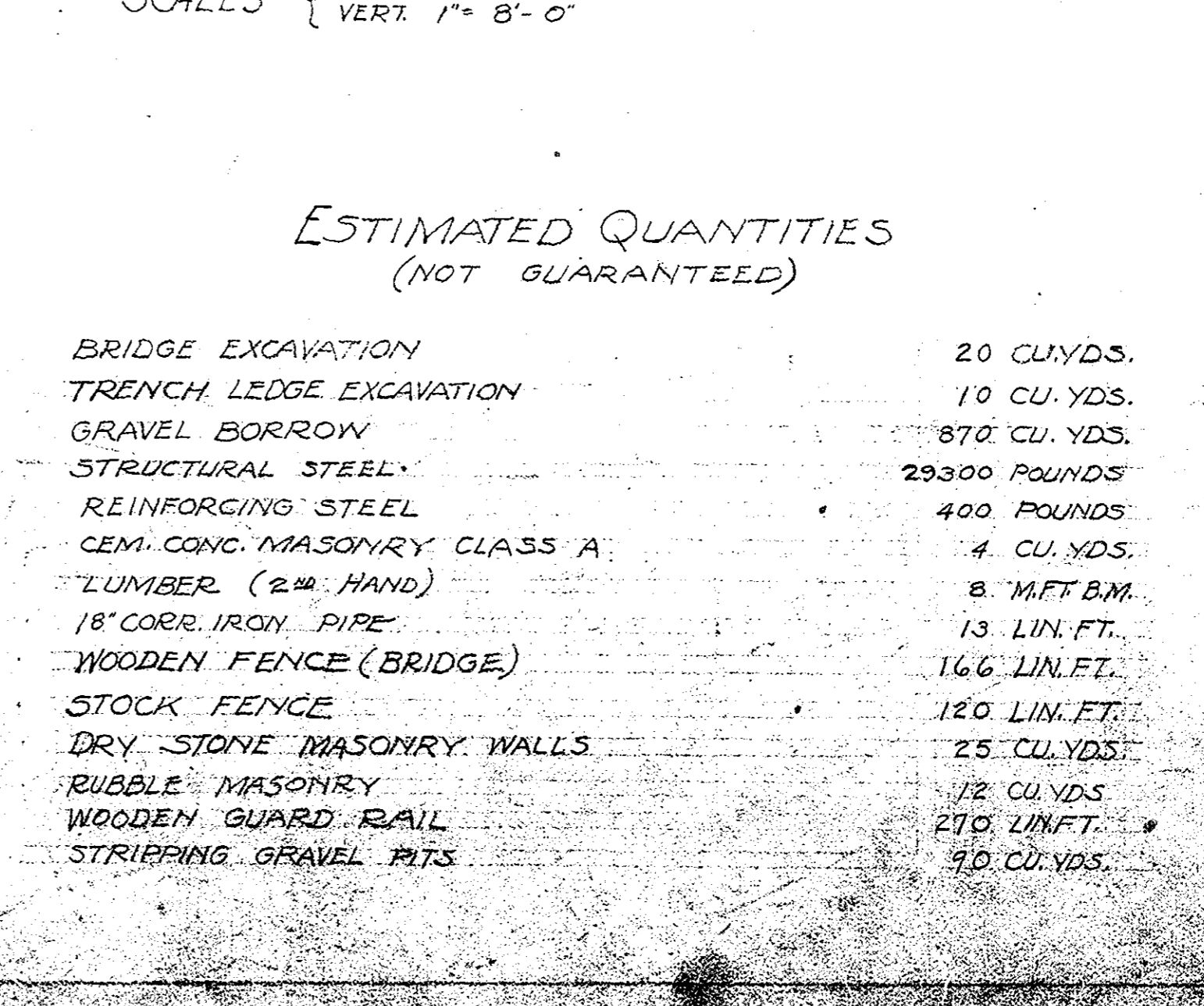
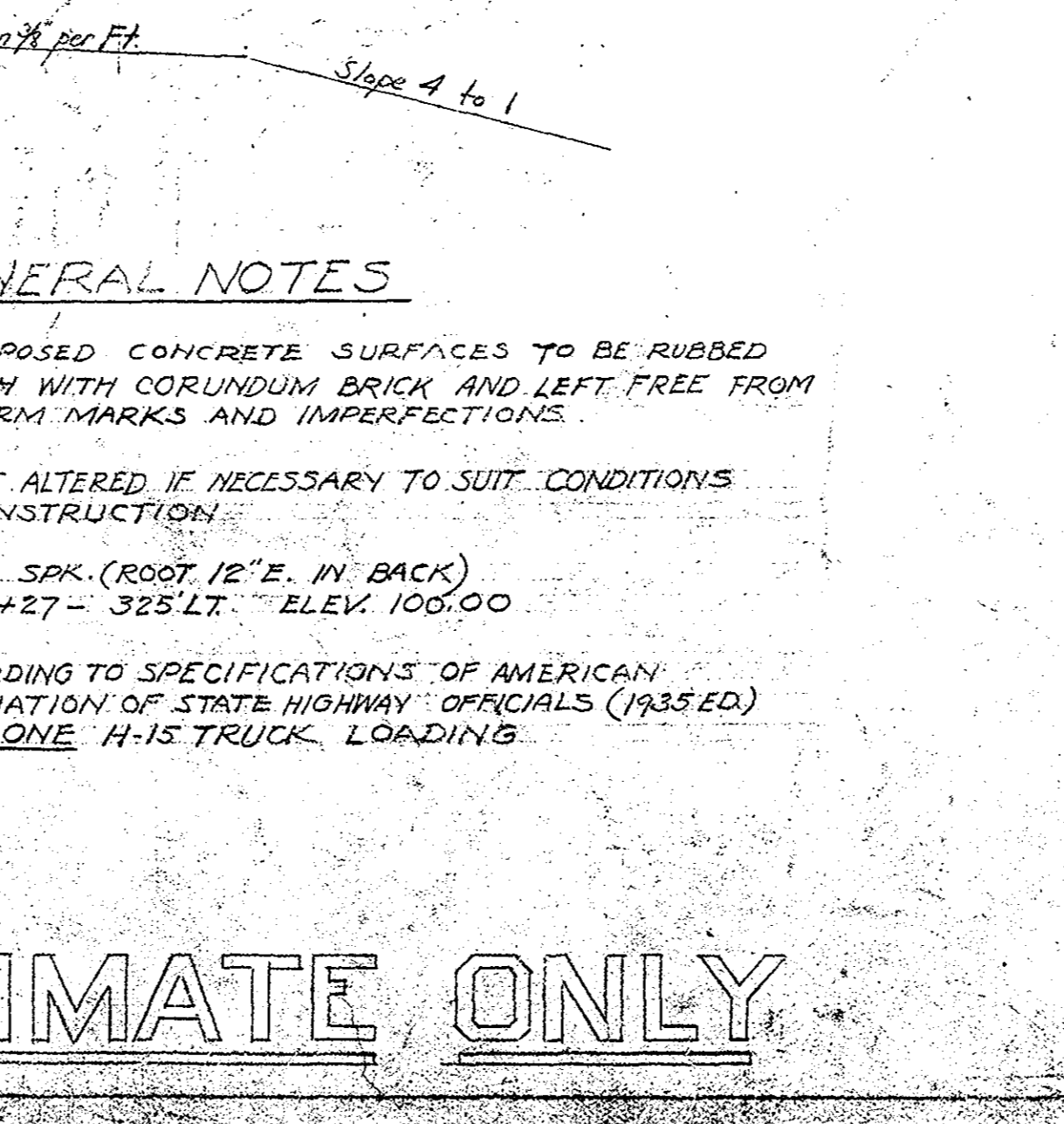
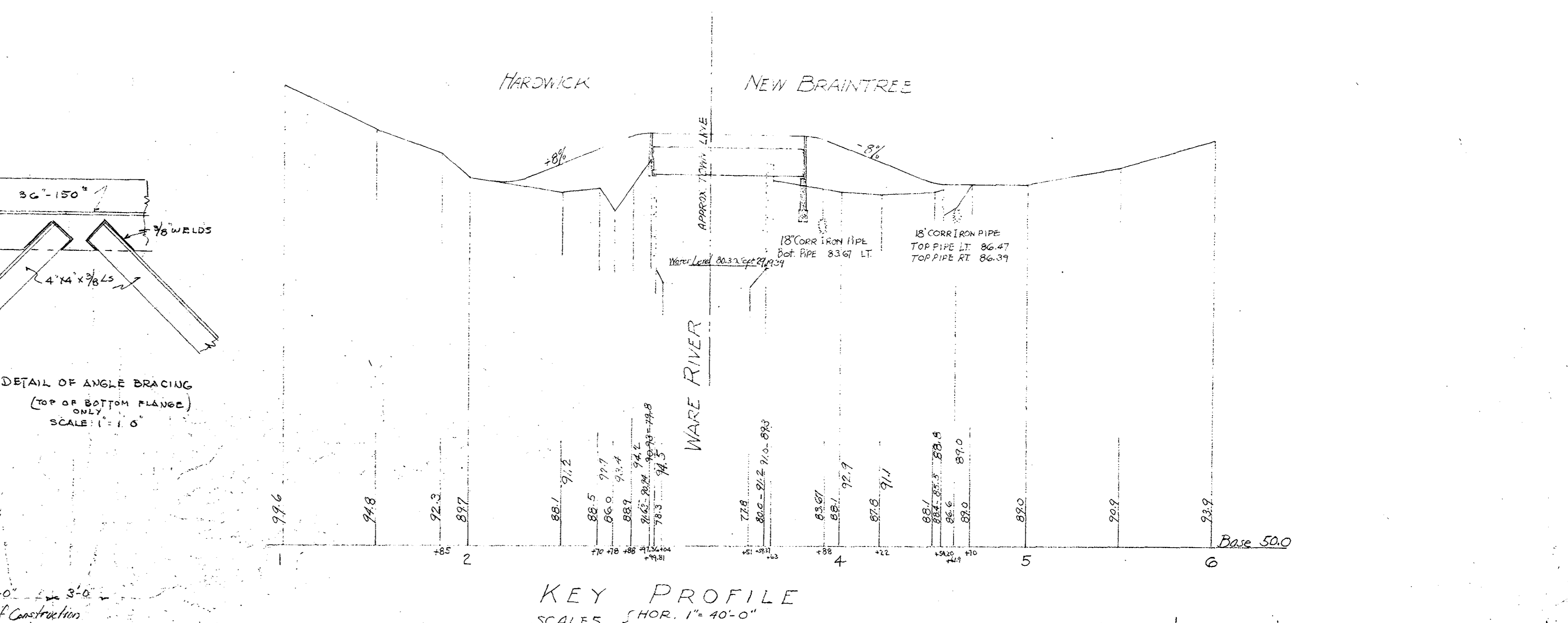
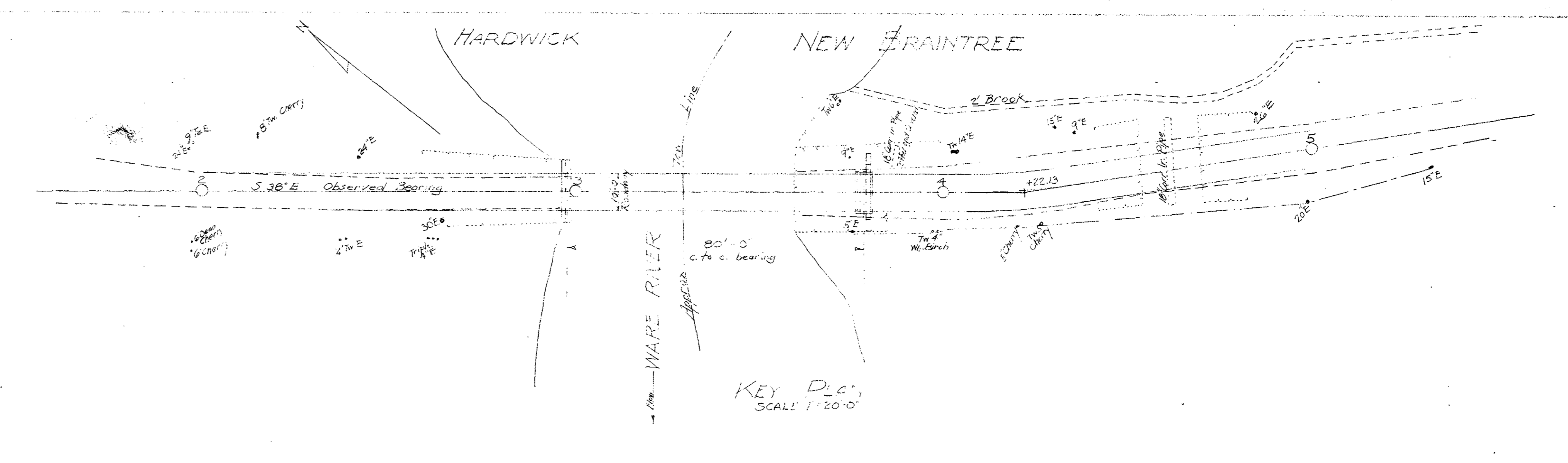
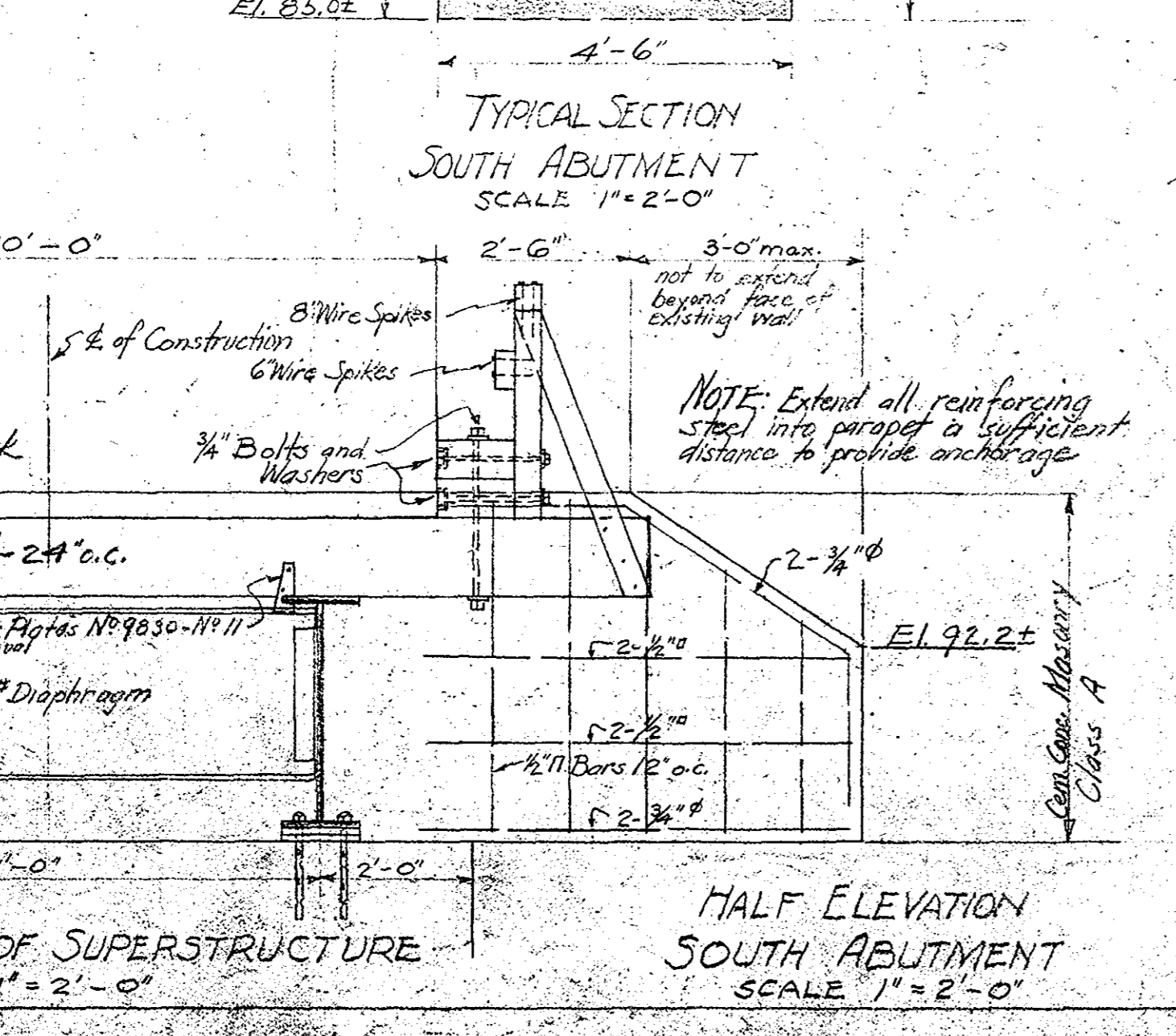
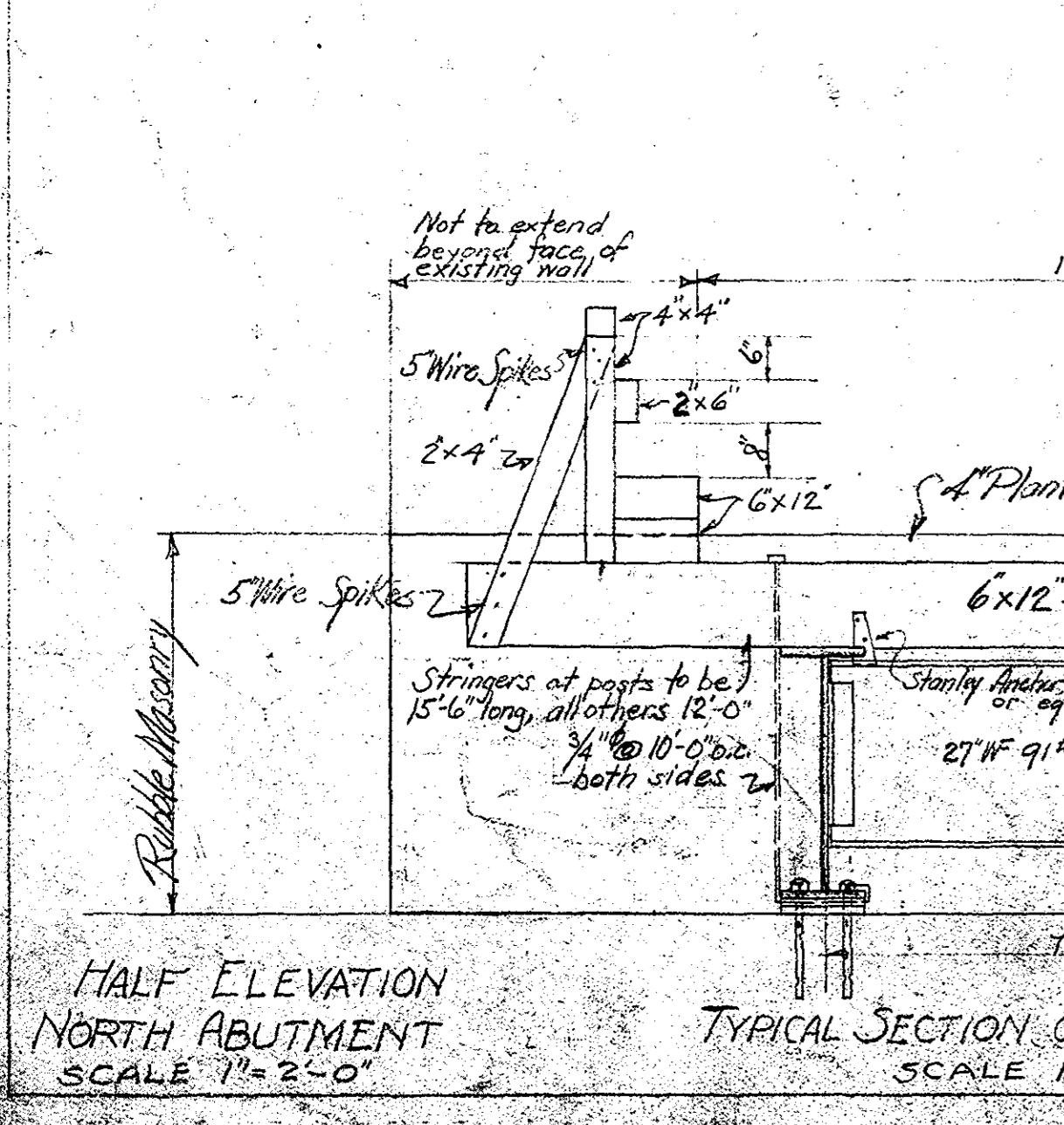
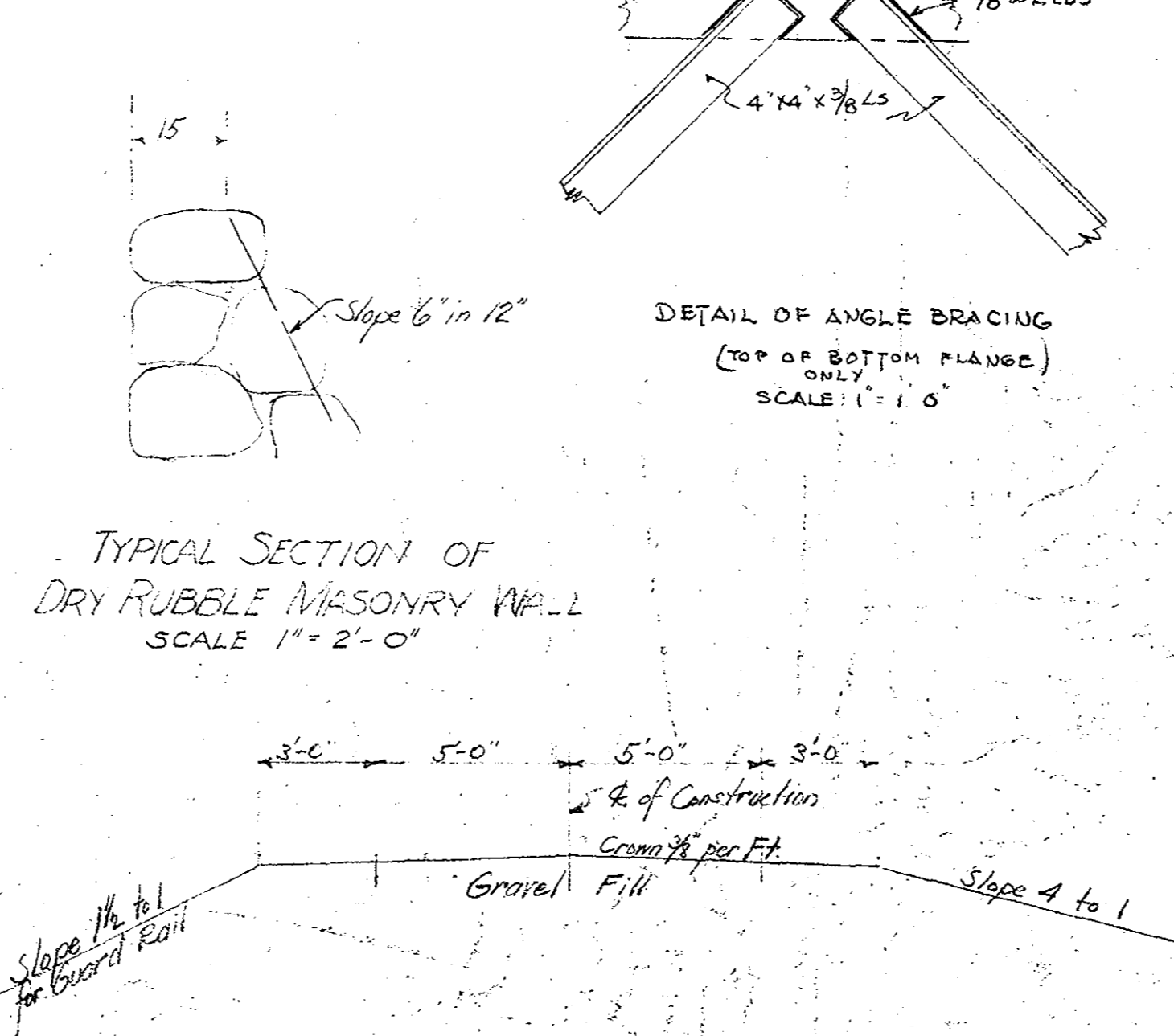
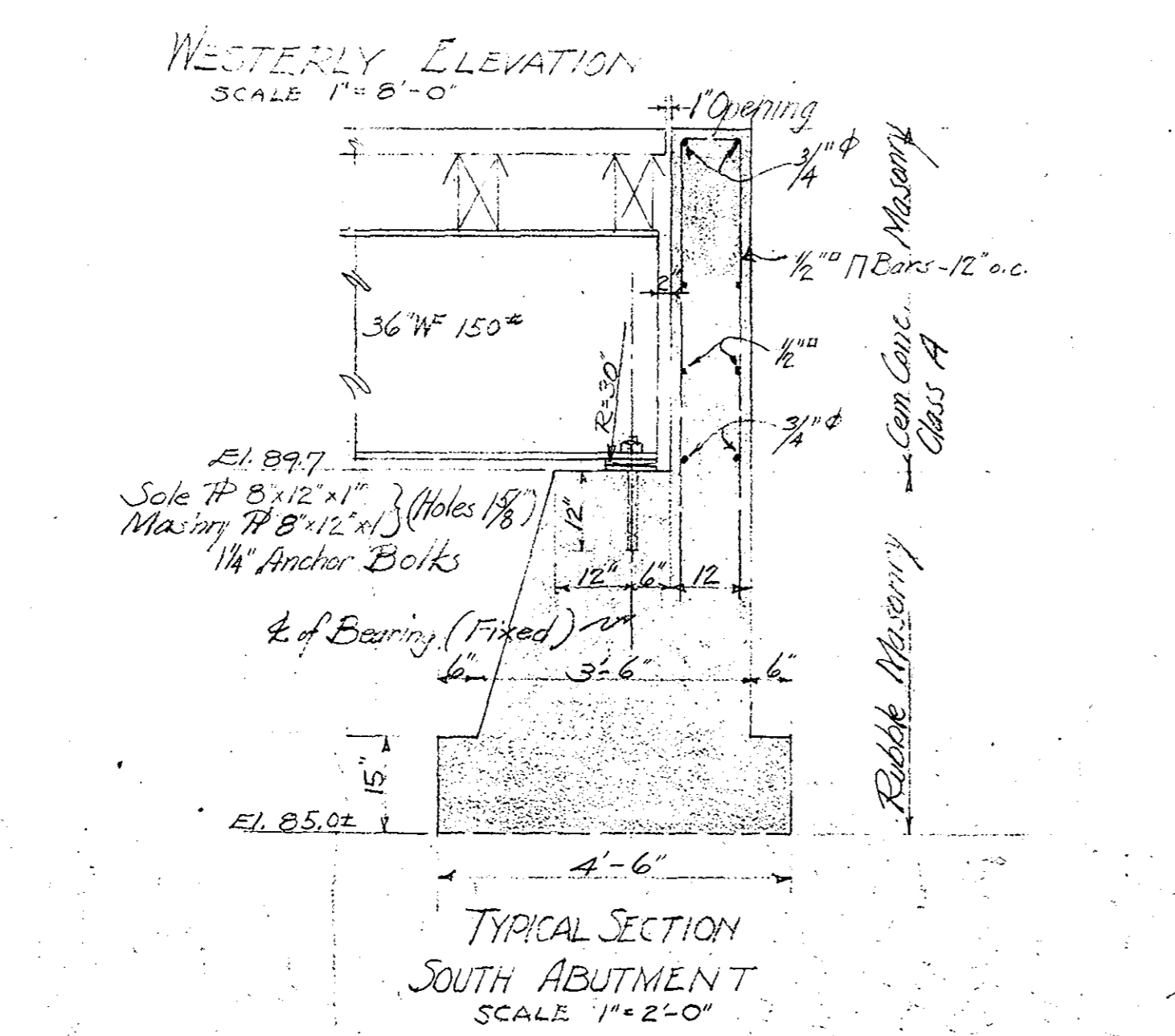
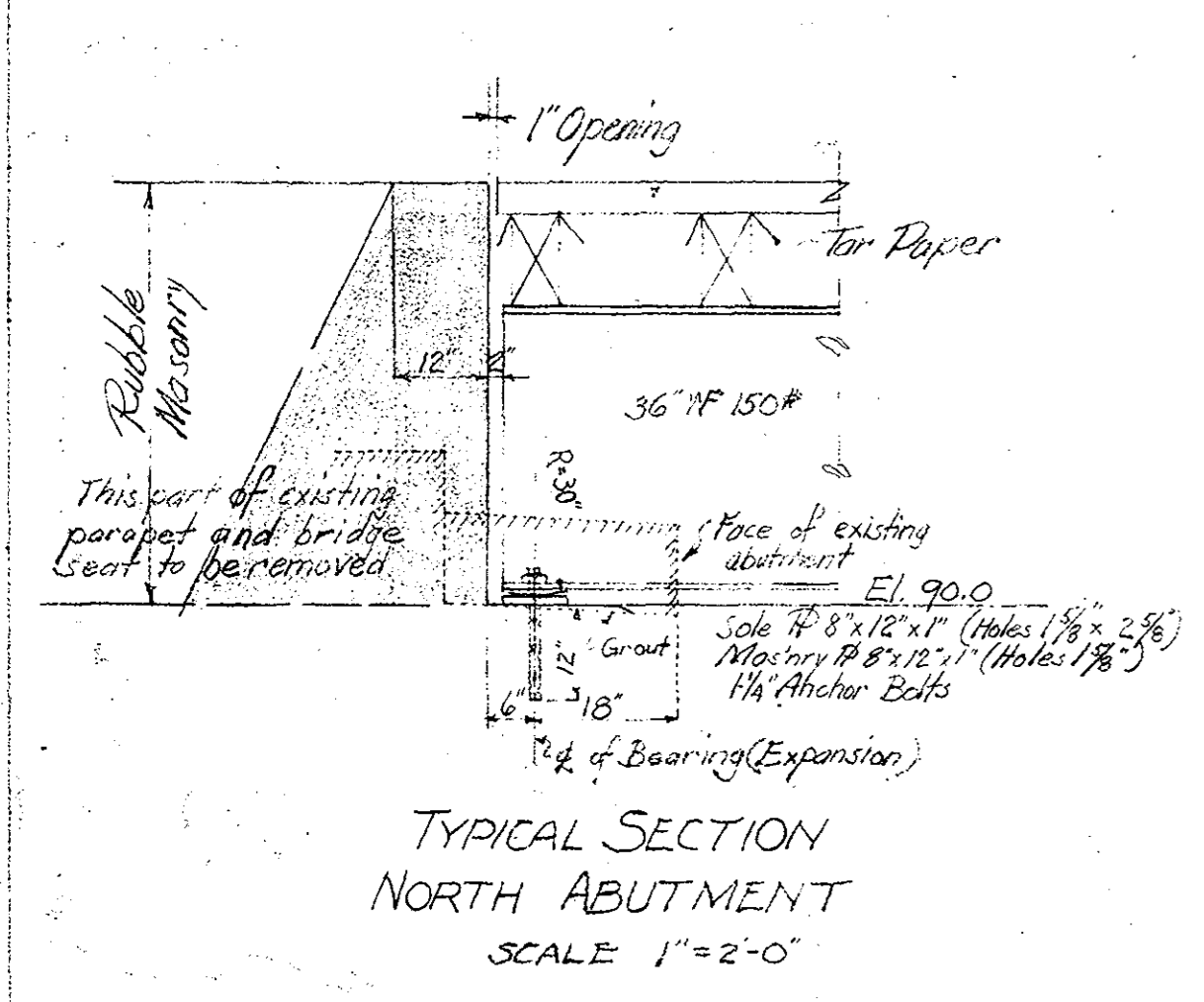
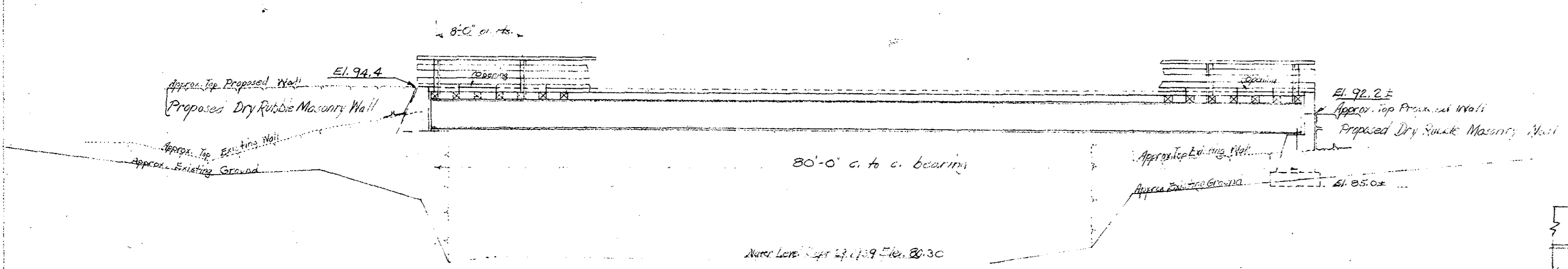
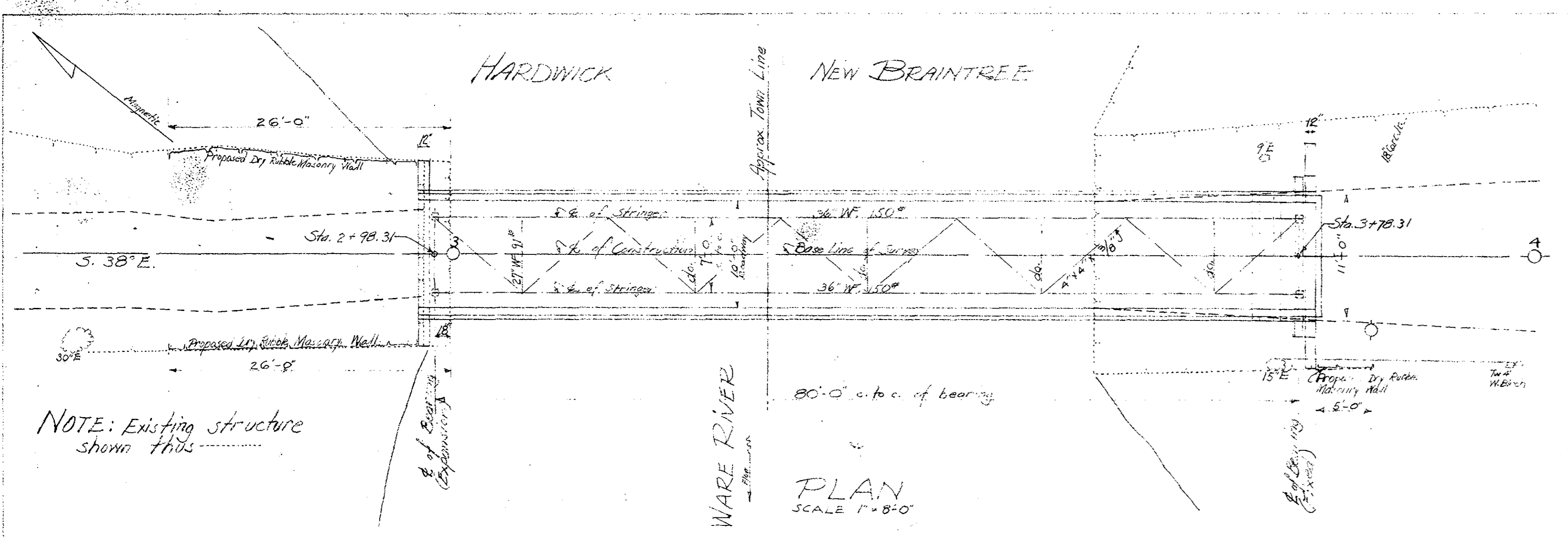
PROFILE OVER MELLIS BRIDGE

HORIZONTAL SCALE 1"=40'-0" VERTICAL SCALE 1"=4'-0"

DESIGNED BY QUEEXAN	AUG. 5, 1961	ISSUED FOR CONSTRUCTION
DRAWN BY BOGIE	THE COMMONWEALTH OF MASSACHUSETTS PROPOSED BRIDGE REPAIRS <b>HARDWICK-NEW BRAINTREE</b> MELLIS BRIDGE OVER WARE RIVERS	
CHECKED BY MATHAIAN		
APPROVED FOR ARCHITECTURE	OFFICE OF DEPARTMENT OF PUBLIC WORKS 100 NASSAU ST. BOSTON, MASS. AUG. 1961	
SPEC. ENGINEER	SWEET 1 OF 2 SHEETS • BRIDGE No. H-8-3-N-7-2	







**GENERAL NOTES**

**FINISH** : ALL EXPOSED CONCRETE SURFACES TO BE RUBBED SMOOTH WITH CORUNDUM BRICK AND LEFT FREE FROM ALL FORM MARKS AND IMPERFECTIONS.

**FOUNDATIONS** : MAY BE ALTERED IF NECESSARY TO SUIT CONDITIONS OF CONSTRUCTION.

**BENCHMARK** : VERT. SPK. (ROOT 12" E. IN BACK) STA. 0+27 - 325' LT. ELEV. 100.00

**DESIGN** : ACCORDING TO SPECIFICATIONS OF AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS (1935 ED.) FOR ONE H-15 TRUCK LOADING.

**ESTIMATED QUANTITIES (NOT GUARANTEED)**

BRIDGE EXCAVATION	20 CU. YDS.
TRENCH LEDGE EXCAVATION	10 CU. YDS.
GRAVEL BORROW	870 CU. YDS.
STRUCTURAL STEEL	29300 POUNDS
REINFORCING STEEL	400 POUNDS
CEM. CONC. MASONRY CLASS A	4 CU. YDS.
LUMBER (2 <sup>ND</sup> HAND)	8 MFT B.M.
18" CORR. IRON PIPE	13 LIN. FT.
WOODEN FENCE (BRIDGE)	166 LIN. FT.
STOCK FENCE	120 LIN. FT.
DRY STONE MASONRY WALLS	25 CU. YDS.
RUBBLE MASONRY	12 CU. YDS.
WOODEN GUARD RAIL	270 LIN. FT.
STRIPPING GRAVEL PITS	90 CU. YDS.

11/29/39	BRACING ADDED	
DATE	SHEET NOS.	DESCRIPTION
LIST OF REVISIONS - USE ONLY PRINTS OF LATEST DATE.		
THE COMMONWEALTH OF MASSACHUSETTS		
PROPOSED BRIDGE		
HARDWICK - NEW BRAINTREE		
MEILUS BRIDGE NO. 20A STATION 3+		
OVER WARE RIVER		
SCALES AS NOTED		
OFFICE OF		
DEPARTMENT OF PUBLIC WORKS		
100 NASHUA ST. - BOSTON, MASS.		
OCTOBER 1939		
BRIDGE ENGINEER	TRACED BY F.P.S.	CHECKED BY G.D.V.
DESIGNED BY F.P.S.	DATE OF ISSUE	
ADVERTISING CONSTRUCTION		

**FOR ESTIMATE ONLY**