

# MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION

NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	1	42
PROJECT FILE NO.		609078	

TITLE SHEET & INDEX

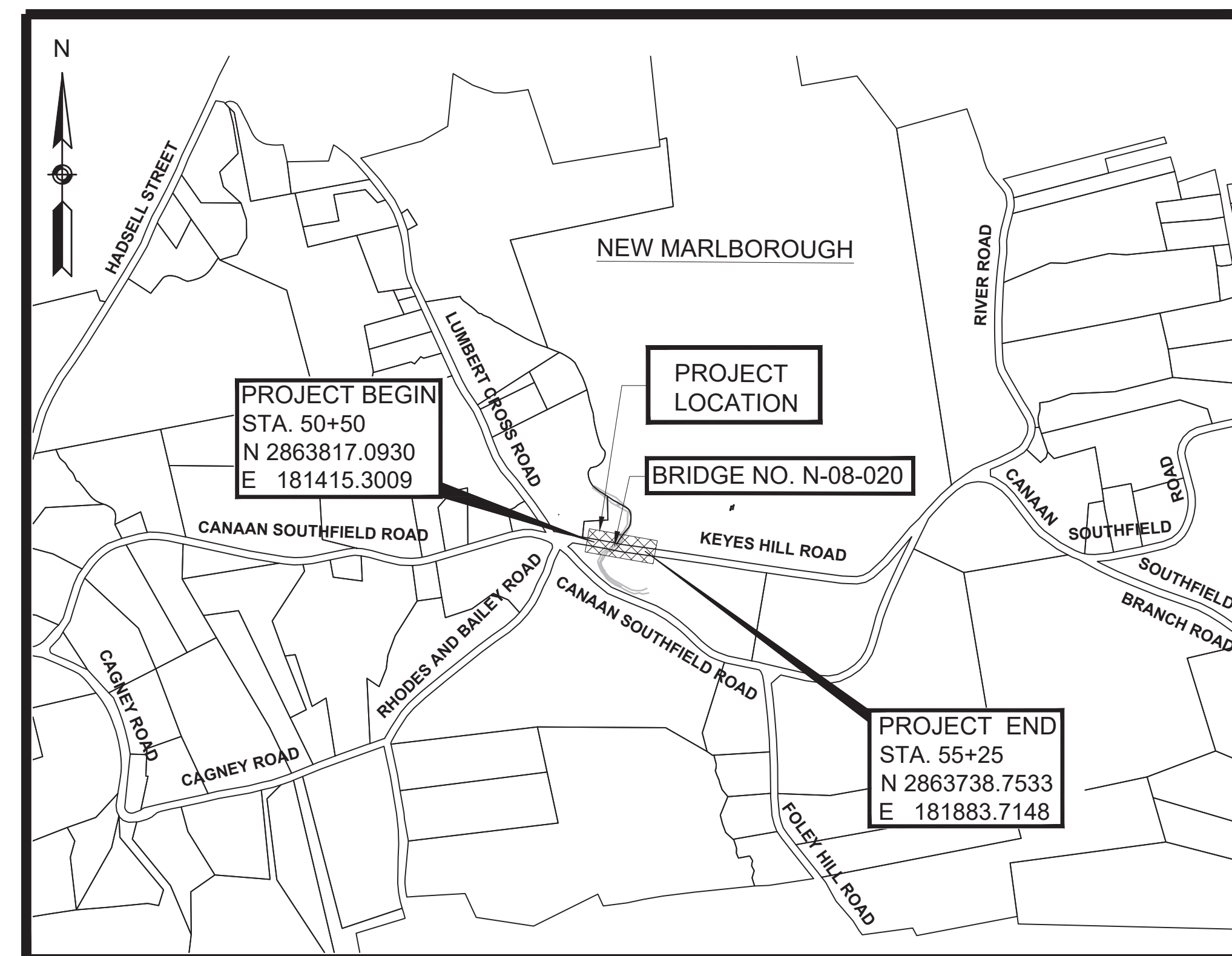
PLAN AND PROFILE OF  
KEYES HILL ROAD OVER UMPACHENE RIVER  
( BRIDGE NO. N-08-020 (CN3) )

IN THE TOWN OF  
**NEW MARLBOROUGH**  
**BERKSHIRE COUNTY**  
FEDERAL AID PROJECT NO. BFL(BR-OFF)-003S(798)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.

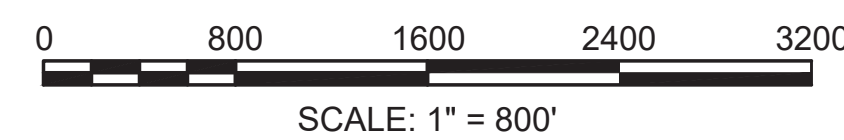
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## DESIGN DESIGNATION (KEYES HILL ROAD)

DESIGN SPEED	20 MPH
ADT (2023)	213
ADT (2043)	260
K	10.8%
D	86.7%
T (PEAK HOUR)	4.3%
T (AVERAGE DAY)	10.8%
DHV	23
DDHV	20
FUNCTIONAL CLASSIFICATION	RURAL LOCAL



LENGTH OF PROJECT = 475 FEET = 0.090 MILES

LAMSON ENGINEERING CORPORATION  
NEWTON, MASSACHUSETTS



Kin Chung Lam  
Digitally signed by Kin Chung Lam  
Date: 2024.11.04 09:03:37 -0507

DATE	DESCRIPTION	REV #

**massDOT**  
Massachusetts Department of Transportation  
Highway Division

APPROVED

*Carrin Lavallee*  
Digitally signed by Carrin Lavallee, P.E.  
Date: 2024.11.07 14:41:02 -0507

CHIEF ENGINEER

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
		SEDIMENT BARRIER
		COIR LOG SEDIMENT BARRIER
		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	DESCRIPTION
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
M&O	MILL & OVERLAY
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

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LEGEND AND ABBREVIATIONS

ABBREVIATIONS (cont.)

GENERAL	DESCRIPTION
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT
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

NOT ALL SYMBOLS OR ABBREVIATIONS ARE NEEDED ON THESE PLANS.

## GENERAL NOTES

### SURVEY

- BOUNDARY INFORMATION SHOWN HEREON WAS COMPILED FROM AN ACTUAL FIELD SURVEY CONDUCTED BY WSP SURVEYORS FROM MAY 19, 2020 THROUGH JUNE 5, 2020.
- NORTH ORIENTATION AND BEARING BASE PER GRID NORTH.
- THE LOCATION OF UNDERGROUND IMPROVEMENTS, UTILITIES OR ENCROACHMENTS, IF ANY EXIST, OR AS SHOWN HEREON, ARE NOT CERTIFIED. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A UTILITY MARK OUT SERVICE. THE LOCATION OF UNDERGROUND UTILITIES DEPICTED ON THIS PLAN HAVE BEEN COMPILED FROM VARIOUS SOURCES, INCLUDING, BUT NOT LIMITED TO INFORMATION AND RECORD PLANS OBTAINED FROM VARIOUS UTILITY PROVIDERS, AND LOCATION OF STRUCTURES VISUALLY IDENTIFIED AND LOCATED DURING THE COURSE OF THE FIELD SURVEY. THE LOCATION OF ALL UTILITIES DEPICTED ON THIS PLAN SHALL BE CONSIDERED APPROXIMATE. WSP MAKES NO WARRANTY NOR GUARANTEE AS TO THE ACCURACY OF THE LOCATION OF THE UTILITY LINES DEPICTED ON THIS PLAT. FURTHERMORE, WSP MAKES NO WARRANTY NOR GUARANTEE THAT THE UTILITIES DEPICTED ON THIS MAP COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE ROUTE, SIZE AND LOCATION OF ALL UTILITIES MUST BE VERIFIED BY THE APPROPRIATE AUTHORITIES. THE PROPER UNDERGROUND FACILITIES PROTECTIVE ORGANIZATION SHALL BE NOTIFIED, AND A UTILITY MARKOUT SERVICE DEPLOYED PRIOR TO CONDUCTING EXCAVATIONS AND CONSTRUCTION.
- THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF AN UP TO DATE ABSTRACT OF TITLE.
- HORIZONTAL COORDINATES RELATIVE TO THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM, MASSACHUSETTS MAINLAND ZONE. BASED ON THE NORTH AMERICAN DATUM OF 1983, NAD83 (2011) EPOCH 2010.00.
- ELEVATIONS RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988, NAVD 1988.
- HORIZONTAL COORDINATE AND ELEVATION UNITS ARE U.S. SURVEY FEET.
- NO EXISTING RECORD LAYOUT FOR THE PORTION OF KEYES HILL ROAD DEPICTED HEREON. FIELD RECONNAISSANCE SURVEY WAS UNABLE TO RECOVER ANY EXISTING MONUMENTS TO ESTABLISH THE LOCATION LINES OF KEYES HILL ROAD. THE LOCATION LINES OF KEYES HILL ROAD DEPICTED HEREON HAVE BEEN ESTABLISHED PURSUANT TO G.M.L. TITLE XIV, CHAPTER 86, SECTION 2 AND IN ACCORDANCE WITH EXISTING OCCUPATION AS EVIDENCED BY PORTIONS OF ESTABLISHED FENCE LINES FRONTING UPON KEYES HILL ROAD IN CONJUNCTION WITH THE EXISTING LOCATION OF BRIDGE NO. N-08-020 OVER THE UMPACHENE RIVER.
- NO EXISTING RECORD LAYOUT FOR THE PORTION OF CANAAN-SOUTHFIELD ROAD DEPICTED HEREON. THE SOUTHERLY LOCATION LINE OF CANAAN-SOUTHFIELD ROAD DEPICTED HEREON ESTABLISHED PER MONUMENTATION FOUND IN ACCORDANCE WITH "SURVEY OF LAND IN NEW MARLBOROUGH, MASSACHUSETTS PREPARED FOR ROBIN RICHARDSON" FILED WITH THE REGISTRY OF DEEDS ON SEPTEMBER 9, 2011 IN PLAT FILE P, PAGE 183. THE NORTHERLY LOCATION LINE OF CANAAN-SOUTHFIELD ROAD DEPICTED HEREON ESTABLISHED PER BEST FIT ALIGNMENT OF THE CENTERLINE OF THE EXISTING TRAVELED WAY OFFSET IN A NORTHEASTERLY DIRECTION 24.75 FEET (1.5 RODS).
- BOUNDARIES OF PROPERTIES ABUTTING THE PUBLIC ROADS DEPICTED HEREON ESTABLISHED PER DEEDS AND/OR PLANS OF RECORD AND ARE NOT NECESSARILY THE RESULT OF A COMPLETE BOUNDARY OF SURVEY OF SAID ABUTTING PROPERTIES.
- AN EXISTING PAIR OF GPS CONTROL POINTS NUMBERS 2555 AND 2556 WAS SET BY MASSDOT. WSP OCCUPIED THE EXISTING GPS PT ON KEYES HILL ROAD AND SET STATION 1 ON MILL STREET. A CLOSED LOOP TRAVERSE WAS RAN WITH STATION 1 AS THE INITIAL BACKSIGHT AND STATION 1993 AS THE INITIAL SETUP POINT. THE AZIMUTH BETWEEN STATIONS 1993 AND 1994 WAS HELD DURING THE TRAVERSE ADJUSTMENT TO POSITION THE MAIN CONTROL LOOP. ALL CONTROL WAS THREE-WIRE LEVELED AND ADJUSTED IN REFERENCE TO THE PROVIDED ELEVATION OF STATION 1993.
- NOTE THAT THE SECTION OF THE UMPACHENE RIVER DEPICTED HEREON WAS SURVEYED PURSUANT TO CHAPTER 1.1.5 OF THE 2013 LFRD BRIDGE MANUAL (REVISED AUGUST 2020). PORTIONS OF THE THREE-DIMENSIONAL SURFACE ALONG THE RIVER HAVE BEEN DEVELOPED USING CROSS-SECTIONAL SURVEY DATA COLLECTED IN THE FIELD AT INTERVALS AND/OR SUPPLEMENTED WITH STATE LIDAR DATA; AND NOT NECESSARILY FROM A COMPLETE DETAILED GROUND SURVEY OF THE ENTIRE AREA REQUIRED TO FACILITATE A HYDRAULIC ANALYSIS. AS SUCH, PORTIONS OF THE TOPOGRAPHIC INFORMATION DEPICTED ON THIS PLAN SET AS DEMARCATED AND LABELED HEREON WERE DEVELOPED AT A LOWER VERTICAL ACCURACY THAN THE PORTIONS ALONG THE ROADS AND DIRECTLY ADJACENT TO BRIDGE N-8-20. THE PORTIONS OF TOPOGRAPHIC INFORMATION DEPICTED AT A LOWER VERTICAL ACCURACY ARE INTENDED FOR THE EXPRESS PURPOSE OF CONDUCTING HYDRAULIC ANALYSIS ONLY.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ANY HIGHWAY BOUND OR PRIVATE PROPERTY PIN THAT MAY BE DAMAGED OR DESTROYED DURING CONSTRUCTION, TO ITS LOCATION JUST PRIOR TO CONSTRUCTION.

### UTILITIES

- ALL UNDERGROUND UTILITIES AS SHOWN WERE COMPILED USING FIELD SURVEY INFORMATION AND AVAILABLE RECORD INFORMATION.
- RECORD UTILITY INFORMATION FROM THE VARIOUS UTILITY COMPANIES AND PUBLIC AGENCIES, ARE APPROXIMATELY ONLY AND ACTUAL LOCATIONS MUST BE DETERMINED IN THE FIELD.
- WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION, AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
- CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF ELECTRIC, TELEPHONE, AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES AT NO ADDITIONAL COST TO THE OWNER. IF THE CONTRACTOR ADJUSTS UTILITY COVERS, IT SHALL BE DEEMED PART OF THE WORK AND THERE WILL BE NO ADDITIONAL COMPENSATION.
- ALL UTILITY COMPANIES, PUBLIC AND PRIVATE MUST BE NOTIFIED, INCLUDING THOSE IN CONTROL OF UTILITIES NOT SHOWN ON THIS PLAN, (SEE CHAPTER 370, ACTS OF 1963, MASSACHUSETTS) PRIOR TO DESIGNING, EXCAVATING, BLASTING, INSTALLING, BACKFILLING, GRADING, PAVEMENT RESTORING OR REPAVING.

### UTILITIES (CONT')

- SUBSURFACE UTILITY LOCATIONS HAVE BEEN PLOTTED TO MEET UTILITY QUALITY LEVEL "C" AS DESCRIBED IN ASCE STANDARD 38-02 AND SUMMARIZED BELOW. THE UNDERGROUND UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS BASED ON ABOVE-GROUND FIELD OBSERVATION AND EXISTING RECORD INFORMATION RECEIVED FROM UTILITY STAKE-HOLDERS.
- THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE NECESSITY OF MAKING HIS/HER OWN INVESTIGATION IN ORDER TO ASSURE THAT NO DAMAGE TO EXISTING STRUCTURES, DRAINAGE LINES, TRAFFIC SIGNAL CONDUITS, ETCETERA, WILL OCCUR.
- NO EXISTING PUBLIC UTILITY STRUCTURES SHALL BE ABANDONED AND/OR DISMANTLED WITHOUT AUTHORIZATION FROM THE ENGINEER.

### DRAINAGE:

DRAINAGE ELEVATIONS ARE PROVIDED FOR DESIGN PURPOSES ONLY.

THE CONTRACTOR SHALL VERIFY BY TEST PIT, THE LOCATIONS OF EXISTING UTILITIES WHICH MAY CONFLICT WITH THE PROPOSED DRAINAGE DESIGN. ANY FIELD ADJUSTMENTS REQUIRED WILL BE MADE AS APPROVED OR DIRECTED BY THE ENGINEER. ONLY AFTER THE CONTRACTOR VERIFIES ELEVATIONS FOR THE CONSTRUCTABILITY OF THE DRAINAGE SYSTEM SHALL ANY STRUCTURES BE ORDERED. ANY FIELD ADJUSTMENTS TO LINE & GRADE UP TO A DEPTH OF 5' SHALL BE INCLUDED IN THE COST OF THE PIPE. PIPE EXCAVATION GREATER THAN 5' WILL BE PAID UNDER CLASS B TRENCH EXCAVATION.

### CONSTRUCTION

- AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DAMAGED BY THE CONTRACTOR'S OPERATIONS, INCLUDING STAGING AREAS, SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.
- THE CONTRACTOR IS HEREBY NOTIFIED THAT ADDITIONAL WORK WITHIN THE PROJECT LIMITS MAY BE PERFORMED BY OTHERS. THE CONTRACTOR SHALL MAKE EVERY EFFORT TO COORDINATE WITH ANY SUCH WORK. NO ADDITIONAL COMPENSATION WILL BE MADE FOR EXTRA WORK DAYS, DELAYS, OR RESCHEDULING OF WORK TO ACCOMMODATE ANY OTHER CONSTRUCTION, PERMIT AND/OR MAINTENANCE OPERATIONS IN THE AREA.
- WHERE THE NEW CONSTRUCTION IS WITHIN THE EXISTING TRAVELED WAY, THE CONTRACTOR SHALL PERFORM WORK SO THAT INTERFERENCE TO BUSINESS CONCERNS AND ABUTTERS, ON ACCOUNT OF THE CONSTRUCTION WORK, IS KEPT TO A MINIMUM. THE CONTRACTOR WILL NOT BE ALLOWED TO PARK EQUIPMENT, OR STOCKPILE MATERIAL ON THE TRAVELED WAYS OVERNIGHT OR WHEN NOT IN USE. THE CONTRACTOR SHALL MAINTAIN SAFE AND REASONABLE ACCESS TO AND FROM ABUTTING PROPERTIES AT ALL TIMES AT NO ADDITIONAL COST.
- THE CONTRACTOR SHALL DISPOSE OF ALL WASTE MATERIAL IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS AT HIS OWN EXPENSE, OUTSIDE OF THE PROJECT LIMITS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR INVESTIGATING AND CONFIRMING THAT ALL ITEMS TO BE REUSED ARE IN SERVICEABLE CONDITION. IF IT IS DEEMED THAT ANY ITEM IS NOT ABLE TO BE REUSED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING AND INCLUDE ESTIMATED COSTS TO INSTALL NEW.
- CONSTRUCTION MATERIALS AND EQUIPMENT SHOULD NOT BE STORED ON THE RIVERBED, AND THAT SEDIMENT, TURBIDITY, AND EROSION CONTROLS BE REQUIRED.
- IN-WATER CONSTRUCTION IS LIMITED TO THE SPRING AND FALL TIME OF YEAR FROM MARCH 15 TO JULY 15 AND SEPTEMBER 1 TO NOVEMBER 15, RESPECTIVELY.

### TRAFFIC

- THE MINIMUM MOUNTING HEIGHT OF POST-MOUNTED SIGNS, MEASURED VERTICALLY FROM THE BOTTOM OF THE SIGN TO THE TOP OF THE CURB OR SIDEWALK, OR TO THE ELEVATION OF THE NEAR EDGE OF THE TRAVELED WAY, SHALL BE 7 FEET UNLESS OTHERWISE SPECIFIED ON THE PLANS.

### TEMPORARY TRAFFIC CONTROL

- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR TRAFFIC MANAGEMENT AND TO COMPLY WITH CONDITIONS OUTLINED WITHIN THE SPECIFICATIONS AND MASSDOT HIGHWAY DIVISION STANDARD DETAILS AND DRAWINGS FOR THE DEVELOPMENT OF TRAFFIC MANAGEMENT PLANS MANUAL.
- THIS PLAN DEPICTS IN SCHEMATIC FORM, THE ELEMENTS OF AN APPROACH TO THE LAYOUT AND PLANNING OF THE WORK DURING THE PROGRESS OF THE CONSTRUCTION OPERATIONS. THE PREPARER OF THIS PLAN HAS NO ROLE IN THE OVERSIGHT OR OTHERWISE IN THE IMPLEMENTATION OF THIS PLAN.
- CONTRACTOR SHALL COORDINATE THE CONSTRUCTION EFFORT WITH OTHER PROJECTS IN THE VICINITY IN ORDER TO MINIMIZE POTENTIAL TRAFFIC AND PARKING IMPACTS.

### TEMPORARY TRAFFIC CONTROL (CONT')

- THE TEMPORARY TRAFFIC CONTROL PLANS CONTAINED HEREIN ARE GIVEN AS A GUIDE FOR TYPICAL WORK ZONE TRAFFIC CONTROL APPLICATIONS FOR THE TYPES OF WORK ANTICIPATED FOR THIS PROJECT. THEY ARE NOT INTENDED TO COVER ALL POSSIBLE CONSTRUCTION OPERATIONS WHICH THE CONTRACTOR MAY CHOOSE TO EMPLOY. WORK ZONE TRAFFIC CONTROL FOR OTHER CONSTRUCTION OPERATIONS OR OTHER TRAFFIC SITUATIONS IF APPLICABLE SHALL BE IN ACCORDANCE WITH THE CURRENT M.U.T.C.D. AND AS APPROVED OR DIRECTED BY THE ENGINEER.
- THESE PLANS ARE NOT INTENDED TO LIMIT THE CONTRACTORS RIGHT TO SCHEDULE THE WORK BUT TO OUTLINE ONE WAY OF PROGRESSING. THE CONTRACTOR IS EXPECTED TO USE KNOWLEDGE AND EXPERIENCE TO PERFORM THE WORK IN THE MOST EFFICIENT MANNER IN COMPLIANCE WITH THE DRAWING AND SPECIFICATIONS AND THE REQUIREMENTS OF THE INDIVIDUAL AGENCIES AND ABUTTERS.
- LANE RESTRICTIONS (OTHER THAN ACTIVE WORK ZONES) MAY NOT REMAIN OVERNIGHT OR DURING NON-WORKING HOURS AND MUST BE REMOVED BY THE END OF EACH WORKING TIME RESTRICTION. AFTER EACH WORKING DAY, TRAFFIC CONTROL DEVICES THAT ARE NOT REQUIRED SHALL BE MOVED OFF THE ROADWAY OR FULL DEPTH CONSTRUCTION AREA AND PLACED SO AS NOT TO IMPEDE PEDESTRIAN AREAS, ABUTTER ACCESS OR CAUSE CONFUSION TO ROADWAY USERS. IN CERTAIN CIRCUMSTANCES, AND ONLY WITH THE APPROVAL OF THE ENGINEER, CAN LANE RESTRICTIONS REMAIN OVERNIGHT, REFLECTORIZED DRUMS MAY BE FITTED WITH STEADY BURN AND/OR FLASHING WARNING LIGHTS AT ONLY THE ENGINEERS DIRECTION.
- PLACE ALL CONSTRUCTION SIGNING AND TRAFFIC CONTROL DEVICES PRIOR TO COMMENCEMENT OF CONSTRUCTION.
- CONTRACTOR SHALL SECURE WORK AREAS ACCORDING TO CURRENT CONDITIONS TO ENSURE PUBLIC SAFETY AND CONVENIENCE. THIS SHALL INCLUDE ENSURING THAT ALL EXCAVATIONS ARE PROTECTED AT ALL TIMES AND WHEN WORK SHIFT IS COMPLETED.
- THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND APPROVAL, TEMPORARY TRAFFIC CONTROL PLANS FOR ANY WORK OUTSIDE THE WORK ZONES INDICATED IN THESE DRAWINGS, INCLUDING ALTERNATIVE PHASING OR MODIFICATION OF ANY ASPECT OF THE TEMPORARY TRAFFIC CONTROL PLANS OR CONSTRUCTION STAGING. THE CONTRACTOR SHALL BEAR RESPONSIBILITY FOR THE SUBMISSION AND REVIEW OF ALTERNATIVE PLANS, AT NO ADDITIONAL COST.
- EXISTING CONDITIONS ARE FOR CONTRACTOR INFORMATION ONLY AND ARE EXISTING CONDITIONS AT THE TIME OF DESIGN. THE CONTRACTOR SHALL VERIFY, AS NECESSARY, ACTUAL FIELD CONDITIONS AT TIME OF CONSTRUCTION.
- TYPICAL DAYTIME WORK HOURS ARE FROM 7:00 AM TO 3:30 PM ON WEEKDAYS, UNLESS OTHERWISE PERMITTED BY THE ENGINEER. WORK SHALL NOT BE PERFORMED THE DAY BEFORE, OR THE DAY AFTER, A HOLIDAY WEEKEND, UNLESS OTHERWISE PERMITTED BY THE ENGINEER. REFER TO TEMPORARY TRAFFIC CONTROL PLANS, SPECIFICATIONS, AND PERMITS FOR MODIFICATION TO ALLOWABLE WORK PERIODS. ALL WORK SCHEDULES, HOWEVER, SHALL BE PRE-APPROVED BY THE DEPARTMENT PRIOR TO BEGINNING WORK. WORK NECESSARY OUTSIDE OF THESE NORMAL WORK HOURS BECAUSE OF TRAFFIC CONDITIONS, AS NOTED IN THE PLANS OR SPECIFICATIONS, SHALL BE APPROVED BY THE ENGINEER.
- CONTRACTOR SHALL PROVIDE DETAILS FOR TRAFFIC CONTROL AS DIRECTED BY THE ENGINEER AND IN ACCORDANCE WITH THE SPECIFICATIONS. CONTRACTOR SHALL BE GUIDED BY TEMPORARY TRAFFIC CONTROL LAYOUTS PROVIDED FOR SPECIFIC LOCATIONS, AND BY TYPICAL LAYOUTS AT ALL OTHER LOCATIONS. TYPICAL LAYOUTS SHALL CONFORM TO PART 6 OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.
- WORK ZONES INDICATED ON THE TEMPORARY TRAFFIC CONTROL PLANS ARE INTENDED FOR THE DURATION OF THE WORK WITHIN THE ZONES ONLY AND SHALL BE RESTORED TO CONDITIONS ACCEPTABLE TO THE ENGINEER AT COMPLETION OF THE WORK INDICATED.
- CONTRACTOR SHALL COORDINATE WITH THE ENGINEER CONCERNING ALL SCHEDULED SPECIAL EVENTS WITHIN THE LIMITS OF WORK.

### CONSTRUCTION SIGNING:

- LOCATIONS OF SIGNS SHOWN ARE APPROXIMATE. EXACT LOCATION SHALL BE DETERMINED BY THE CONTRACTOR IN THE FIELD. THE CONTRACTOR SHALL ENSURE THAT SIGNS ARE PLACED IN ACCORDANCE WITH THE CURRENT M.U.T.C.D. THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO INSTALLING SIGNS.
- EXISTING SIGNING WHICH CONFLICTS WITH PROPOSED CONSTRUCTION TRAFFIC MANAGEMENT SIGNING SHALL BE REMOVED AND STACKED OR COVERED AND RESTORED AT THE END OF THE WORK.
- ALL SIGNS SHALL BE COVERED OR REMOVED WHEN CONDITION IS NOT IN EFFECT.
- THE MINIMUM MOUNTING HEIGHT OF POST-MOUNTED SIGNS, MEASURED VERTICALLY FROM THE BOTTOM OF THE SIGN TO THE TOP OF THE CURB OR SIDEWALK, OR TO THE ELEVATION OF THE NEAR EDGE OF THE TRAVELED WAY, SHALL BE 7 FEET UNLESS OTHERWISE SPECIFIED ON THE PLANS.

### PLAN REFERENCES

- PLAN ENTITLED "SURVEY OF LAND IN NEW MARLBOROUGH, MASSACHUSETTS PREPARED FOR ROBIN RICHARDSON" FILED WITH THE REGISTRY OF DEEDS ON MAY 5, 2011 IN PLAT FILE P, PAGE 167.
- "SURVEY OF LAND IN NEW MARLBOROUGH, MASSACHUSETTS PREPARED FOR ROBIN RICHARDSON" FILED WITH THE REGISTRY OF DEEDS ON SEPTEMBER 8, 2011 IN PLAT FILE P, PAGE 183.
- "PLAN OF PROPERTY OWNED BY FRANK J. & HELEN SANTELLI IN THE VILLAGE OF MILL RIVER IN THE TOWN OF NEW MARLBOROUGH, MASS." FILED WITH THE REGISTRY OF DEEDS ON DECEMBER 15, 1975 IN MAP BOOK 5, PAGE 14.

## NEW MARLBOROUGH KEYES HILL ROAD OVER UMPACHENE RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	3	42
PROJECT FILE NO.		609078	

### GENERAL NOTES

**NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	4	42
PROJECT FILE NO.		609078	

**TYPICAL SECTIONS**

**PAVEMENT NOTES:  
KEYES HILL ROAD**

- PROP. FULL DEPTH ROADWAY AND BRIDGE CONSTRUCTION**  
(STA. 50+50 TO 52+19 AND 52+75 TO 55+25.00)

**SURFACE COURSE:** 1.50" SUPERPAVE SURFACE COURSE 9.5 (SSC-9.5) OVER ASPHALT EMULSION FOR TACK COAT (RS-1H) OVER

1.75" SUPERPAVE INTERMEDIATE COURSE 12.5 (SIC-12.5) OVER ASPHALT EMULSION FOR TACK COAT (RS-1H) OVER

**BASE COURSE:** 3.25" SUPERPAVE BASE COURSE 25.0 (SBC-25.0) OVER

**SUB-BASE COURSE:** 4" DENSE GRADED CRUSHED STONE OVER  
8" GRAVEL BORROW TYPE B

- PROP. PAVEMENT ON BRIDGE:**  
(STA. 52+19 TO 52+75)

**SURFACE COURSE:** 1.5" SUPERPAVE BRIDGE SURFACE COURSE 9.5 POLYMER (SSC-B-9.5-P) OVER ASPHALT EMULSION FOR TACK COAT (RS-1H) OVER

**PROTECTIVE COURSE:** 1.5" SUPERPAVE BRIDGE PROTECTIVE COURSE 9.5 POLYMER (SPC-B-9.5-P) OVER MEMBRANE WATERPROOFING FOR BRIDGE DECKS

- HOT MIX ASPHALT DRIVEWAY:**  
(3' WIDE STA. 50+85 LT. TO 50+97 LT. & 10' WIDE 53+42.5 RT. TO 53+67.5 RT.)

**SURFACE COURSE:** 1.5" SURFACE COURSE OVER  
2.5" INTERMEDIATE COURSE OVER

**SUB-BASE:** 8" GRAVEL BORROW TYPE B

- GRAVEL DRIVEWAY:**

**SURFACE COURSE:** 4" DENSE GRADE CRUSHED STONE OVER

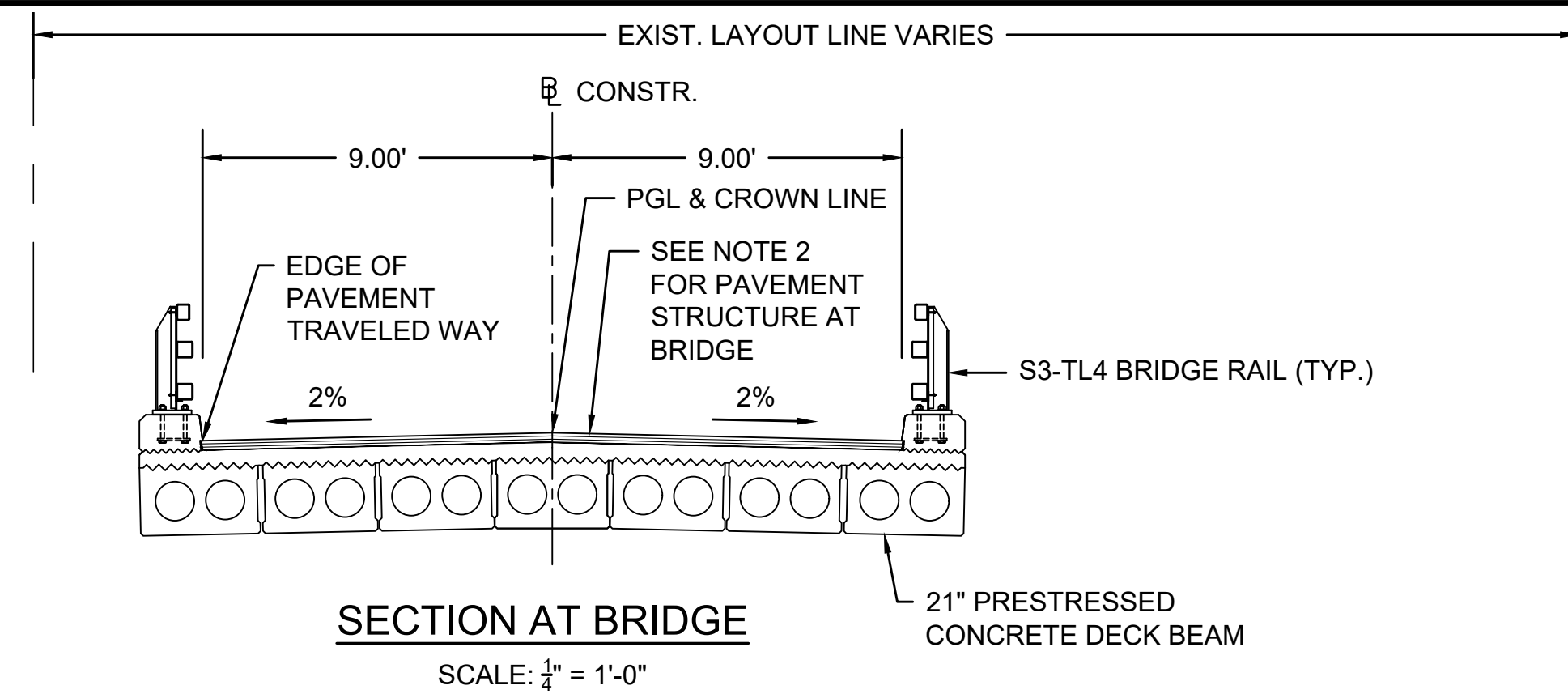
**SUB-BASE:** 8" GRAVEL BORROW TYPE B

**NOTES:**

ALL HMA SHALL BE PER SECTION 450 QUALITY ASSURANCE OF HMA AND SECTION 450 SUPERPAVE HMA SPECIFICATIONS.

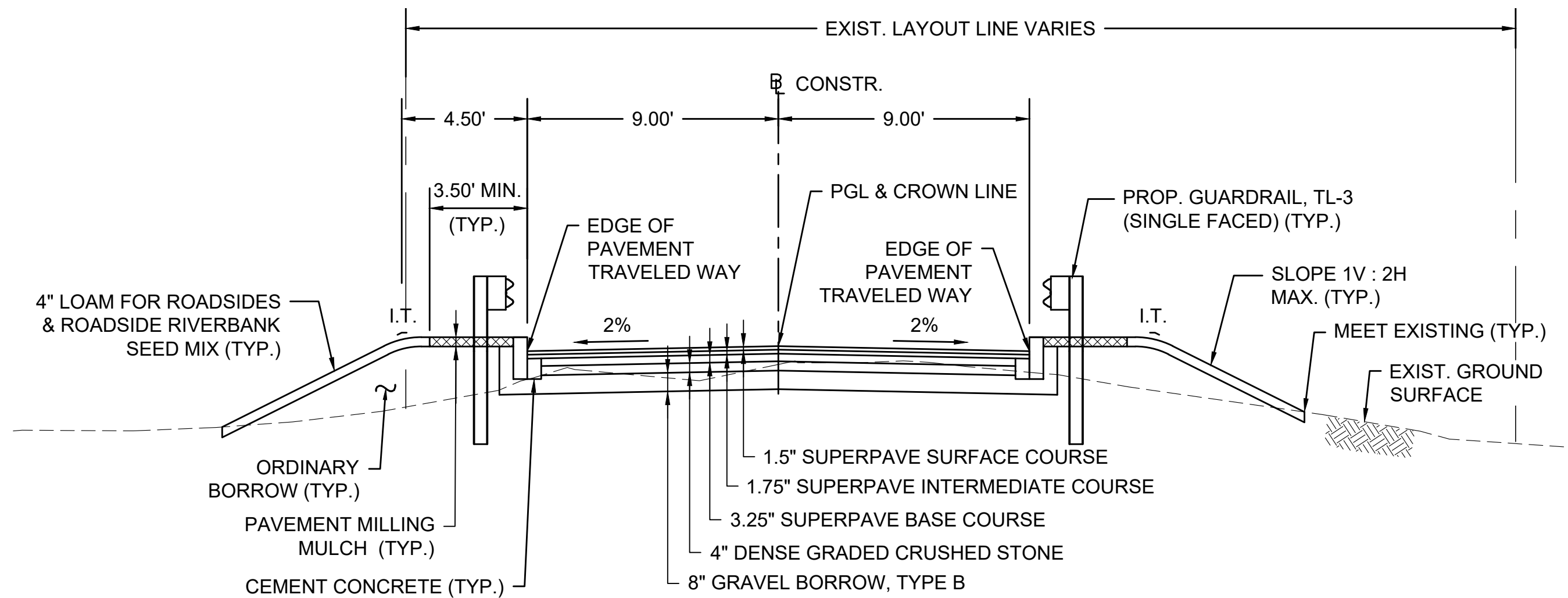
ALL HMA SHALL BE PRODUCED AS WARM MIX ASPHALT PAVEMENT.

- TACK COAT SHALL BE SPRAY APPLIED TRIPLE OVERLAP FOR UNIFORM COVERAGE BETWEEN 0.06 TO 0.08 GAL/SY OVER SMOOTH SURFACES (PROTECTIVE COURSES) PRIOR TO PAVING OVERLAY.
- EXISTING GRAVEL SUBBASE DETERMINED TO BE SUITABLE MAY REMAIN, AS DIRECTED BY THE ENGINEER.
- PROPOSED VERTICAL GRANITE CURB TYPE VA3 SHALL BE INSTALLED PER MASSDOT STANDARD DRAWING E106.3.0.



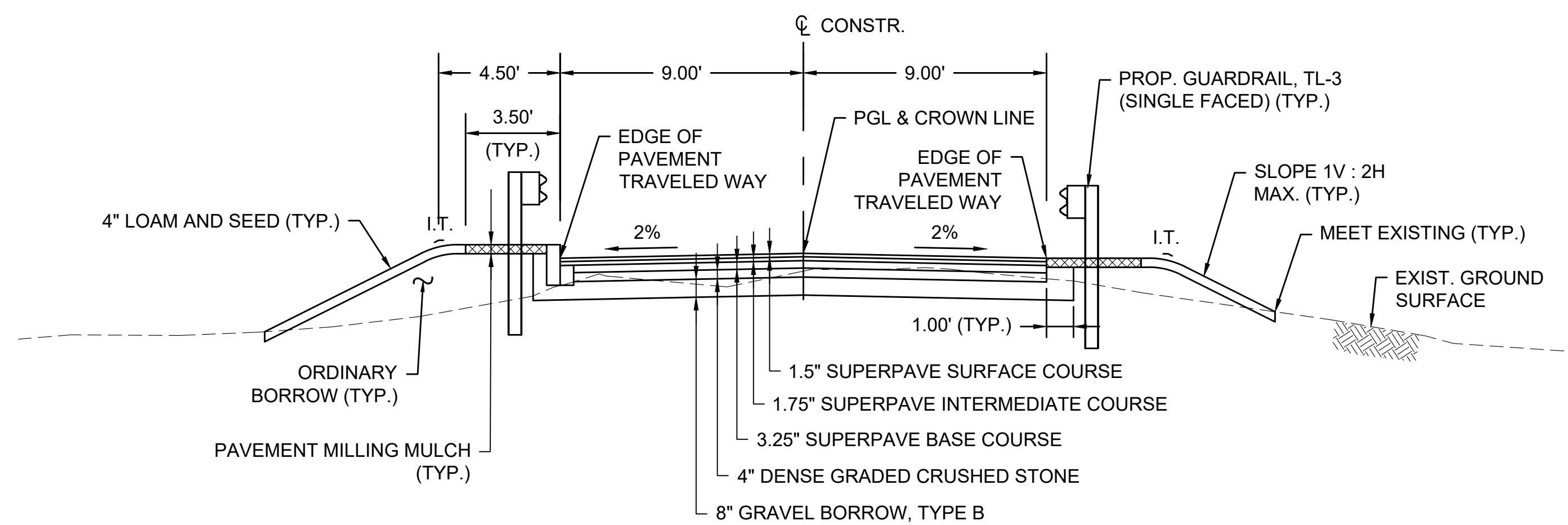
**SECTION AT BRIDGE**

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



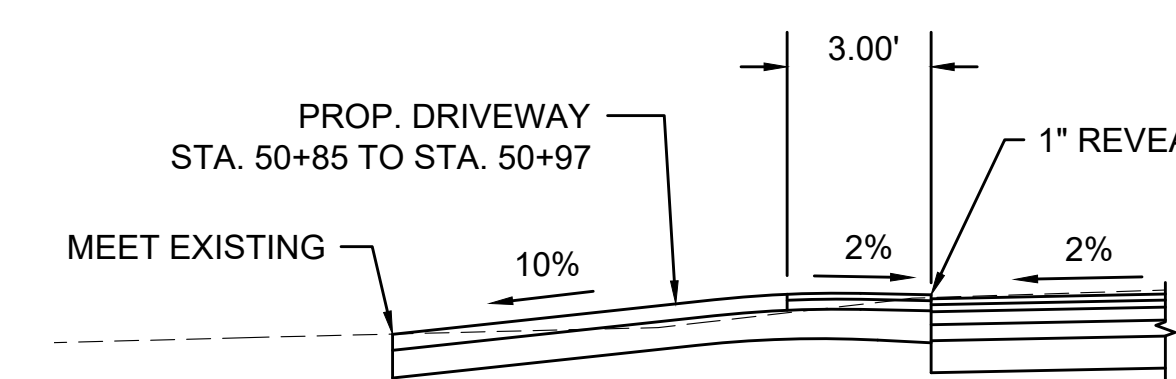
**STA. 51+80± TO STA. 51+95±  
STA. 53+09± TO STA. 53+41±**

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



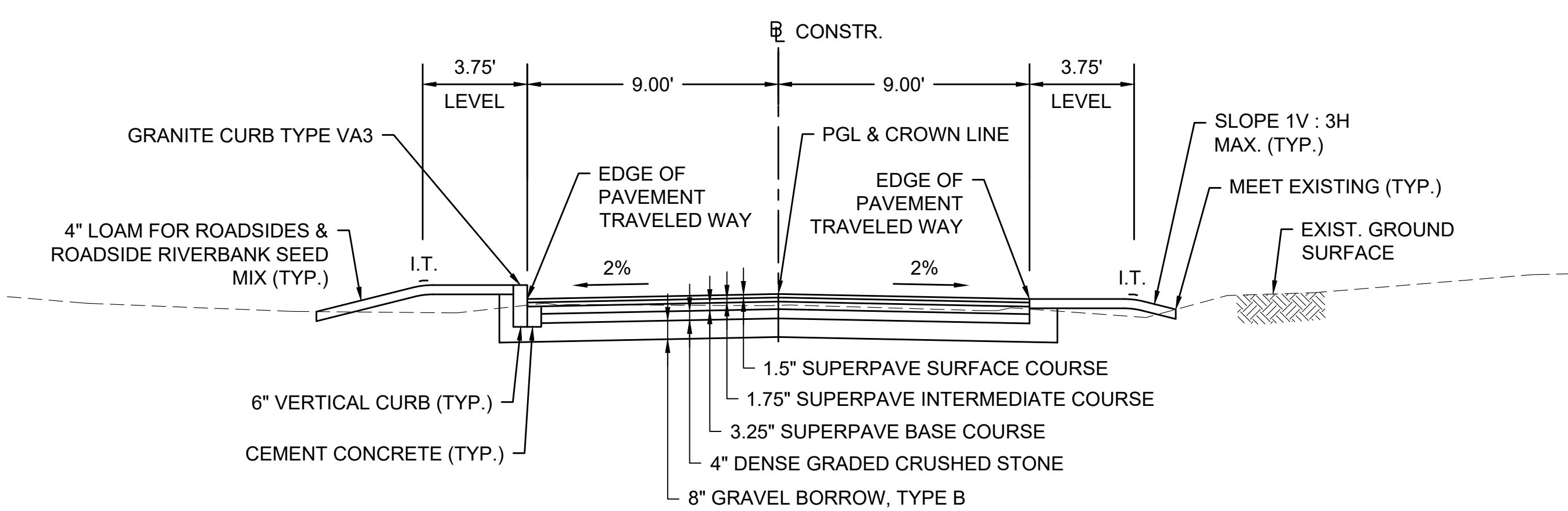
**STA. 51+55± TO STA. 51+80±**

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



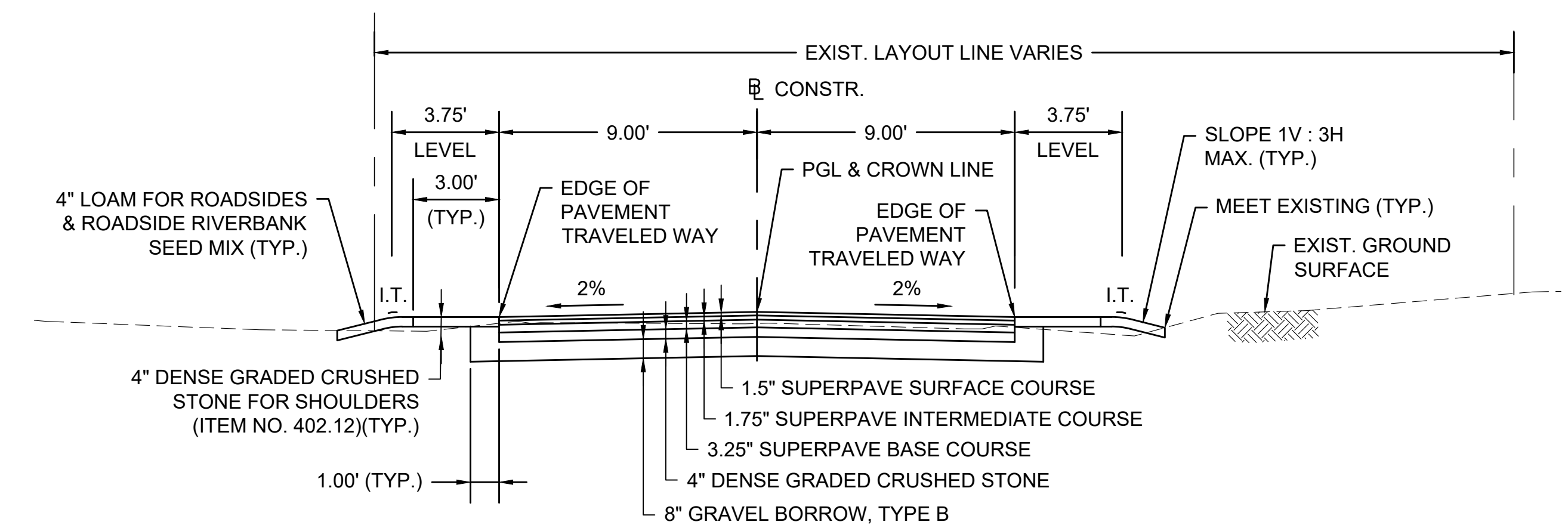
**STA. 50+85 LT. TO STA. 50+97 LT.**

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



**STA. 51+46± TO STA. 51+55±**

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



**STA. 50+50 TO 51+46±  
STA. 53+41± TO 55+25**

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

KEYES HILL ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	50+00.00	2863824.8906	181365.9126		S81°01'40"E 165.00'	51+65.00	2863799.1583	181528.8938
C1	51+65.00	2863799.1583	181528.8938	R = 1500.00' Δ = 1°31'40" L = 40.00' T = 20.00'		52+05.00	2863792.3941	181568.3165
L2	52+05.00	2863792.3941	181568.3165		S79°30'00"E 182.00'	53+87.00	2863759.2272	181747.2689
C2	53+87.00	2863759.2272	181747.2689	R = 2000.00' Δ = 3°40'01" L = 128.00' T = 64.02'		55+15.00	2863739.9430	181873.7858
L3	55+15.00	2863739.9430	181873.7858		S83°10'01"E 85.00'	56+00.00	2863729.8300	181958.1820

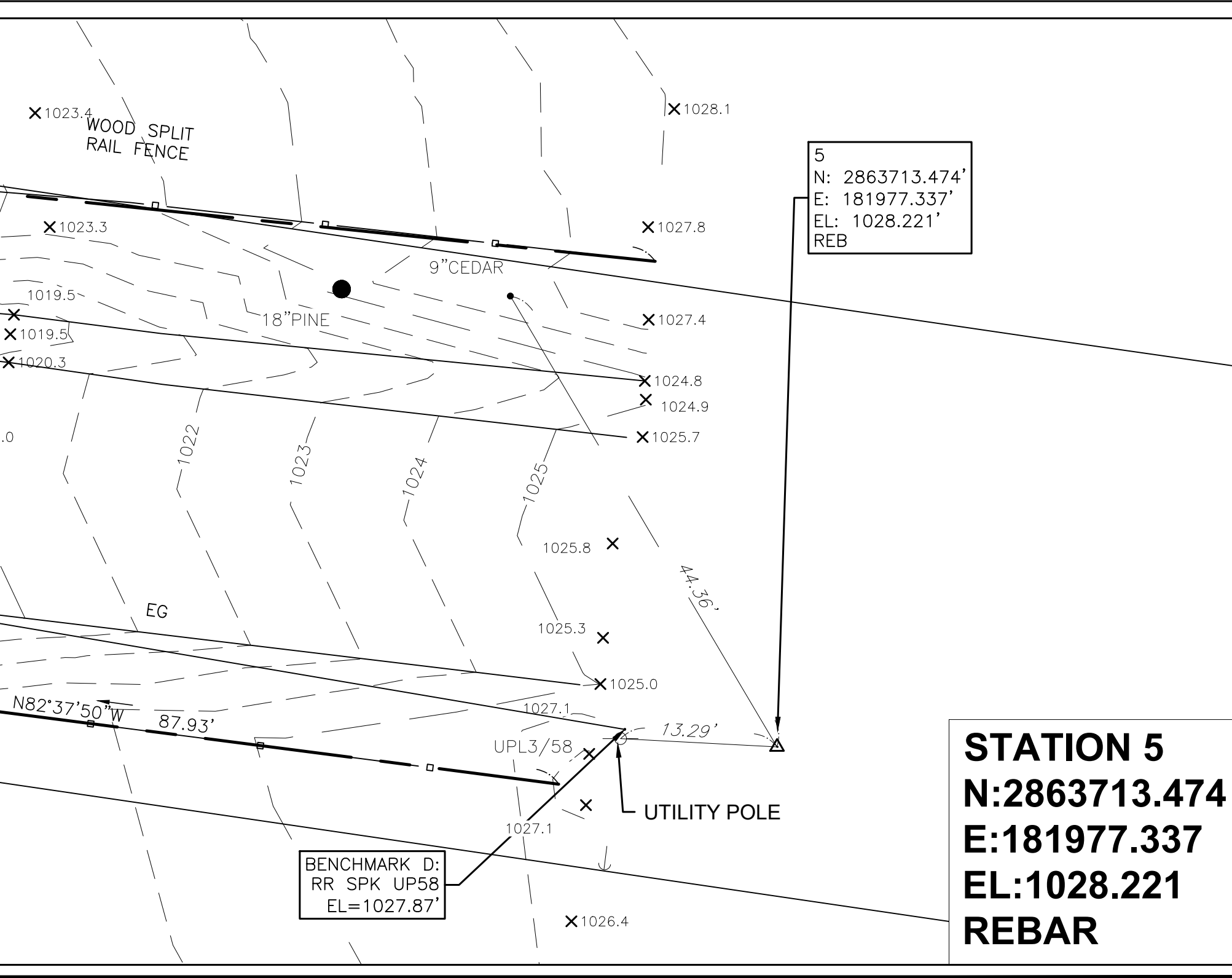
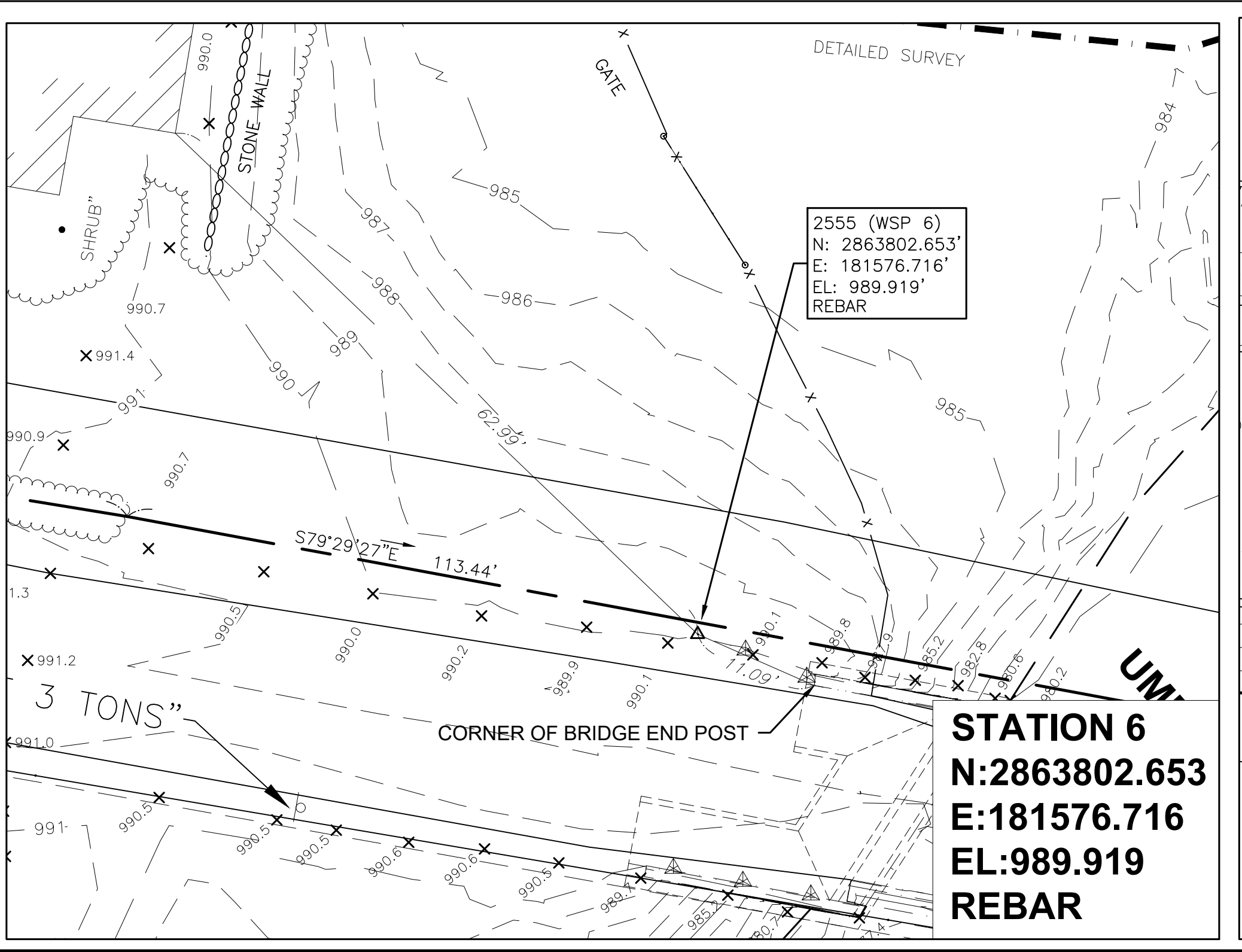
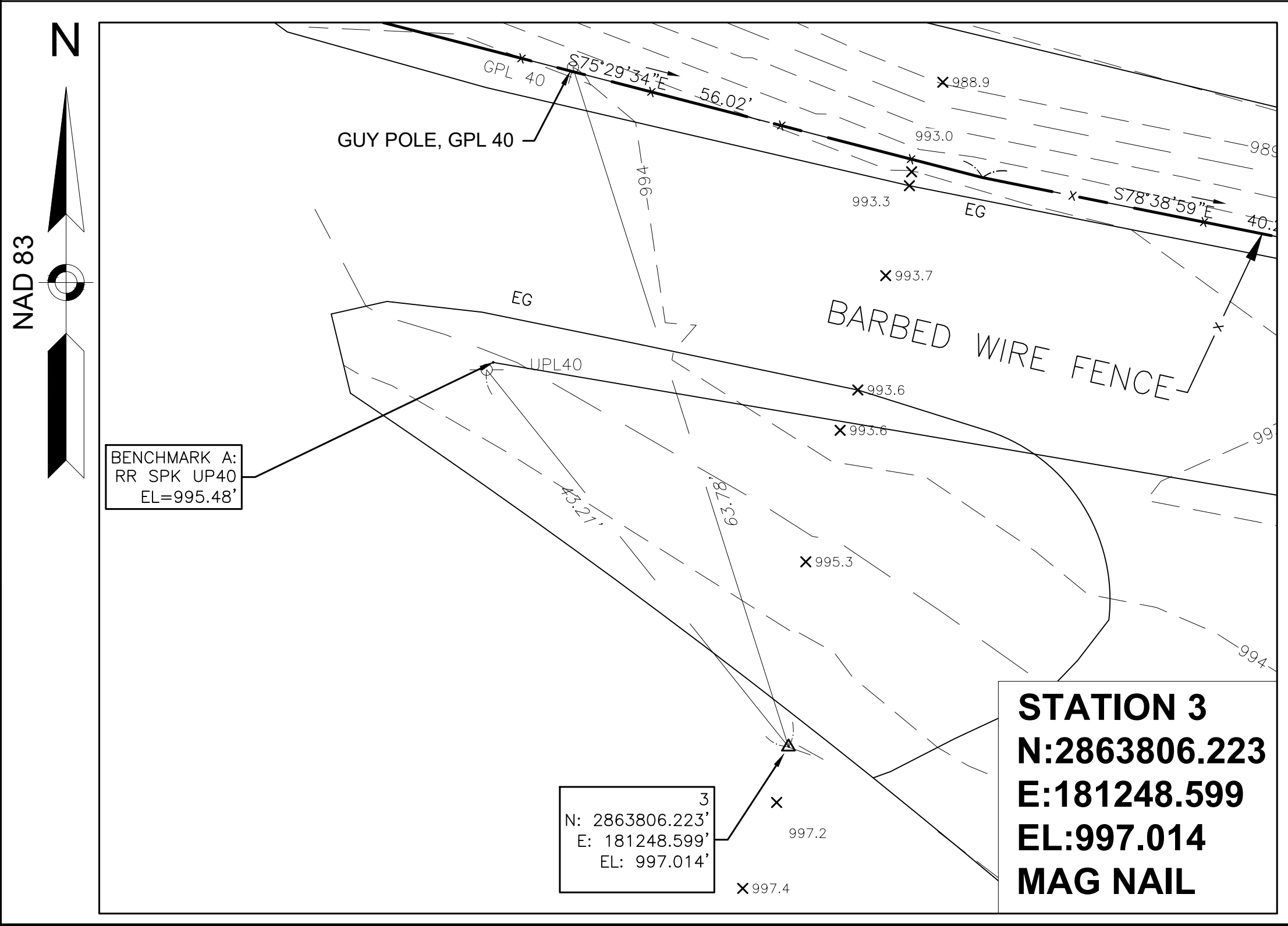
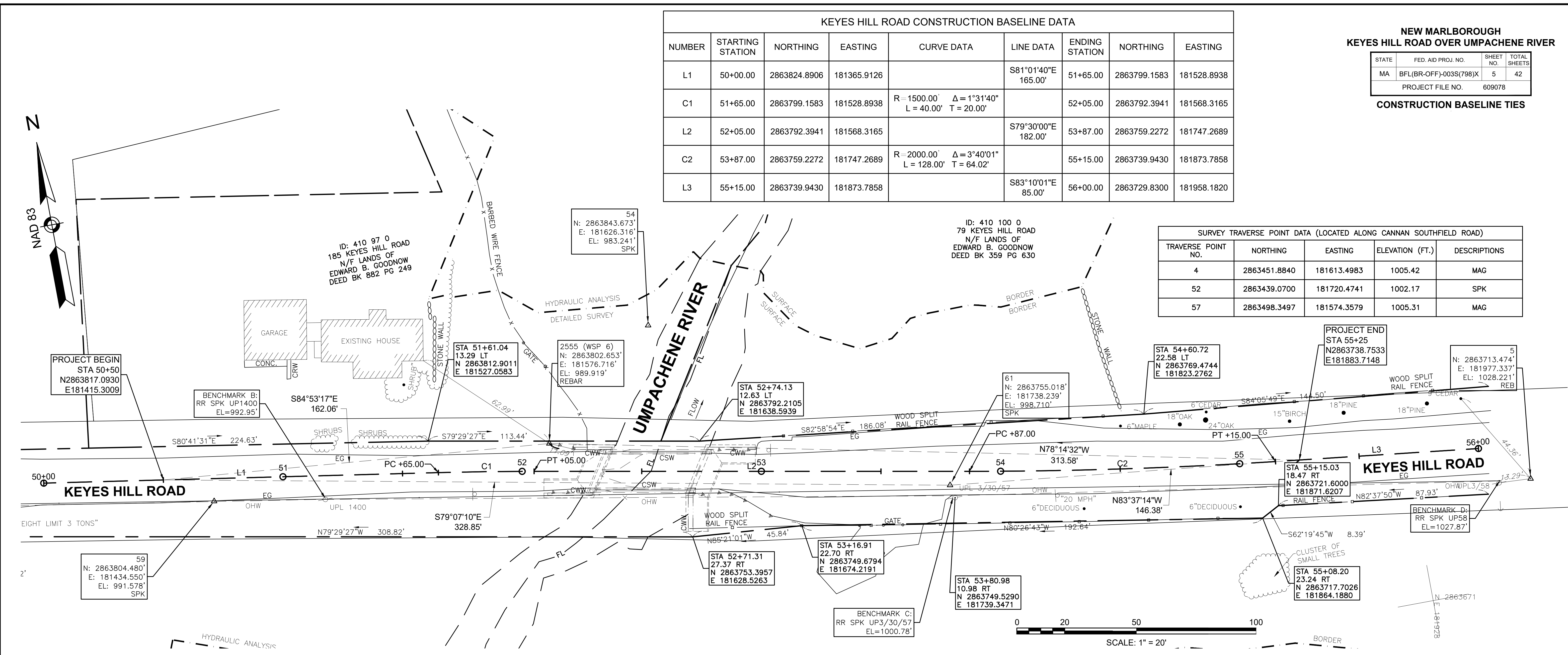
**NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	5	42
PROJECT FILE NO.		609078	

**CONSTRUCTION BASELINE TIES**

**SURVEY TRAVERSE POINT DATA (LOCATED ALONG CANNAN SOUTHFIELD ROAD)**

TRAVERSE POINT NO.	NORTHING	EASTING	ELEVATION (FT.)	DESCRIPTIONS
4	2863451.8840	181613.4983	1005.42	MAG
52	2863439.0700	181720.4741	1002.17	SPK
57	2863498.3497	181574.3579	1005.31	MAG



HIGHWAY GUARD DETAILS

PROP. TRAILING ANCHORAGE: STA. 51+63.37± LT. TO STA 51+75.87± LT.  
PROP. GUARDRAIL TRANSITION TO BRIDGE RAIL: STA. 51+75.87± LT. TO STA. 52+09.62± LT.

PROP. GUARDRAIL TANGENT END TREATMENT: STA. 51+46.58± RT. TO STA. 51+59.08± RT.  
PROP. GUARDRAIL TL-3 (SINGLE FACED): STA. 51+59.08± RT. TO STA. 51+68.47± RT.  
PROP. GUARDRAIL TRANSITION TO BRIDGE RAIL: STA. 51+68.47± RT. TO STA. 52+02.22± RT.

PROP. GUARDRAIL TRANSITION TO BRIDGE RAIL: STA. 53+04.62± LT. TO STA. 53+38.37± LT.  
PROP. GUARDRAIL TL-3 (SINGLE FACED): STA. 53+38.37± LT. TO STA. 53+46.09± LT.  
PROP. GUARDRAIL TANGENT END TREATMENT: STA. 53+46.09± LT. TO STA. 53+58.59± LT.

PROP. GUARDRAIL TRANSITION TO BRIDGE RAIL: STA. 52+74.16± RT. TO STA. 53+07.91± RT.  
PROP. TRAILING ANCHORAGE: STA. 53+07.91± RT. TO STA. 53+17.41± RT.

GRANITE CURB TYPE VA3

GRANITE CURB CORNER TYPE B STA. 51+00.50± LT. TO GUARDRAIL TRANSITION STA. 52+05.79± LT.  
STA. 51+81.45± RT. TO GUARDRAIL TRANSITION STA. 51+98.45± RT.  
GUARDRAIL TRANSITION STA. 53+08.51± LT. TO STA. 53+48.25 LT.  
GUARDRAIL TRANSITION STA. 52+77.91± RT. TO GRANITE CURB CORNER TYPE B STA. 53+39.00 RT.

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

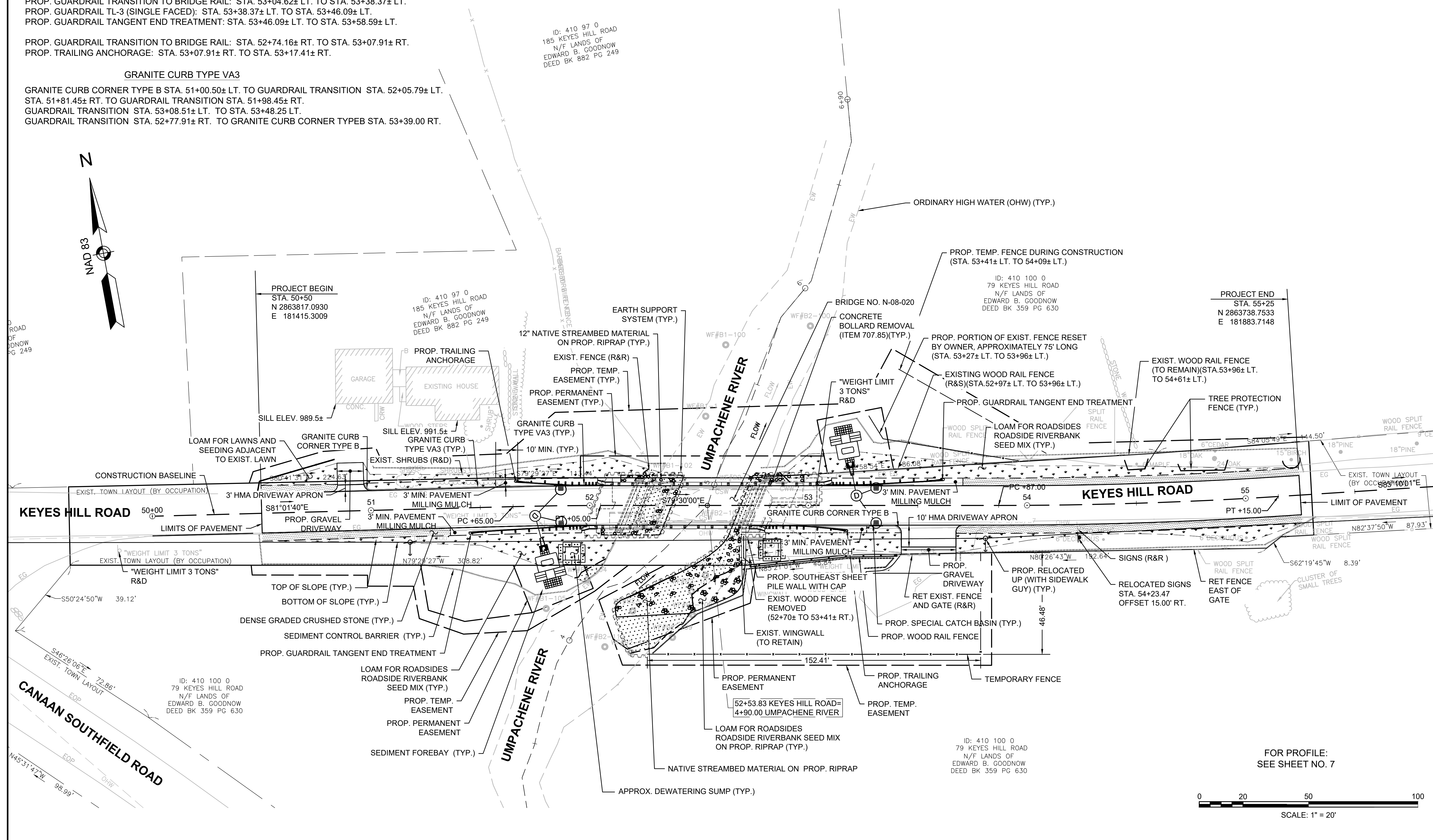
DRAINAGE DETAILS

SEE SHEET 9.

NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	6	42
PROJECT FILE NO.		609078	

CONSTRUCTION PLAN

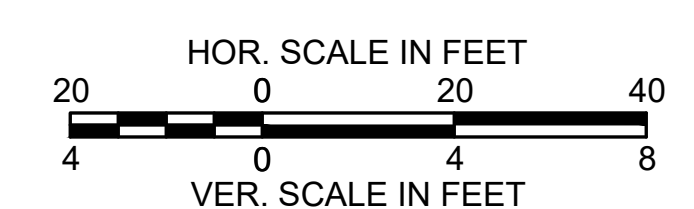
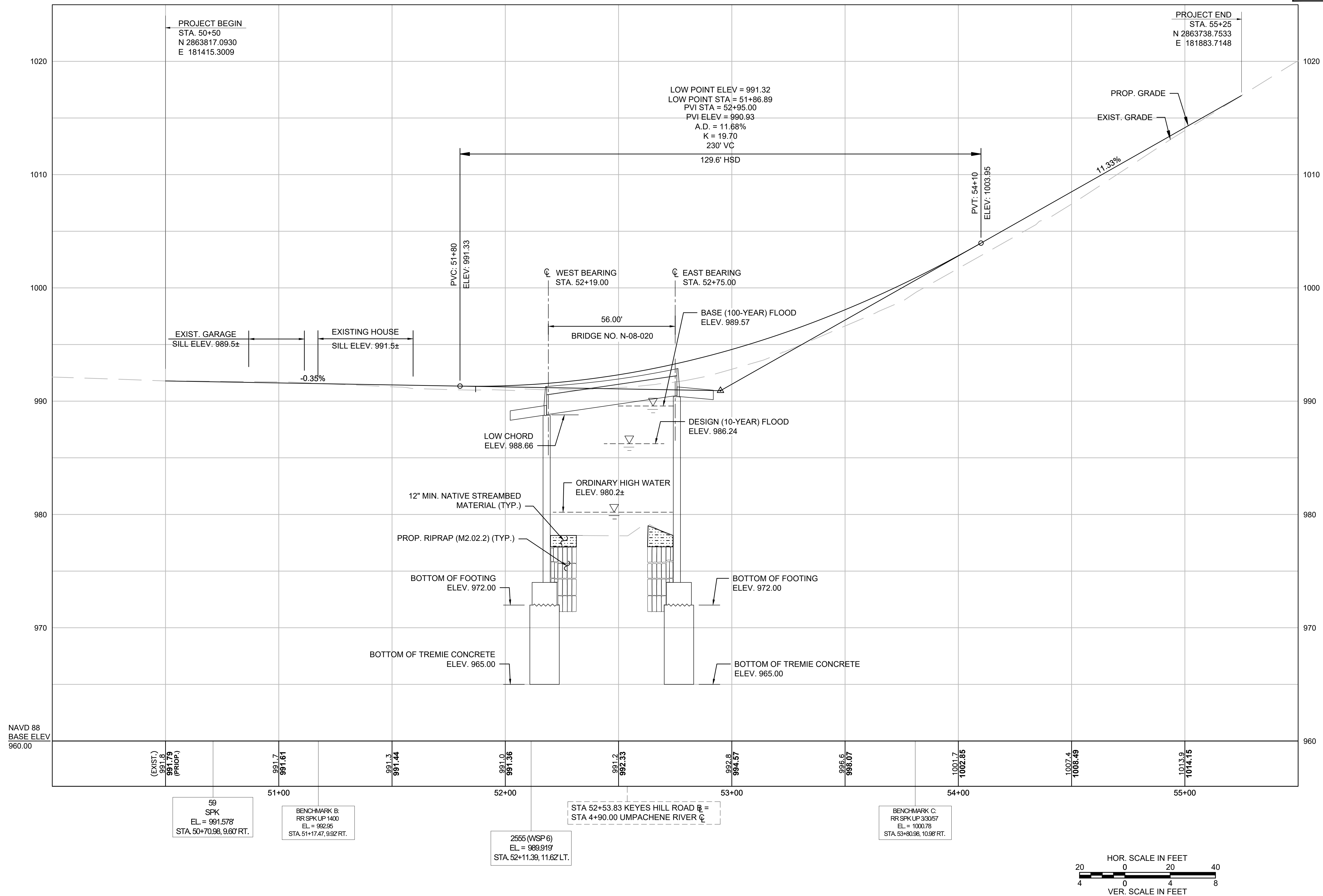


609078\_Hd6 (CONSTRUCTION PLAN).DWG Plotted on 12-August-2024 5:00 PM

NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
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PROJECT FILE NO.		609078	

PROFILE



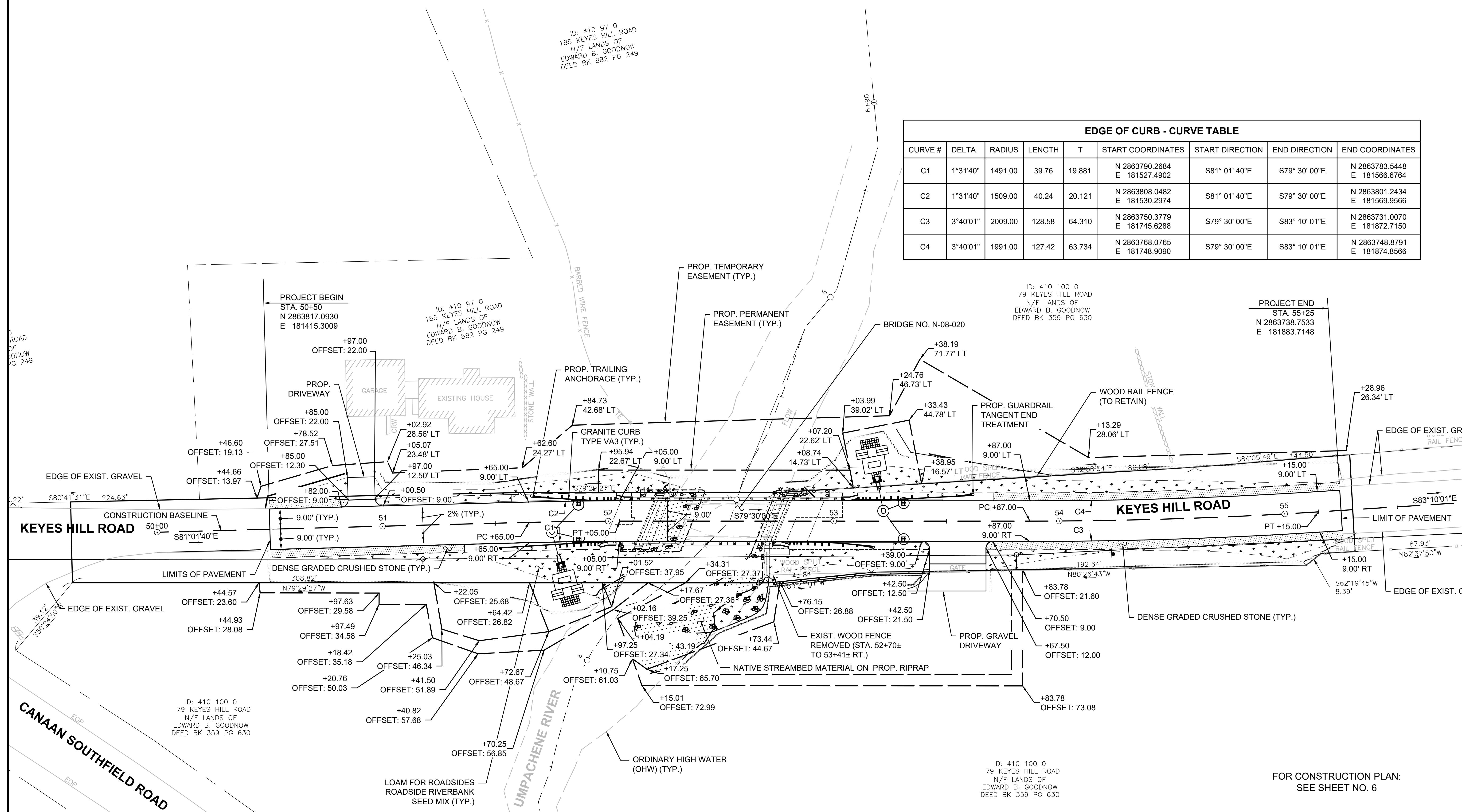
FOR CONSTRUCTION PLAN:  
SEE SHEET NO. 6

**NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER**

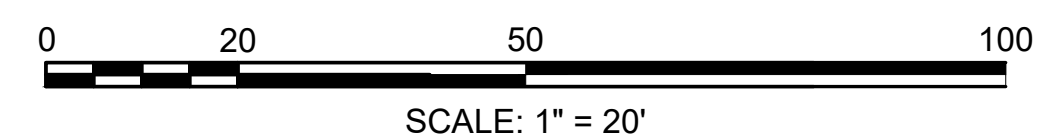
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	8	42
PROJECT FILE NO.		609078	

**CURB TIE & GRADING PLAN**

EDGE OF CURB - CURVE TABLE								
CURVE #	DELTA	RADIUS	LENGTH	T	START COORDINATES	START DIRECTION	END DIRECTION	END COORDINATES
C1	1°31'40"	1491.00	39.76	19.881	N 2863790.2684 E 181527.4902	S81° 01' 40"E	S79° 30' 00"E	N 2863783.5448 E 181566.6764
C2	1°31'40"	1509.00	40.24	20.121	N 2863808.0482 E 181530.2974	S81° 01' 40"E	S79° 30' 00"E	N 2863801.2434 E 181569.9566
C3	3°40'01"	2009.00	128.58	64.310	N 2863750.3779 E 181745.6288	S79° 30' 00"E	S83° 10' 01"E	N 2863731.0070 E 181872.7150
C4	3°40'01"	1991.00	127.42	63.734	N 2863768.0765 E 181748.9090	S79° 30' 00"E	S83° 10' 01"E	N 2863748.8791 E 181874.8566



FOR CONSTRUCTION PLAN:  
SEE SHEET NO. 6

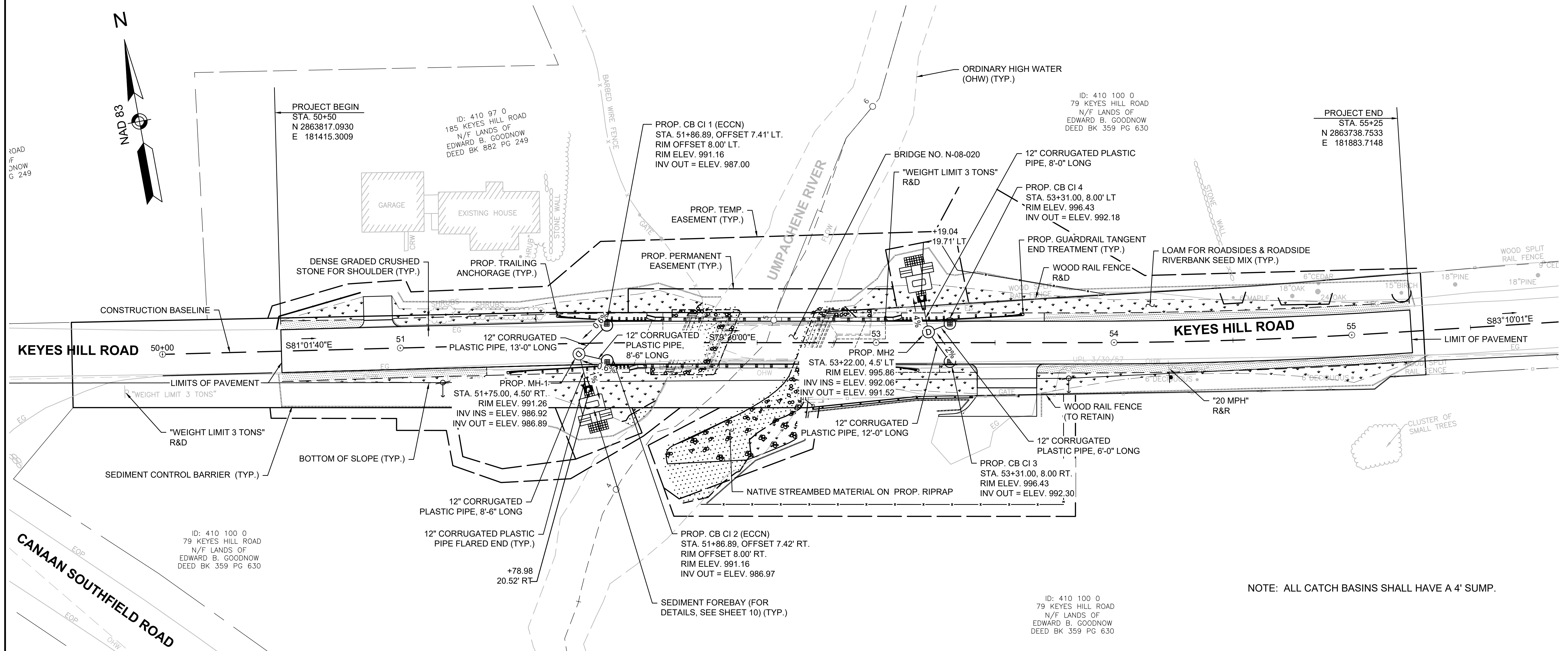




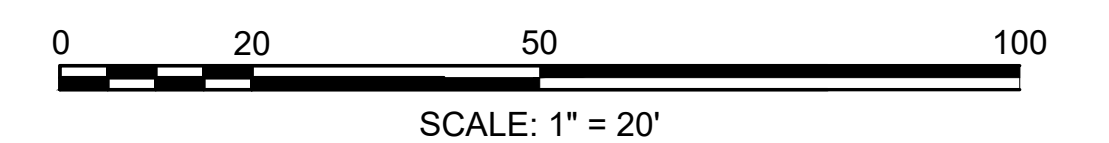
NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	9	42
PROJECT FILE NO.		609078	

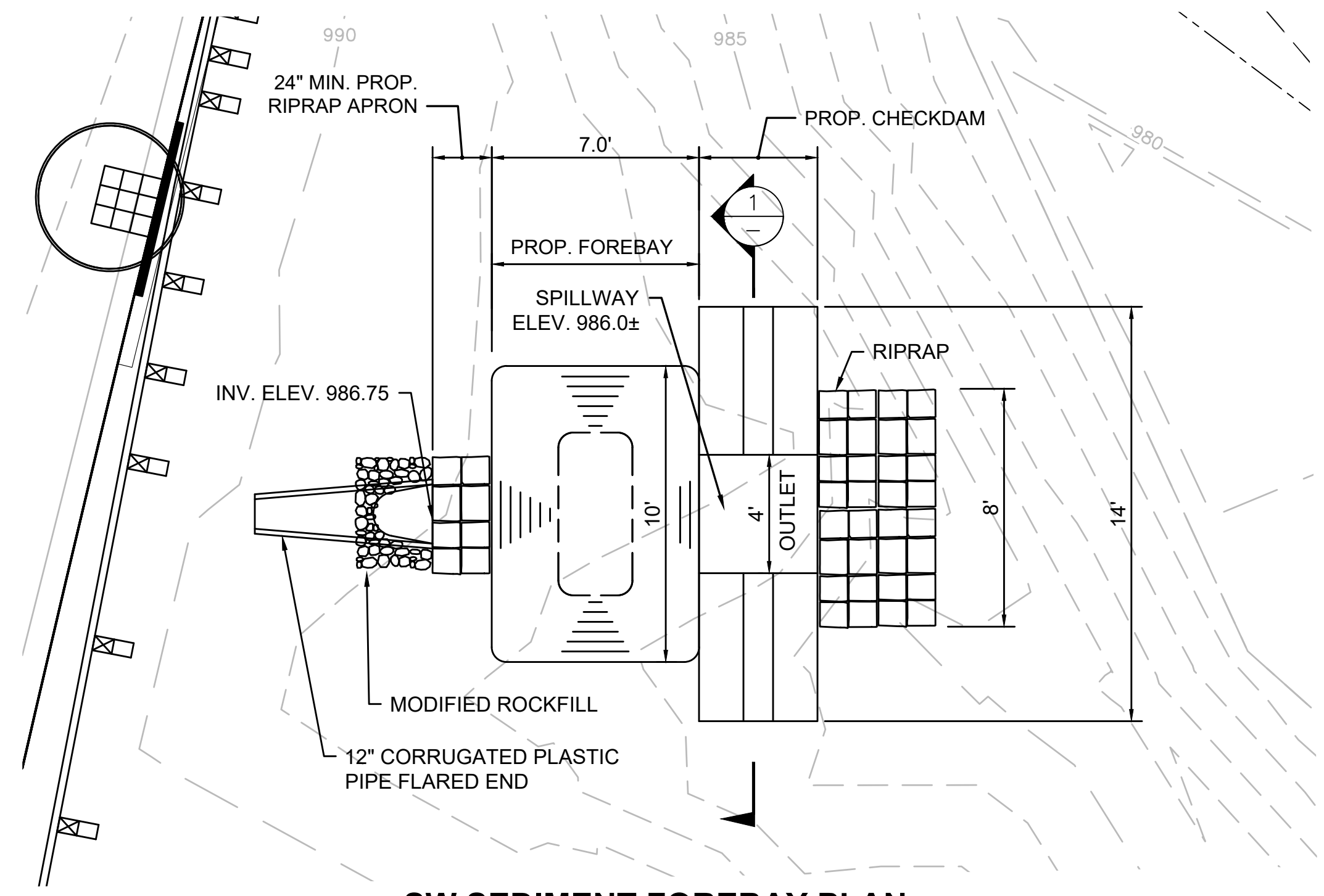
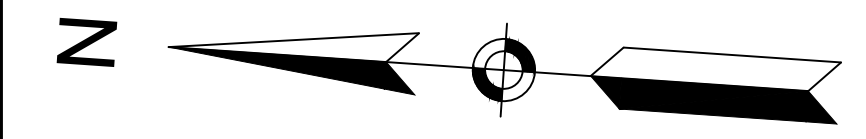
DRAINAGE PLAN 1 OF 2



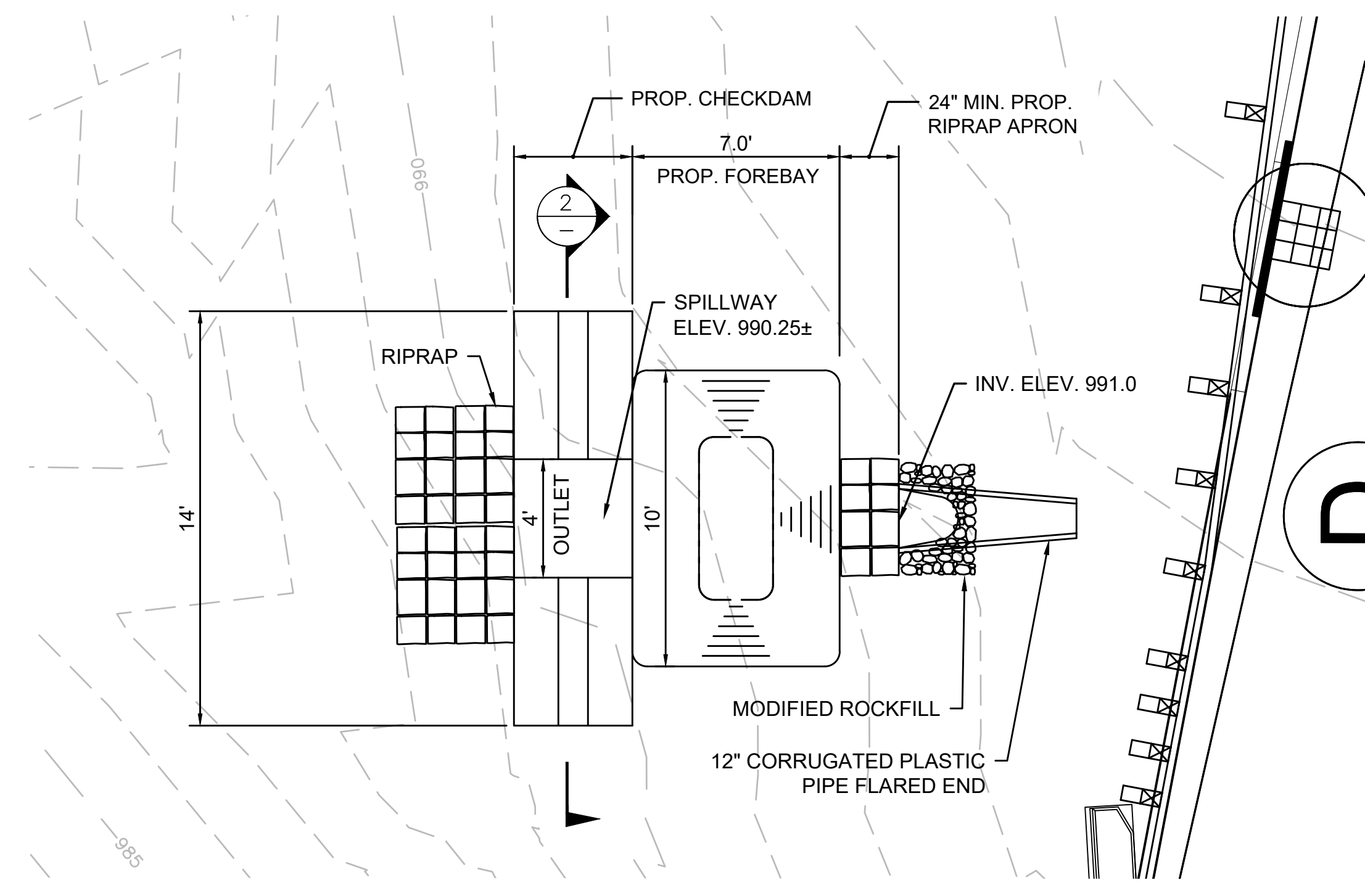
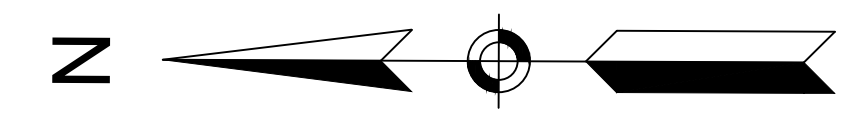
NOTE: ALL CATCH BASINS SHALL HAVE A 4' SUMP.



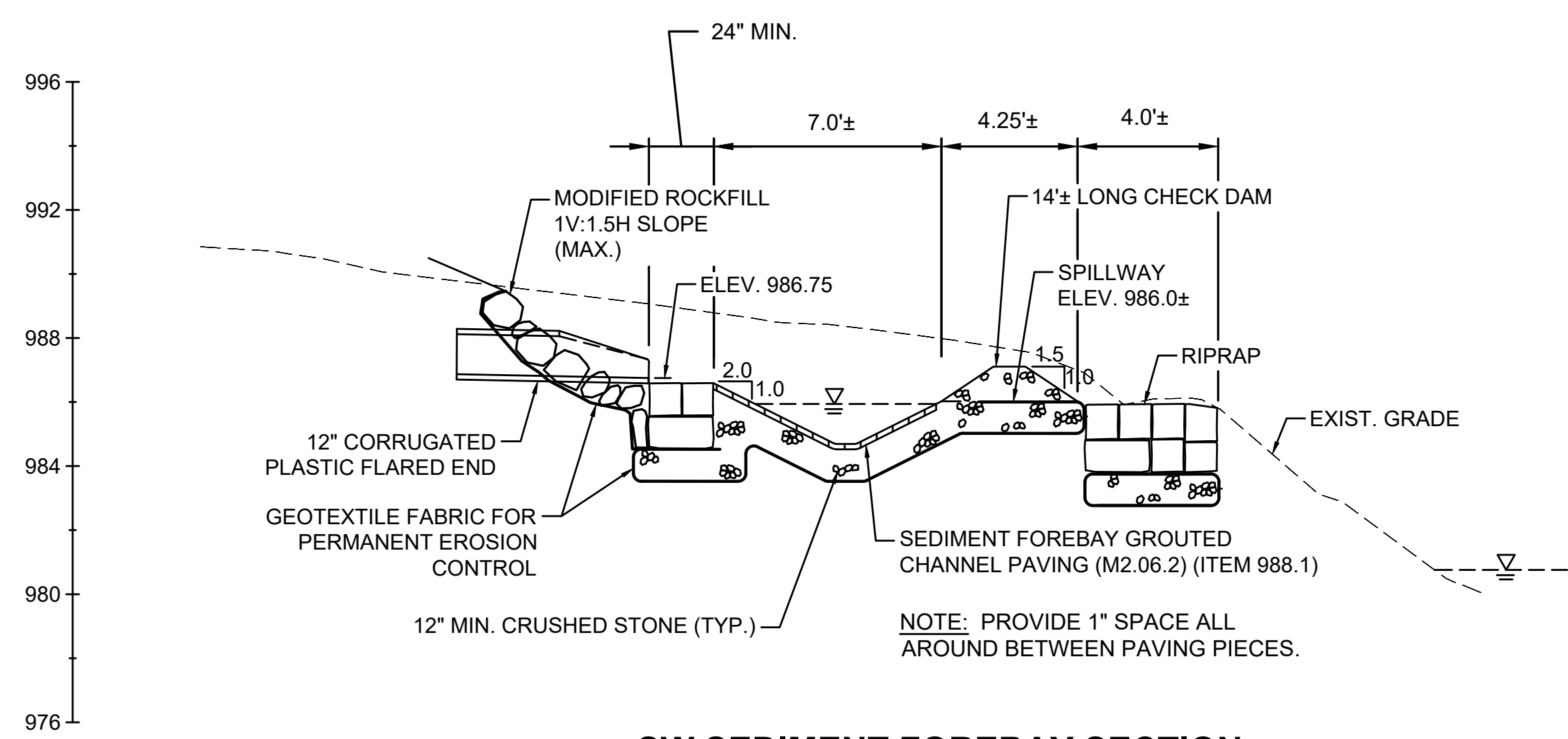
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MA	BFL(BR-OFF)-003S(798)X	10	42
PROJECT FILE NO.		609078	



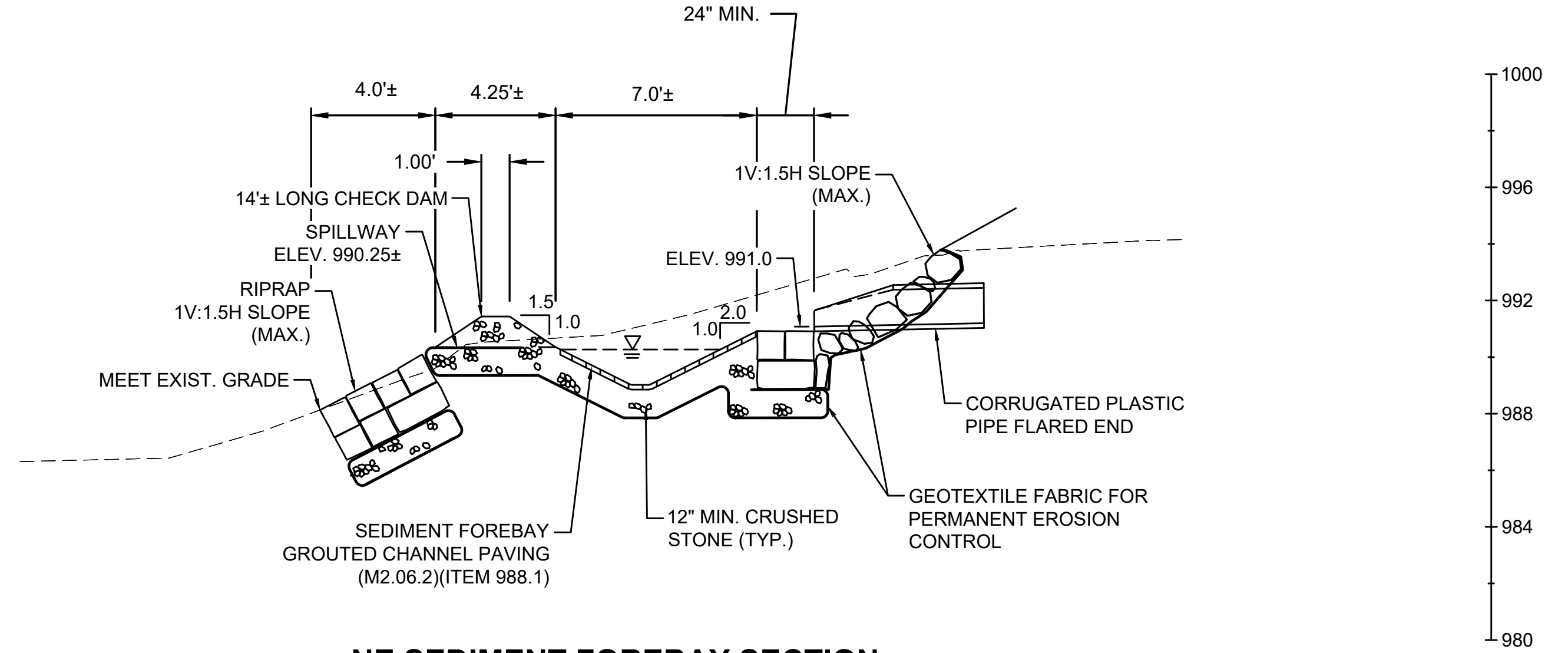
**SW SEDIMENT FOREBAY PLAN**  
SCALE: 1/4" = 1'-0"



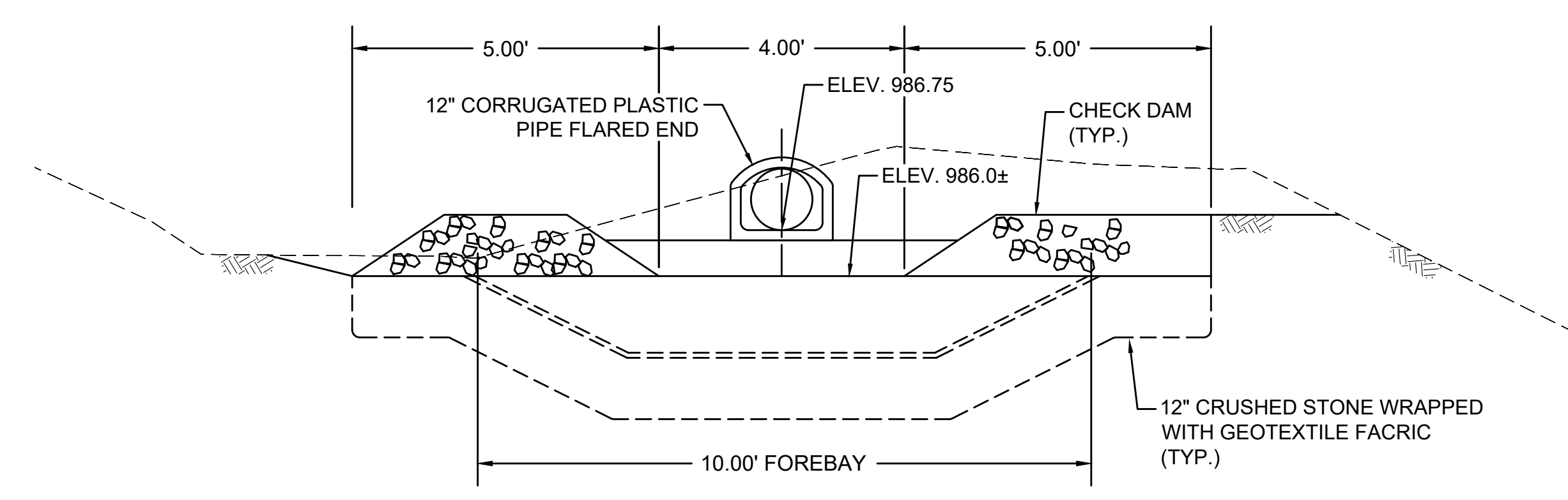
**NE SEDIMENT FOREBAY PLAN**  
SCALE: 1/4" = 1'-0"



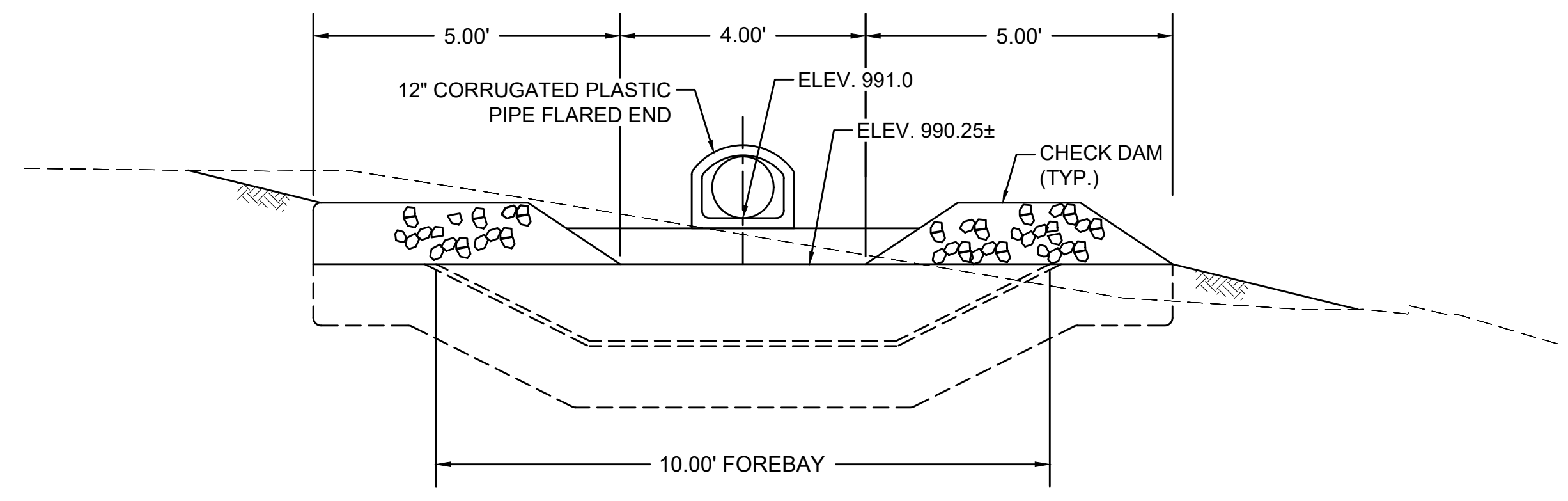
**SW SEDIMENT FOREBAY SECTION**  
SCALE: 1/4" = 1'-0"



**NE SEDIMENT FOREBAY SECTION**  
SCALE: 1/4" = 1'-0"



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

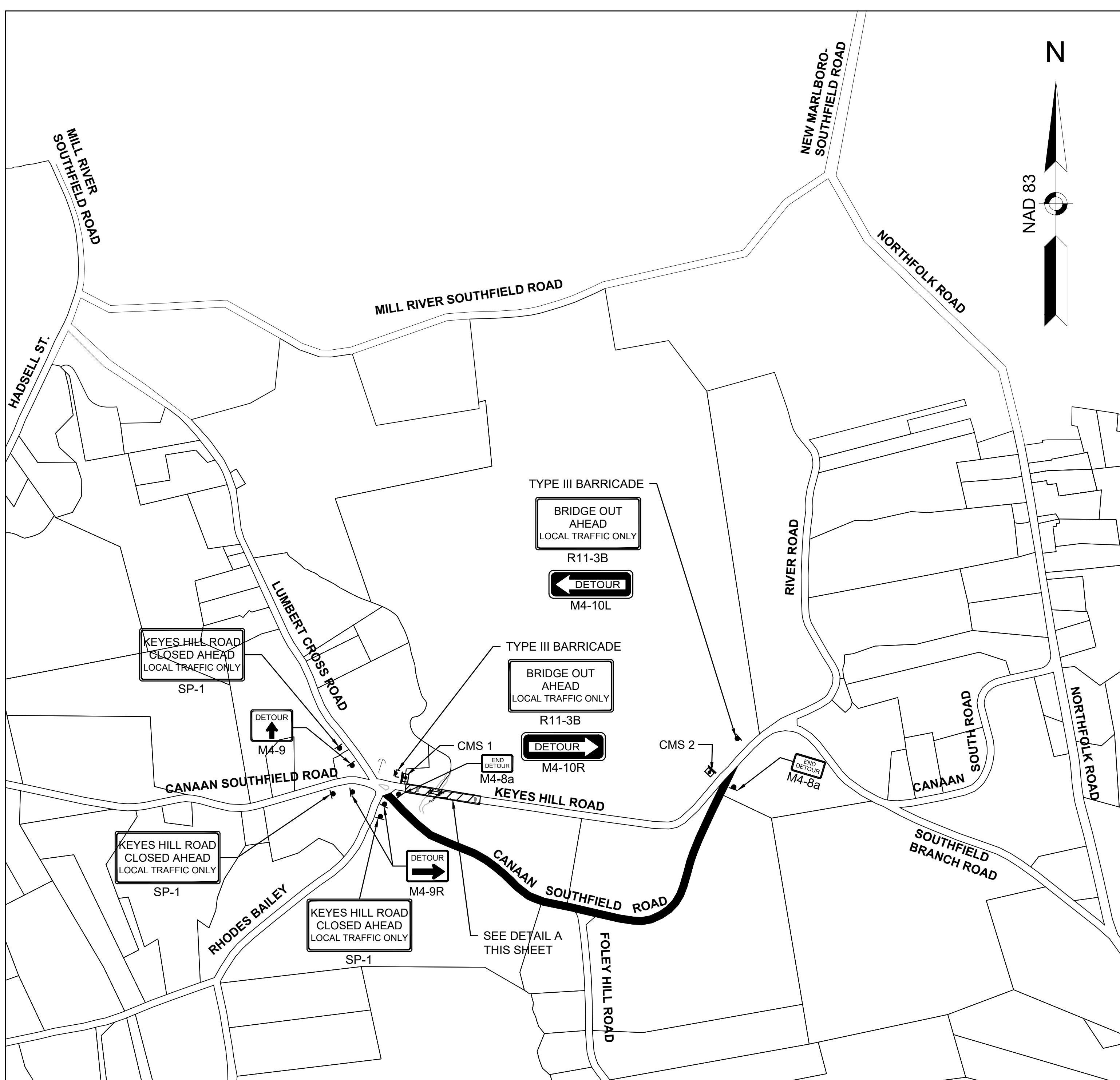


**SECTION 2**  
SCALE: 1/2" = 1'-0"

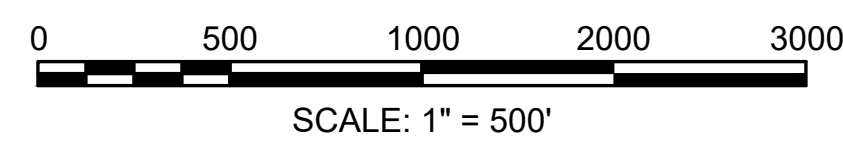
**NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	11	42
PROJECT FILE NO.		609078	

**DETOUR PLAN**



**DETOUR PLAN**



**CHANGEABLE MESSAGE SIGN (CMS) SCHEDULE**

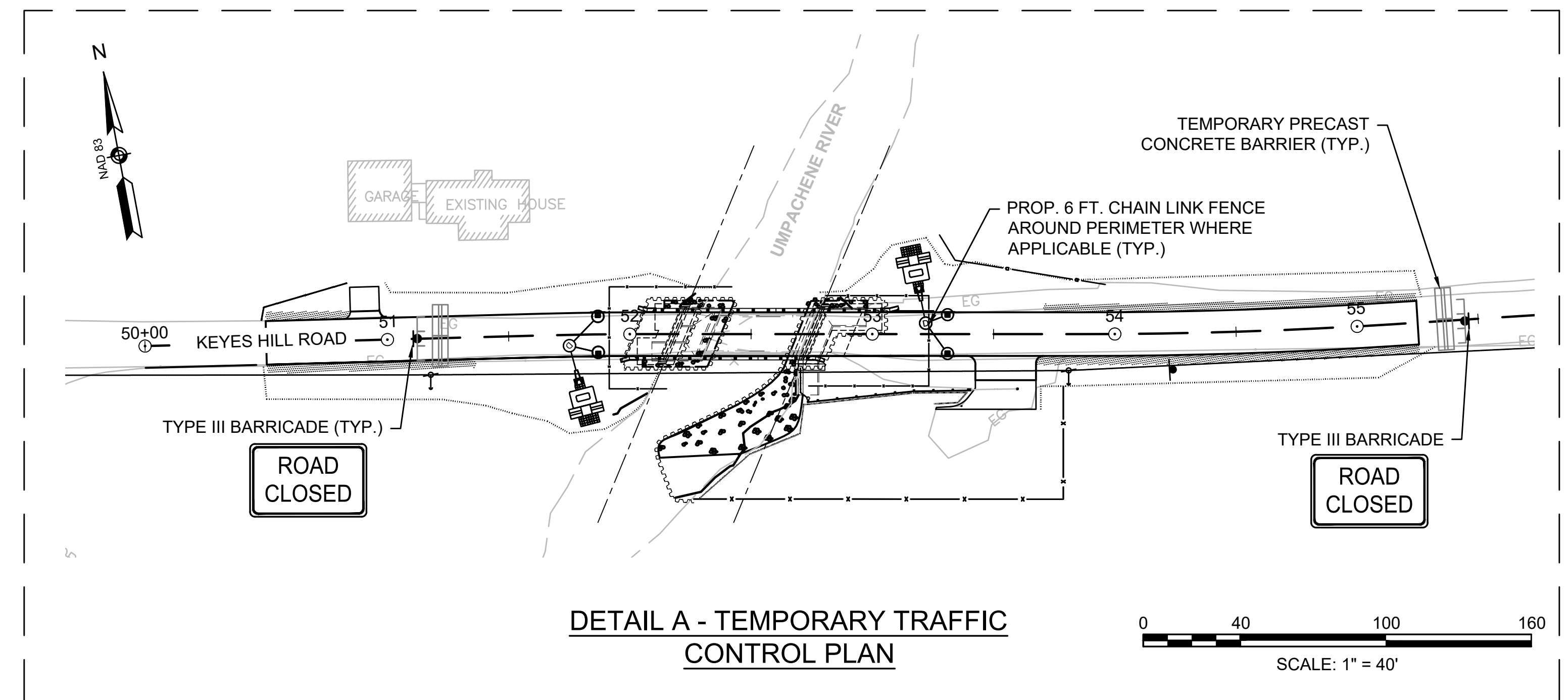
CMS	2 WEEKS PRIOR TO START OF CONSTRUCTION	
	PANEL 1	PANEL 2
1 & 2	BRIDGE OUT AHEAD	STARTING XX/XX/XX

NOTE: CMS SHALL BE USED 2 WEEKS PRIOR TO THE START OF CONSTRUCTION AND FOR ANY MAJOR CHANGES IN TRAFFIC PATTERNS DURING CONSTRUCTION. THE CMS SHALL BE STORED AWAY WHEN NOT ACTIVE.

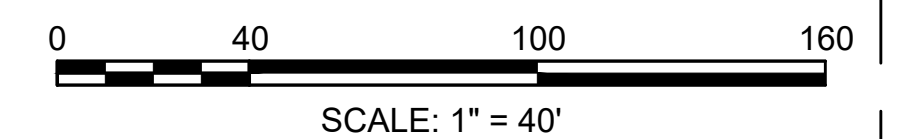
**TEMPORARY TRAFFIC CONTROL SIGN SUMMARY**

IDENTIFICATION NUMBER	SIZE OF SIGN (IN)		TEXT	TEXT DIMENSIONS (INCHES) LETTER HEIGHT	NUMBER OF SIGNS REQUIRED	COLOR			UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT				BACK-GROUND	LEGEND	BORDER		
M4-8A	24	18	END DETOUR	①	2	①	①	①	3.00	6.00
M4-9	30	24	DETOUR		1				5.00	5.00
M4-9R	30	24	DETOUR		2				5.00	10.00
M4-10L	48	18	DETOUR		1				6.00	6.00
M4-10R	48	18	DETOUR		1				6.00	6.00
R11-2	48	30	ROAD CLOSED		2				10.00	20.00
R11-3B	60	30	BRIDGE OUT AHEAD LOCAL TRAFFIC ONLY		2				12.50	25.00
SP-1	60	30	KEYES HILL ROAD CLOSED AHEAD LOCAL TRAFFIC ONLY		3				12.50	37.50

① SEE MUTCD 2022 EDITION, 1990 STD. DRAWINGS FOR SIGNS AND SUPPORTS SECTION M9.30.0. OF THE MASSDOT STANDARD SPECIFICATION FOR TEXT DIMENSIONS AND COLOR. BACKGROUND SHEETING FOR ALL CONSTRUCTION WARNING SIGNS SHALL BE OF A FLUORESCENT ORANGE COLOR PER 2024 MASSDOT SPECIFICATIONS SECTION 850.43.



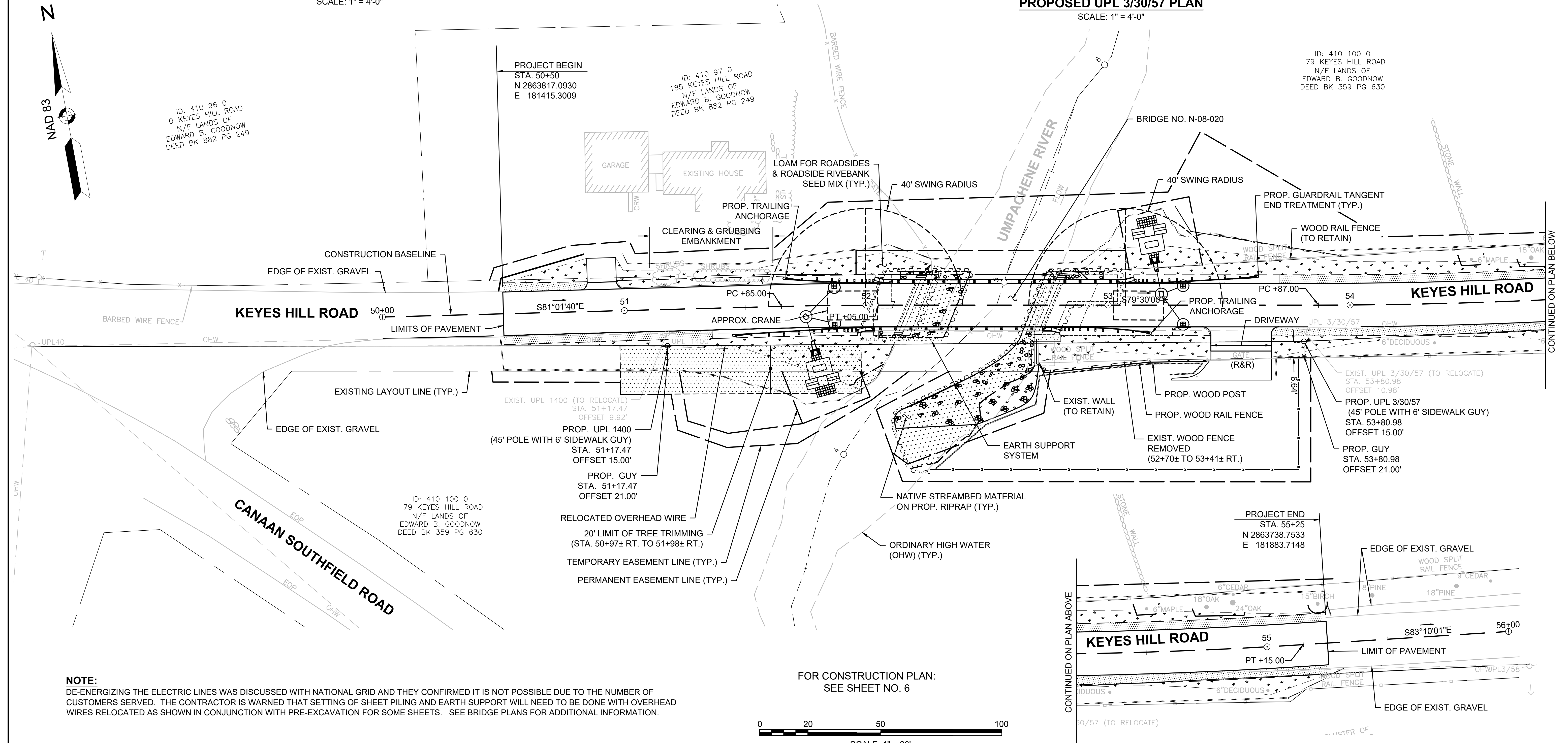
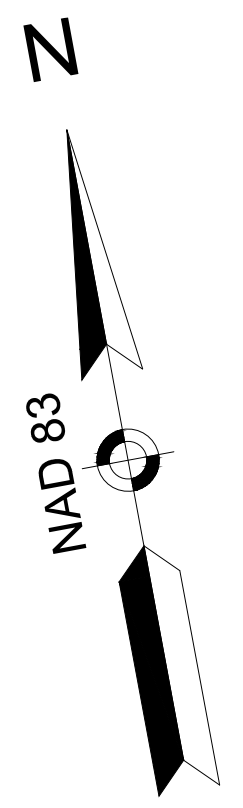
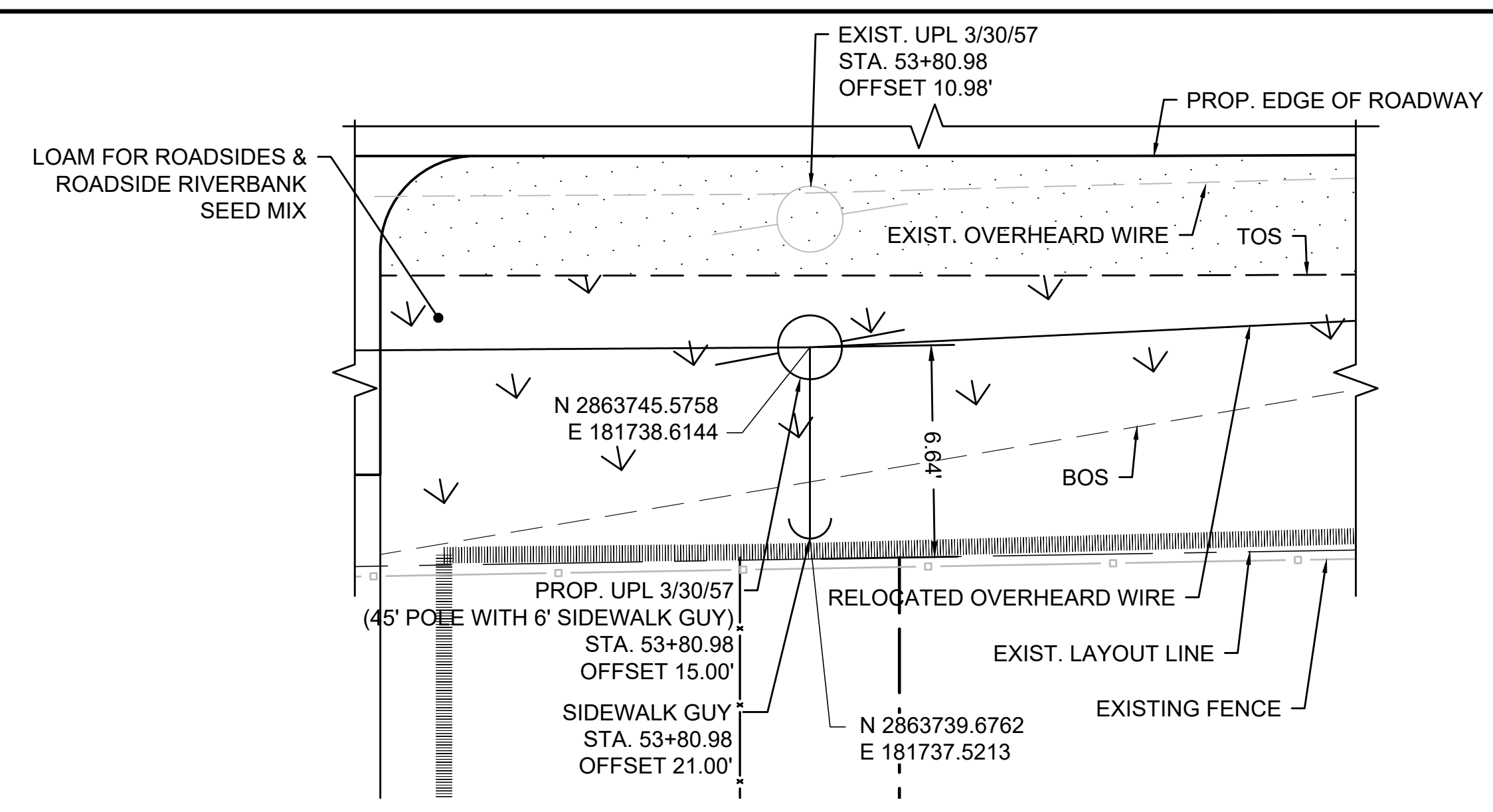
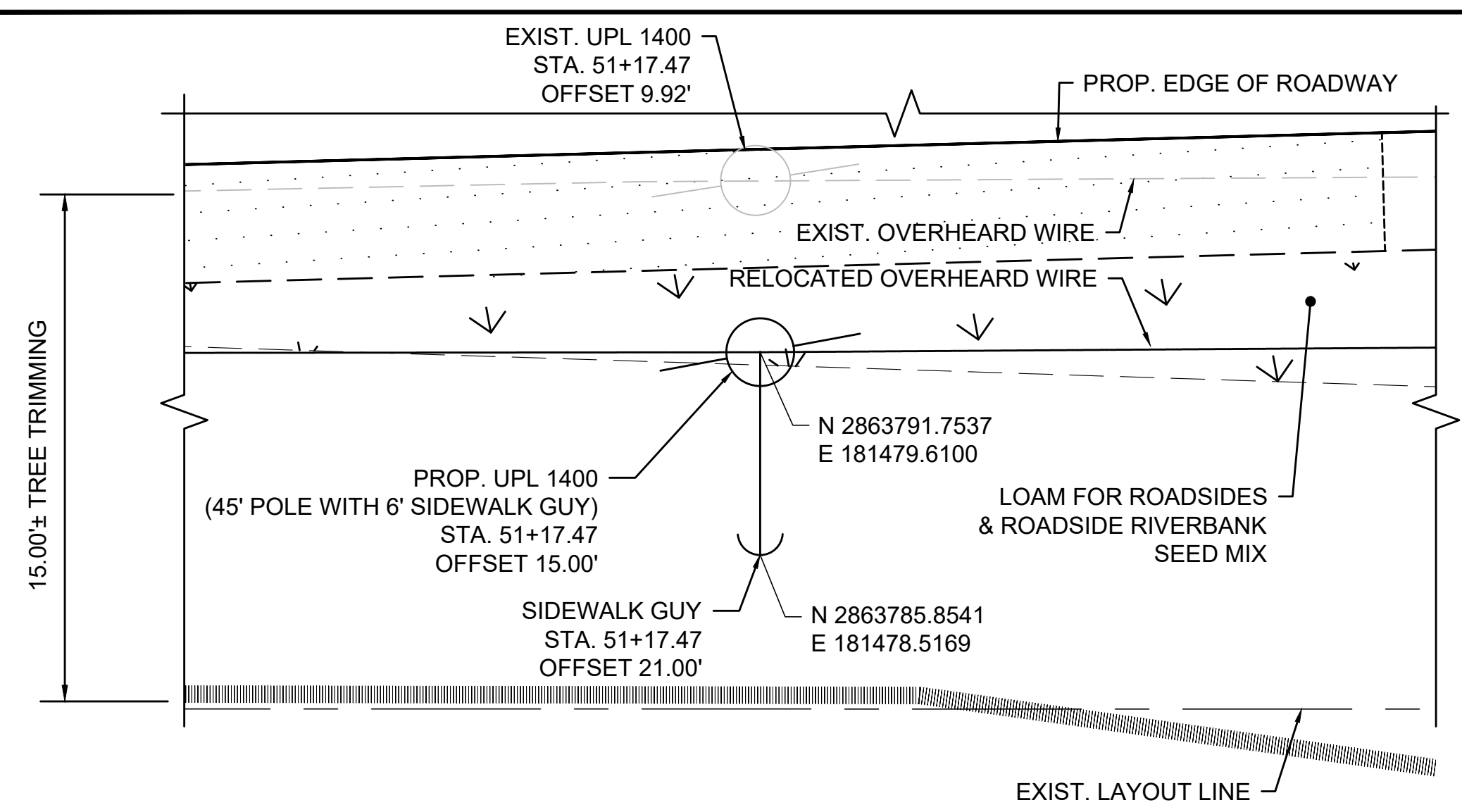
**DETAIL A - TEMPORARY TRAFFIC CONTROL PLAN**



**NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER**

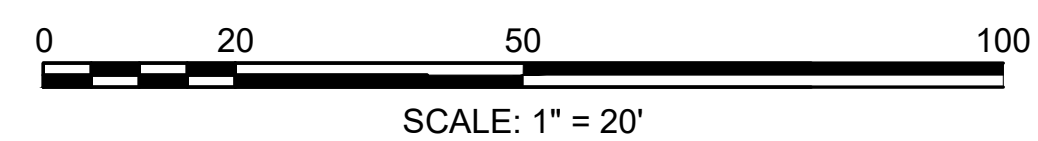
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	12	42
PROJECT FILE NO.			609078

**UTILITY PLAN**



**NOTE:**  
 DE-ENERGIZING THE ELECTRIC LINES WAS DISCUSSED WITH NATIONAL GRID AND THEY CONFIRMED IT IS NOT POSSIBLE DUE TO THE NUMBER OF CUSTOMERS SERVED. THE CONTRACTOR IS WARNED THAT SETTING OF SHEET PILING AND EARTH SUPPORT WILL NEED TO BE DONE WITH OVERHEAD WIRES RELOCATED AS SHOWN IN CONJUNCTION WITH PRE-EXCAVATION FOR SOME SHEETS. SEE BRIDGE PLANS FOR ADDITIONAL INFORMATION.

FOR CONSTRUCTION PLAN:  
 SEE SHEET NO. 6








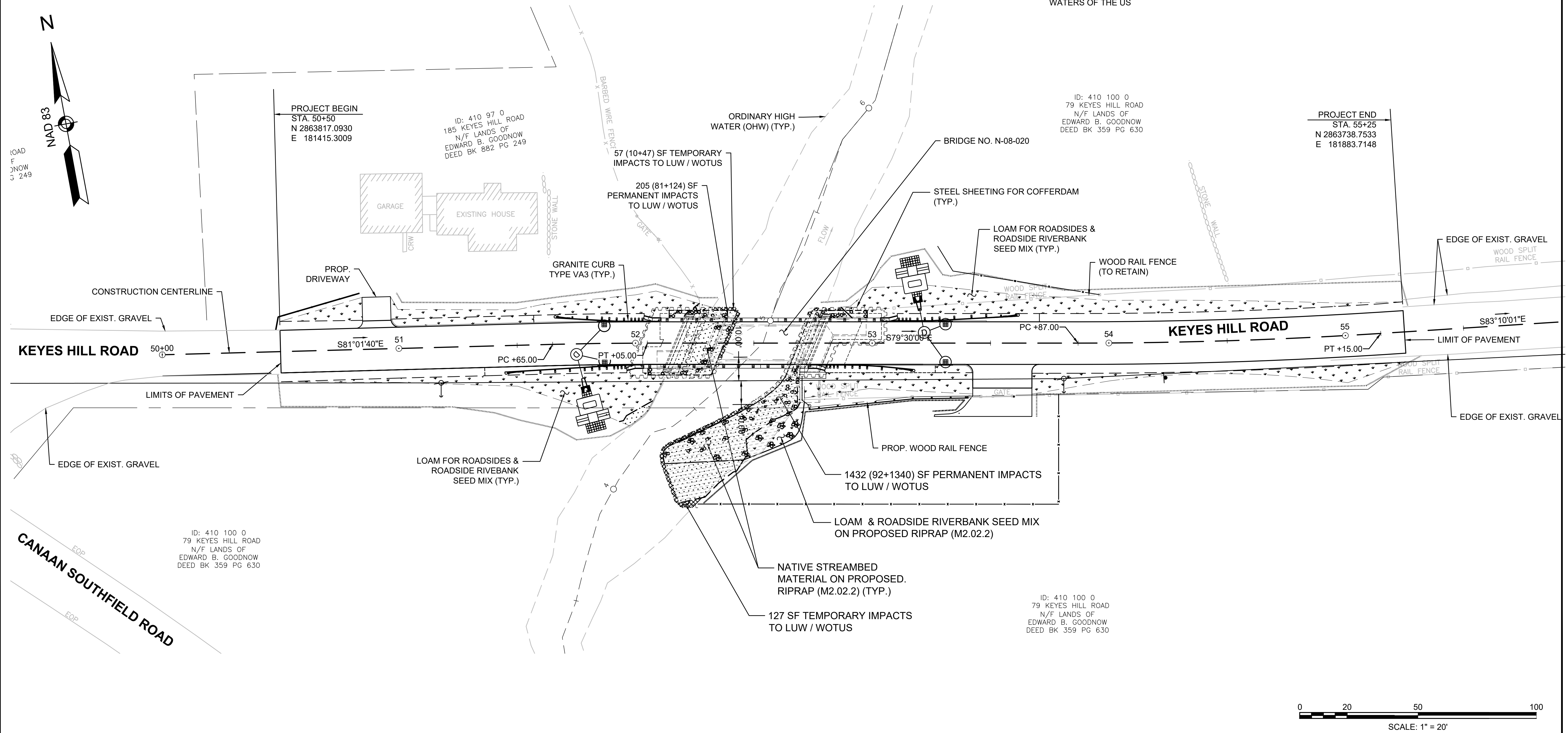
**NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	13	42
PROJECT FILE NO.		609078	

**RESOURCE IMPACT PLAN**

RESOURCE IMPACT AREA				
QUADRANTS	TEMP. IMPACTS TO VEGETATED WETLAND AREA (SF)	PERM. IMPACTS TO VEGETATED WETLAND AREA (SF)	TEMP. IMPACTS TO LAND UNDER WATER AREA (SF)	PERM. IMPACTS TO LAND UNDER WATER AREA (SF)
NW CORNER	-	-	47	81
NE CORNER	-	-	-	92
SW CORNER	-	-	10	124
SE CORNER	-	-	127	1340
TOTAL	-	-	184	1637

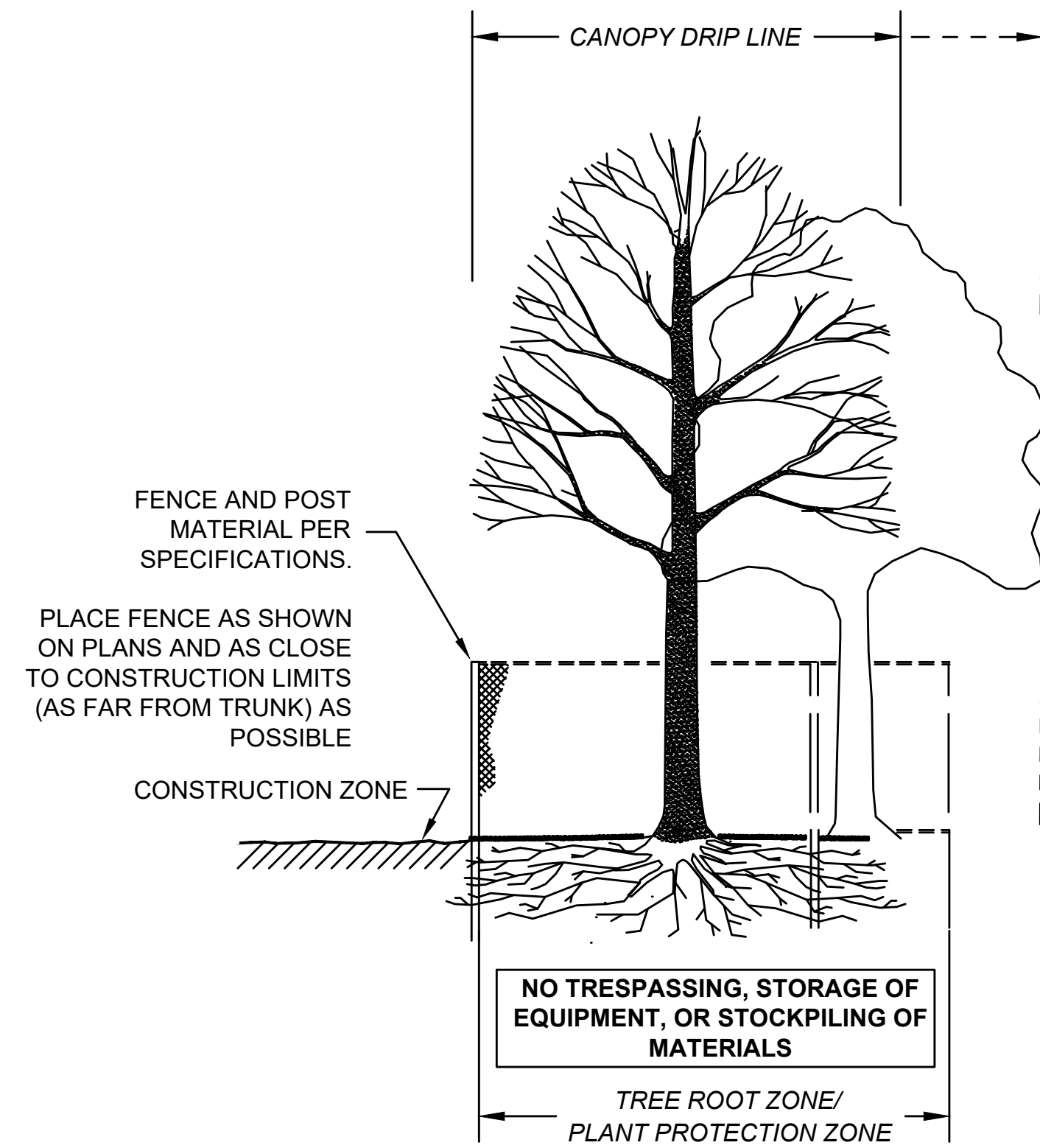
-  ESTIMATED TEMPORARY IMPACTS TO LUW / WOTUS = 184 SF
  -  ESTIMATED PERMANENT IMPACTS TO LUW / WOTUS = 1637 SF
  -  LOAM FOR ROADSIDES & ROADSIDE RIVERBANK SEED MIX
  -  NATIVE STREAMBED MATERIAL
  -  PROPOSED RIPRAP BELOW
- LUW / WOTUS = LAND UNDER WATER WATERS OF THE US



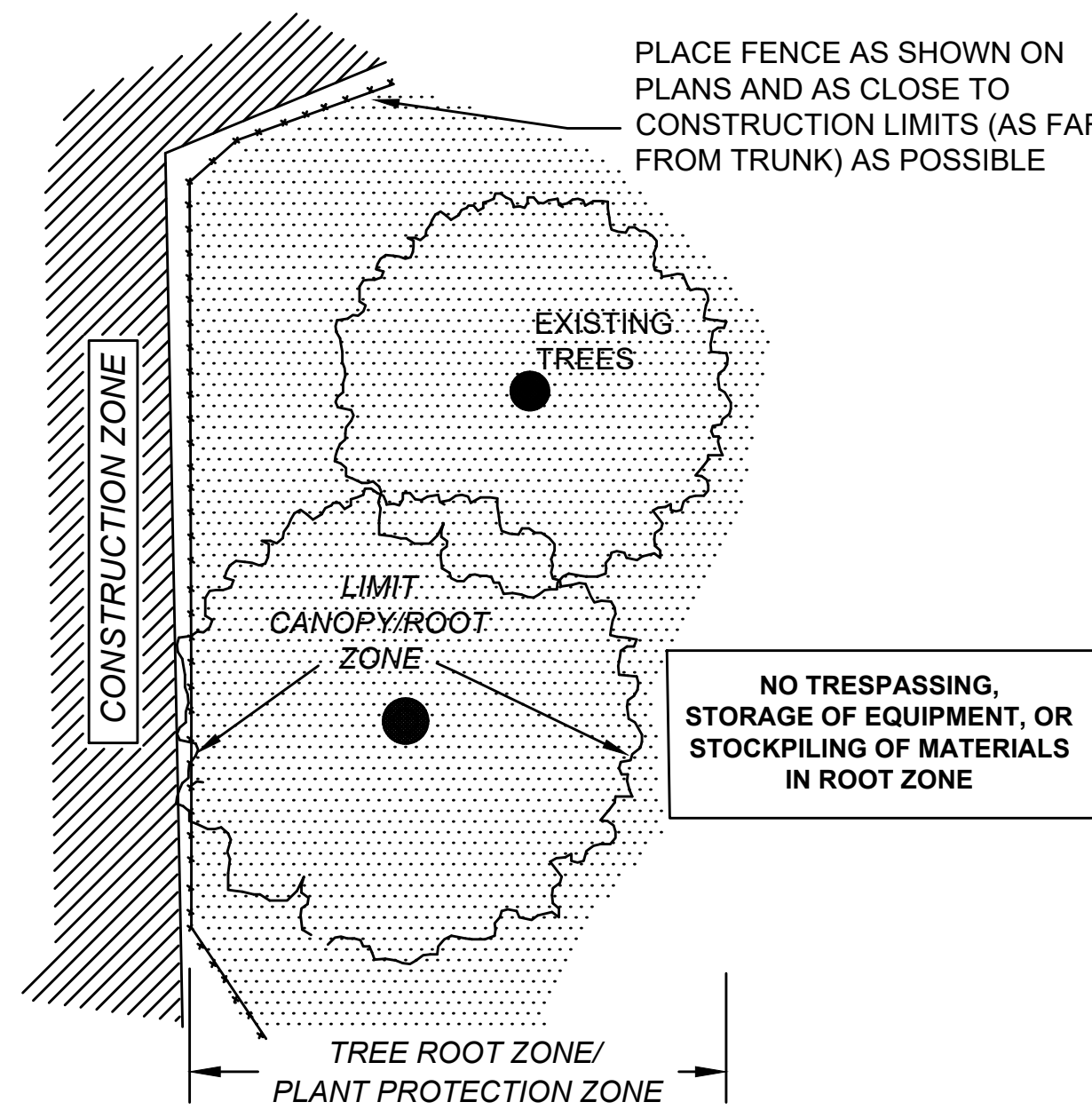
**NEW MARLBOROUGH  
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MA	BFL(BR-OFF)-003S(798)X	14	42
PROJECT FILE NO.		609078	

**SITE PROTECTION DETAILS**



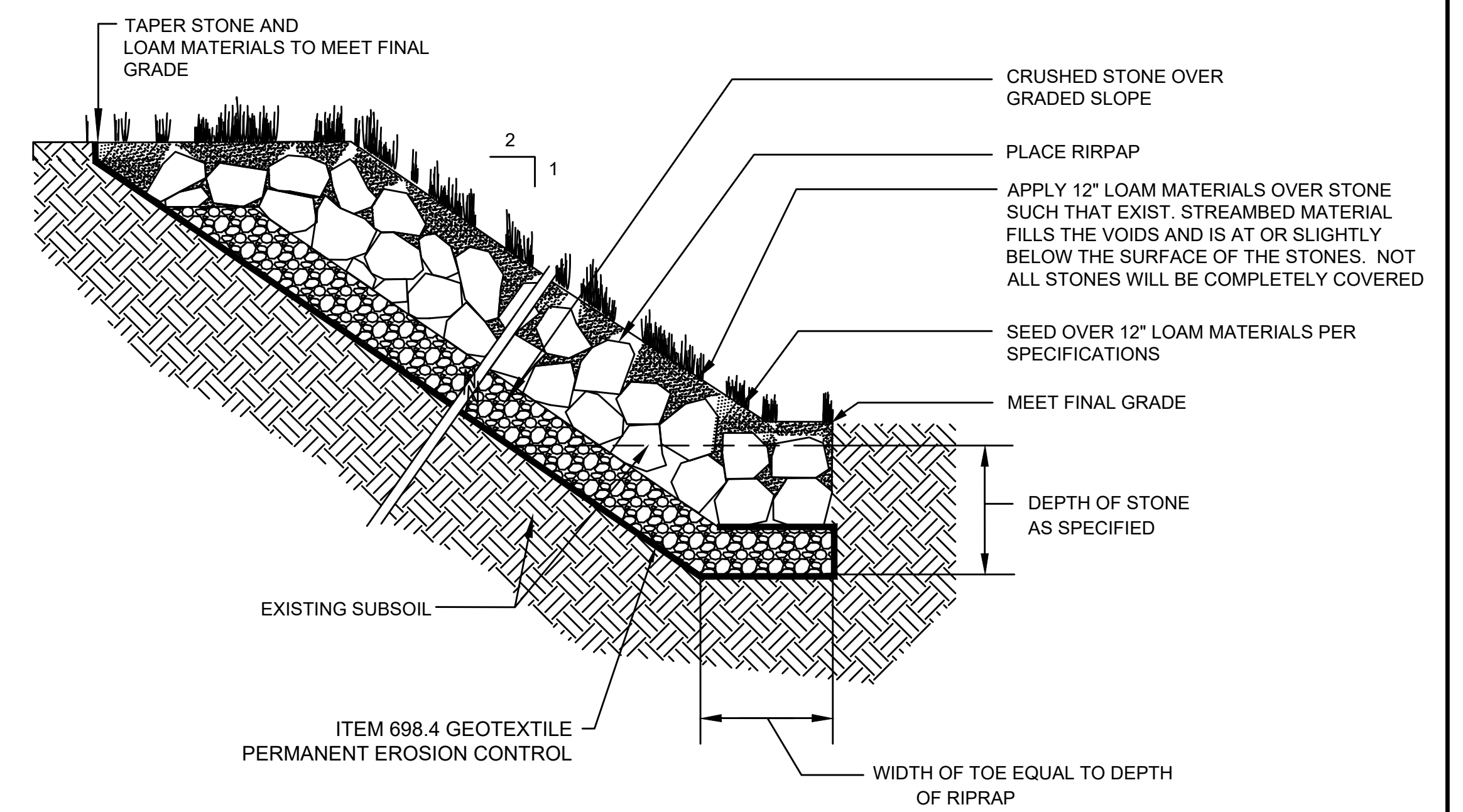
**SECTION - FENCE PROTECTION OF ROOT ZONE**



**PLAN VIEW - FENCE PROTECTION OF ROOT ZONE**

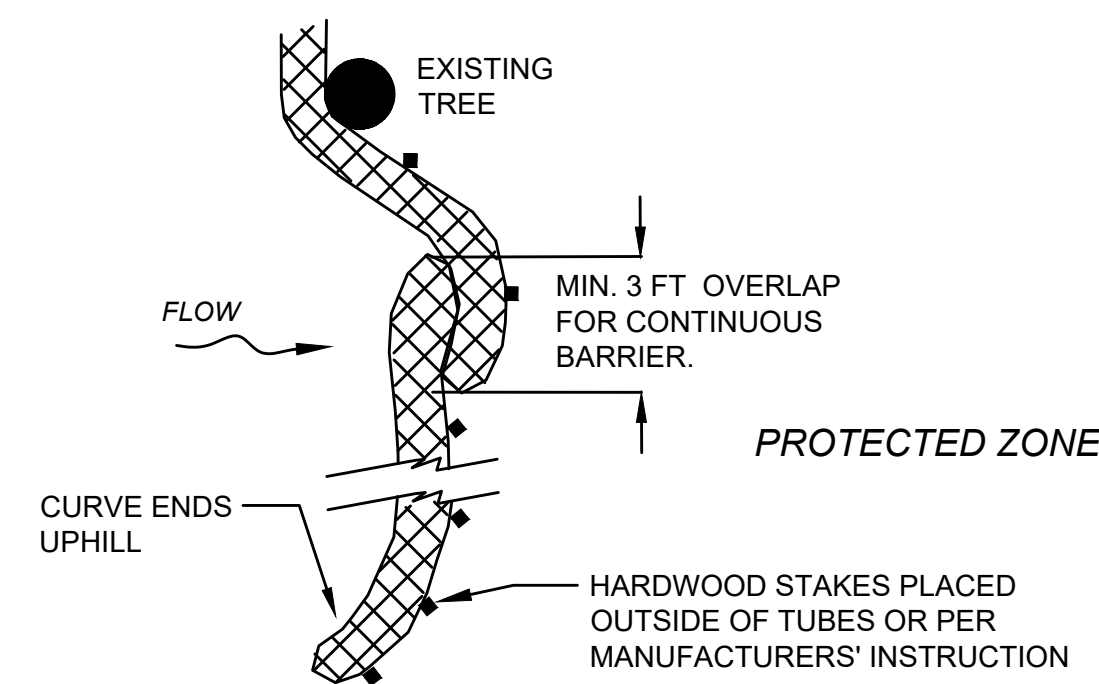
**TREE PROTECTION - ROOT ZONE**

NOT TO SCALE



**LOAM AND SEED OVER RIPRAP (NON-WATERWAY)**

NOT TO SCALE

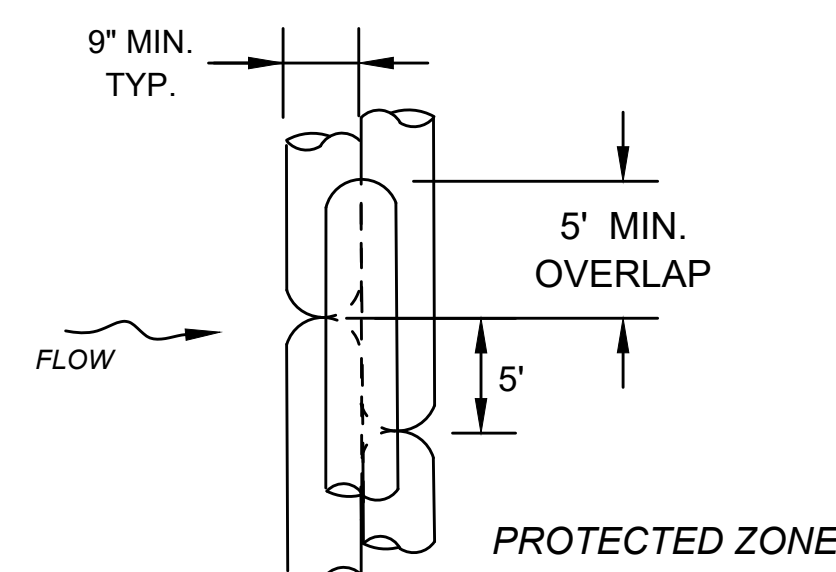


PLACE TUBE AS CLOSE TO LIMIT OF SOIL DISTURBANCE AS POSSIBLE, ALONG CONTOURS, AND PERPENDICULAR TO FLOW.

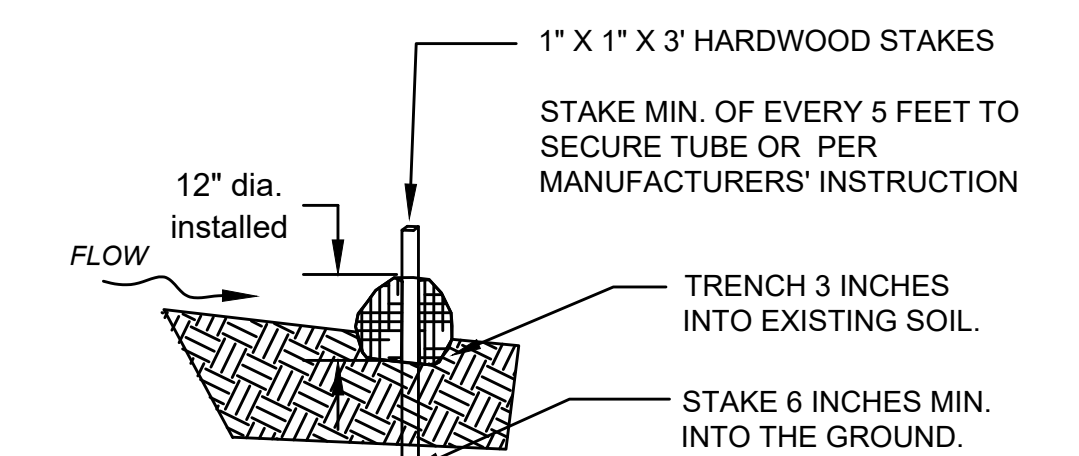
ADJUST LOCATION AS REQUIRED FOR OPTIMUM EFFECTIVENESS. DO NOT INSTALL IN WATERWAYS.

**PLAN VIEW**

WHERE SPECIFIED ON CONSTRUCTION PLANS OR AS REQUIRED



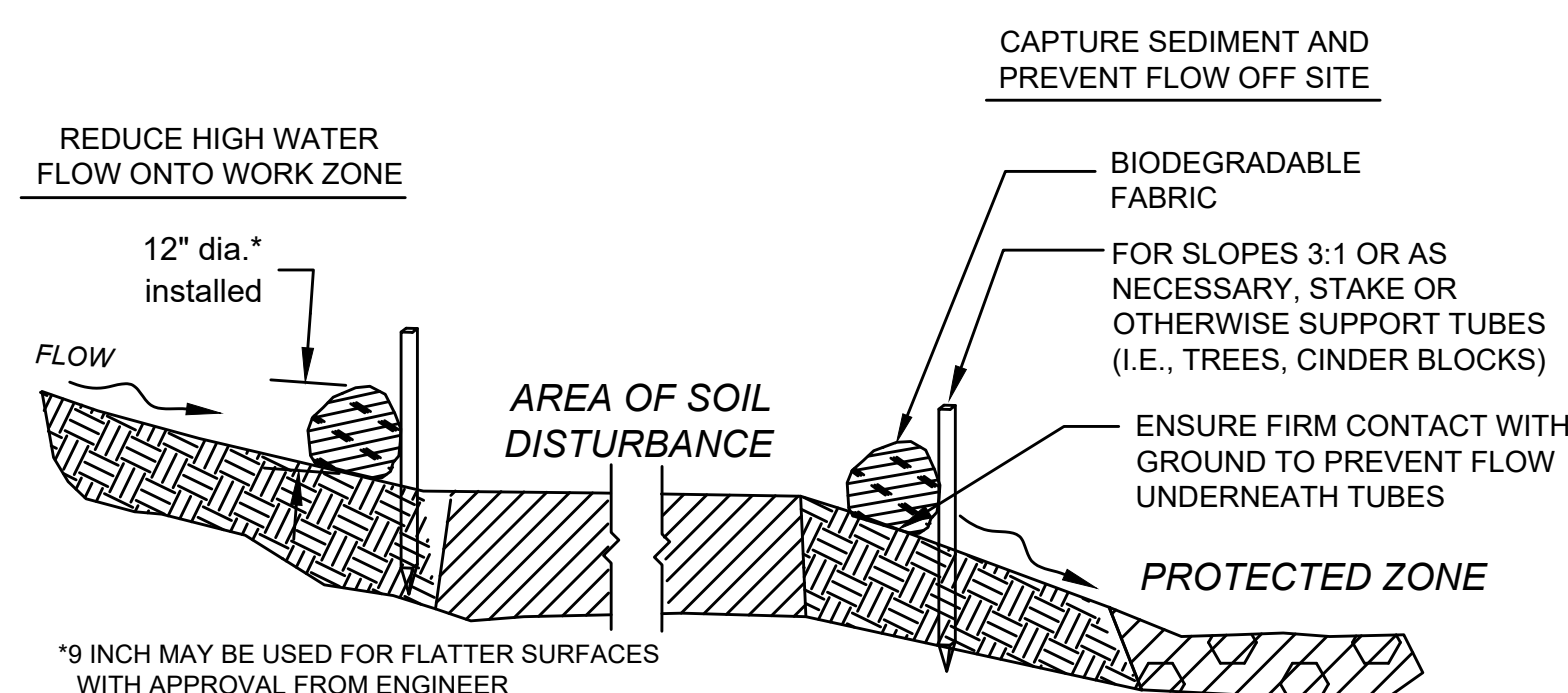
**PLAN VIEW**



**SECTION**

**12 INCH STRAW WATTLE**

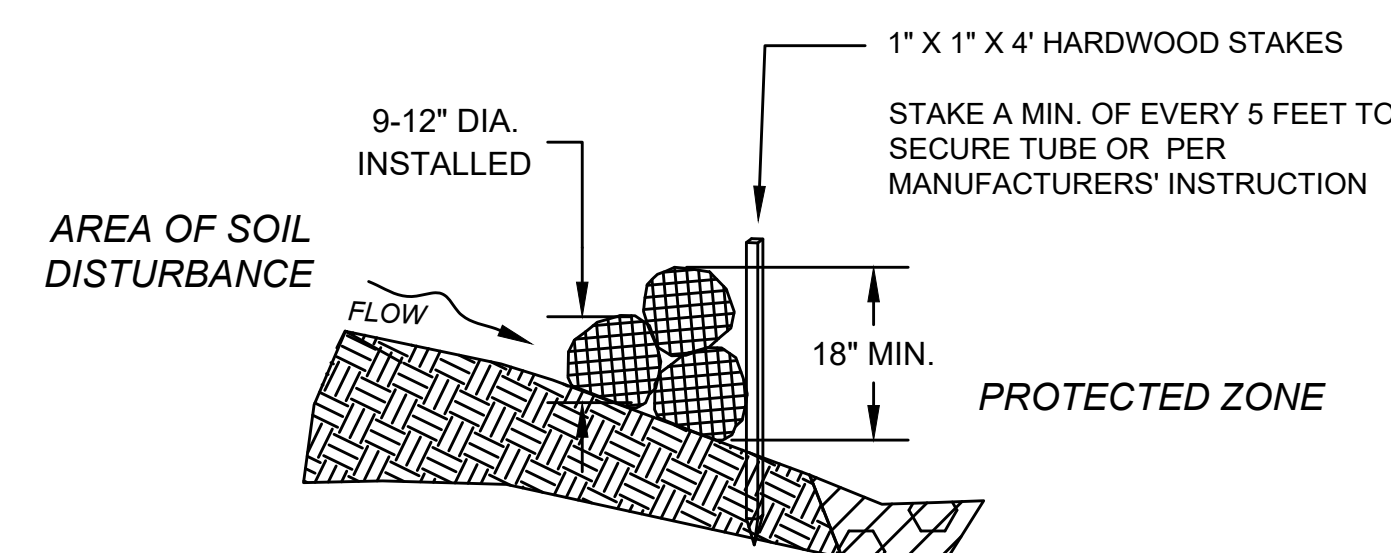
NOT TO SCALE



**SECTION**

**SEDIMENT BARRIER - COMPOST FILTER TUBE**

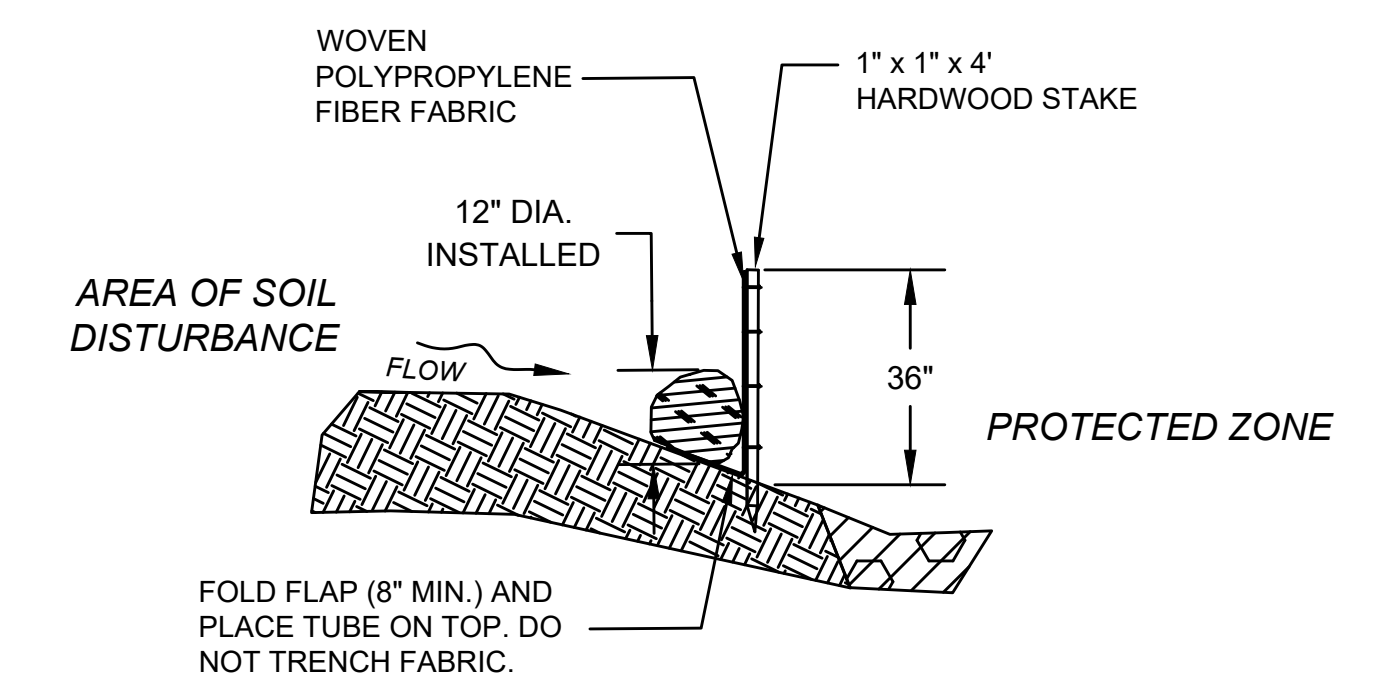
NOT TO SCALE



**SECTION**

**COMPOST FILTER TUBES STACKED**

NOT TO SCALE



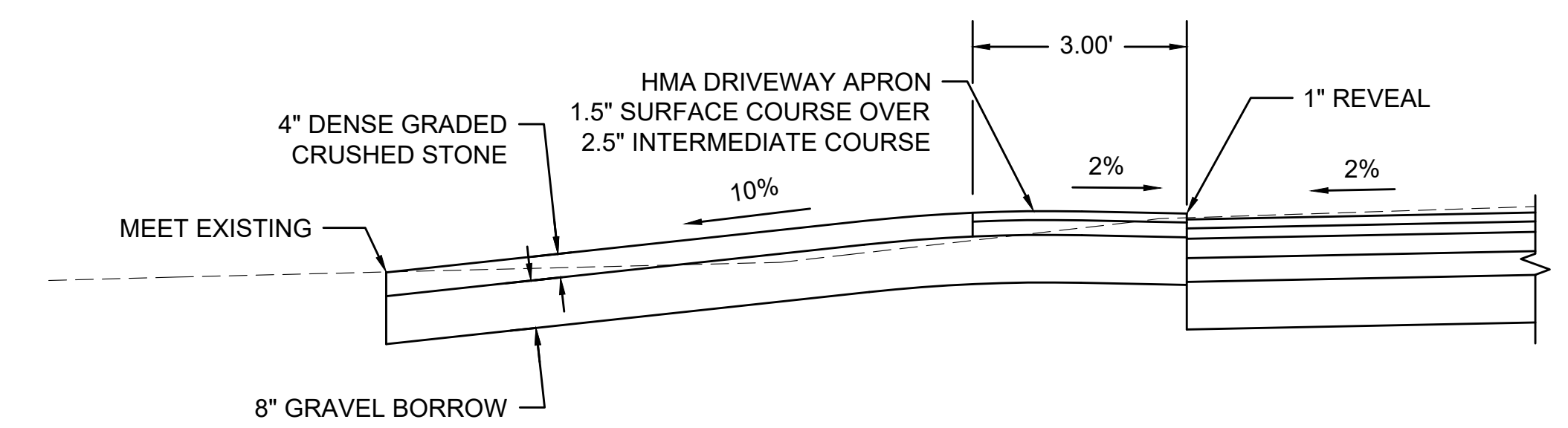
**SECTION**

**COMPOST FILTER TUBE & SILT FENCE**

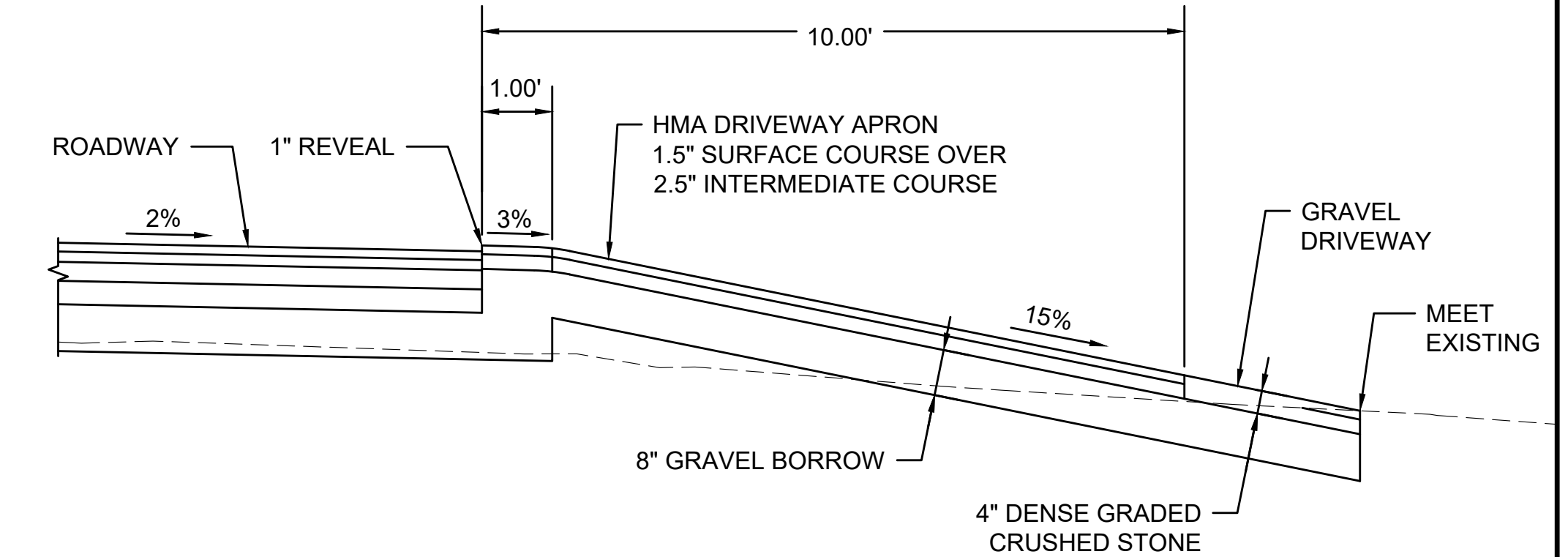
NOT TO SCALE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	15	42
PROJECT FILE NO.		609078	

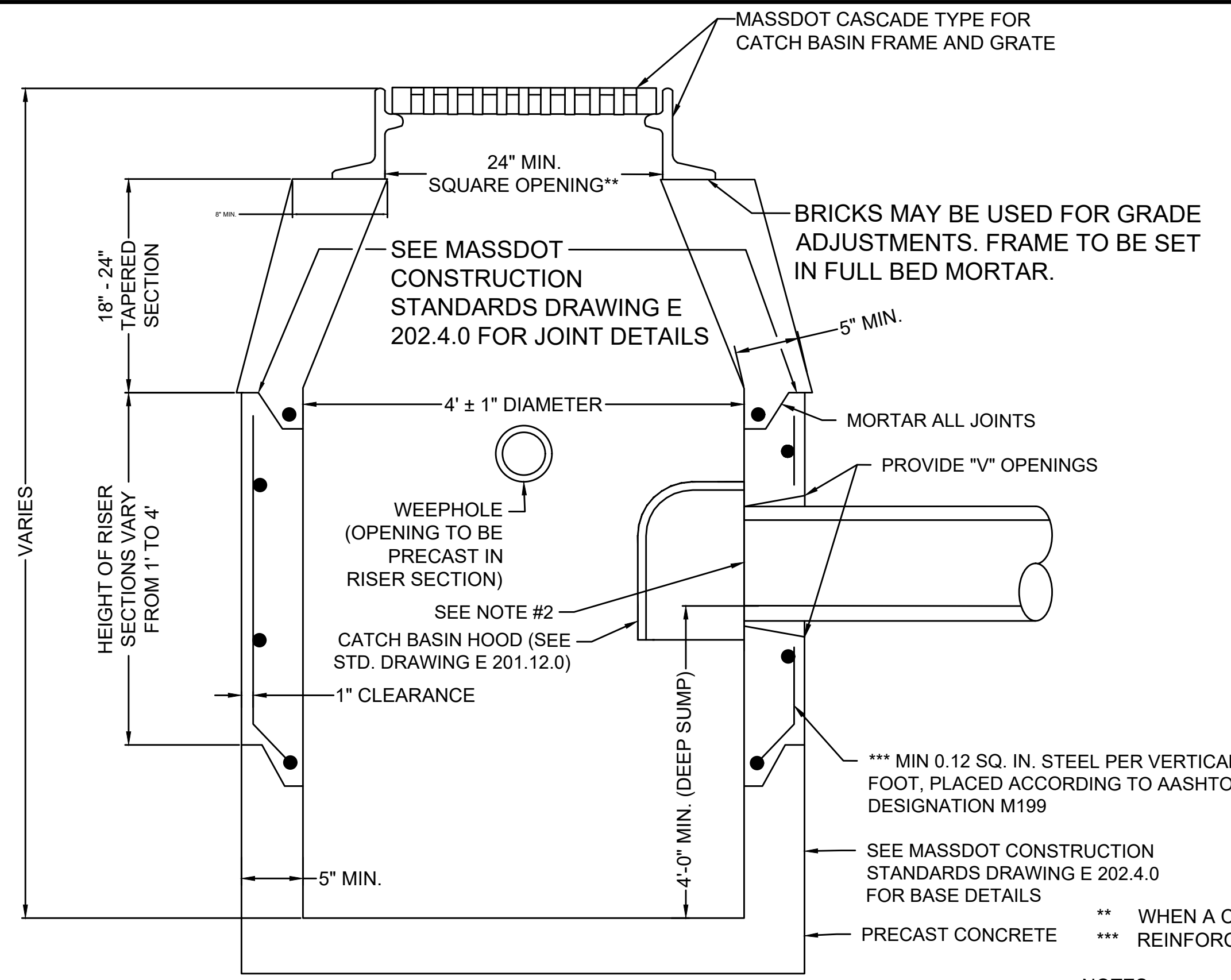
CONSTRUCTION DETAILS



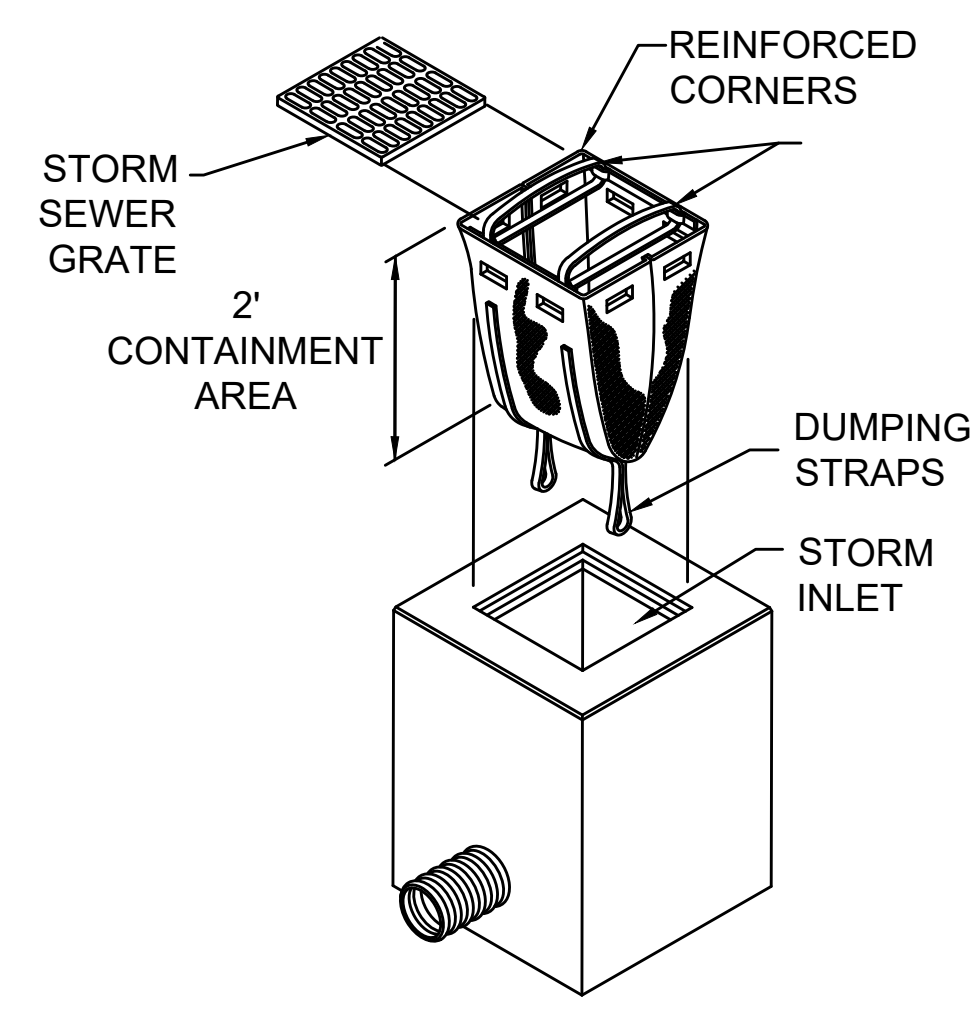
STA. 50+85 TO 50+97 GRAVEL DRIVEWAY  
NOT TO SCALE



STA. 53+42.5± TO 53+67.5± GRAVEL DRIVEWAY  
NOT TO SCALE

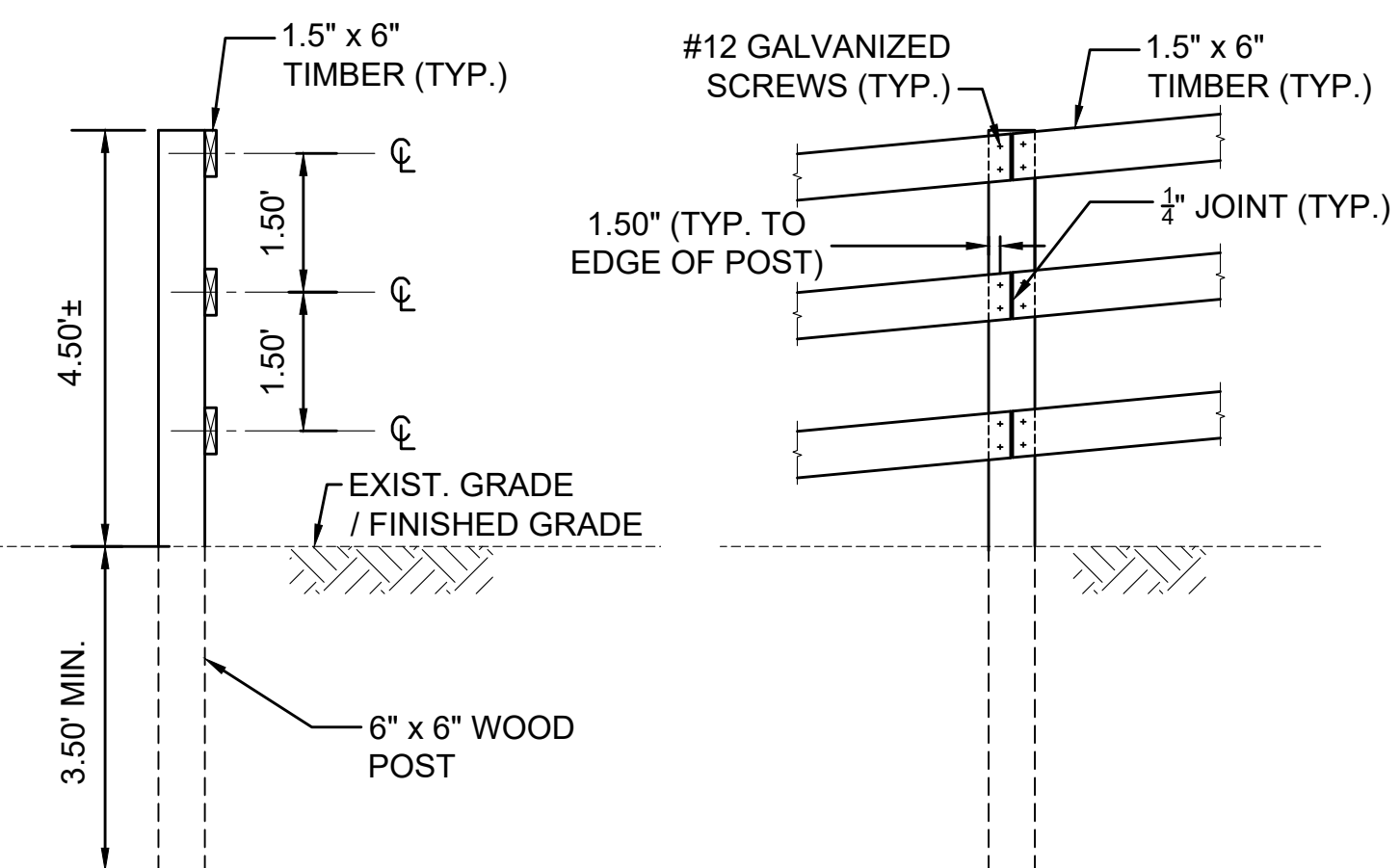


PROPOSED CATCH BASIN  
NOT TO SCALE

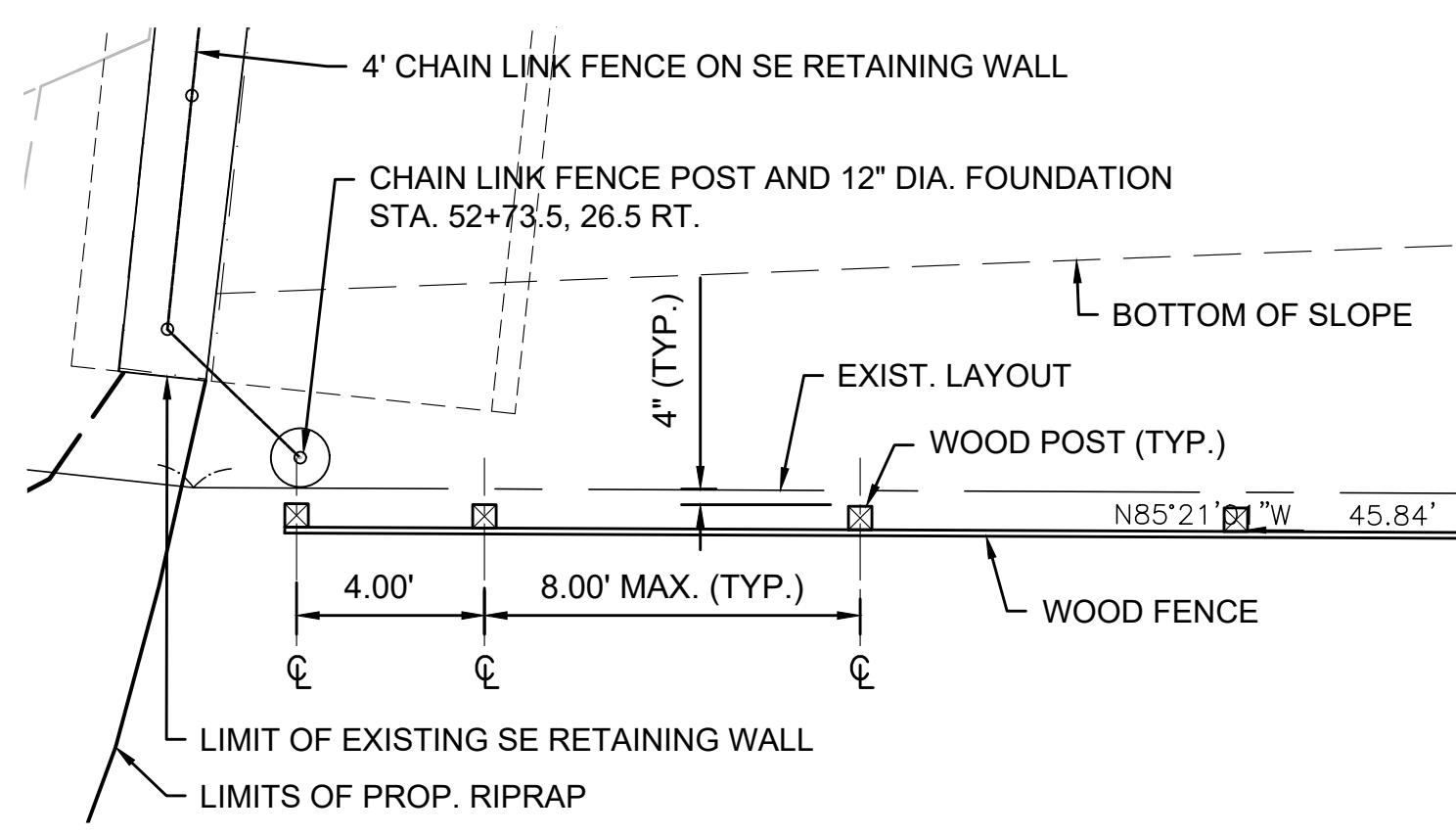


SILT SACK  
NOT TO SCALE

- NOTES:
- DETAILS NOT INDICATED ABOVE ARE TO BE SIMILAR TO THOSE SHOWN ON MASSDOT CONSTRUCTION STANDARDS SHEET 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.
  - ECCENTRIC CATCH BASIN SIMILAR.
- \*\* WHEN A CURB INLET IS INSTALLED, THE OPENING IS TO BE 24"±1" X 27"±1"  
\*\*\* REINFORCING STEEL BASED ON WALL THICKNESS OF 5"

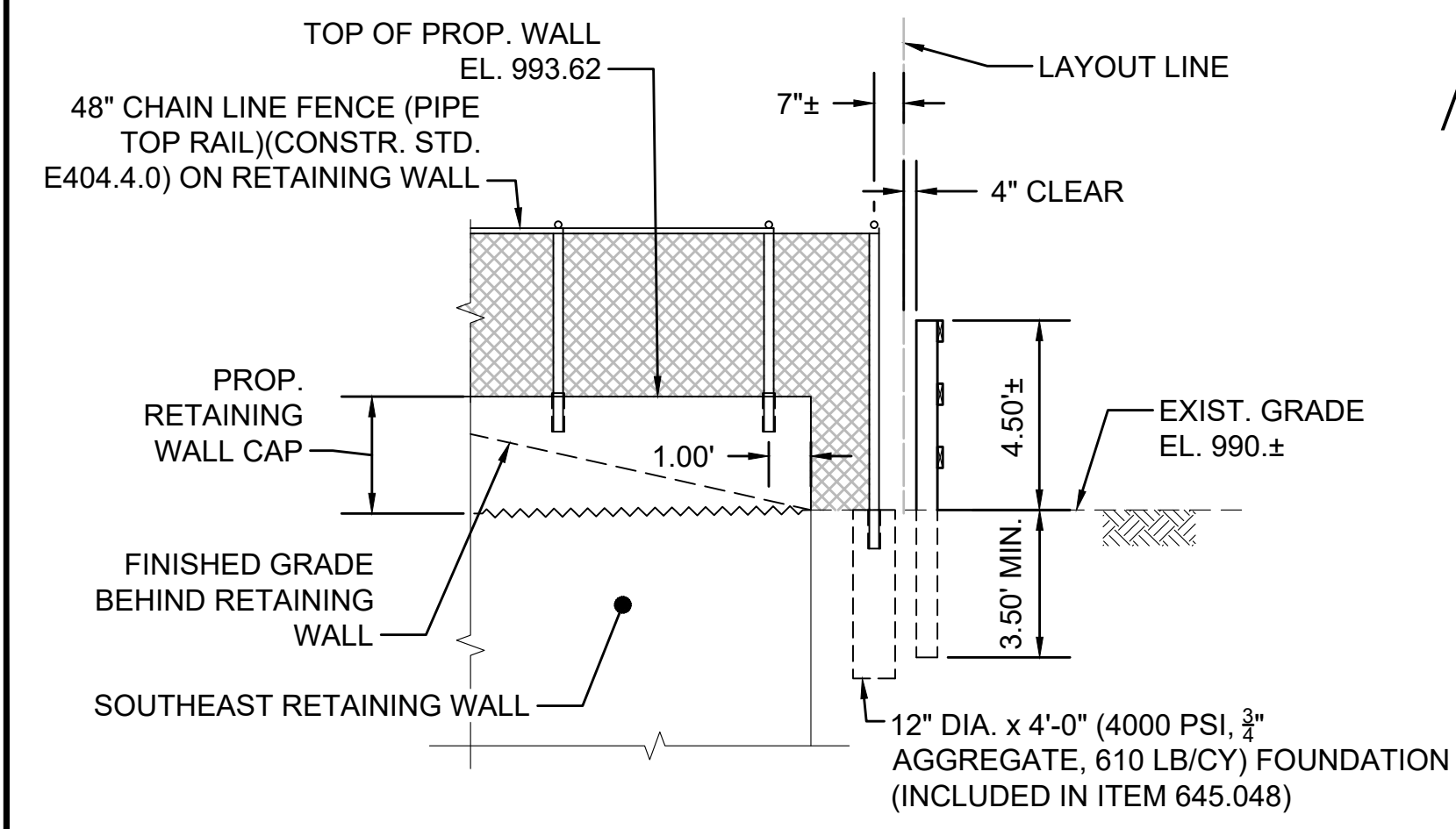


TYPICAL WOOD FENCE  
NOT TO SCALE

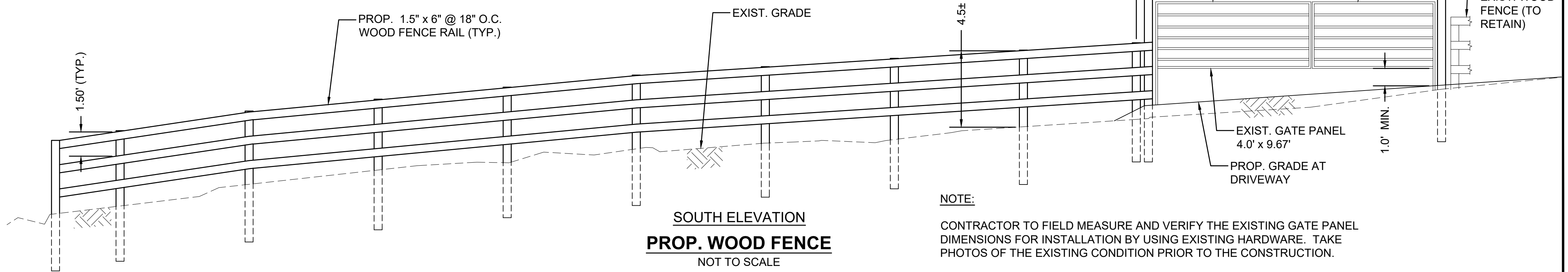


- NOTE:
- THE WORK INCLUDES THE REMOVAL AND DISPOSAL OF THE EXISTING TIMBER BOARDS AND POSTS, DIS-ASSEMBLE AND RE-STALL THE EXISTING METAL GATES, AND CONSTRUCT THE PROPOSED TIMBER POSTS AND BOARDS TO BE SIMILAR TO THE RETAINING WOOD FENCE IN APPEARANCE.
  - NEW TIMBER POST: SIZE 6"x6" AT 8'-0" MAX. ON CENTER WITH THE LAST WEST SPACING AT 4'-0" ON CENTER.
    - POST AT 3'-6" MIN. BELOW THE PROPOSED GRADE AND AT 4'-6" ABOVE THE PROPOSED GRADE.

- NEW TIMBER BOARD: SIZE 1.5"x6", 3 BOARDS AT 18" ON CENTER. NO SPLICE OF BOARDS BETWEEN POSTS.
- EXISTING METAL GATE: DIS-ASSEMBLE AND RE-INSTALL EXISTING METAL GATES WITH THE EXISTING HARDWARE, CONSTRUCT NEW POST 6"x6" AT EACH END OF THE GATE.
- BOARD TO POST CONNECTION: #12 GALVANIZED SCREWS PAIR WITH 3/32" PILOT HOLES.
- THE ABOVE WORK IS PAID FOR UNDER ITEM 655. CEDAR RAIL FENCE.

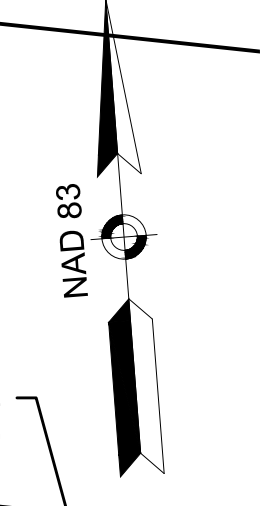


PROP. WOOD FENCE AT SE RETAINING WALL  
NOT TO SCALE



SOUTH ELEVATION  
PROP. WOOD FENCE  
NOT TO SCALE

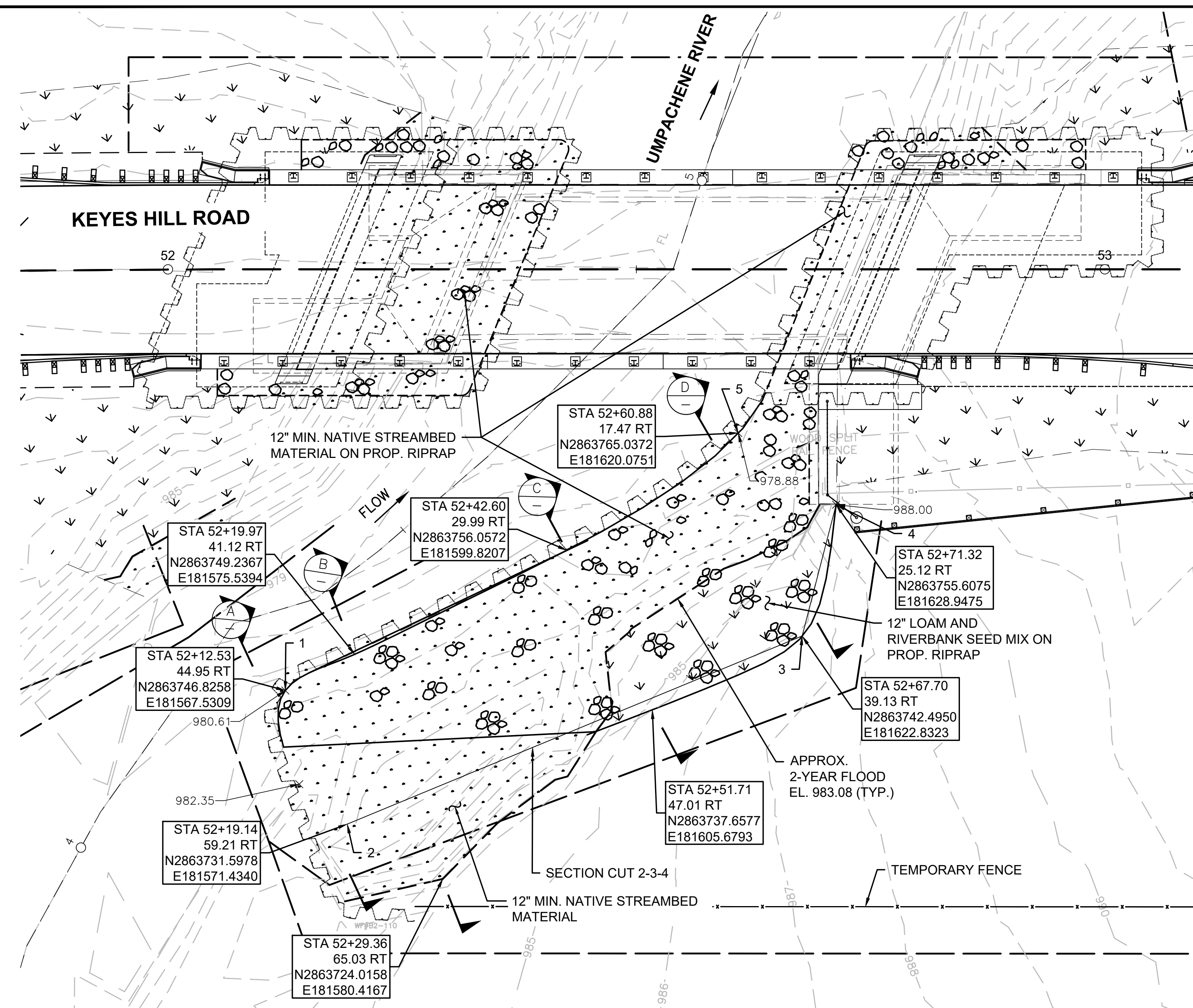
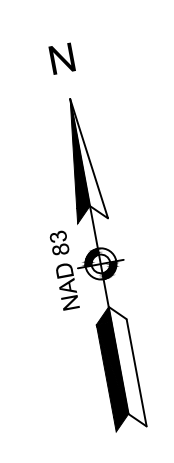
- NOTE:
- CONTRACTOR TO FIELD MEASURE AND VERIFY THE EXISTING GATE PANEL DIMENSIONS FOR INSTALLATION BY USING EXISTING HARDWARE. TAKE PHOTOS OF THE EXISTING CONDITION PRIOR TO THE CONSTRUCTION.



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UPSTREAM CHANNEL BANK IMPROVEMENT

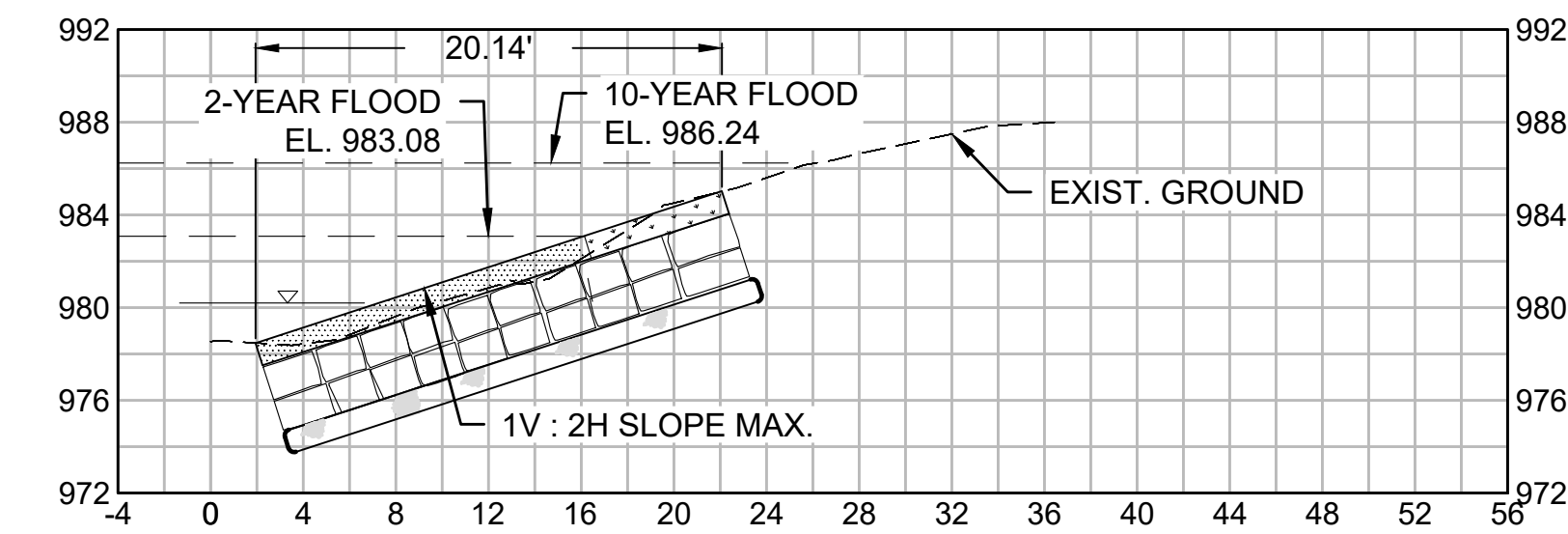
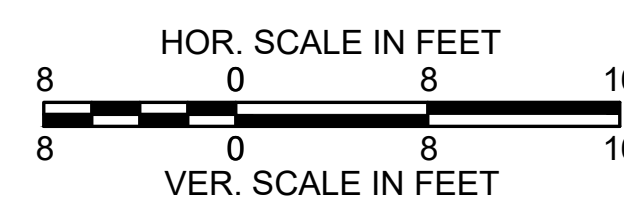


RIPRAP PLAN AT BRIDGE SOUTHEAST CORNER

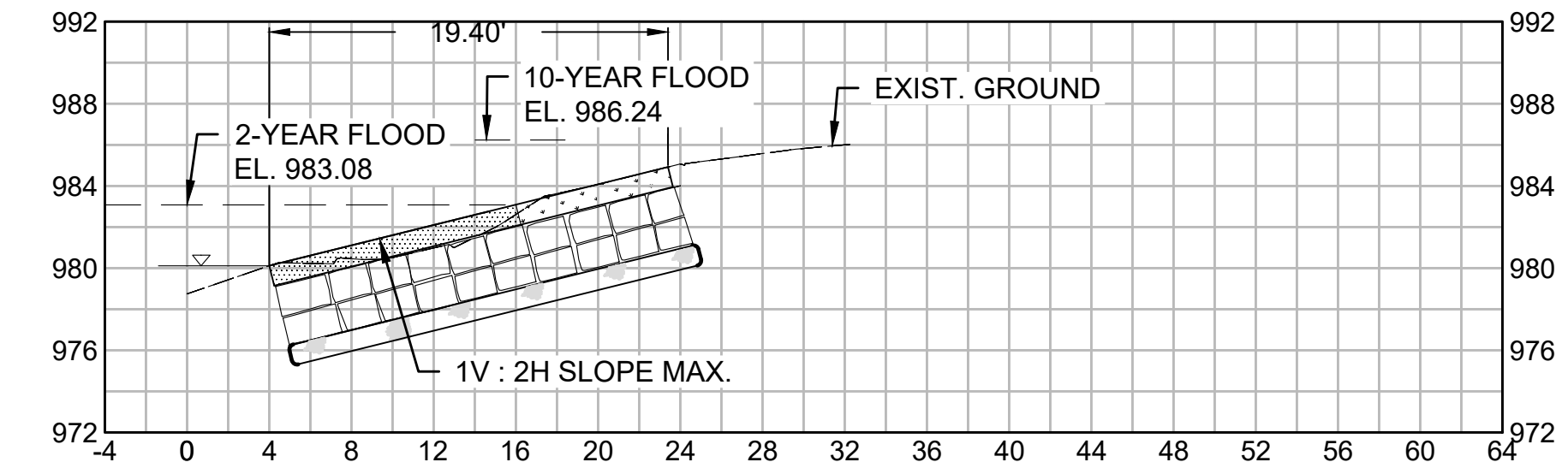
NOTE: FOR RIPRAP INSTALLATION DETAILS AROUND BRIDGE, SEE BRIDGE PLAN SHEET 6 OF 22.

LEGEND

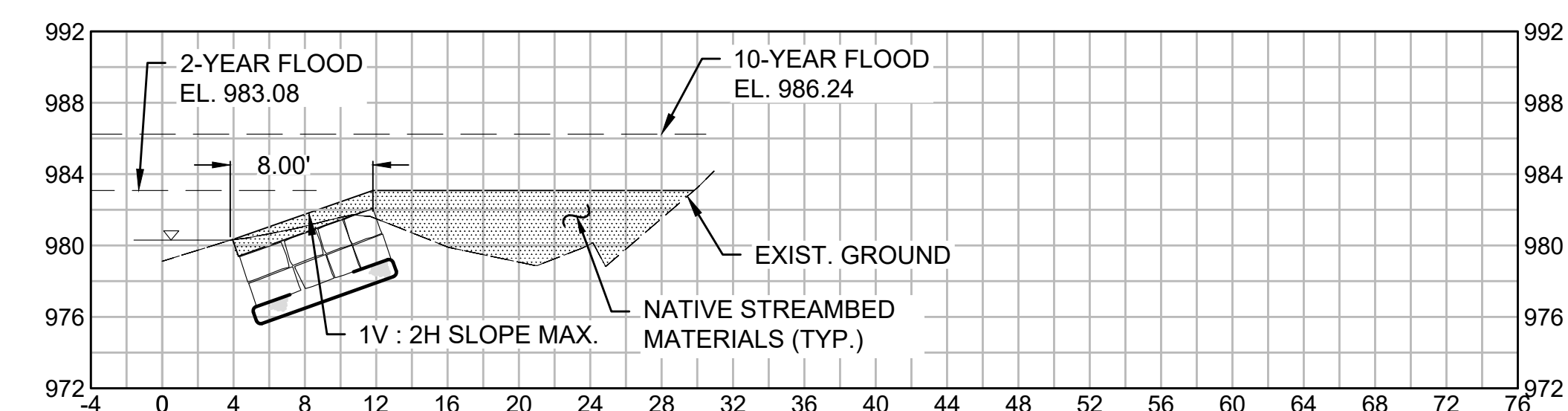
- LOAM & ROADSIDE RIVER BANK SEED MIX
- 12" THICK LOAM & ROADSIDE RIVER BANK SEED MIX ON PROP. RIPRAP
- NATIVE STREAMBED MATERIAL
- 12" THICK NATIVE STREAMBED MATERIAL ON PROP. RIPRAP



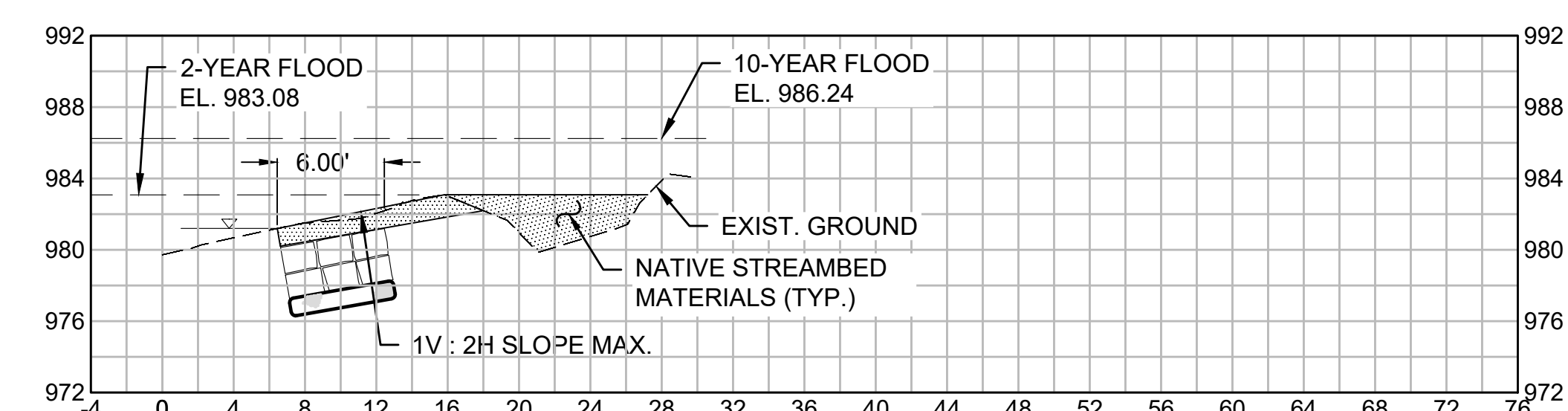
SECTION D



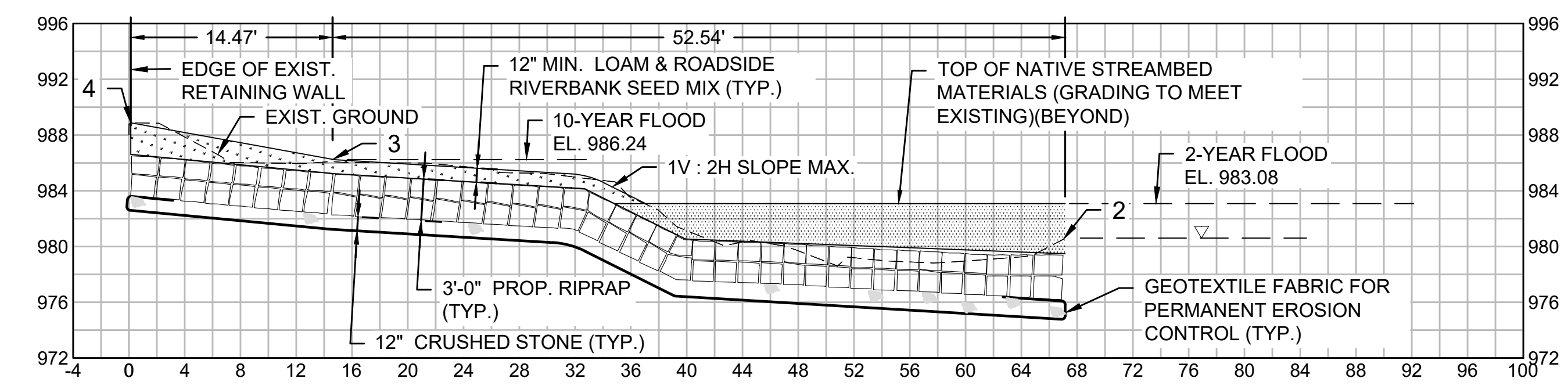
SECTION C



SECTION B



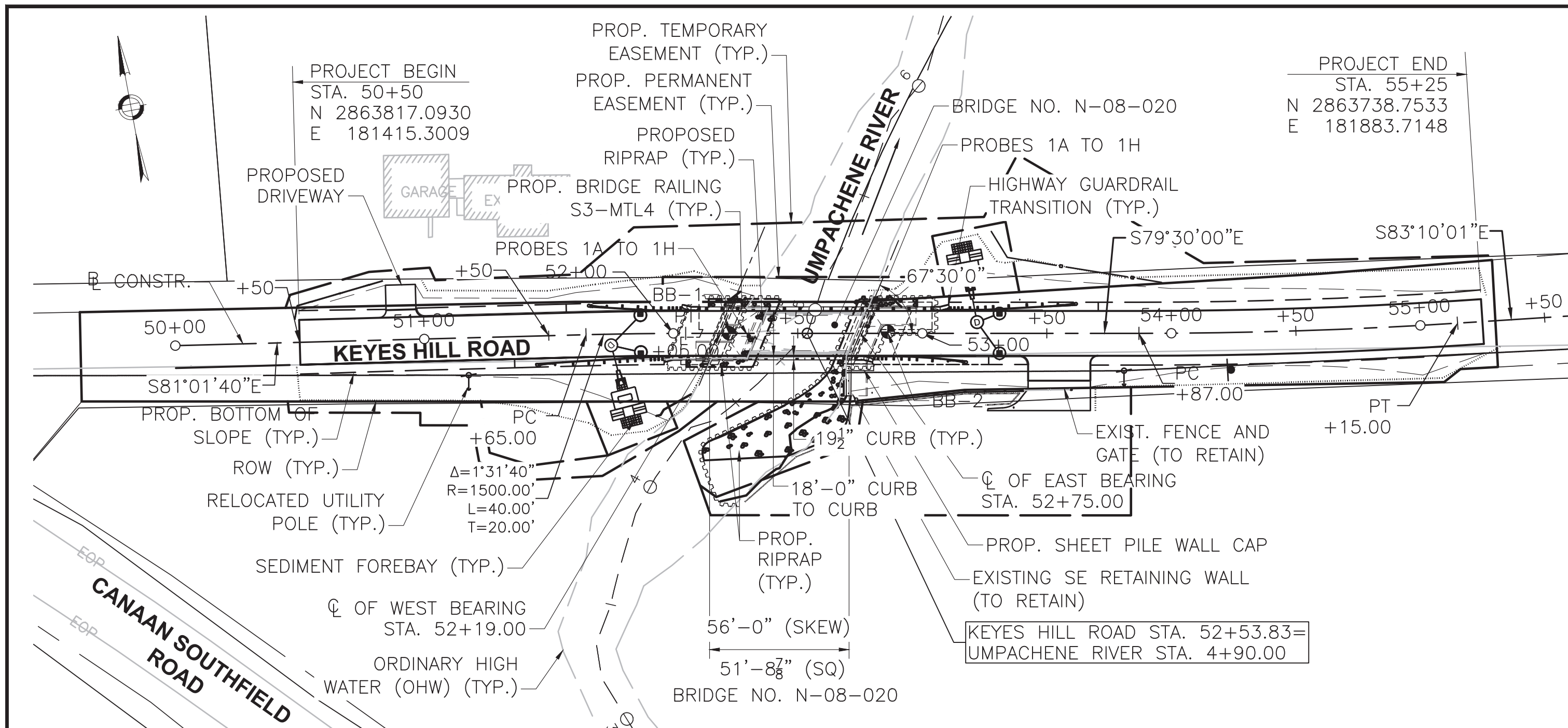
SECTION A



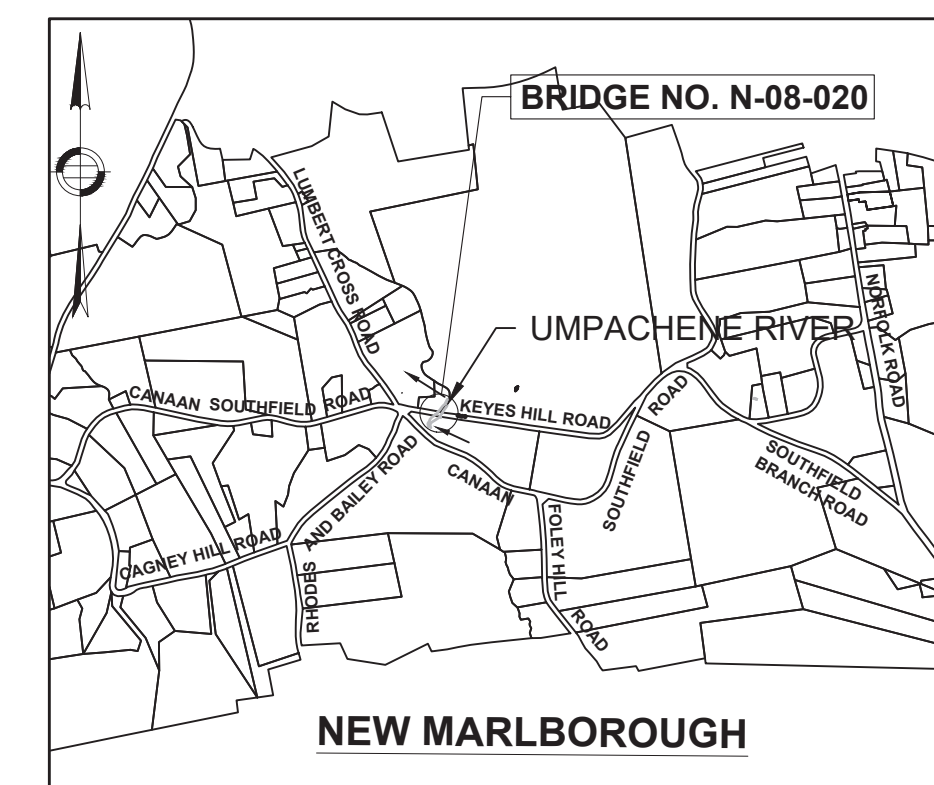
SECTION ALONG 2-3-4

STEEL SHEET PILE/EARTH SUPPORT SYSTEM NOT SHOWN FOR CLARITY.





**KEY PLAN**  
SCALE: 1" = 40'



**LOCUS**  
1" = 2000'

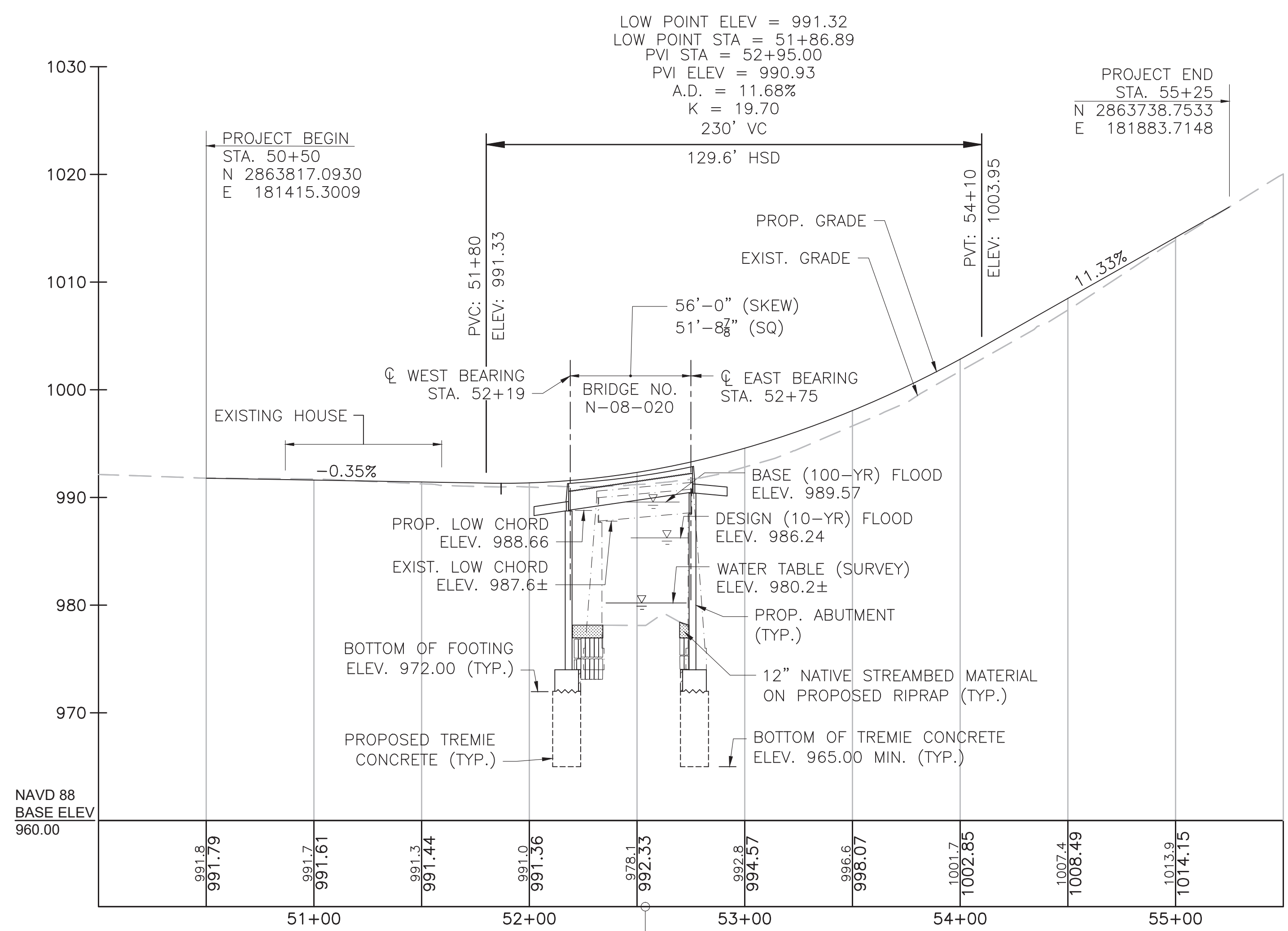
**NEW MARLBOROUGH  
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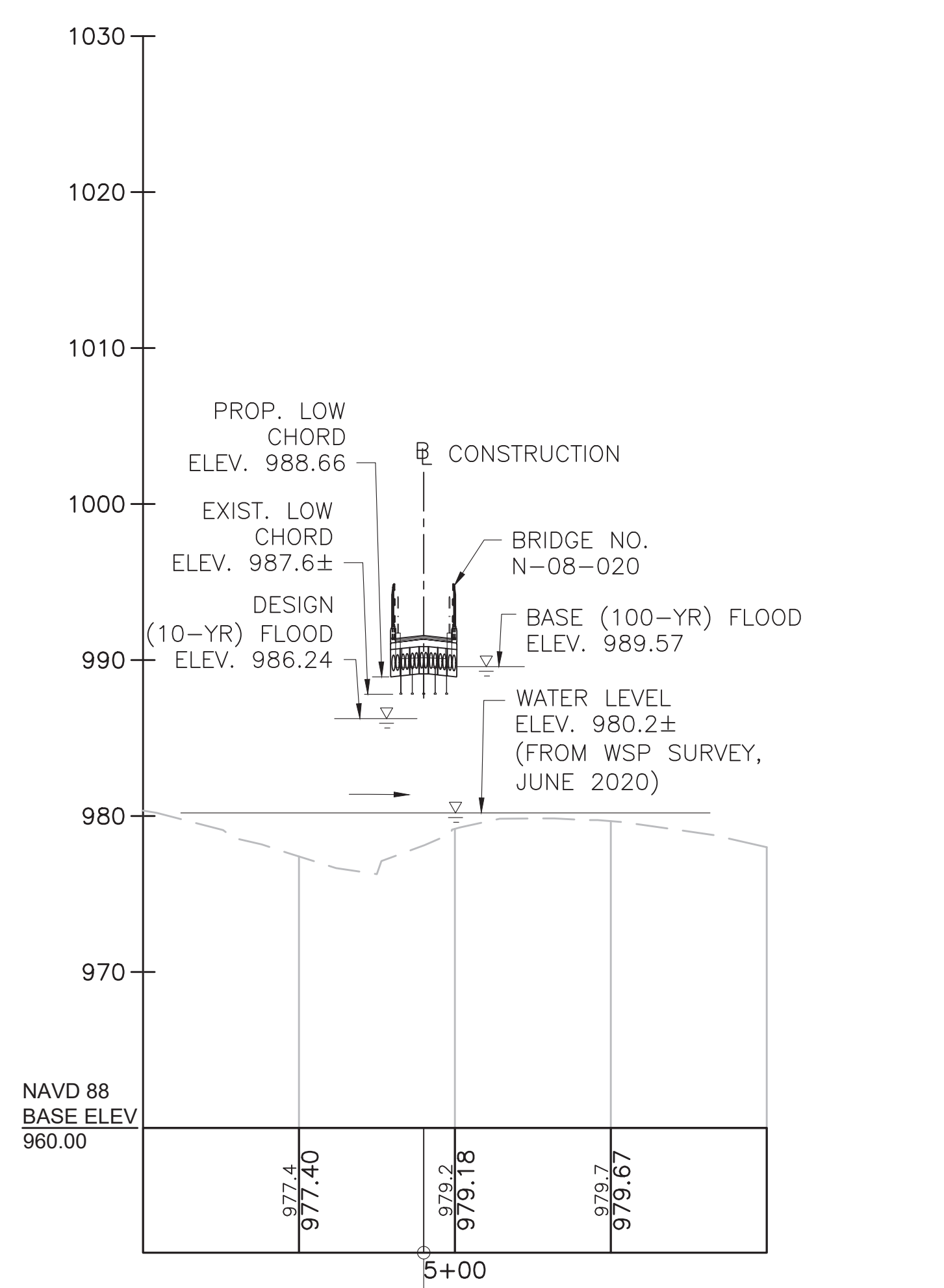
**KEY PLAN AND PROFILE**

**DRAWING INDEX**

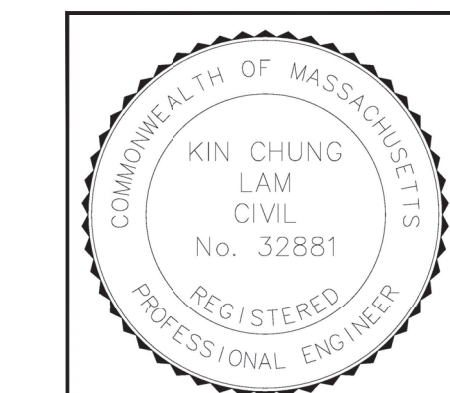
1. KEY PLAN AND PROFILE
2. GENERAL NOTES
3. BORING LOGS (1 OF 3)
4. BORING LOGS (2 OF 3)
5. BORING LOGS (3 OF 3)
6. BRIDGE PLAN & ELEVATION
7. PHASE 1 CONSTRUCTION SHEET PILE
8. PHASE 2 CONSTRUCTION SHEET PILE
9. ABUTMENT PLANS & ELEVATIONS
10. TYPICAL ABUTMENT SECTION
11. CURTAIN WALL
12. WINGWALL ELEVATIONS
13. WINGWALL DETAIL 1
14. WINGWALL DETAIL 2
15. BRIDGE BEARING
16. FRAMING PLAN
17. PRESTRESSED CONCRETE BEAM 1
18. PRESTRESSED CONCRETE BEAM 2
19. BRIDGE TRANSVERSE SECTION
20. S3-MTL4 BRIDGE RAILING (1 OF 2)
21. S3-MTL4 BRIDGE RAILING (2 OF 2)
22. HIGHWAY GUARDRAIL TRANSITION



**PROFILE - KEYES HILL ROAD**  
HORIZONTAL SCALE: 1" = 40'-0"  
VERTICAL SCALE: 1" = 8'-0"



**PROFILE - UMPACHENE RIVER**  
HORIZONTAL SCALE: 1" = 40'-0"  
VERTICAL SCALE: 1" = 8'-0"



Kin Chung Lam  
Digitally signed by Kin Chung Lam  
Date: 2024.11.04 08:57:52 -0500

**LAMSON ENGINEERING CORPORATION**

SEPT. 14, 2024 ISSUED FOR CONSTRUCTION



**PROPOSED BRIDGE  
NEW MARLBOROUGH  
KEYES HILL ROAD  
OVER UMPACHENE RIVER**

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

Alexander K. Bardow, P.E.  
STATE BRIDGE ENGINEER

Digitally signed by Alexander K. Bardow, P.E.  
Date: 2024.11.07 17:15:55 -0500  
*Alexander K. Bardow*  
Digitally signed by Carrie Lavallee, P.E.  
Date: 2024.11.15 09:57:59 -0500  
Carrie Lavallee  
CHIEF ENGINEER

609078 Structural Plans Submittal (SF) 7-SEPTEMBER-2024 Plotted on 7-Sep-2024 9:21 AM

**GENERAL NOTES:**

**DESIGN:**

IN ACCORDANCE WITH THE 2020 (9TH EDITION) LRFD SPECIFICATIONS OF THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) FOR HL-93 LOADING.

**MASSDOT BENCH MARKS:**

"2555" (WSP 6): REBAR  
N 286802.6530, E 81576.7160,  
ELEV. 989.919' (NAVD 1988)

"61": SPK  
N 2863755.018, E 181738.239  
ELEV. 998.710' (NAVD 1988)

BENCH MARK C: RR SPK UP3/30/57  
ELEV. 1000.78' (NAVD 1988)

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

**DATE:**

TO BE PLACED ON THE INSIDE FACE OF THE SOUTHWESTERLY AND NORTHEASTERLY 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. ALL HIGHWAY GUARDRAIL TRANSITIONS SHALL FEATURE THE SAME DATE.

**MASSDOT SURVEY NOTEBOOKS:**

SURVEY NOTEBOOK NUMBER IS 40576.

**SCALES:**

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

**FOUNDATIONS:**

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

**UNSUITABLE MATERIAL:**

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

**ANCHOR BOLTS (FOR BRIDGE RAILING):**

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

**EXISTING CONDITIONS:**

INFORMATION SHOWN FOR EXISTING BRIDGE STRUCTURE IS TAKEN FROM THE EXISTING BRIDGE PLAN DATED OCTOBER 1938, AND APPROXIMATED FROM SURVEY DRAWINGS. ALL DIMENSIONS AND DETAILS SHOWN FOR EXISTING STRUCTURE ARE NOT GUARANTEED. THE CONTRACTOR SHALL DETERMINE AND ESTABLISH ALL DIMENSIONS AND DETAILS NECESSARY FOR COMPLETION OF ALL WORK BY FIELD MEASUREMENT AND SURVEY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ADEQUACY AND ACCURACY THEREOF AND SHALL NOT ORDER ANY MATERIAL OR BEGIN FABRICATION UNTIL THE ABOVE WORK IS COMPLETED AND THE EXTENT OF THE PROPOSED WORK IS APPROVED BY THE ENGINEER.

**GEOTECHNICAL DESIGN:**

SEE GEOTECHNICAL REPORT, DATED JANUARY 26, 2024.

NO CONSTRUCTION SHOULD BE CONDUCTED BELOW ELEV. 940.1 (APPROXIMATELY 52' FROM THE EXISTING ROADWAY SURFACE AT BRIDGE LOCATION) TO AVOID CONSTRUCTION ISSUES FROM POTENTIAL AQUIFER CONDITION.

**CONCRETE:**

ALL CONCRETE SHALL BE 5,000 PSI, 3/4 IN., 685 HP CEMENT CONCRETE.

TREMIE CONCRETE SHALL BE 4,000 PSI, 3/4 IN., 610 CEMENT CONCRETE. AN ADDITIONAL 10% OF CEMENT SHALL BE ADDED TO THIS CONCRETE DEPOSITED IN WATER.

ALL CIP AND PRECAST CONCRETE POUR SHOWN ON THESE CONSTRUCTION DRAWINGS WHERE ALL VOLUMETRIC DIMENSIONS ARE 4 FEET OR GREATER SHALL BE CONSIDERED TO BE MASS CONCRETE PLACEMENTS AND SHALL REQUIRE A HEAT OF HYDRATION ANALYSIS AND THERMAL CONTROL PLAN, AS SPECIFIED IN THE MASSDOT STANDARD SPECIFICATIONS.

**REINFORCEMENT:**

REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M31 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"	17"	21"
2. 12" OF CONCRETE BELOW BAR	20"	22"	27"
3. COATED BARS, COVER < 3d, OR CLEAR SPACING < 6d	21"	26"	31"
4. COATED BARS, ALL OTHER CASES	17"	21"	25"
5. CONDITION 2. AND 3.	23"	29"	35"
6. CONDITION 2. AND 4.	21"	27"	32"

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

**EPOXY COATED BARS:**

ALL REINFORCING BARS AND SUPPORTING DEVICES IN THE ABUTMENTS, WINGWALLS, BACKWALLS, CURTAIN WALLS, RETAINING WALL CAP, CONCRETE DECK SLAB, AND SAFETY CURBS SHALL BE COATED.

**MEMBRANE WATERPROOFING:**

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

ESTIMATED QUANTITIES (NOT GUARANTEED)			
ITEM NO.	DESCRIPTION	QUANTITY	UNIT
115.1	DEMOLITION OF BRIDGE NO. N-08-020	1	LS
127.	CONCRETE EXCAVATION	10	CY
140.	BRIDGE EXCAVATION	740	CY
140.1	BRIDGE EXCAVATION WITHIN COFFERDAM	280	CY
151.2	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	530	CY
156.	CRUSHED STONE	130	TON
160.3	CONTROLLED LOW-STRENGTH MATERIAL (> 300 PSI)	10	CY
191.11	CORE BORING	60	FT
450.601	SUPERPAVE BRIDGE SURFACE COURSE - 9.5 POLYMER (SSC-B - 9.5 - P)	10	TON
450.701	SUPERPAVE BRIDGE PROTECTIVE COURSE - 9.5 POLYMER (SPC-B - 9.5 - P)	10	TON
645.048	48 INCH CHAIN LINK FENCE (PIPE TOP RAIL)(LINE POST OPTION)	15	FT
698.4	GEOTEXTILE FABRIC FOR PERMANENT EROSION CONTROL	300	SY
950.31	EARTH SUPPORT SYSTEM - BRIDGE NO. N-08-020	1	LS
953.	STEEL SHEETING OBSTRUCTION	280	FT
983.1	RIPRAP	450	TON
991.1	CONTROL OF WATER - STRUCTURE NO. N-08-020	1	LS
994.01	TEMPORARY PROTECTIVE SHIELDING, BRIDGE NO. N-08-020	1	LS
995.01	BRIDGE STRUCTURE, BRIDGE NO. N-08-020	1	LS

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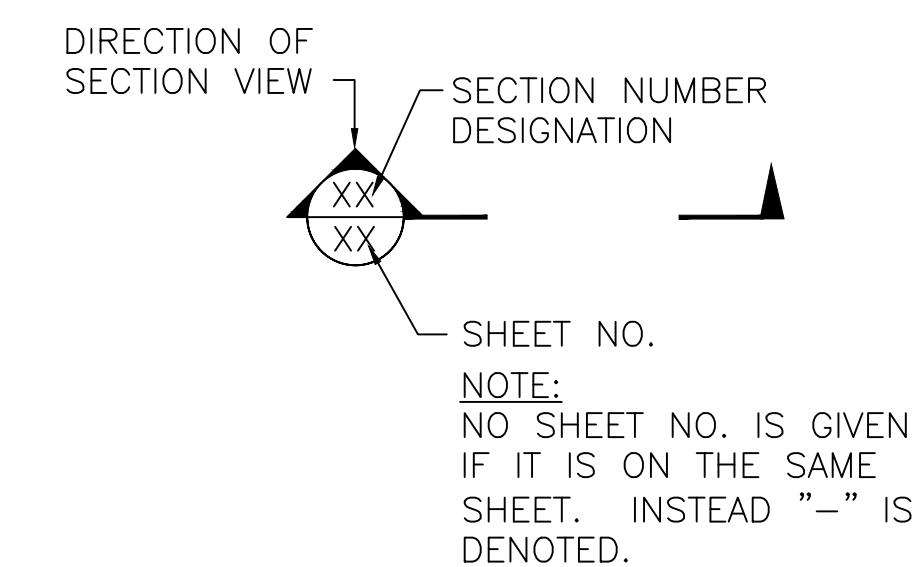
**GENERAL NOTES**

TRAFFIC DATA		
	ROADWAY OVER	ROADWAY UNDER
DESIGN YEAR	2043	YEAR
AVERAGE DAILY TRAFFIC - PRESENT	213	ADT
AVERAGE DAILY TRAFFIC - DESIGN YEAR	260	ADT
DESIGN HOURLY VOLUME	23	DHV
DIRECTIONAL DISTRIBUTION	0.87	DIST
TRUCK PERCENTAGE - AVERAGE DAY	10.8%	ADTT
TRUCK PERCENTAGE - PEAK HOUR	4.3%	PHTT
DESIGN SPEED	20 MPH	DES
DIRECTIONAL DESIGN HOURLY VOLUME	20	DDHV

SEISMIC DESIGN CRITERIA	
DESIGN RETURN PERIOD:	1000 TR.
DESIGN SPECTRA	
As	0.094
SDs	0.211
SD1	0.089
SITE CLASS	D
SEISMIC DESIGN CATEGORY (SDC)	A

HYDRAULIC DESIGN FLOOD (HDF) DATA	
DRAINAGE AREA (SQ. MILES)	9.24
HDF DISCHARGE (C.F.S.)	1,673
HDF FREQUENCY (YEARS)	10
HDF VELOCITY (F.P.S.)	7.54
HDF ELEVATION (FEET, NAVD, UPSTREAM)	986.24
BASE (100-YEAR) FLOOD DATA	
BASE FLOOD DISCHARGE (C.F.S.)	3,615
BASE FLOOD ELEVATION (FEET, NAVD, UPSTREAM)	989.57
SCOUR DESIGN FLOOD (SDF) EVENT DATA	
SDF EVENT FREQUENCY (YEARS)	25
SDF ELEVATION (FEET, NAVD, UNDER BRIDGE)	987.36
SDF TOTAL SCOUR DEPTH AT ABUTMENT (FEET)	9.50
SDF TOTAL SCOUR DEPTH AT PIER (FEET)	N/A
SCOUR CHECK FLOOD (SCF) EVENT DATA	
SCF EVENT FREQUENCY (YEARS)	50
SCF ELEVATION (FEET, NAVD, UNDER BRIDGE)	988.38
SCF TOTAL SCOUR DEPTH AT ABUTMENT (FEET)	11.14
SCF TOTAL SCOUR DEPTH AT PIER (FEET)	N/A
FLOOD OF RECORD	
DISCHARGE (C.F.S.)	N/A
FREQUENCY (IF KNOWN, YEARS)	N/A
MAXIMUM ELEVATION (FEET, NAVD)	N/A
DATE (MM/YYYY)	N/A
HISTORY OF ICE FLOES	N/A
EVIDENCE OF SCOUR AND EROSION	N/A

**SECTION MARK**

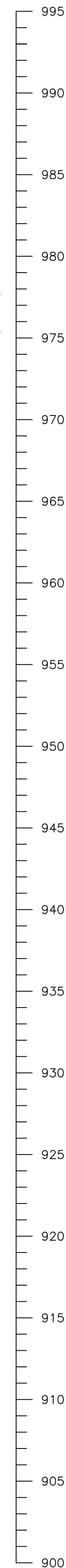


DATE	DESCRIPTION
SEPT. 14, 2024	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

BORING NO. BB-1

massDOT Boring Log		LAMSON ENGINEERING CORPORATION 437 Cherry Street, #109, Newton, Massachusetts 02465 Phone: (617) 558-0101 E-Mail: Lamsoneng@msn.com				Boring No. BB-1 (Bridge Boring)		Scale: 1" = 5'	
City/Town: New Marlborough		Bridge No.: N-08-020 (06N)		Project File No.: 609078		Contract No.: -			
Location: Keys Hill Road over Umpachene River		Date & Time Started: 8/19/20 11:00 a.m.		Date & Time Completed: 8/21/20 10:30 a.m.		Total Hours: 19.5			
Groundwater Depth (Feet): 0'		Date & Time: 8/21/20 7:00 a.m.		Date & Time Completed: 8/21/20 10:30 a.m.		19.5			
Coordinates: N 2,863,789.3 E 181,585.4		Ground Elevation (Feet): 991.0'		Inspector's Name: WeiJie Dong					
Drilling Company: New England Boring Contractors				Driller's Name: Mark D'Ambrosio		Helper's Name: Cody Richards			
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot			Recovery (inches)	Field Description	Strata Changes		
S-1	0' - 2'	15	26	32	19	15'	Dry, very dense, brown, FINE TO COARSE SAND, some fine to coarse gravel, trace inorganic silt.		
S-2	4' - 6'	14	8	6	4	11'	Dry, medium dense, brown, FINE TO COARSE SAND, some fine to coarse gravel, trace inorganic silt.		
S-3	10' - 12'	3	4	5	15	0"	No Recovery (Sand & Gravel from Wash).		
S-4	15' - 17'	10	23	22	8	9"	Wet, dense, gray, FINE TO COARSE SAND, some fine to coarse gravel, trace inorganic silt.		
S-5	20' - 22'	17	15	17	20	8"	Wet, dense, brown, FINE TO COARSE SAND, some fine to coarse gravel, trace inorganic silt.		
S-6	25' - 27'	12	19	15	18	17"	Wet, dense, brown, FINE SAND, some inorganic silt, some fine to medium gravel.		
S-7	30' - 32'	20	25	22	21	17"	Wet, dense, brown, FINE SAND, some inorganic silt, some fine to medium gravel.		
S-8	35' - 37'	16	18	23	30	18"	Wet, dense, brown, FINE SAND, some inorganic silt, some fine to medium gravel.		
S-9	40' - 42'	19	42	44	78	7"	Wet, very dense, brown, FINE SAND, some inorganic silt, some fine to medium gravel.		
S-10	45' - 47'	21	23	25	28	21"	Wet, dense, brown, FINE SAND, some inorganic silt, some fine to medium gravel.		
S-11	50' - 50'3"	120/3"			3"	3"	Wet, very dense, brown, FINE SAND, some inorganic silt, some fine to medium gravel.		
S-12	55' - 57'	19	26	28	27	18"	Wet, very dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.		
S-13	60' - 60'9"	21	100/3"		5"	5"	Wet, very dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.		
S-14	65' - 67'	21	57	29	35	15"	Wet, very dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.		
S-15	70' - 72'	13	32	54	48	9"	Wet, very dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.		
S-16	75' - 77'	16	19	23	22	17"	Wet, dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.		
S-17	80' - 82'	26	42	72	75	6"	Wet, very dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.		
S-18	85' - 85'9"	103	70/3"		8"	8"	Wet, very dense, brown, FINE TO COARSE SAND & FINE TO COARSE GRAVEL, trace inorganic silt.		
S-19	90' - 90'3"	120/3"			3"	3"	Wet, very dense, brown, FINE TO COARSE SAND & FINE TO COARSE GRAVEL, trace inorganic silt.		

ELEVATION (FEET)



BOTTOM OF FOOTING  
ELEV. 972.00

BOTTOM OF TREMIE CONCRETE  
ELEV. 965.00 (MIN.)

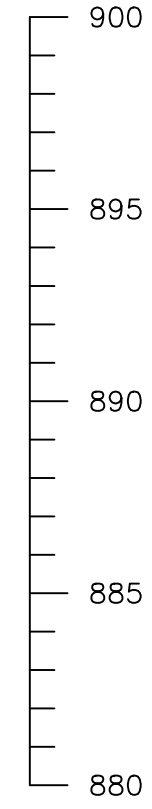
TIP OF STEEL SHEETING  
ELEV. 951.00 (SEE NOTE 4)

NO CONSTRUCTION BELOW  
ELEV. 940.1± (SEE NOTE 4)

BORING NO. BB-1 (CONTINUED)

massDOT Boring Log		LAMSON ENGINEERING CORPORATION 437 Cherry Street, #109, Newton, Massachusetts 02465 Phone: (617) 558-0101 E-Mail: Lamsoneng@msn.com				Boring No. BB-1 (Bridge Boring)		Scale: 1" = 5'	
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot		Recovery (inches)	Field Description	Strata Changes			
S-20	100' - 101'4"	45	61	70'4"	16"	Pockets of Cobbles / Boulders Top of Possible Weathered Bedrock @ 98'6"			
S-21	105' - 105'8"	72	58'2"		6"	Possible Highly Weathered Bedrock Bottom of Exploration @ 105'8" - Boring terminated at 105'8" deep due to artesian.			

ELEVATION (FEET)



Notes: * Ground water measured at ground level due to artesian.		Arrow-Board: Signs: - Cones: 4	Protective Device: Well Depth: - Stick Up Pipe: -	Stand: - Solid Pipe: - Screen Pipe: -	Box: -
Penetration Resistance (N) Guide:				Type of Drill Rig: Truck GT8	
Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Sils, Clays)		Hammer Weight: 300 lbs Fall: 24"	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance	Casing Types: HW	NW
Very Loose	0 - 4	Very Soft	0 - 2	Size: 4"	3"
Loose	4 - 10	Soft	2 - 4	Depth: 25'	100'
Medium Dense	10 - 30	Medium Stiff	4 - 8	Sampler Type: S/S Size: 1 3/8" ID	
Dense	30 - 50	Stiff	8 - 15	Automatic Hammer Weight: 140 lbs	
Very Dense	Over 50	Very Stiff	15 - 30	Safety Hammer Weight: Donut Hammer Weight: Fall: 30"	
N-Sum of Second and Third 6" Blow Counts			Hard	Over 30	Core Barrel Type: - Size: -
Terms Used for Second Entry of Descriptions: and = 40-50%, some = 10-40%, trace = 10% or less					

NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	19	42
PROJECT FILE NO.		609078	

BORING LOGS (1 OF 3)

BORING NOTES:

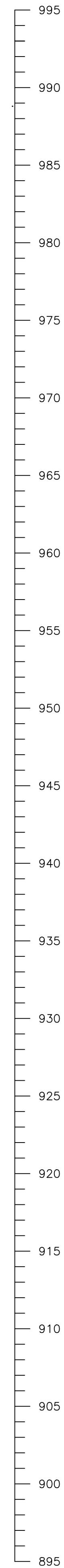
- LOCATION OF A BORING IS SHOWN ON SHEET 1 OF 22 AS THUS: ●
- LOCATION OF A PROBE IS SHOWN ON SHEET 1 OF 22 AS THUS: +
- BORINGS ARE TAKEN FOR PURPOSE OF DESIGN AND SHOW CONDITIONS AT THE BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.
- WATER LEVELS SHOWN ON THE BORING LOGS COULD NOT BE MEASURED AT THE TIME OF TAKING BORINGS DUE TO ARTESIAN AQUIFER CONDITION.  
  
ARTESIAN AQUIFER WAS ENCOUNTERED DURING THE BORING EXPLORATION PROGRAM AT BOTH BORINGS BB-1 AND BB-2. TOP OF THE ARTESIAN AQUIFER IS ESTIMATED BETWEEN DEPTH OF 52' TO 96'. NO CONSTRUCTION SHOULD BE CONDUCTED BELOW ELEV. 940.1 (APPROXIMATELY 52' FROM THE EXISTING ROADWAY SURFACE AT BRIDGE LOCATION) TO AVOID CONSTRUCTION ISSUES FROM POTENTIAL AQUIFER CONDITION.  
  
DUE TO THE PROXIMITY OF THE PROPOSED PROJECT TO THE UMPACHENE RIVER, THE GROUNDWATER LEVEL IS LIKELY TO BE INFLUENCED BY THE RIVER WATER WHICH ALSO FLUCTUATES DUE TO SEASONAL CHANGES AND STORM EVENTS.
- FIGURES IN THE COLUMN INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A 1-3/8" I.D. SPLIT SPOON SAMPLER 6" USING A 140 POUND WEIGHT FALLING 30".
- BORING SAMPLES ARE STORED AT A STORAGE FACILITY LOCATED ON ROUTE 114 (219 WINTHROP AVENUE) IN LAWRENCE, MASSACHUSETTS. THE CONTRACTOR MAY EXAMINE THE SOIL AND ROCK SAMPLES BY CONTACTING THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL SECTION AT 10 PARK PLAZA, ROOM 6500, BOSTON, MA 02116, AT (857)368-9182.
- ALL BORINGS WERE MADE IN AUGUST 2020.
- BORINGS WERE MADE BY NEW ENGLAND BORING CONTRACTORS LOCATED AT 40 FORDWAY STREET, DERRY, NEW HAMPSHIRE 03038.
- THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.

SEPT. 14, 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	

BORING NO. BB-2

massDOT Boring Log		LAMSON ENGINEERING CORPORATION 437 Cherry Street, #109, Newton, Massachusetts 02465 Phone: (617) 558-0101 E-Mail: Lamsoneng@msn.com				Boring No. BB-2 (Bridge Boring) Scale: 1" = 5'		
City/Town: New Marlborough		Bridge No.: N-08-020 (06N)		Project File No.: 609078		Contract No.: -		
Location: Keyes Hill Road over Umpachene River		Date & Time Started: 8/17/20 12:00 a.m.		Date & Time Completed: 8/19/20 11:00 a.m.		Total Hours: 19.5		
Groundwater Depth (Feet): "0"		Date & Time: 8/19/20 7:00 a.m.		Inspector's Name: Weijie Dong		Coordinates: N 2,863,778.3 E 181,648.2		
Ground Elevation (Feet): 992.1'		Driller's Name: Mark D'Ambrosio		Helper's Name: Cody Richards				
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches				Recovery (Inches)	Field Description	Strata Changes
		Coring	Times	Minute	Per Foot			
S-1	0' - 2'	16	16	16	16	15"	Dry, dense, brown, FINE TO COARSE SAND, some fine to coarse gravel, trace inorganic silt.	
S-2	5' - 7'	12	6	5	7	5"	Dry, medium dense, brown, FINE TO COARSE SAND, trace fine gravel, trace inorganic silt.	
S-3	10' - 12'	15	12	16	11	6"	Wet, medium dense, brown, FINE TO COARSE SAND, some fine to coarse gravel, trace inorganic silt.	
S-4	15' - 17'	2	2	1	3	7"	Wet, soft, gray, INORGANIC SILT, pieces of wood, trace fine sand, trace fine gravel.	14'
S-5	20' - 22'	6	7	26	30	11"	Wet, dense, brown, FINE SAND, some inorganic silt, trace fine gravel.	18'6"
S-6	25' - 27'	9	11	20	13	16"	Wet, dense, brown, FINE SAND, some inorganic silt, trace fine gravel.	
S-7	30' - 32'	14	30	26	22	12"	Wet, very dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.	
S-8	35' - 37'	13	20	19	20	19"	Wet, dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.	
S-9	40' - 42'	14	17	39	25	17"	Wet, very dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.	
S-10	45' - 47'	10	12	16	18	21"	Wet, dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.	
S-11	50' - 52'	12	20	34	45	17"	Wet, very dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.	
S-12	55' - 57'	16	35	54	58	12"	Wet, very dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.	
S-13	60' - 62'	21	30	22	31	5"	Wet, very dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.	
S-14	65' - 67'	10	20	23	28	8"	Wet, dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.	
S-15	70' - 72'	22	18	20	23	16"	Wet, dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.	
S-16	75' - 76'6"	17	27	108		13"	Wet, very dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.	
S-17	80' - 82'	28	40	50	41	14"	Wet, very dense, brown, FINE SAND, some inorganic silt, some fine to coarse gravel.	
S-18	85' - 87'	63	57	42	35	17"	Wet, very dense, brown, FINE TO COARSE SAND, some fine gravel, trace inorganic silt.	
S-19	95' - 96'	50	80			10"	Wet, very dense, brown, FINE TO COARSE SAND, some fine gravel, trace inorganic silt.	96'

ELEVATION (FEET)



BOTTOM OF FOOTING  
ELEV. 972.00

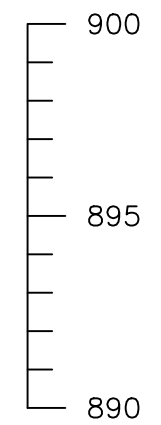
BOTTOM OF TREMIE CONCRETE  
ELEV. 965.00 (MIN.)

TIP OF STEEL SHEETING  
ELEV. 951.00 (SEE SHEET 3  
OF 22, NOTE 4)

NO CONSTRUCTION BELOW  
ELEV. 940.1±

BORING NO. BB-2 (CONTINUED)

massDOT Boring Log		LAMSON ENGINEERING CORPORATION 437 Cherry Street, #109, Newton, Massachusetts 02465 Phone: (617) 558-0101 E-Mail: Lamsoneng@msn.com				Boring No. BB-2 (Bridge Boring) Scale: 1" = 5'	
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches		Recovery (Inches)	Field Description	Strata Changes	
		Coring	Times	Minute	Per Foot		
						96'	
					Bottom of Exploration @ 96'		
					- Boring terminated at 96' deep due to artesian.		
Notes: * Ground water measured at ground level due to artesian.					Arrow-Board: Signs: - Cones: 4	Protective Device: Well Depth: - Stick Up Pipe: -	Stand: - Solid Pipe: - Screen Pipe: -
Penetration Resistance (N) Guide:					Type of Drill Rig: Truck GT8		
Cohesionless Soils (Sands, Gravels)			Cohesive Soils (Sills, Clays)			Hammer Weight: 300 lbs Fall: 24"	
Relative Density	Penetration Resistance		Consistency	Penetration Resistance		Casing Types: HW	NW
Very Loose	0 - 4		Very Soft	0 - 2		Size: 4"	3"
Loose	4 - 10		Soft	2 - 4		Depth: 25"	95"
Medium Dense	10 - 30		Medium Stiff	4 - 8		Sampler Type: S/S Size: 1 3/8" ID	
Dense	30 - 50		Stiff	8 - 15		Automatic Hammer Weight: 140 lbs	
Very Dense	Over 50		Very Stiff	15 - 30		Safety Hammer Weight:	
N=Sum of Second and Third 6" Blow Counts			Hard	Over 30		Donut Hammer Weight: Fall: 30"	
Terms Used for Second Entry of Descriptions: and = 40-50%, some = 10-40%, trace = 10% or less					Core Barrel Type: - Size: -		



NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	20	42
PROJECT FILE NO.		609078	

BORING LOGS (2 OF 3)

BORING NOTES:

FOR BORING NOTES, SEE SHEET 3.

SEPT. 14, 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	

**NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	21	42
PROJECT FILE NO.		609078	

**BORING LOGS (3 OF 3)**

<b>massDOT</b> Probe Log	<b>LAMSON ENGINEERING CORPORATION</b> 437 Cherry Street, #109, Newton, Massachusetts 02465 Phone: (617) 558-0101 E Mail: Lamsoneng@msn.com	<b>Probe No.</b> P-1	Page 1/1
City/Town: New Marlborough	Bridge No.: N-08-020 (06N)	Project File No.: 609078	Contract No.:
Location: Keyes Hill Road over Umpachene River		Date & Time Started: 8/24/20 9:30 am	Total Hours: 1.5
Coordinates: N 2,863,784.3 E 181,594.3		Ground Elev.(Feet): 991.0	Date & Time Completed: 8/24/20 11:00 am
Drilling Company: New England Boring Contractors	Driller's Name: Carl Downings	Helper's Name: Mark D'Ambrosio	
Inspector's Name: Weijie Dong	Type of Drill Rig: Geoprobe 6712DT	Drill Rods/Solid Augers: 1.5" Drill Rods	Type: Size: Hammer:

**INFORMATION LOG**

Probe Number	Depth	Distance From Face	Refusal or Required Depth
P-1A	6"	1'6"	Refusal
P-1B	6"	2'6"	Refusal
P-1C	7"	3'6"	Refusal
P-1D	7'6"	4'6"	Refusal
P-1E	11'6"	5'6"	Refusal

Probe Number	Depth	Distance From Face	Refusal or Required Depth
P-1F	10'6"	6"	Refusal
P-1G	10'6"	7"	Refusal
P-1H	6"	6"	Refusal

Remarks: Coordinates and ground elevation are for first probe P-1A.  
\* Probe hole P-1D and P-1E are drilled at 70° and 75°, respectively.

**SKETCH (PLAN VIEW)**

Remarks:

<b>massDOT</b> Probe Log	<b>LAMSON ENGINEERING CORPORATION</b> 437 Cherry Street, #109, Newton, Massachusetts 02465 Phone: (617) 558-0101 E Mail: Lamsoneng@msn.com	<b>Probe No.</b> P-2	Page 1/1
City/Town: New Marlborough	Bridge No.: N-08-020 (06N)	Project File No.: 609078	Contract No.:
Location: Keyes Hill Road over Umpachene River		Date & Time Started: 8/17/20 10:00 am	Total Hours: 1.5
Coordinates: N 2,863,782.5 E 181,639.4		Ground Elev.(Feet): 991.7	Date & Time Completed: 8/17/20 11:30 am
Drilling Company: New England Boring Contractors	Driller's Name: Mark D'Ambrosio	Helper's Name: Cody Richards	
Inspector's Name: Weijie Dong	Type of Drill Rig: Truck - GT8	Drill Rods/Solid Augers: DR	Type: AW Size: 1-3/8" Hammer: 140 lb

**INFORMATION LOG**

Probe Number	Depth	Distance From Face	Refusal or Required Depth
P-2A	2'6"	1'6"	Refusal
P-2B	2'0"	2'6"	Required

Probe Number	Depth	Distance From Face	Refusal or Required Depth

Remarks: Coordinates and ground elevation are for first probe P-2A.  
\* Probe line terminated at hole P-2B due to AW rods were kicked off the existing abutment causing bent rods. Possibly hit refusal at 5'6" deep. Unable to continue with the probe line.

**SKETCH (PLAN VIEW)**

Remarks:

**NOTE:**  
THESE ARE THE PROBE RESULTS AT THE BACK OF EXISTING ABUTMENT.

<b>massDOT</b> Probe Log	<b>LAMSON ENGINEERING CORPORATION</b> 437 Cherry Street, #109, Newton, Massachusetts 02465 Phone: (617) 558-0101 E Mail: Lamsoneng@msn.com	<b>Probe No.</b> P-3	Page 1/1
City/Town: New Marlborough	Bridge No.: N-08-020 (06N)	Project File No.: 609078	Contract No.:
Location: Keyes Hill Road over Umpachene River		Date & Time Started: 8/24/20 11:00 am	Total Hours: 1.5
Coordinates: N 2,863,781.5 E 181,638.7		Ground Elev.(Feet): 991.7	Date & Time Completed: 8/24/20 12:30 pm
Drilling Company: New England Boring Contractors	Driller's Name: Carl Downings	Helper's Name: Mark D'Ambrosio	
Inspector's Name: Weijie Dong	Type of Drill Rig: Geoprobe 6712DT	Drill Rods/Solid Augers: 1.5" Drill Rods	Type: Size: Hammer:

**INFORMATION LOG**

Probe Number	Depth	Distance From Face	Refusal or Required Depth
P-3A	2'6"	1'6"	Refusal
P-3B	6"	2'6"	Refusal
P-3C	8"	3'6"	Refusal
P-3D	8'6"	4'6"	Refusal
P-3E	8"	5'6"	Refusal

Probe Number	Depth	Distance From Face	Refusal or Required Depth
P-3F	8'6"	6'6"	Refusal
P-3G	11'6"	7'6"	Refusal

Remarks: Coordinates and ground elevation are for first probe P-3A.  
- Probe line P-3 created due to termination of P-2. Located at approximately 12" offset of P-2.

**SKETCH (PLAN VIEW)**

Remarks:

**BORING NOTES:**  
FOR BORING NOTES, SEE SHEET 3.

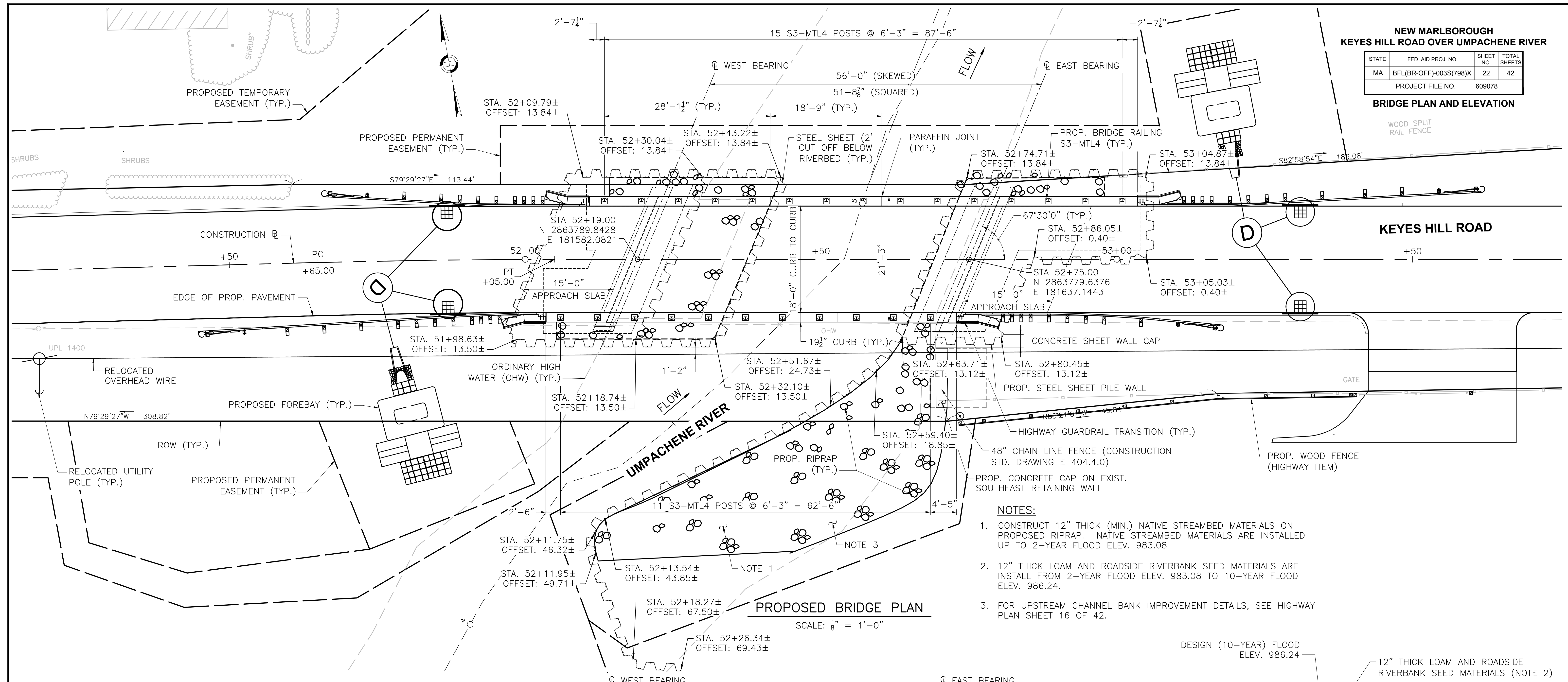
SEPT. 14, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

609078 Structural Plans Submittal (SF) 7-SEPTEMBER-2024 7-SEPTEMBER-2024 9:22 AM BORING LOGS (3 OF 3) DWG

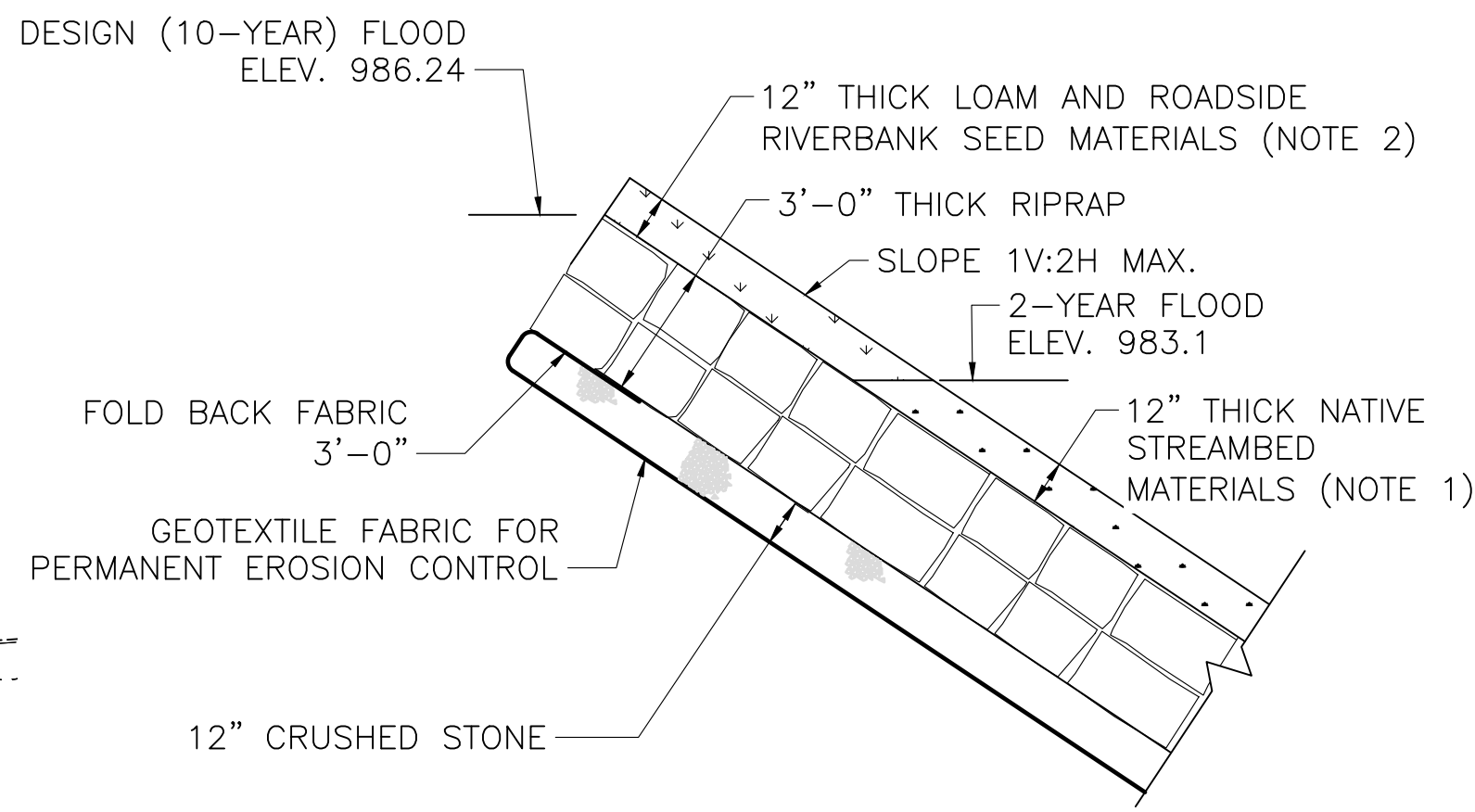
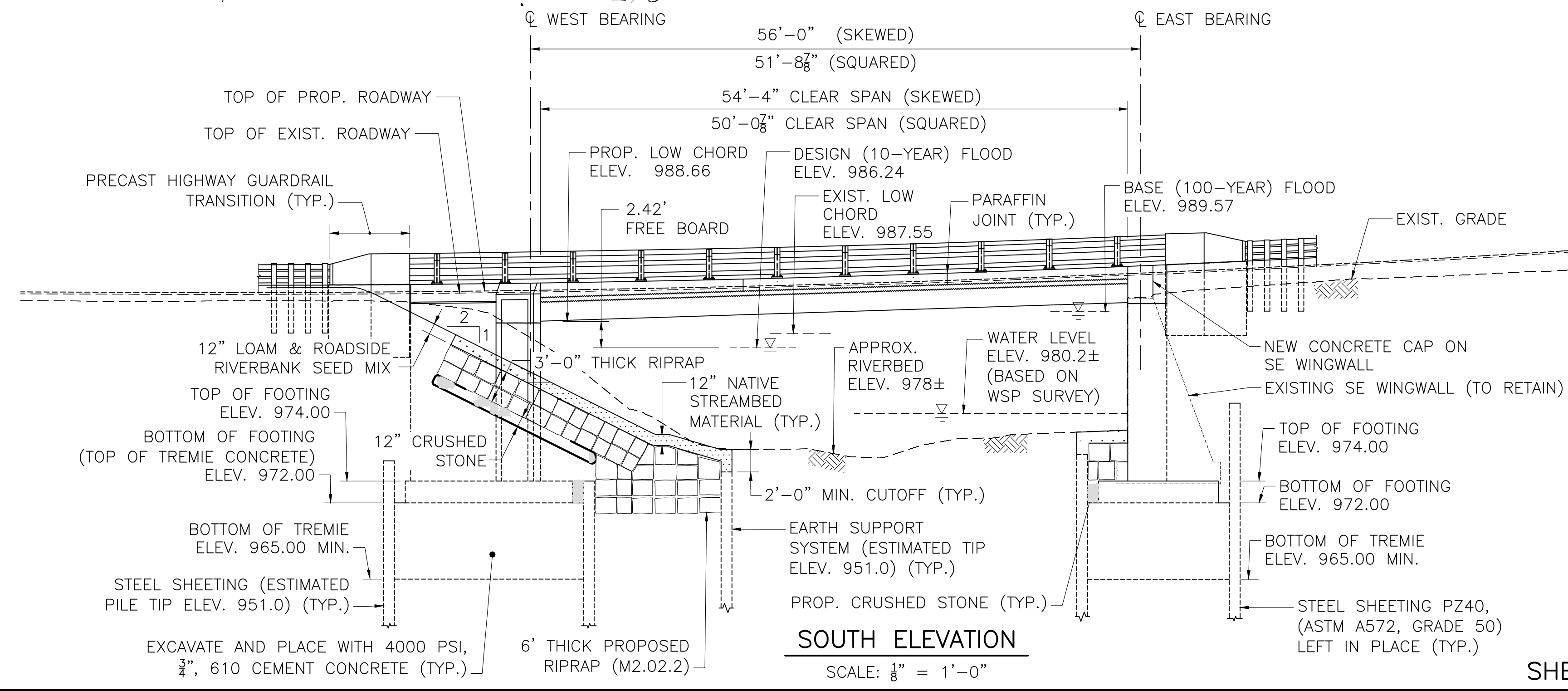
**NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	22	42
PROJECT FILE NO.		609078	

**BRIDGE PLAN AND ELEVATION**

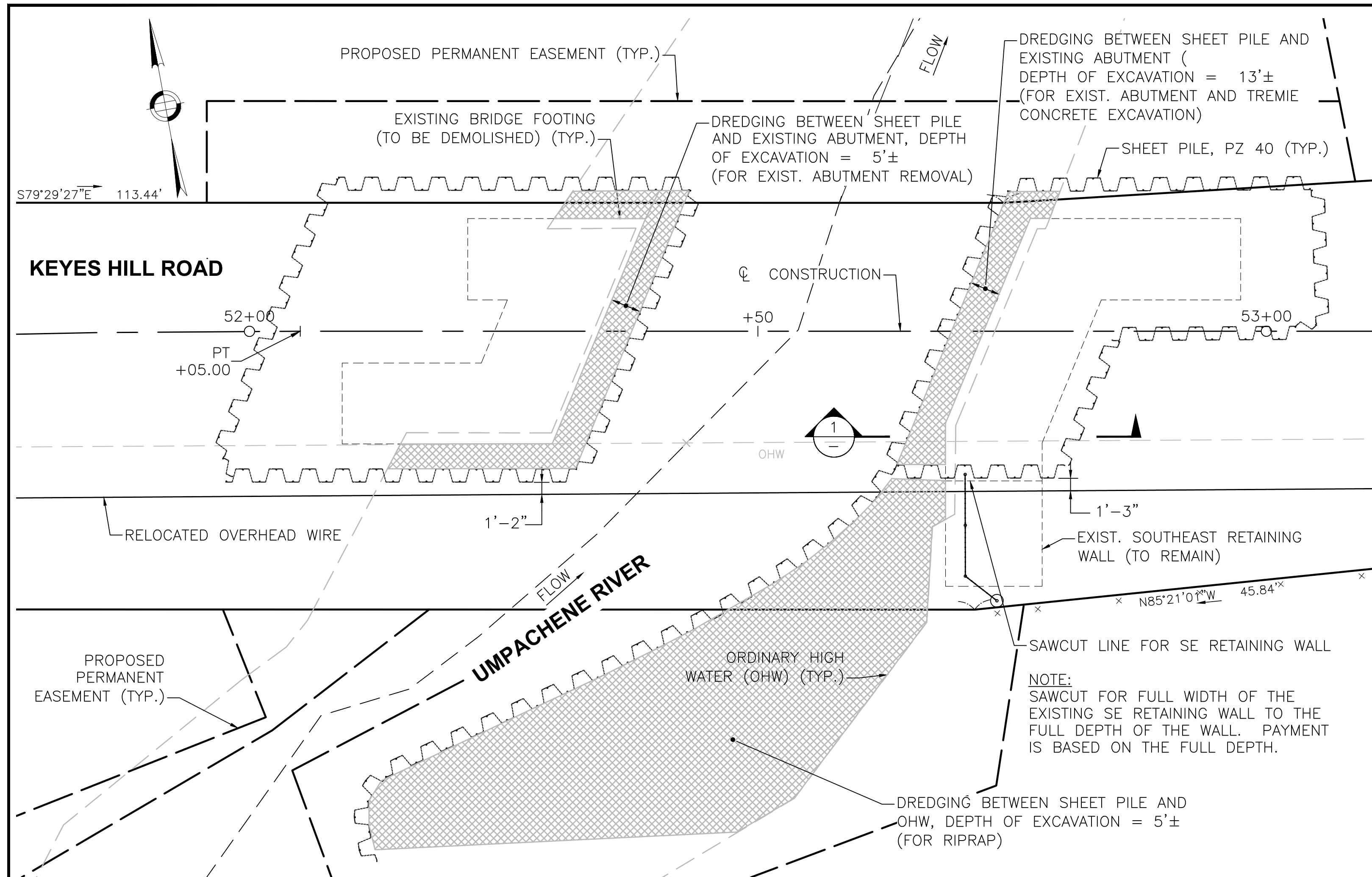


- NOTES:**
1. CONSTRUCT 12" THICK (MIN.) NATIVE STREAMBED MATERIALS ON PROPOSED RIPRAP. NATIVE STREAMBED MATERIALS ARE INSTALLED UP TO 2-YEAR FLOOD ELEV. 983.08
  2. 12" THICK LOAM AND ROADSIDE RIVERBANK SEED MATERIALS ARE INSTALL FROM 2-YEAR FLOOD ELEV. 983.08 TO 10-YEAR FLOOD ELEV. 986.24.
  3. FOR UPSTREAM CHANNEL BANK IMPROVEMENT DETAILS, SEE HIGHWAY PLAN SHEET 16 OF 42.



DATE	DESCRIPTION
SEPT. 14, 2024	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY: <i>[Signature]</i> STATE BRIDGE ENGINEER	
USE ONLY PRINTS OF LATEST DATE	

609078 Structural Plans Submittal (SF) 7-SEPTEMBER-2024 Plotted on 7-Sep-2024 9:22 AM



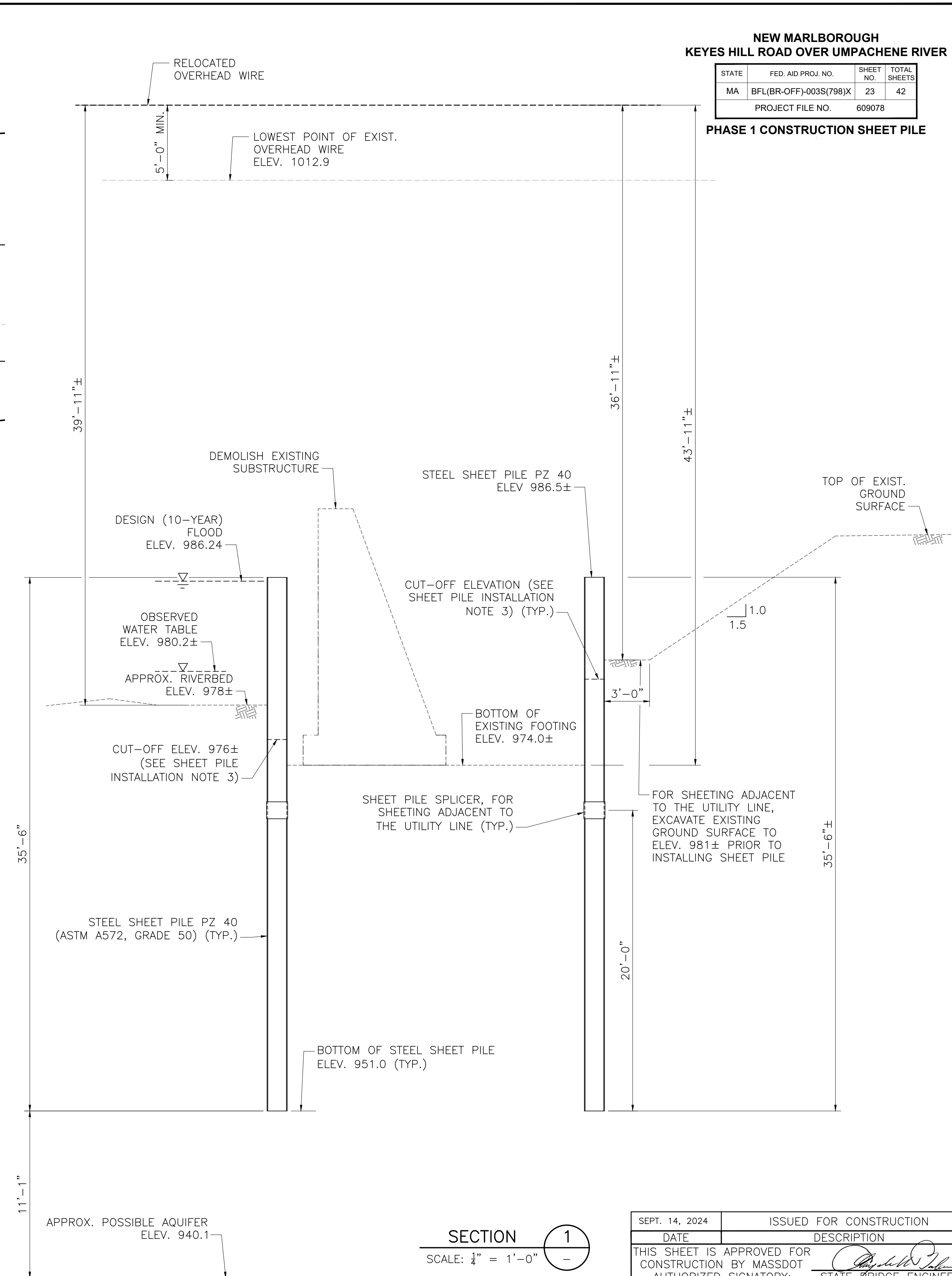
**PHASE 1 – EARTH SUPPORT SYSTEM PLAN**  
 SCALE: 1/8" = 1'-0"  
 (FOR EXISTING SUBSTRUCTURE DEMOLITION)

**SHEET PILE INSTALLATION NOTES:**

1. CONTRACTOR SHALL FIELD VERIFY THE NECESSARY DIMENSIONS TO AVOID CONFLICT OF SHEET PILE INSTALLATION ADJACENT TO THE OVERHEAD UTILITY LINE.
2. CONTRACTOR SHOULD USE SIDE GRIP METHOD AND VIBRATING SHEET PILE IN PLACE FOR SHEETS ADJACENT TO THE UTILITY LINE.
3. **PERMANENT SHEETING**  
SHEETING AROUND THE TREMIE CONCRETE IS PERMANENT SHEETING. SHEETING LOCATED WITHIN 10' MIN. FROM THE PROPOSED UTILITY LINE IS PERMANENT SHEETING. ALL PERMANENT SHEETING SHALL BE LEFT IN PLACE. IT SHALL BE CUTOFF 24" MIN. BELOW BOTTOM OF RIVER, 4' BELOW THE PROPOSED GROUND SURFACE OR 10' BELOW THE PROPOSED APPROACH SLAB AFTER CONSTRUCTION.
4. **TEMPORARY SHEETING**  
SHEETING THAT IS NOT PERMANENT SHEETING IS TEMPORARY SHEETING AND SHALL BE REMOVED FROM THE SITE, UNLESS OTHERWISE APPROVED BY THE ENGINEER.

**SHEET PILE SEQUENCE:**

1. INSTALL SHEETING. SHEETING MUST NOT BE DRIVEN BELOW ELEV. 951.0
2. DEMOLISH AND REMOVE THE EXISTING SUBSTRUCTURES, EXCEPT SOUTHEAST RETAINING WALL THAT IS TO BE RETAINED.
3. INSTALL WALER, STRUT AND CORNER BRACING. SINCE THESE COMPONENTS ARE FOR TEMPORARY USE, CONTRACTOR MAY HAVE AN ALTERNATIVE DESIGN FOR ENGINEER APPROVAL.
4. EXCAVATE AND REMOVE SUBSOIL TO ELEV. 965.0 MIN.
5. PERFORM TREMIE CONCRETE.
6. REMOVE WALERS, STRUTS AND CORNER BRACING.
7. CONSTRUCT PROPOSED CONCRETE FOOTING AND WALLS.
8. CUT SHEETING TO THE ELEVATION AS STATED ON PLAN.



**NEW MARLBOROUGH**  
**KEYES HILL ROAD OVER UMPACHENE RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	23	42
PROJECT FILE NO.		609078	

**PHASE 1 CONSTRUCTION SHEET PILE**

DATE	DESCRIPTION
SEPT. 14, 2024	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

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

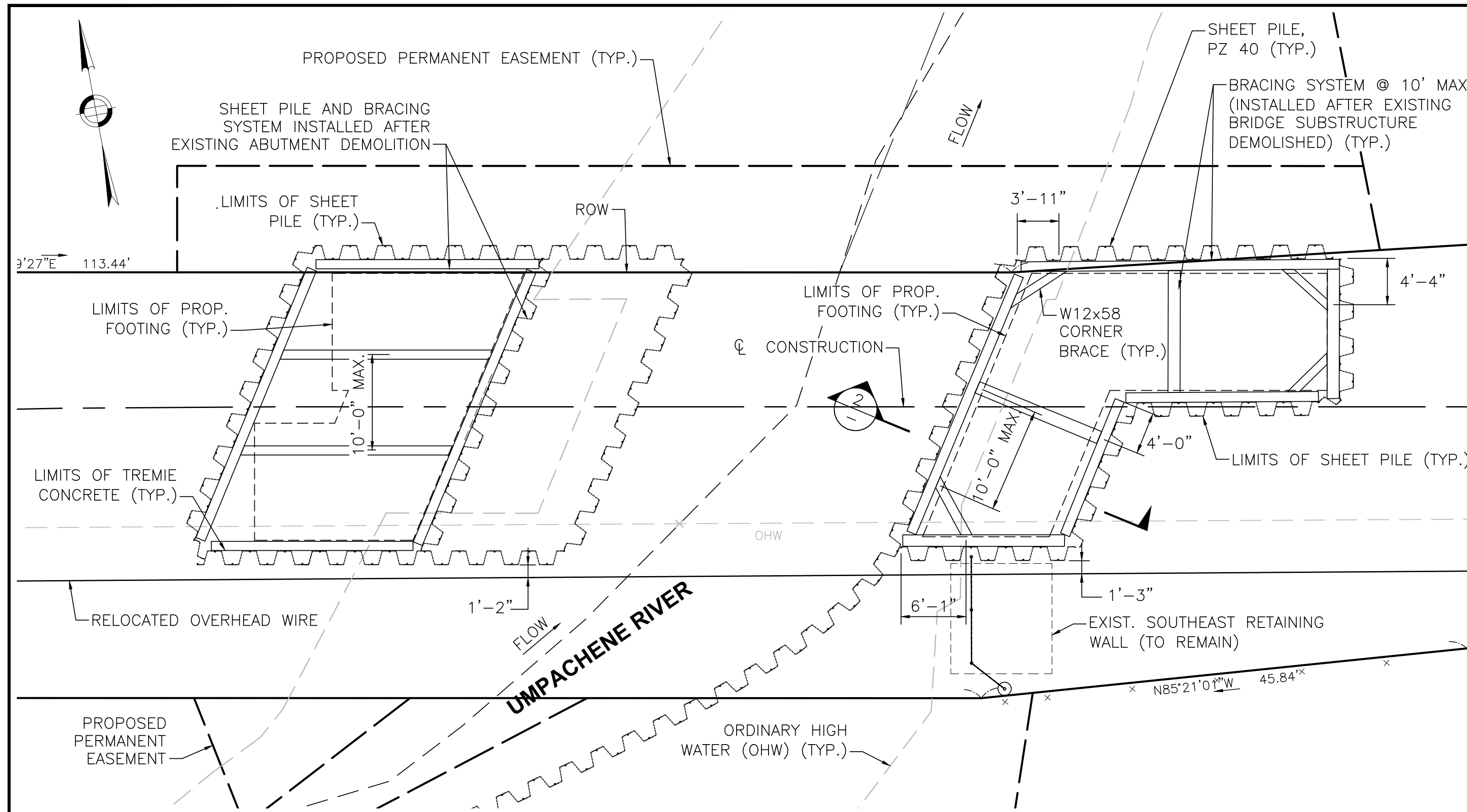
609078 Structural Plans Submittal (SF) 7-SEPTEMBER-2024 PHASE 1 CONSTRUCTION SHEET PILE.DWG Plotted on 7-Sep-2024 9:22 AM

NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	24	42
PROJECT FILE NO.			609078

PHASE 2 CONSTRUCTION SHEET PILE

**RAKE FINISH NOTE:**  
PROVIDE RAKE FINISH AT THE TOP OF TREMIE CONCRETE WHERE SUBSTRUCTURE FOOTING IS TO BE CONSTRUCTURED.



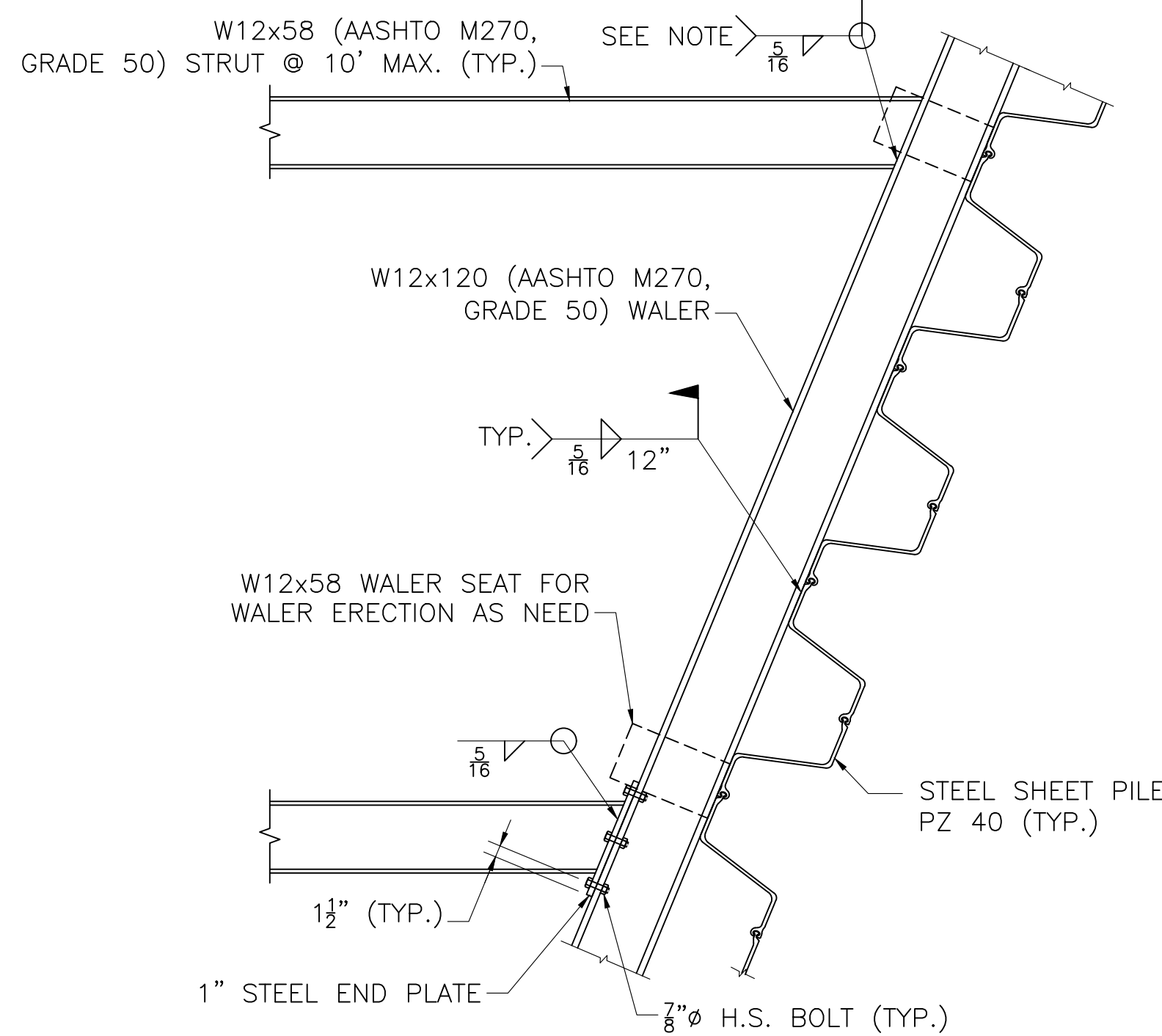
PHASE 2 - EARTH SUPPORT SYSTEM PLAN

SCALE: 1/8" = 1'-0"  
(FOR PROPOSED SUBSTRUCTURE CONSTRUCTION)

SUBMITALLS FOR TREMIE CONCRETE:

SUBMIT TREMIE CONCRETING EQUIPMENT, TOOLS, CONSTRUCTION METHOD AND PROCEDURE FOR ENGINEER'S REVIEW.

NOTE: CONTRACTOR CAN CHOOSE TO WELD ALL AROUND BETWEEN WALER AND STRUT.



PLAN - WALER AND STRUT DETAILS

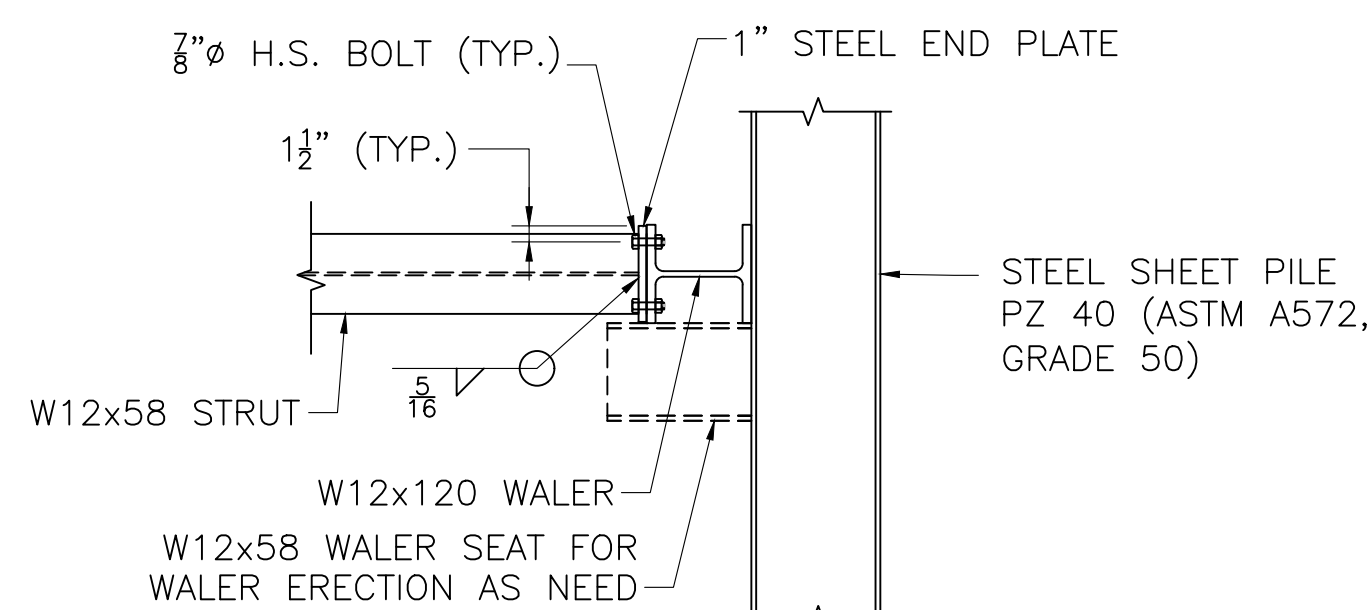
SCALE: 1/2" = 1'-0"

TREMIE CONCRETE CONSTRUCTION NOTES:

- AFTER STEEL SHEETING INSTALLATION, EXCAVATE AND REMOVE SOIL IN WATER TO BOTTOM OF TREMIE CONCRETE ELEVATION 965.0 MIN.
- START TREMIE CONCRETE FROM THE MIDDLE OF FOOTING TO THE FACE OF SHEETING AND FROM THE BOTTOM OF TREMIE CONCRETE AT ELEV. 965.0 TO APPROXIMATELY 12" ABOVE THE TOP ELEV. 972.0.
- REMOVE THE TOP EXTRA CONCRETE THAT IS LIKELY TO HAVE SPOILS MIXED IN. IF THE CONCRETE NEEDED TO BE REMOVED IS BELOW ELEV. 972.0, CONTRACTOR SHOULD PLACE MORE CONCRETE TO THE TOP ELEV. 972.0
- PERFORM 6 BORINGS, 3 AT EACH ABUTMENT, AT A LOCATION CHOSEN BY THE ENGINEER. EACH BORING SHOULD BE CONTINUOUS CORING THROUGH TREMIE CONCRETE. CORING LOGS ALONG WITH CORED SAMPLE PHOTOS SHOULD BE SUBMITTED TO ENGINEER FOR REVIEW.
- IMMEDIATELY BELOW THE BOTTOM OF TREMIE CONCRETE (ELEV. 965 MIN.), A SOIL BORING AND SAMPLING WITH SPT (STANDARD PENETRATION TEST) SHALL BE CONDUCTED.
- EACH BORED HOLE SHALL BE BACKFILLED WITH CEMENT GROUT OF 5000 PSI THAT SHALL BE LISTED IN MASSDOT QUALIFIED CONSTRUCTION MATERIALS LIST (QCML).

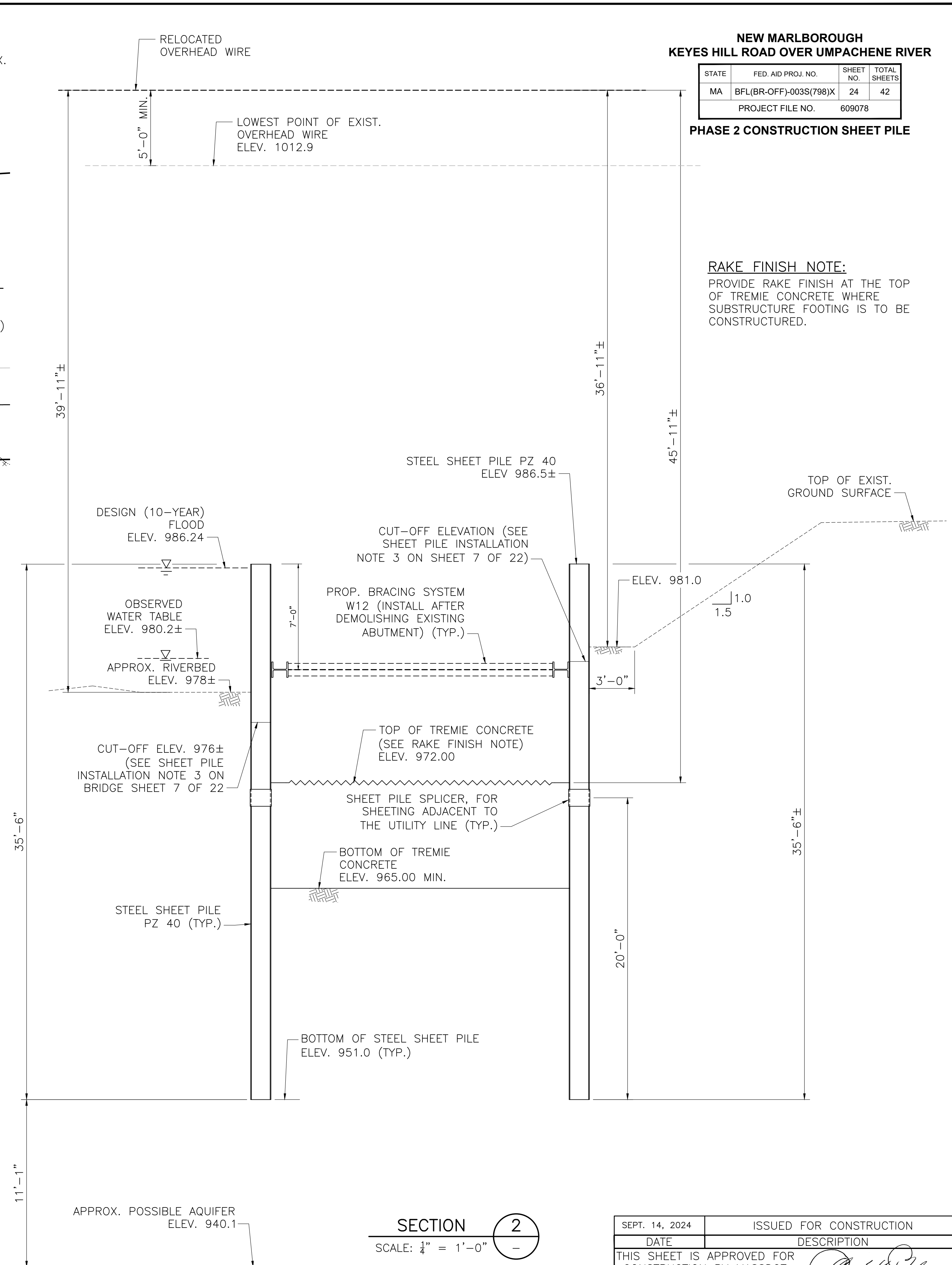
NOTE:

PROVIDE SHIM PLATES BETWEEN CONNECTION MEMBERS AND WELD THEM AROUND AS NEEDED.



ELEVATION - WALER AND STRUT DETAILS

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



SECTION 2

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

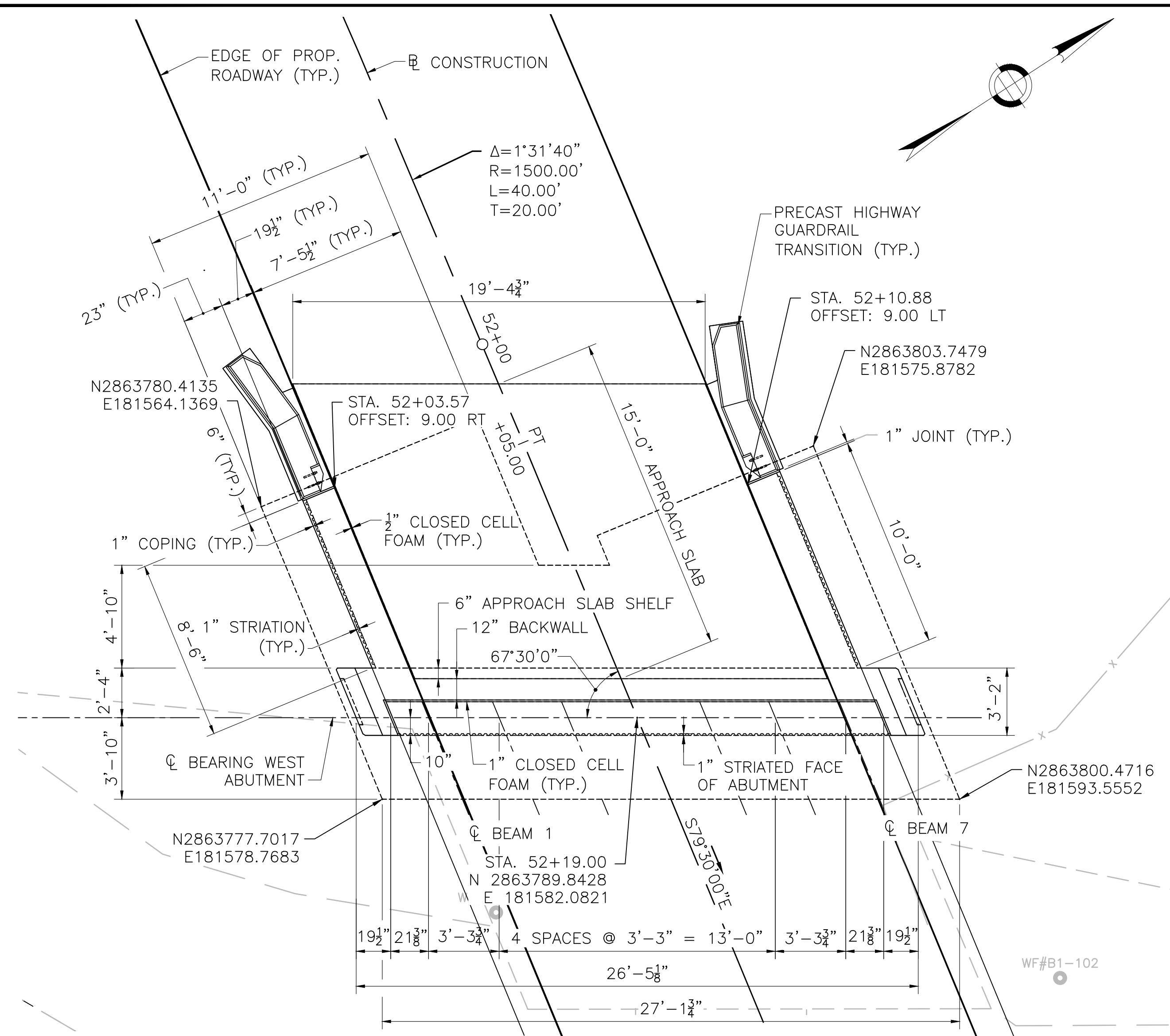
DATE	DESCRIPTION
SEPT. 14, 2024	ISSUED FOR CONSTRUCTION
	CONSTRUCTION BY MASSDOT
	AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
	USE ONLY PRINTS OF LATEST DATE



**NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER**

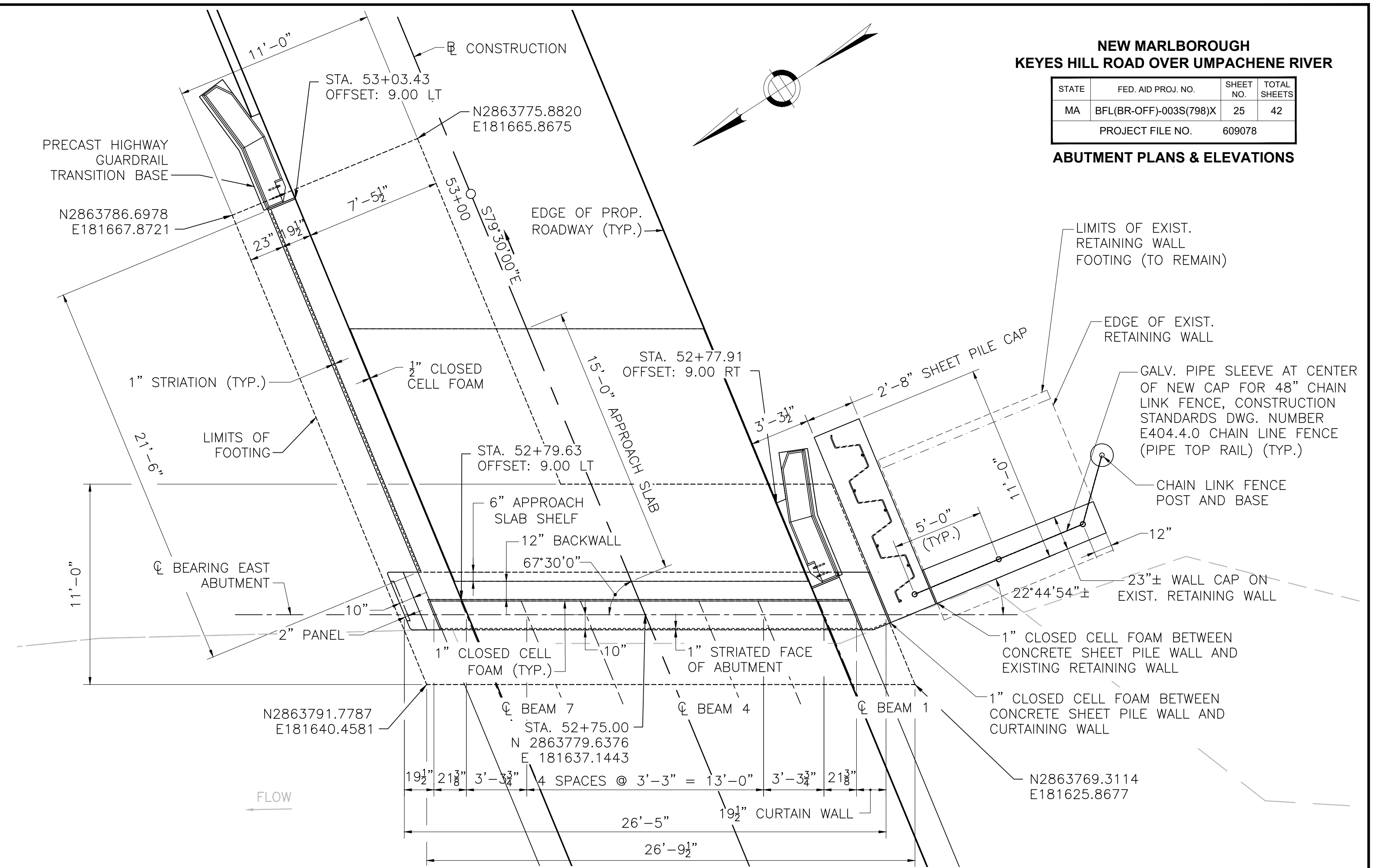
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	25	42
PROJECT FILE NO.			609078

**ABUTMENT PLANS & ELEVATIONS**



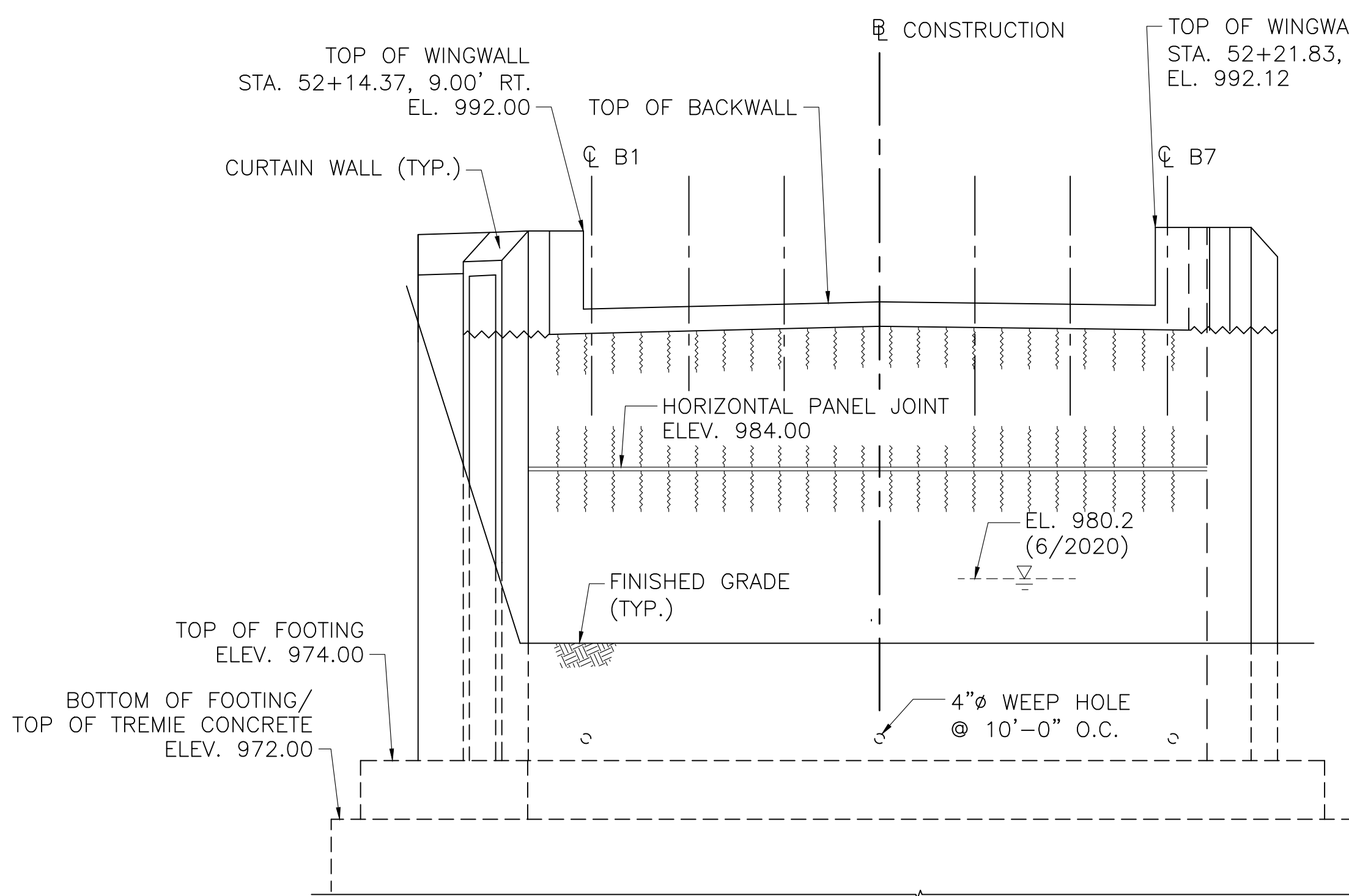
**WEST ABUTMENT PLAN**

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



**EAST ABUTMENT PLAN**

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

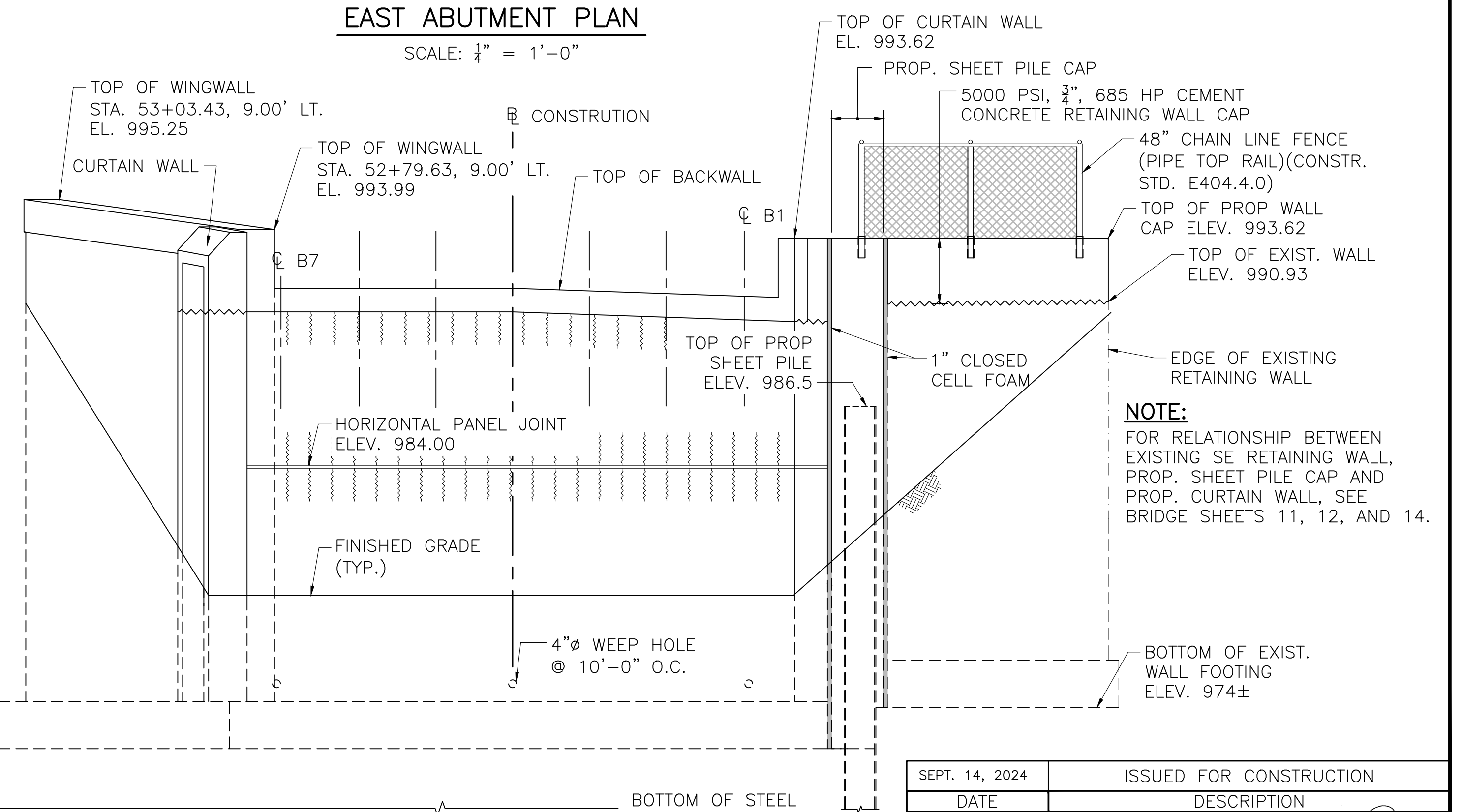


**WEST ABUTMENT ELEVATION**

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

BEAM NO.	WEST ABUTMENT		EAST ABUTMENT	
	SOUTH BEARING	NORTH BEARING	SOUTH BEARING	NORTH BEARING
BEAM 1	988.51	988.55	990.10	990.16
BEAM 2	988.60	988.64	990.23	990.29
BEAM 3	988.68	988.72	990.34	990.40
BEAM 4	988.76	988.77	990.46	990.49
BEAM 5	988.75	988.73	990.48	990.48
BEAM 6	988.71	988.69	990.48	990.48
BEAM 7	988.66	988.64	990.46	990.46

**NOTE:**  
PROPOSED RIPRAP AND SUPPORT OF EXCAVATION ARE NOT SHOWN FOR CLARITY.



**EAST ABUTMENT ELEVATION**

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

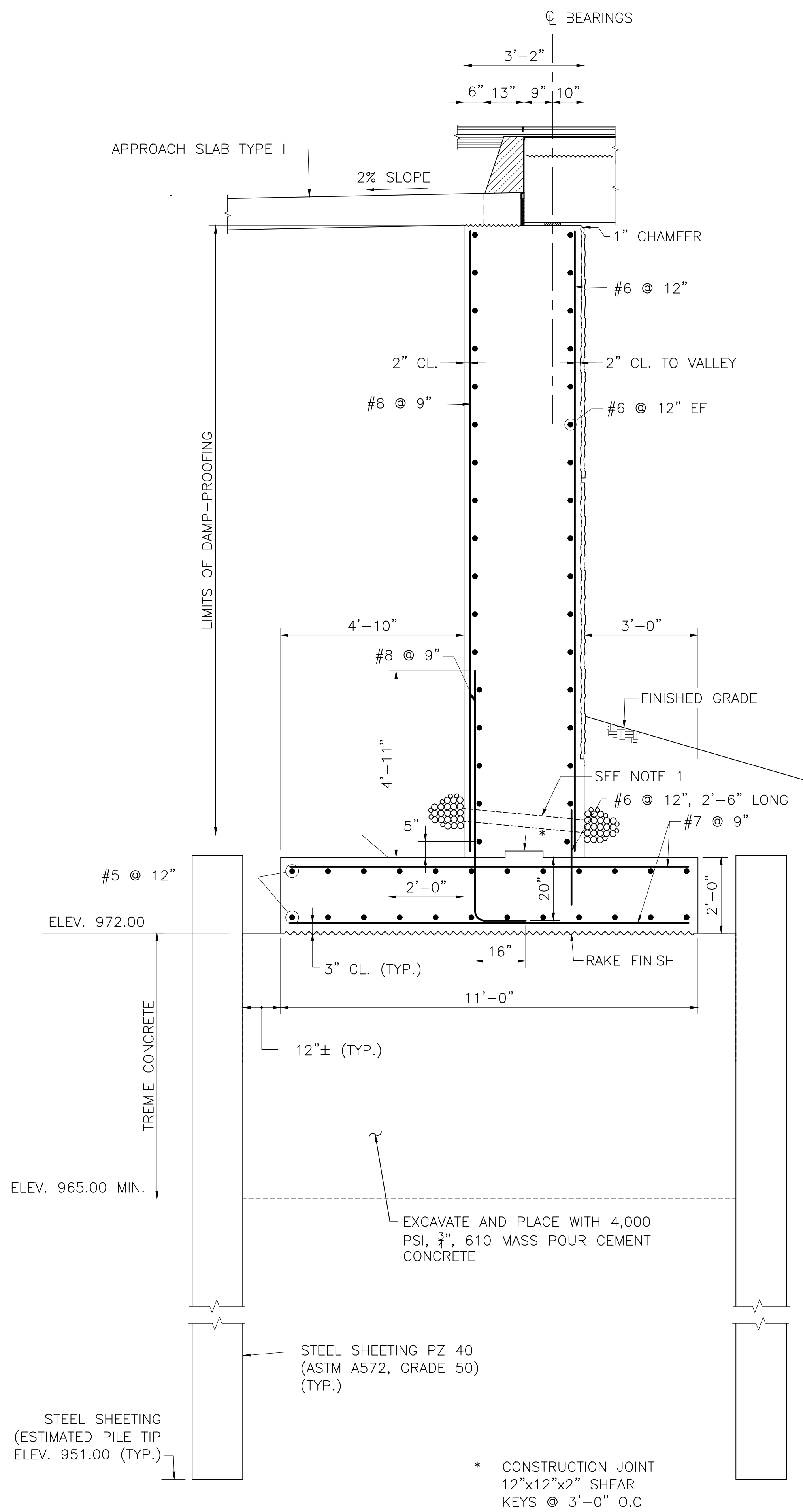
**NOTE:**  
FOR RELATIONSHIP BETWEEN EXISTING SE RETAINING WALL, PROP. SHEET PILE CAP AND PROP. CURTAIN WALL, SEE BRIDGE SHEETS 11, 12, AND 14.

SEPT. 14, 2024	ISSUED FOR CONSTRUCTION
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AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

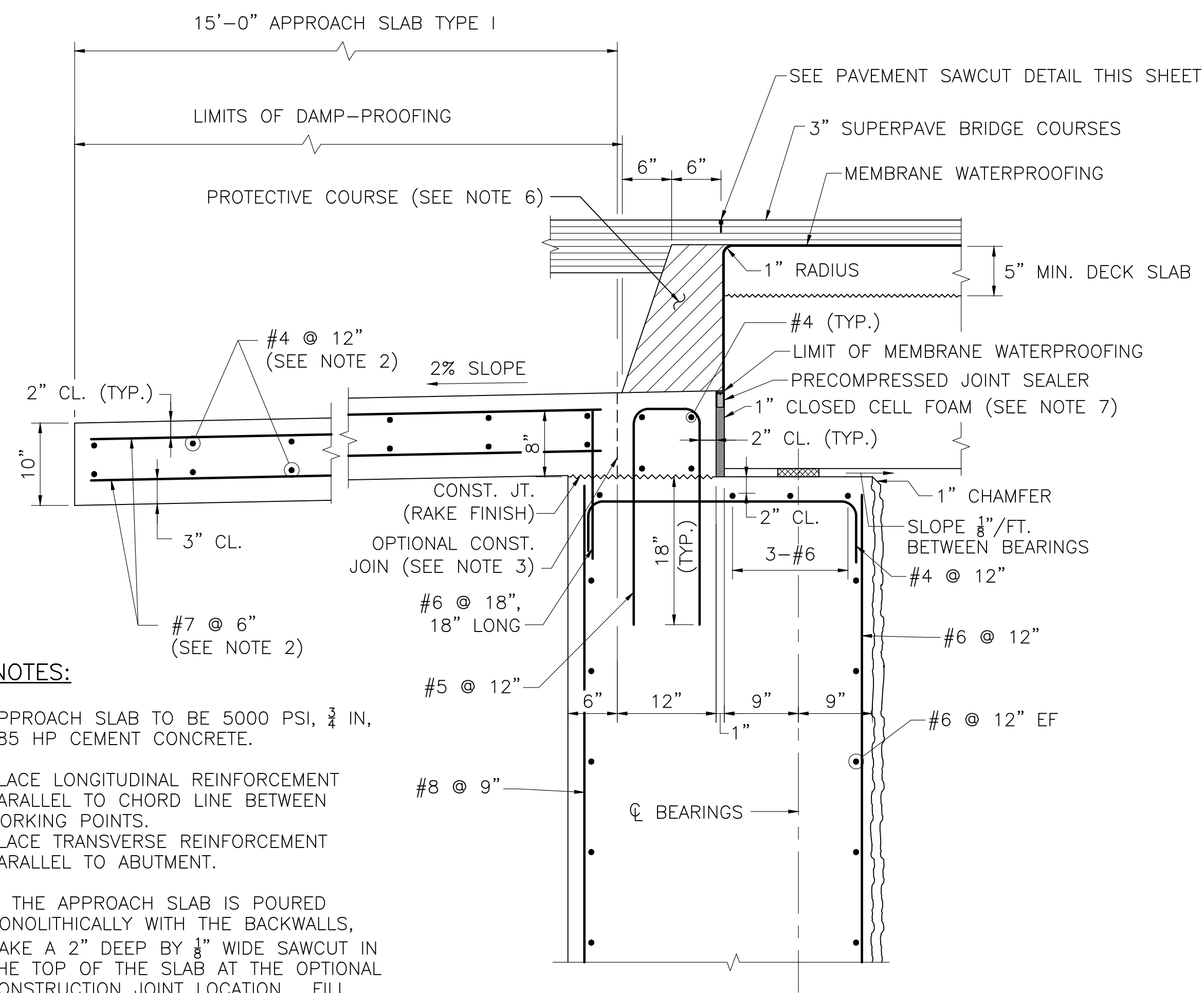
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	26	42
PROJECT FILE NO.		609078	

TYPICAL ABUTMENT SECTION



TYPICAL ABUTMENT SECTION

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



DETAILS AT ABUTMENT - ROADWAY SECTION

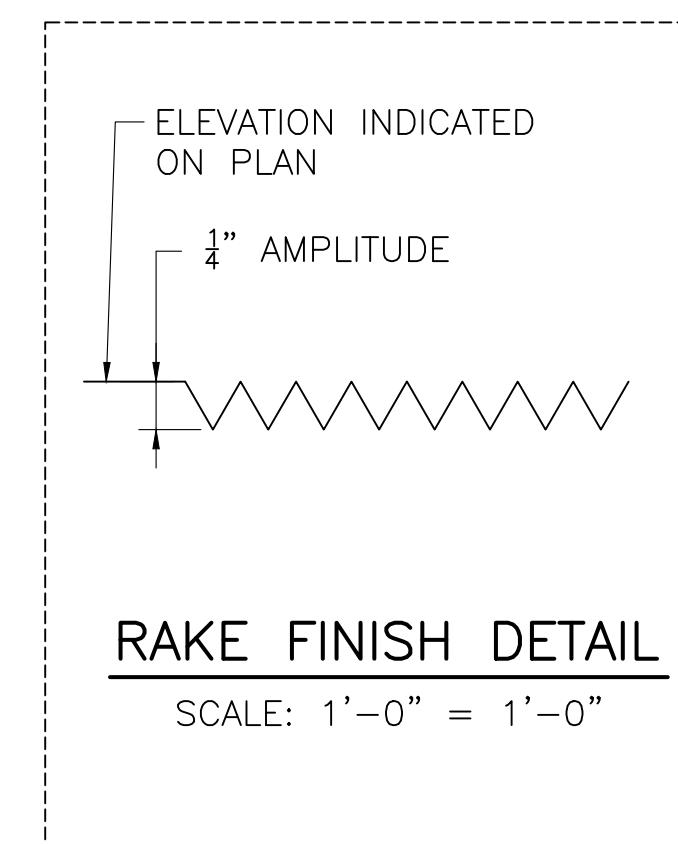
SCALE: 1" = 1'-0"

NOTES:

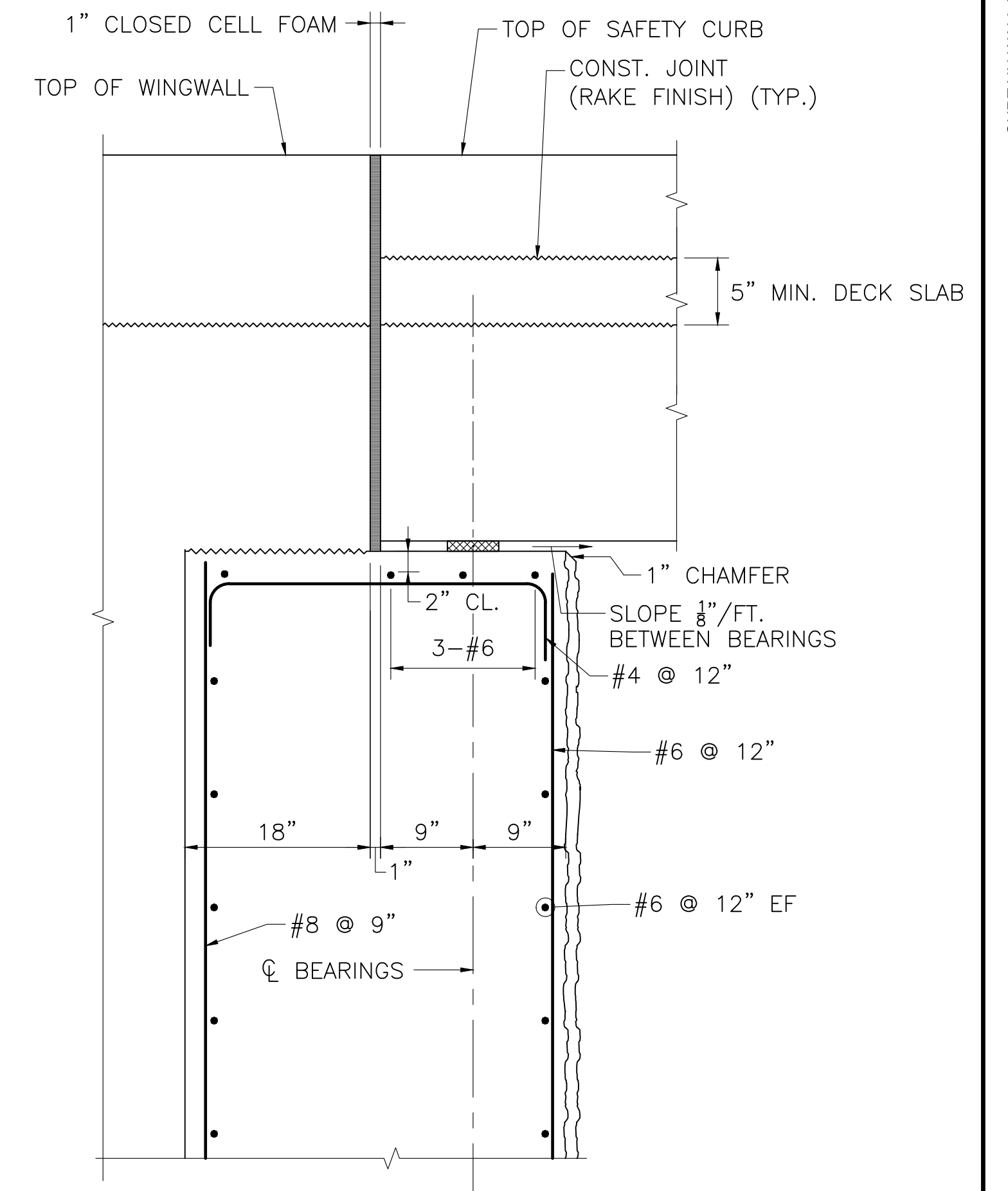
- APPROACH SLAB TO BE 5000 PSI, 3/4 IN, 685 HP CEMENT CONCRETE.
- PLACE LONGITUDINAL REINFORCEMENT PARALLEL TO CHORD LINE BETWEEN WORKING POINTS. PLACE TRANSVERSE REINFORCEMENT PARALLEL TO ABUTMENT.
- IF THE APPROACH SLAB IS POURED MONOLITHICALLY WITH THE BACKWALLS, MAKE A 2" DEEP BY 1/8" WIDE SAWCUT IN THE TOP OF THE SLAB AT THE OPTIONAL CONSTRUCTION JOINT LOCATION. FILL SAWCUT WITH CONCRETE JOINT SEALER.

ABUTMENT SECTION NOTES:

- 4" Ø WEEP HOLES 10'-0" O.C. LOCATED 12" ABOVE THE HEEL OF FOOTING SLOPING 1" PER FOOT TOWARDS THE FRONT FACE. PROVIDE 1 CUBIC YARD OF CRUSHED STONE AT END OF WEEP HOLE.
- ALL CONCRETE SHALL BE 5000 PSI, 3/4 IN, 685 HP CEMENT CONCRETE.
- TREMIE CONCRETE ON SOIL  
THE FACTORED BEARING PRESSURE = 6.22 KSF AS PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS STRENGTH I LOAD COMBINATION.  
FACTORED BEARING RESISTANCE = 9.90 KSF. FACTORED BEARING RESISTANCE IS THE PRODUCT OF THE NOMINAL BEARING RESISTANCE AND A RESISTANCE FACTOR OF 0.45.
- ABUTMENT FOOTING ON TREMIE CONCRETE  
THE FACTORED BEARING PRESSURE = 12.33 KSF AS PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS STRENGTH I LOAD COMBINATION.  
FACTORED BEARING RESISTANCE ON TREMIE CONCRETE = 403 KSF. FACTORED BEARING RESISTANCE IS THE PRODUCT OF THE NOMINAL BEARING RESISTANCE AND A RESISTANCE FACTOR OF 0.70.
- ALL REINFORCING SHOWN IN THIS DETAIL SHALL BE COATED BARS, EXCEPT FOR APPROACH SLAB REINFORCEMENT.
- HMA PROTECTIVE BERM TO BE SUPERPAVE BRIDGE PROTECTIVE COURSE (SPC-B-12.5), PLACED IN 2" LAYERS AND COMPACTED WITH A MECHANICAL HAND-GUIDED TEMPER.
- ATTACH CLOSED CELL FOAM TO BACK OF PRECAST BEAM WITH ADHESIVE.
- ALL CURTAIN WALLS AND BACKWALL CONCRETE SHALL BE PLACED AFTER ALL BEAMS HAVE BEEN ERECTED.

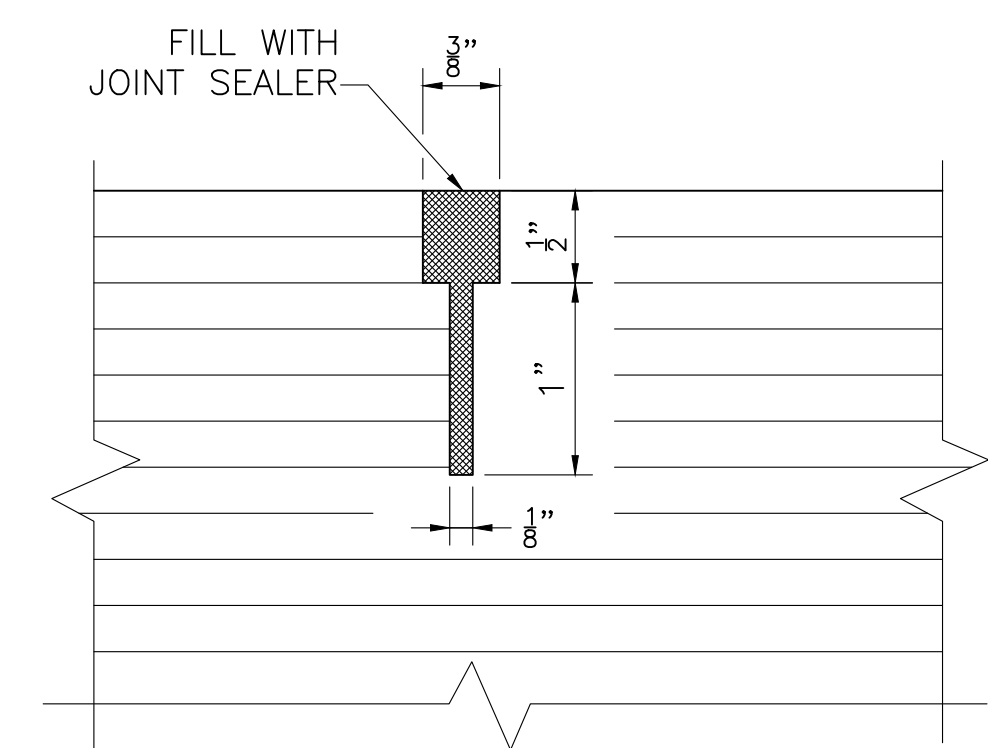


RAKE FINISH DETAIL  
SCALE: 1'-0" = 1'-0"



DETAILS AT ABUTMENT - SAFETY CURB

SCALE: 1" = 1'-0"



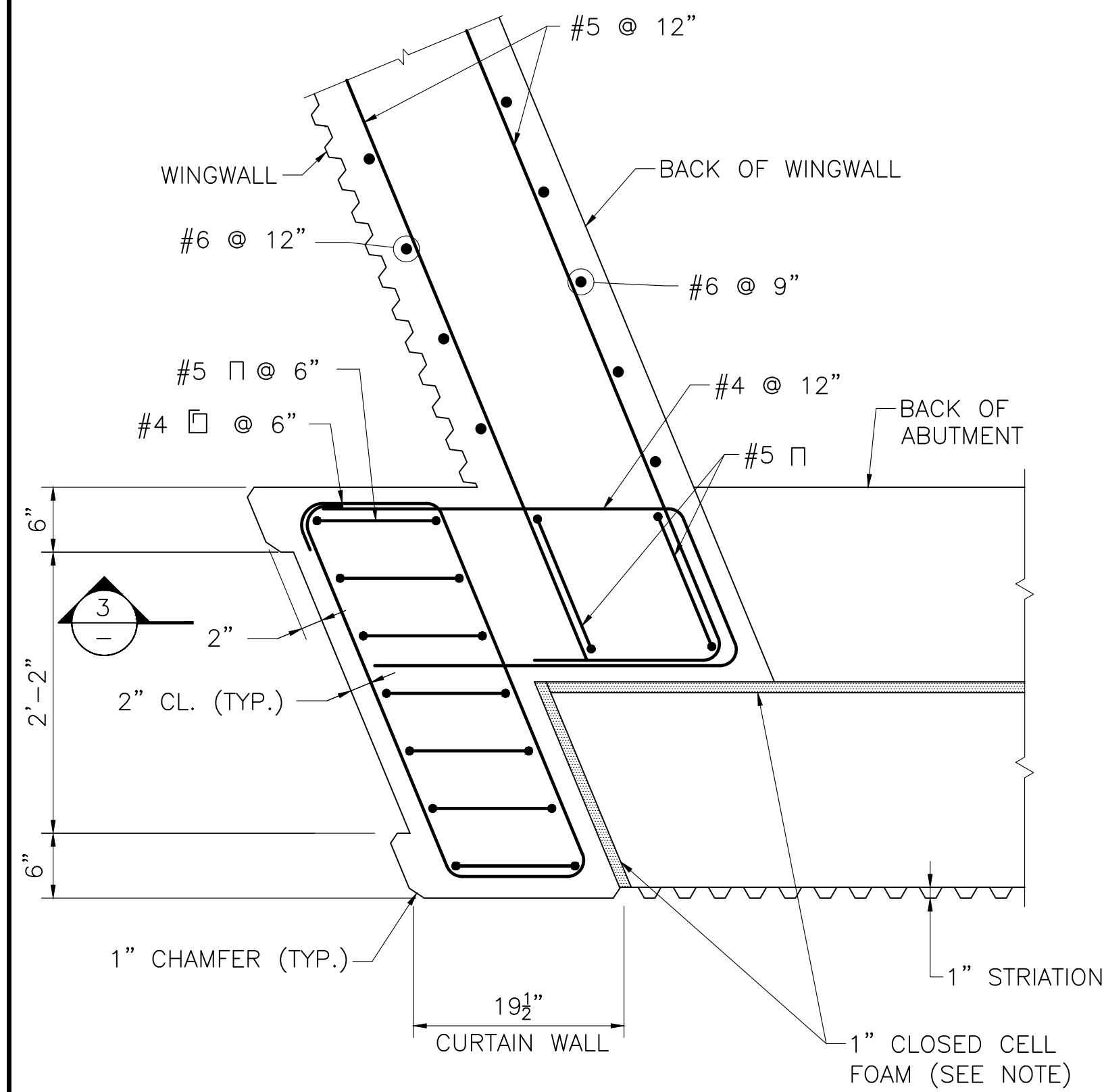
PAVEMENT SAWCUT DETAIL  
FULL SIZE

DATE	DESCRIPTION
SEPT. 14, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
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AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

**NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER**

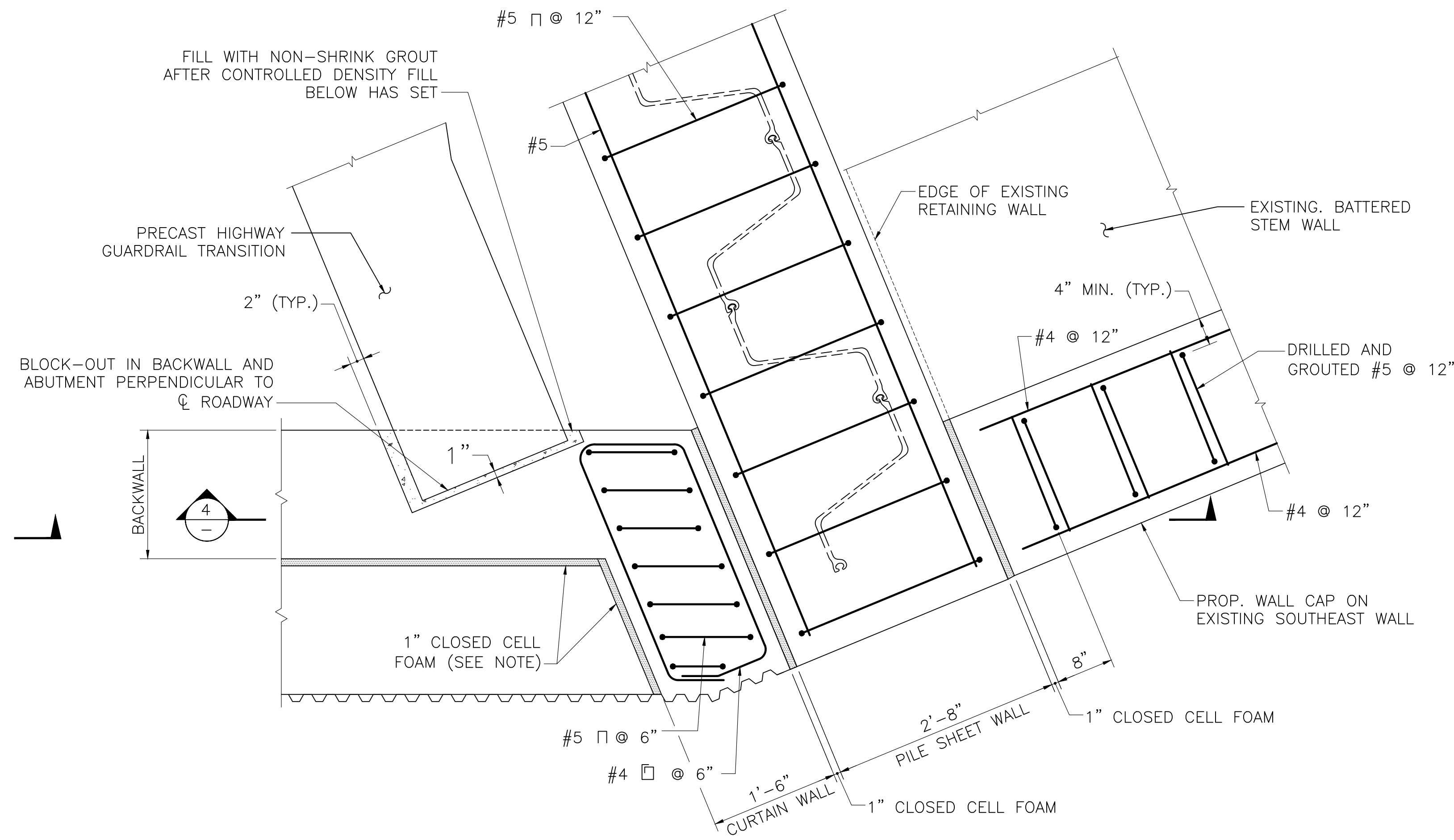
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	27	42
PROJECT FILE NO. 609078			

**CURTAIN WALL**



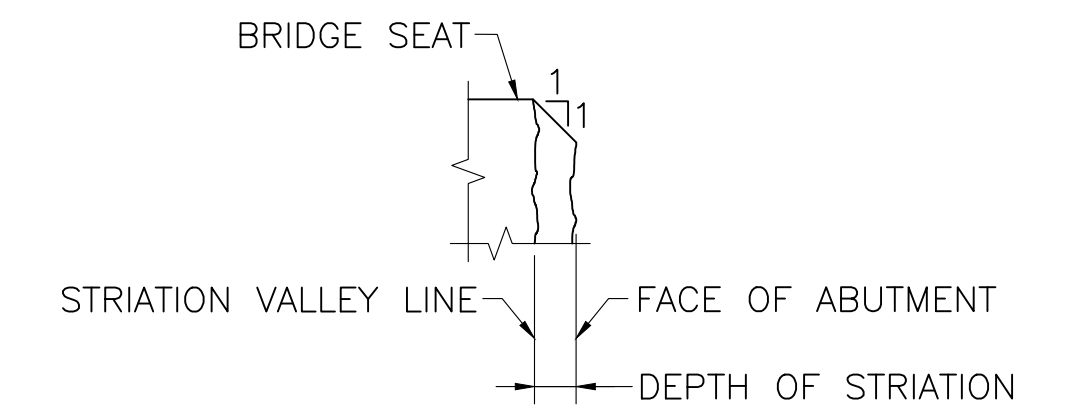
**SECTIONAL PLAN AT  
ABUTMENT END U-WINGWALLS**

SCALE: 1" = 1'-0"



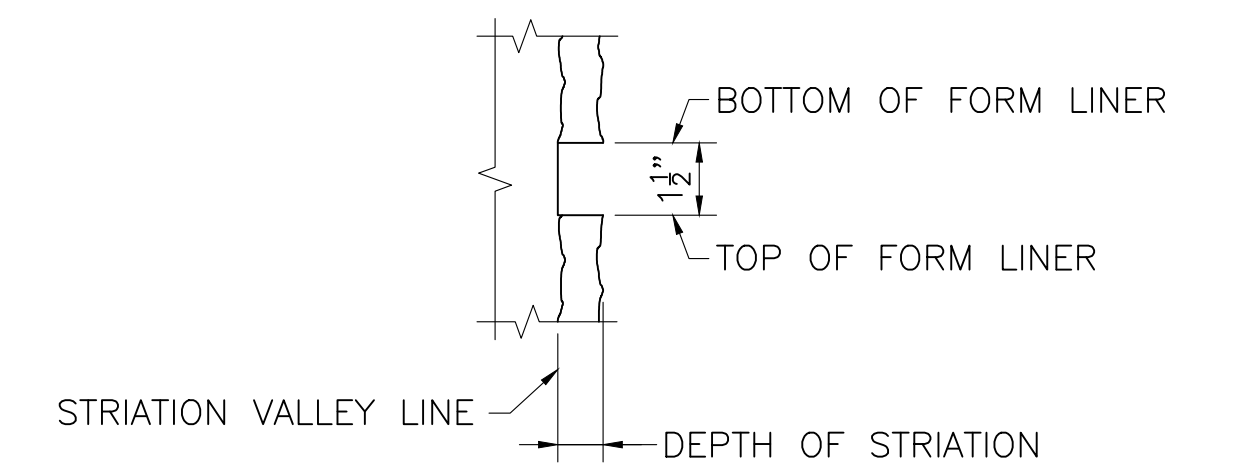
**SECTIONAL PLAN AT ABUTMENT  
END SOUTHEAST WALL**

SCALE: 1" = 1'-0"



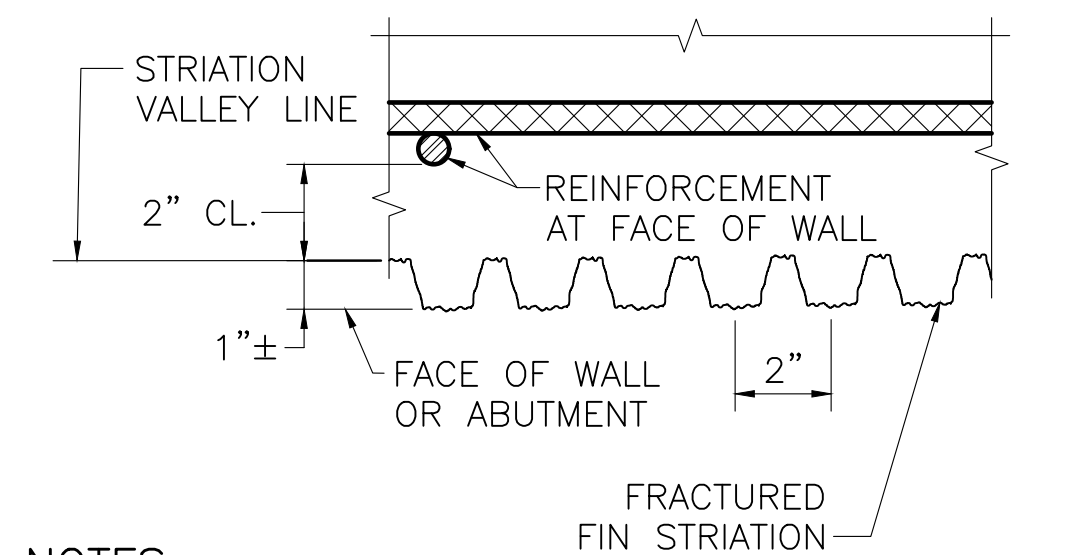
**DETAIL AT BRIDGE SEAT**

SCALE: 3" = 1'-0"



**HORIZONTAL PANEL JOINT**

SCALE: 3" = 1'-0"

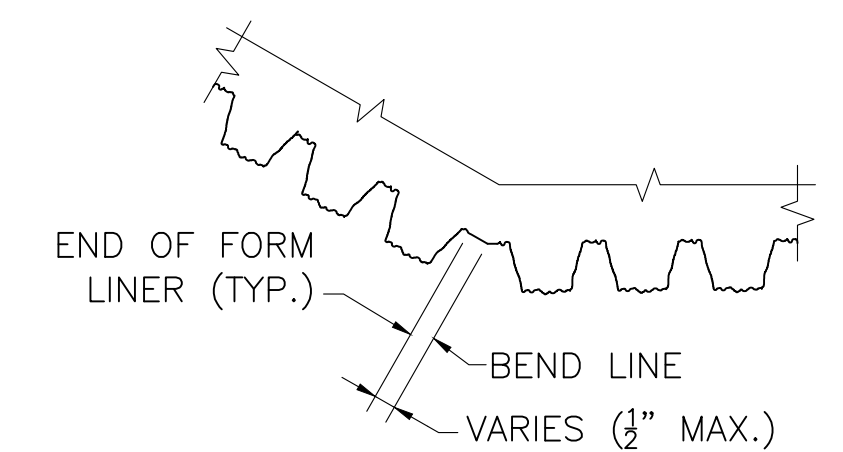


**NOTES:**

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

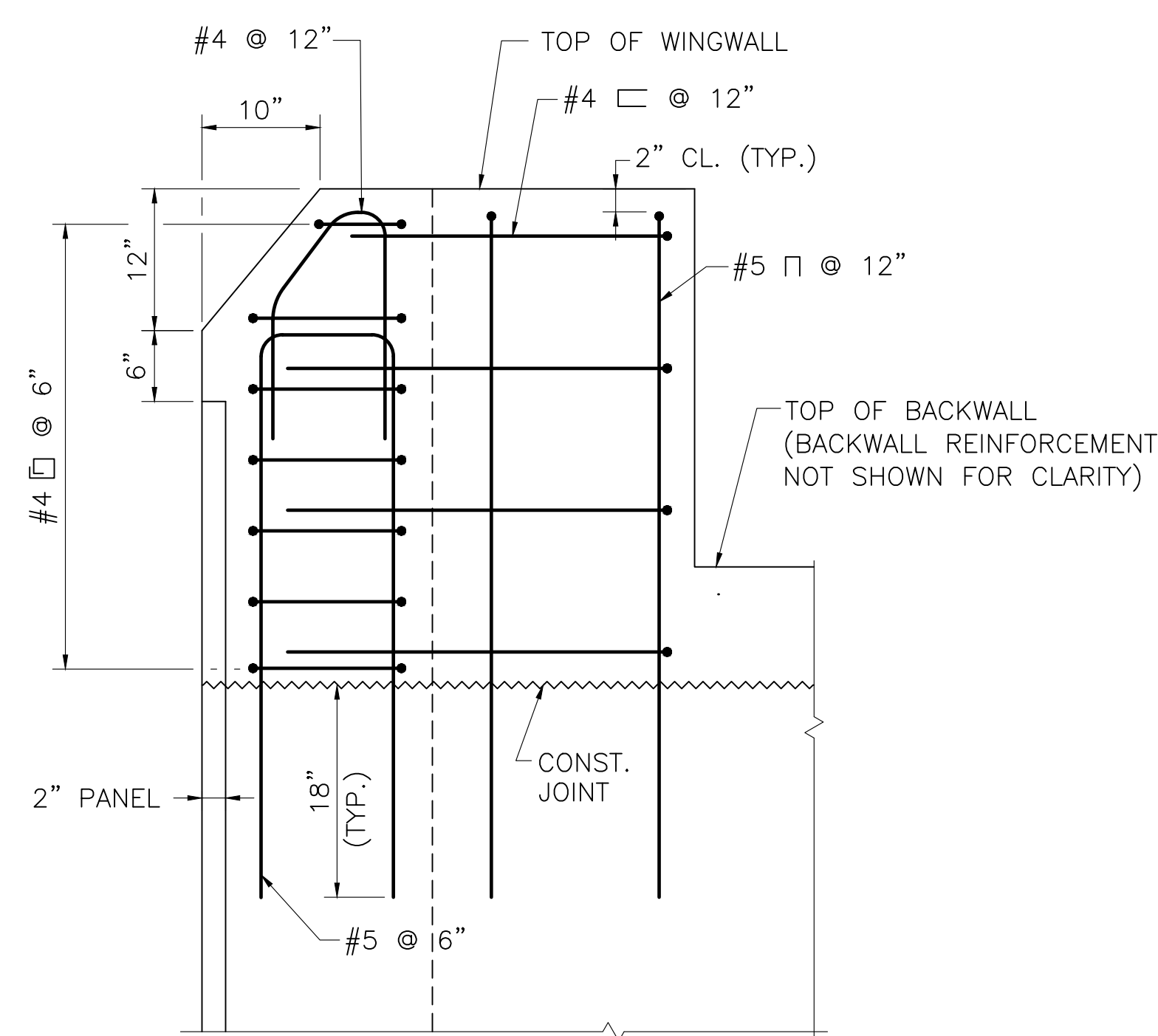
**TYPICAL STRIATION DETAIL**

SCALE: 3" = 1'-0"



**DETAIL AT WALL CORNER**

SCALE: 3" = 1'-0"

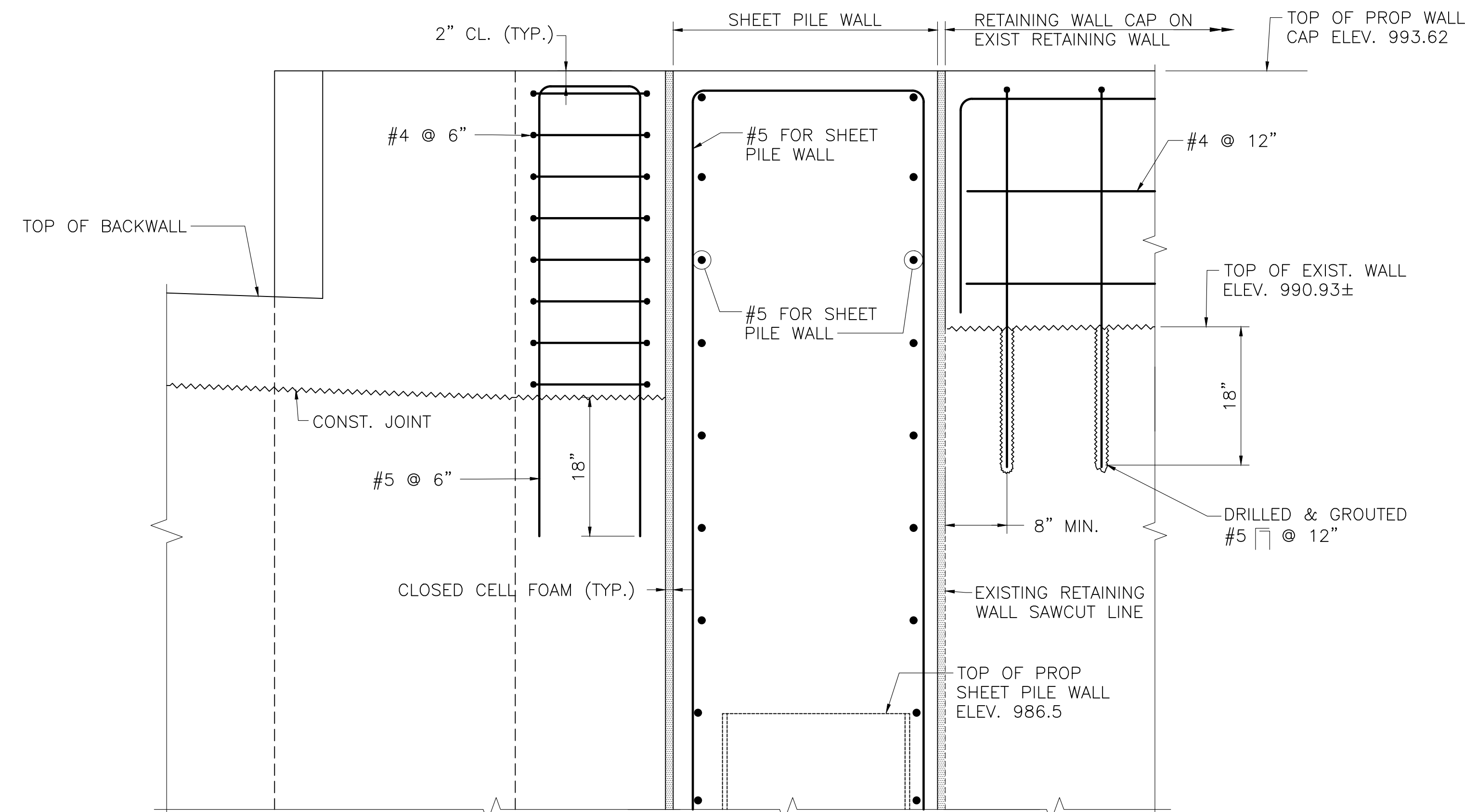


**NOTE:**

REINFORCEMENT BELOW CONSTRUCTION JOINT HAS BEEN OMITTED FOR CLARITY.

**SECTION 3**

SCALE: 1" = 1'-0"



**SECTION 4**

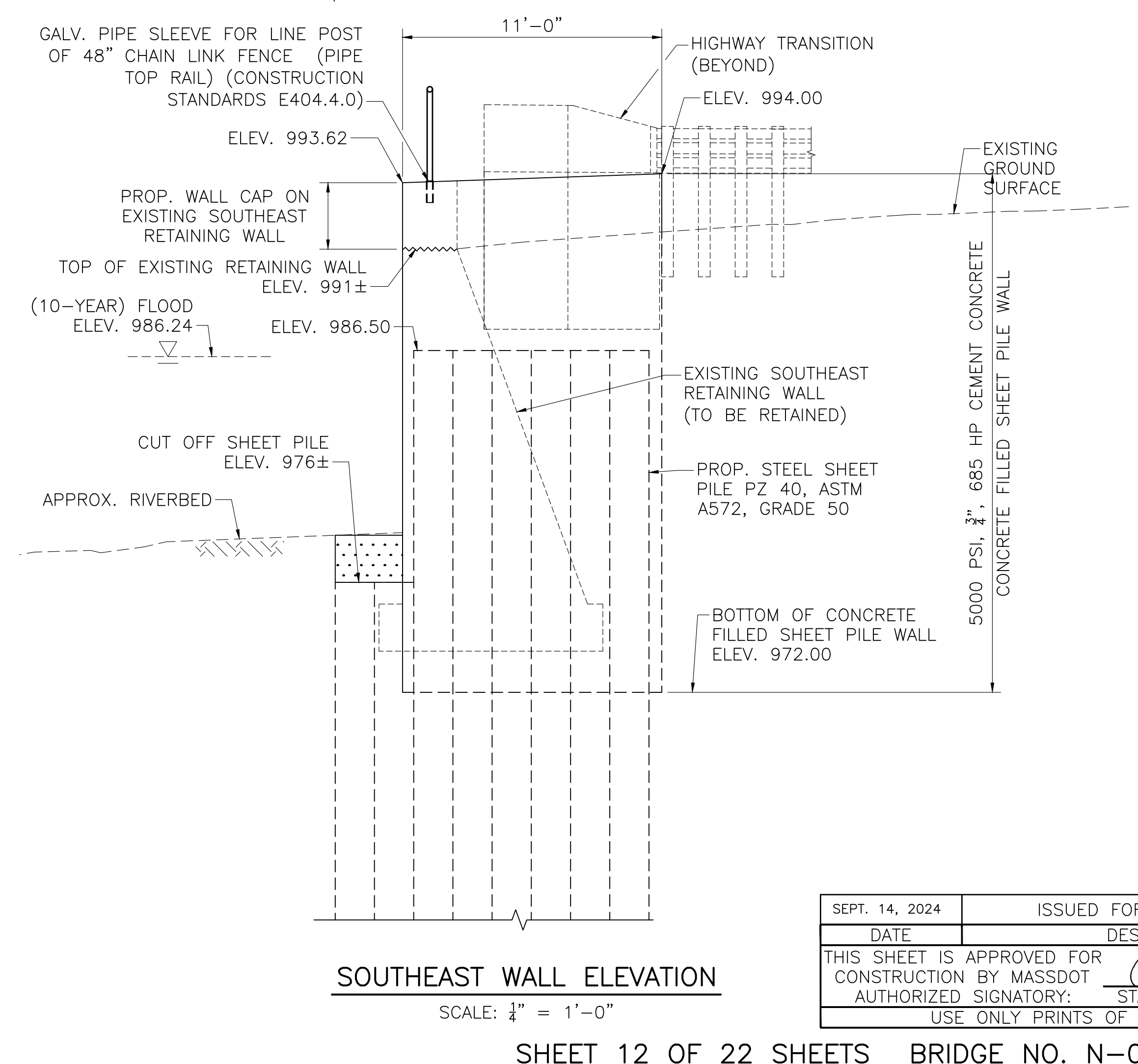
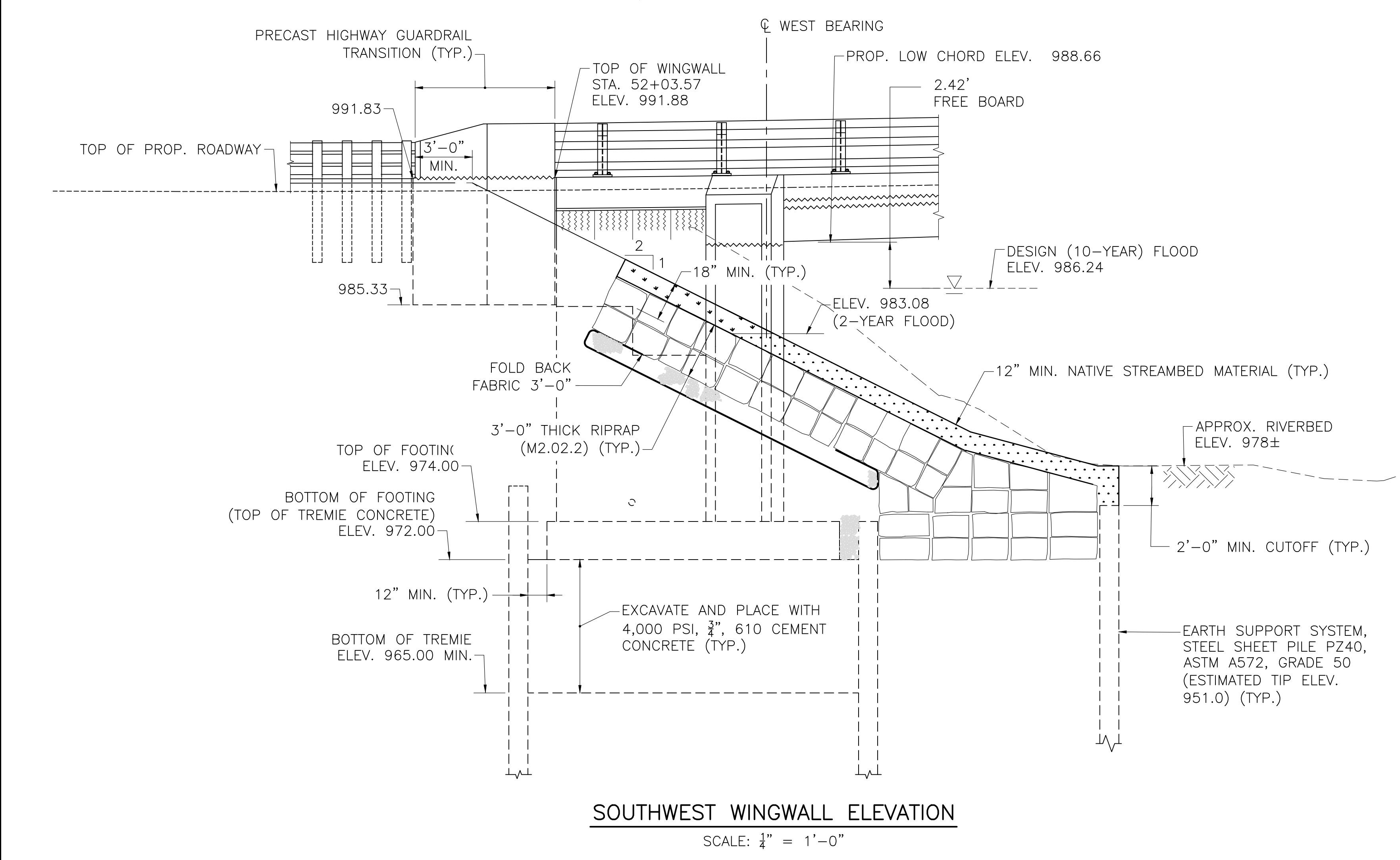
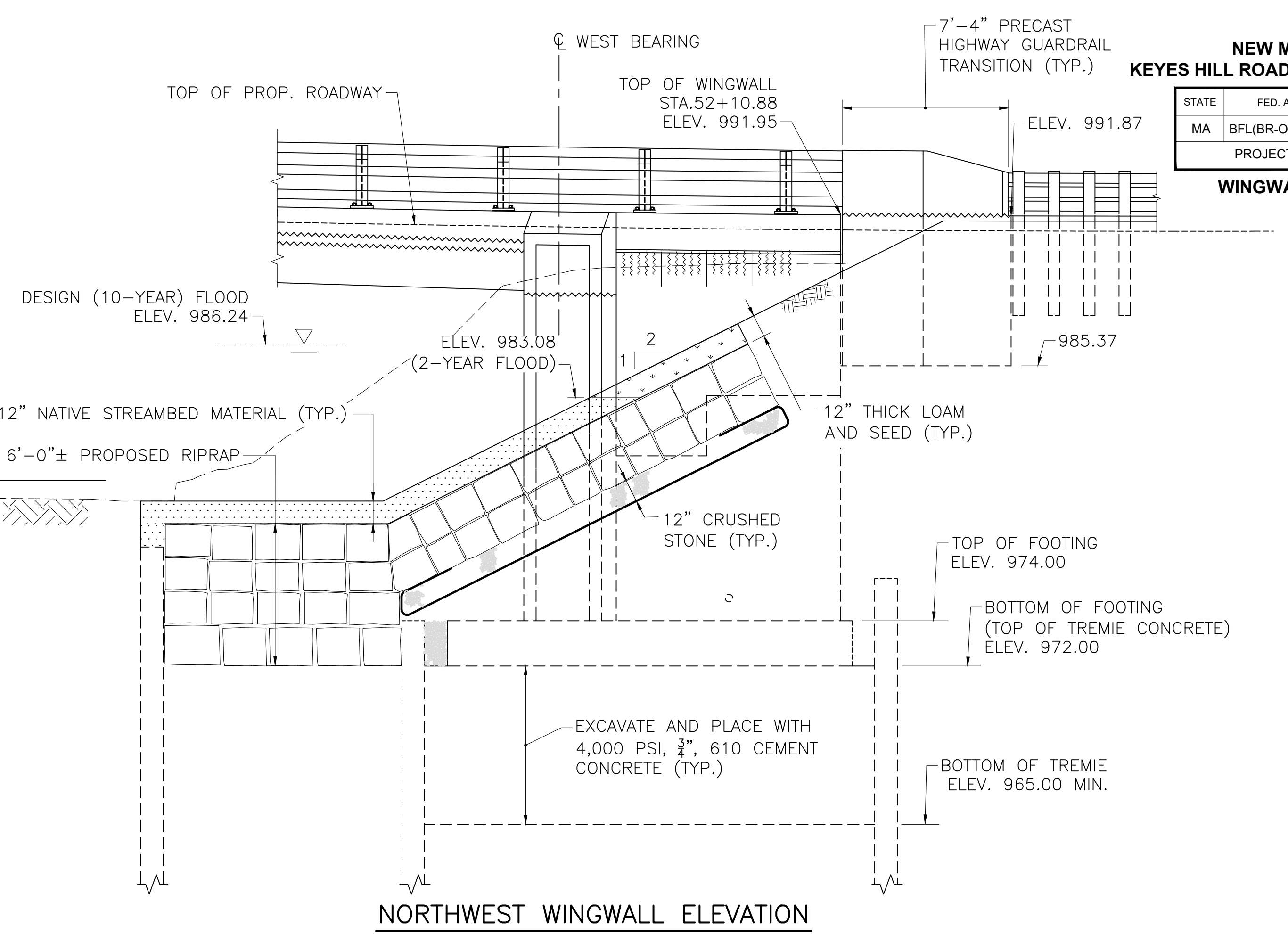
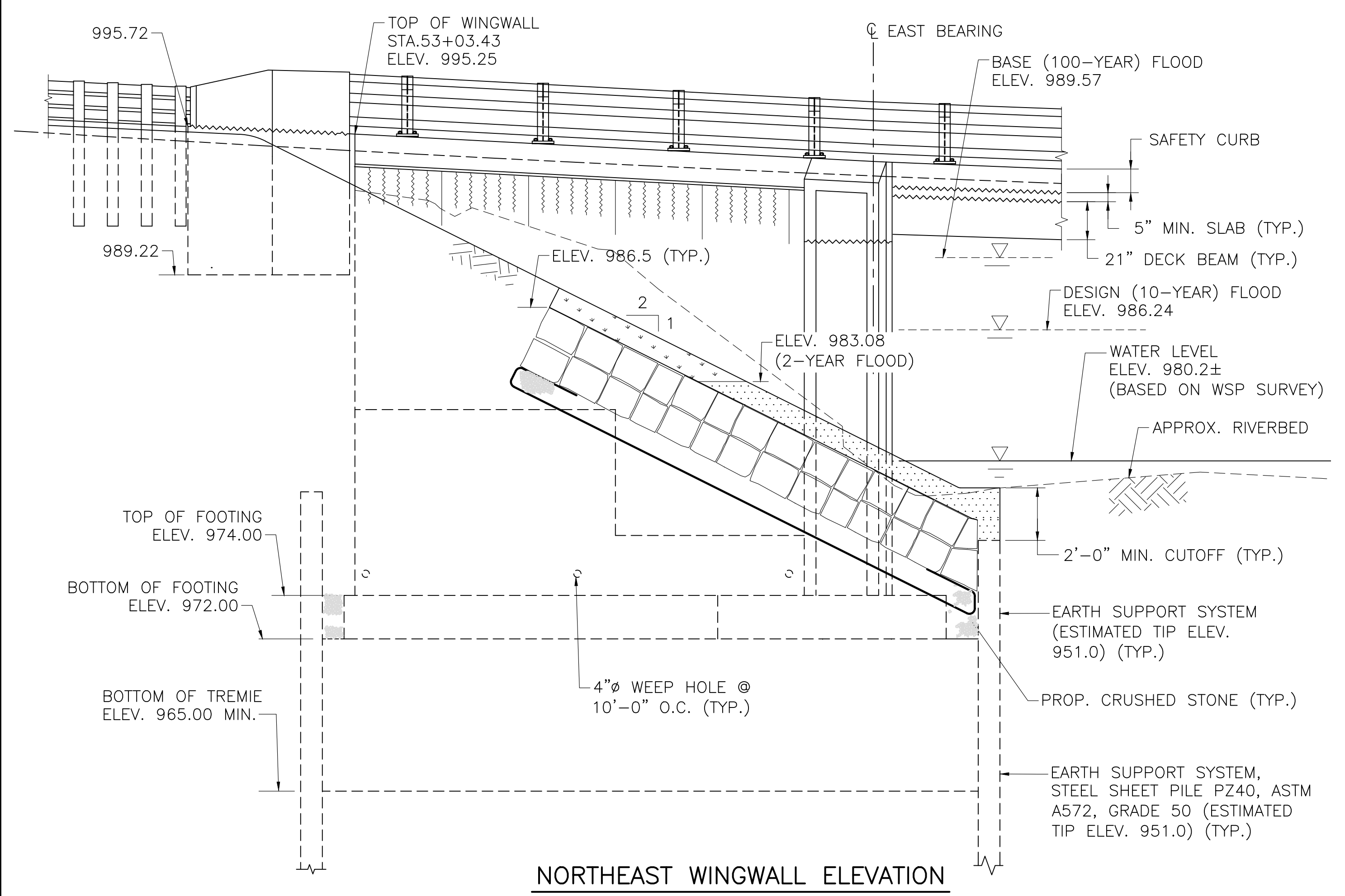
SCALE: 1" = 1'-0"

DATE	DESCRIPTION
SEPT. 14, 2024	ISSUED FOR CONSTRUCTION
	THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT
	AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
	USE ONLY PRINTS OF LATEST DATE

**NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	28	42
PROJECT FILE NO.			609078

**WINGWALL ELEVATIONS**



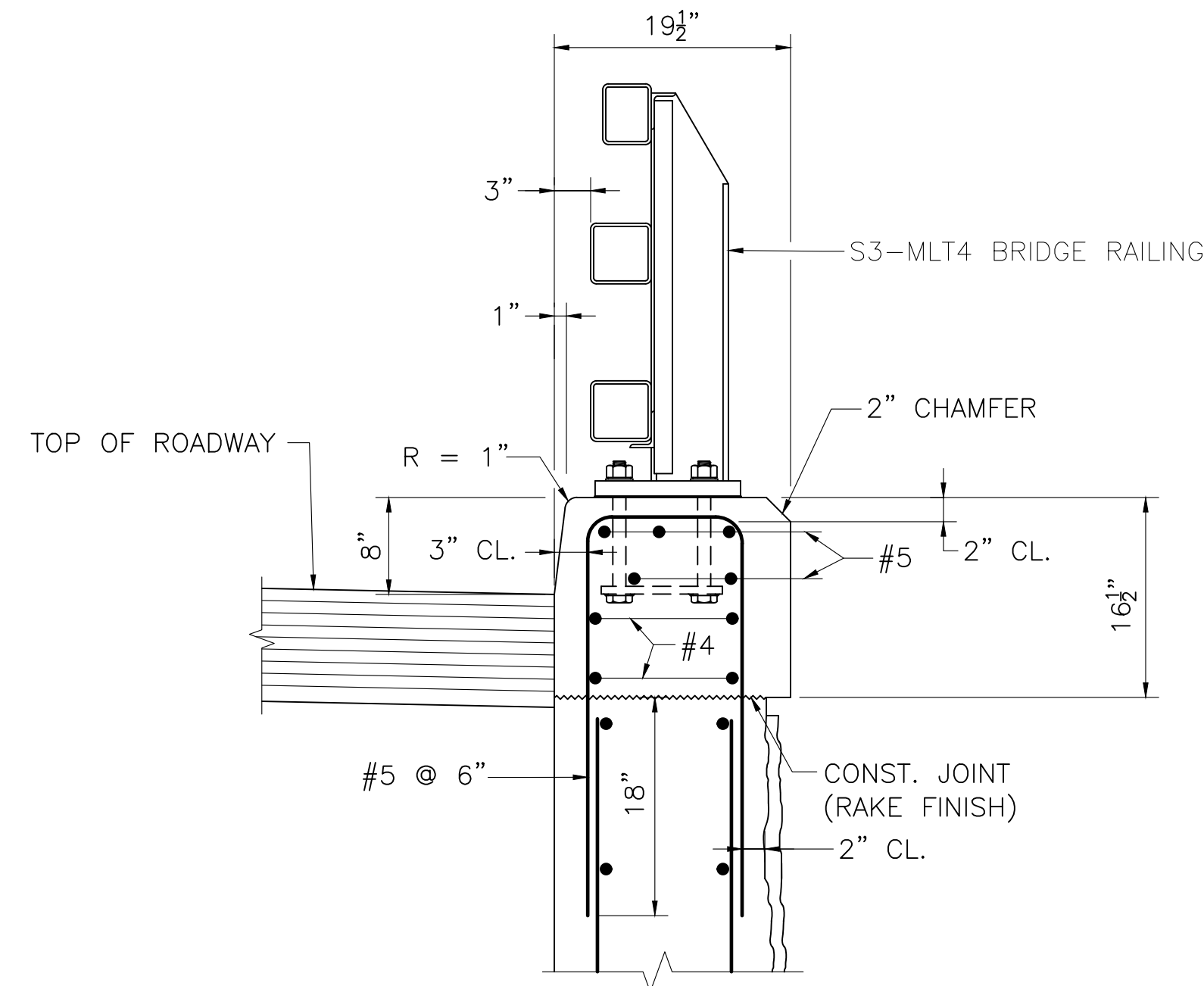
DATE	DESCRIPTION
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	USE ONLY PRINTS OF LATEST DATE

609078 Structural Plans Submittal (SF) 7-SEPTEMBER-2024 Plotted on 7-Sep-2024 9:24 AM

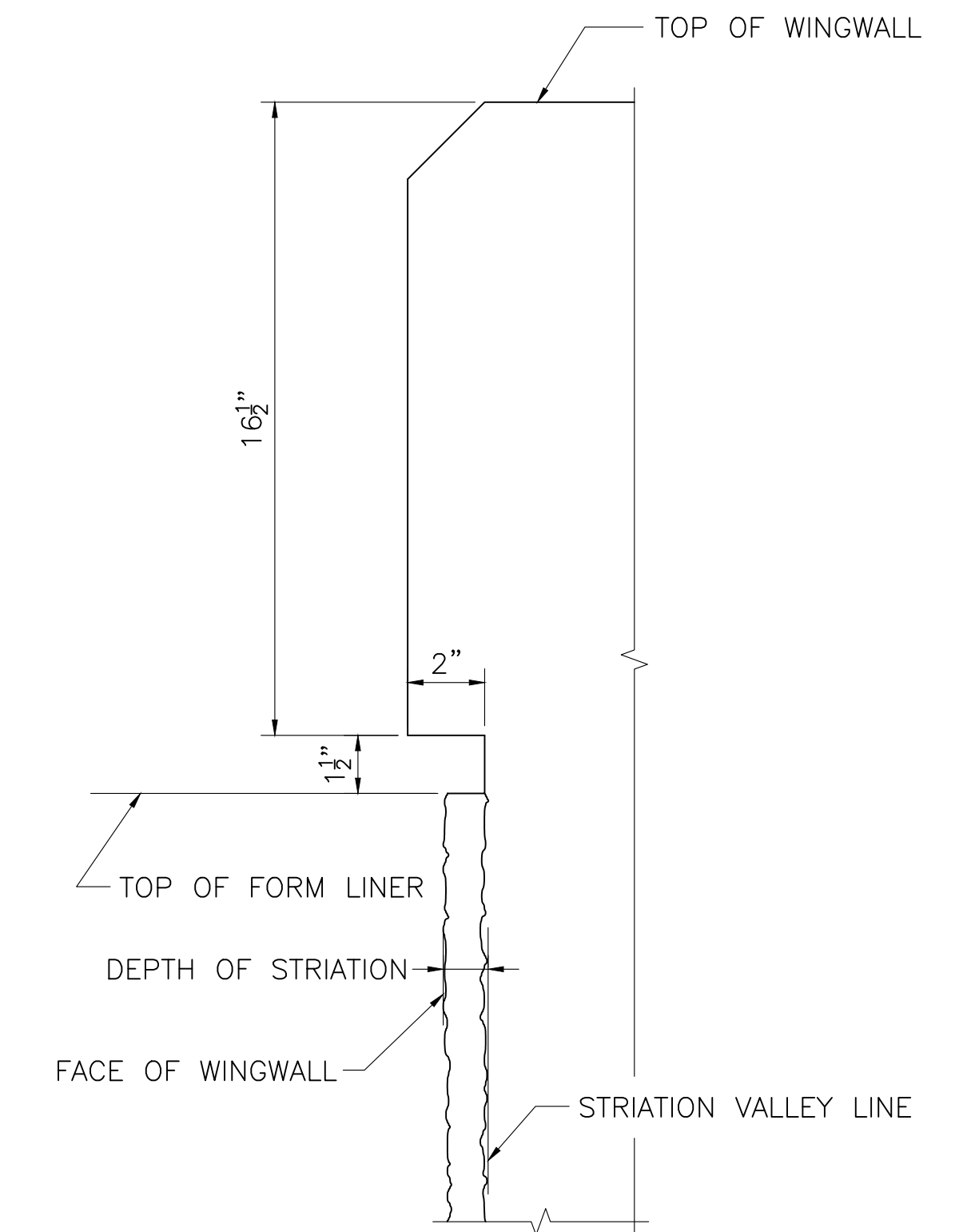
NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	29	42
PROJECT FILE NO.		609078	

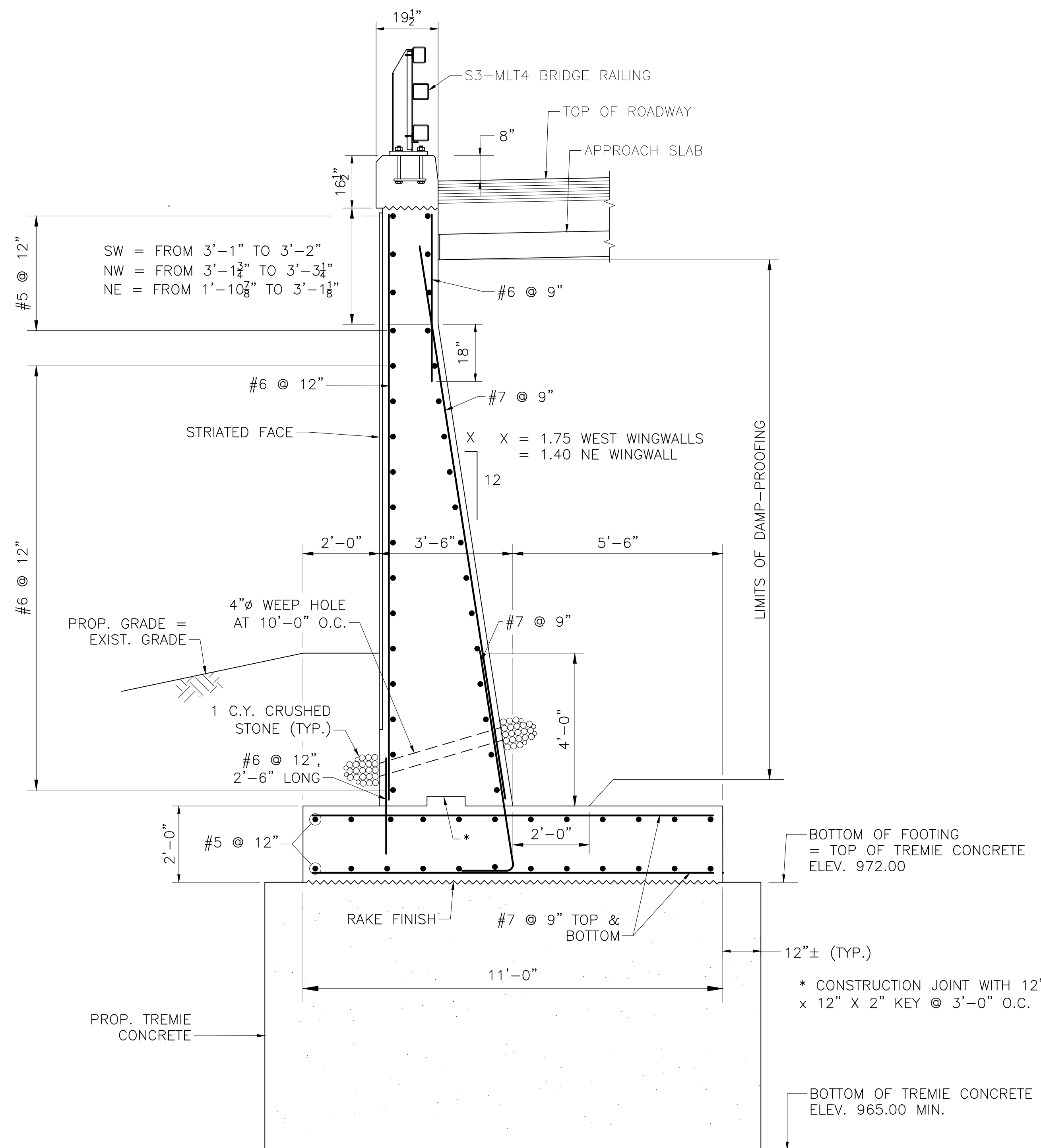
WINGWALL DETAIL 1



TOP OF U-WINGWALL  
DETAILS AT SAFETY CURB  
SCALE: 1" = 1'-0"



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



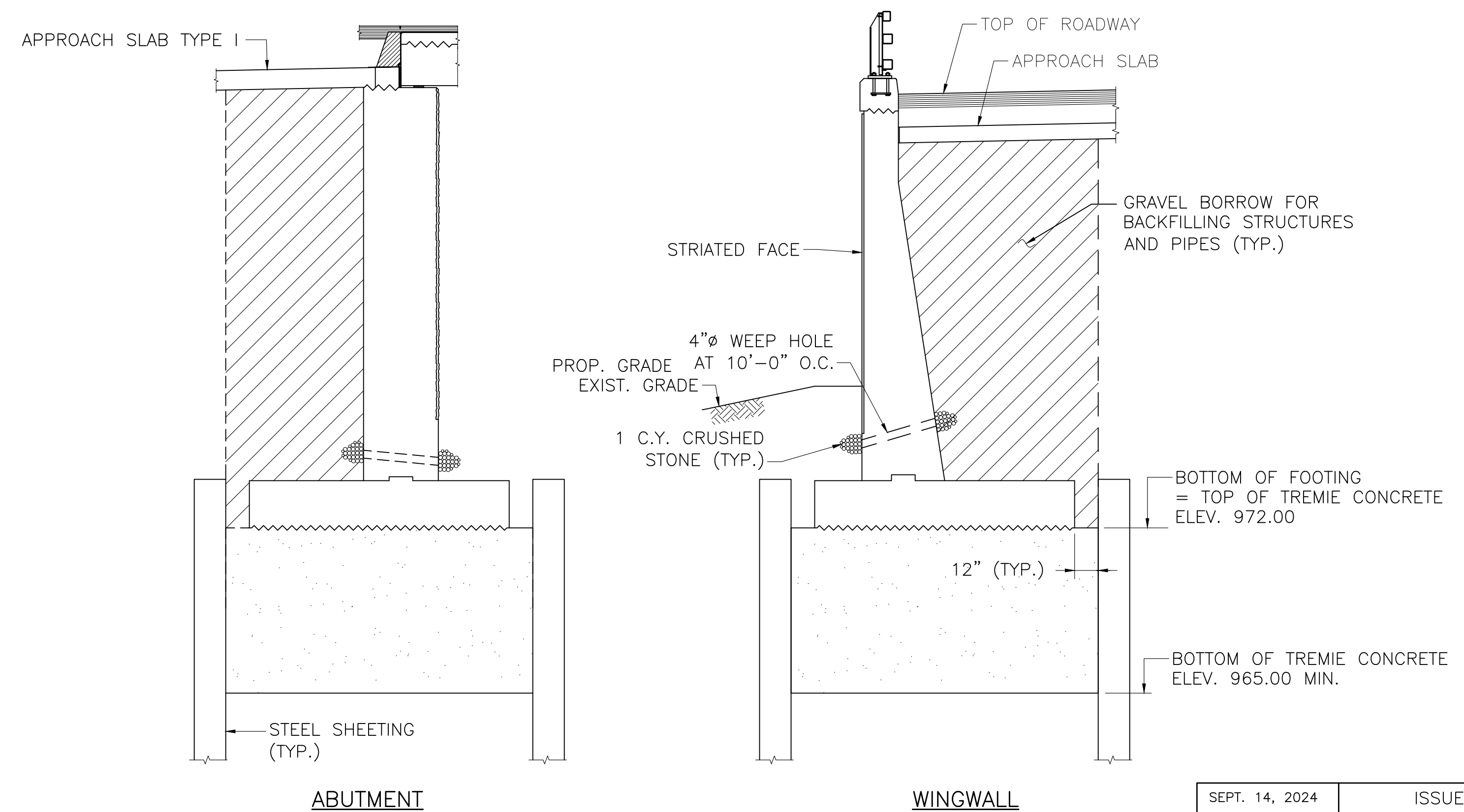
EARTH SUPPORT SYSTEM NOT SHOWN FOR CLARITY.

U-WINGWALL SECTION

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

NOTES:

- TREMIE CONCRETE ON SOIL**  
THE FACTORED BEARING PRESSURE = 4.88 KSF AS PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS STRENGTH I LOAD COMBINATION.  
FACTORED BEARING RESISTANCE = 9.60 KSF. FACTORED BEARING RESISTANCE IS THE PRODUCT OF THE NOMINAL BEARING RESISTANCE AND A RESISTANCE FACTOR OF 0.45.
- WINGWALL FOOTING ON TREMIE CONCRETE**  
THE FACTORED BEARING PRESSURE = 9.26 KSF AS PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS STRENGTH I LOAD COMBINATION.  
FACTORED BEARING RESISTANCE = 403 KSF. FACTORED BEARING RESISTANCE IS THE PRODUCT OF THE NOMINAL BEARING RESISTANCE AND A RESISTANCE FACTOR OF 0.70.
- AN ARTESIAN AQUIFER WAS ENCOUNTERED DURING THE BORING EXPLORATION AT BOTH BORINGS BB-1 AND BB-2.



LIMITS OF GRAVEL BORROW FOR  
BACKFILLING STRUCTURES AND PIPES

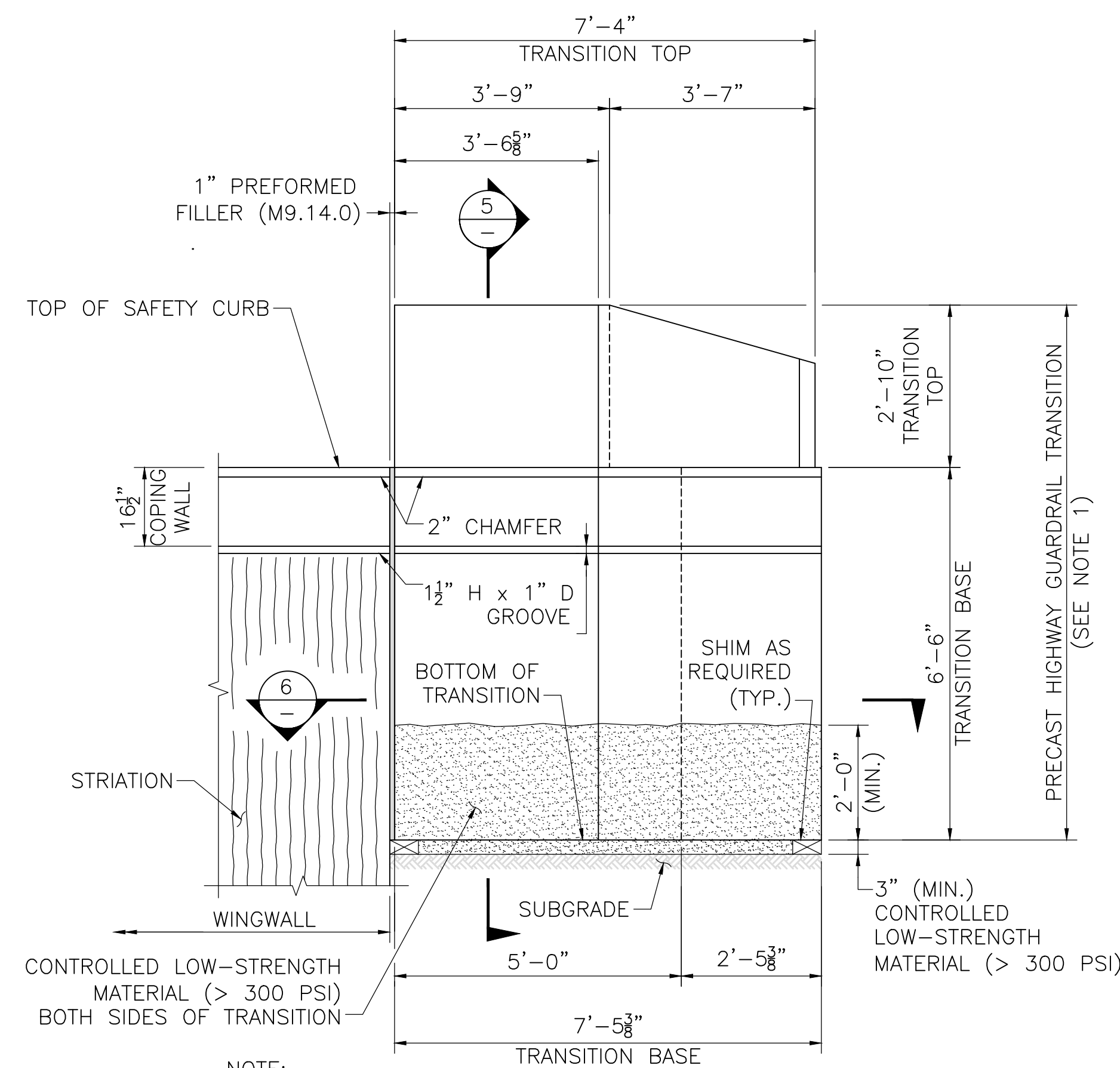
SCALE: 1/4" = 1'-0"

DATE	DESCRIPTION
SEPT. 14, 2024	ISSUED FOR CONSTRUCTION
	CONSTRUCTION BY MASSDOT
	AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
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NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	30	42
PROJECT FILE NO.		609078	

WINGWALL DETAIL 2

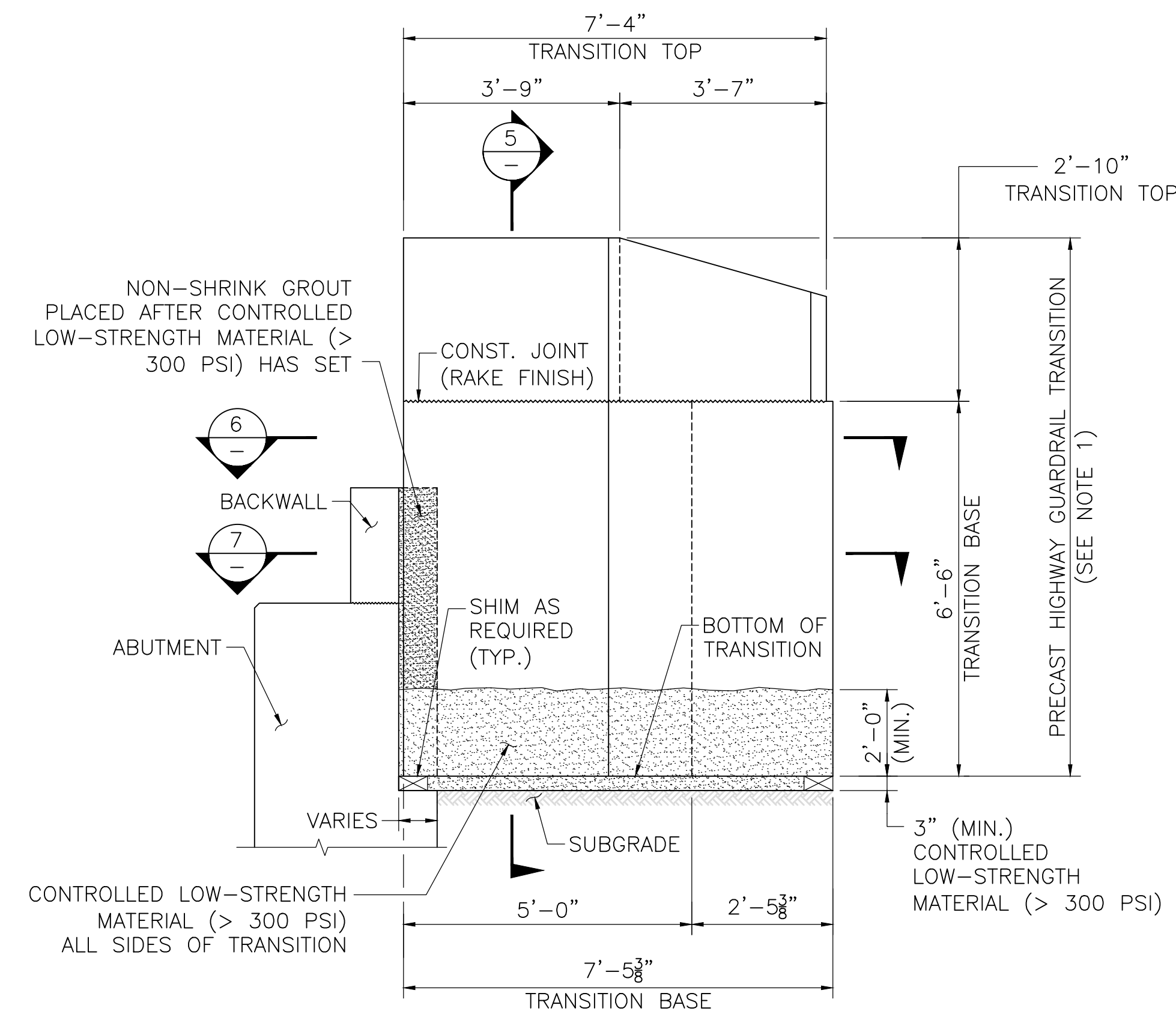


NOTE:

DENSITY CONTROL FILL STATED IN THE 2024 BRIDGE MANUAL 4.8.2 AND THE SPECIFICATIONS UNDER ITEM 995 IS THE SAME AS THIS CONTROLLED LOW-STRENGTH MATERIAL (ITEM 160.3).

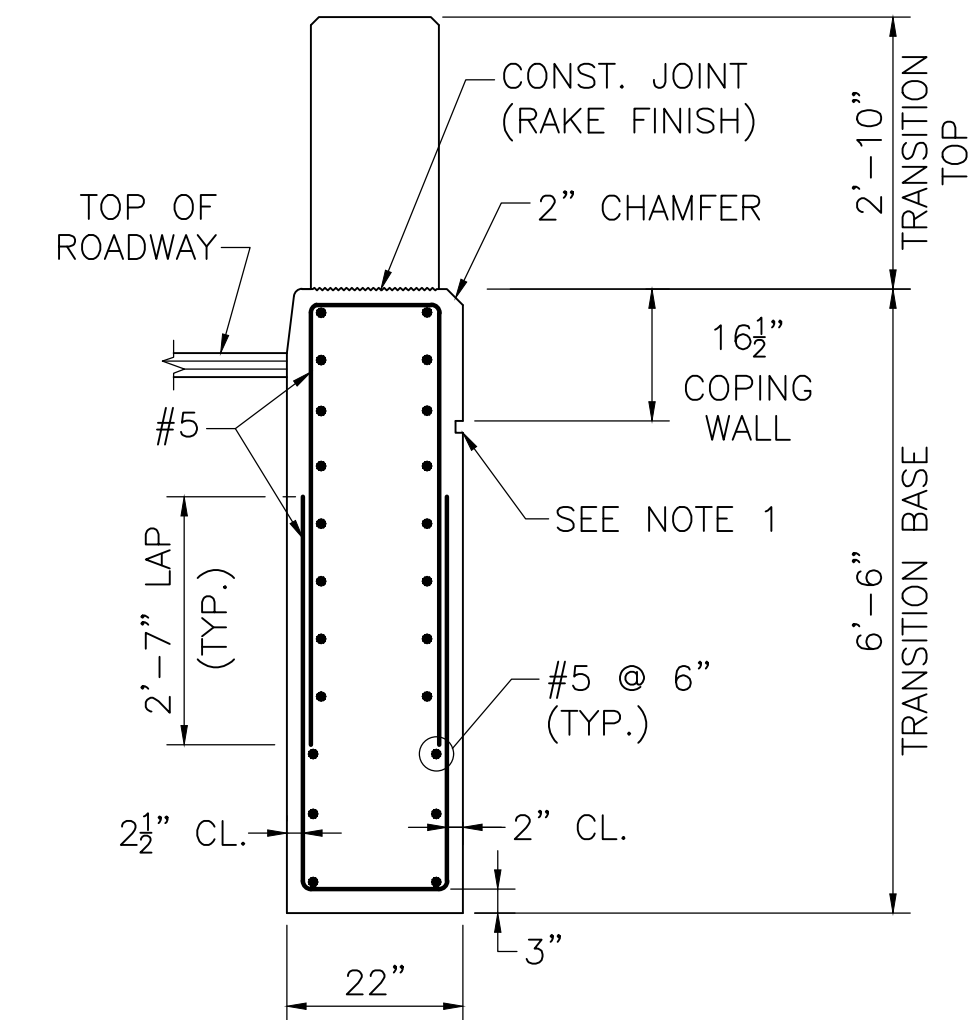
PRECAST GUARDRAIL TRANSITION  
ELEVATION AT U-WINGWALL

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



PRECAST GUARDRAIL TRANSITION  
ELEVATION AT SOUTHEAST CORNER

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

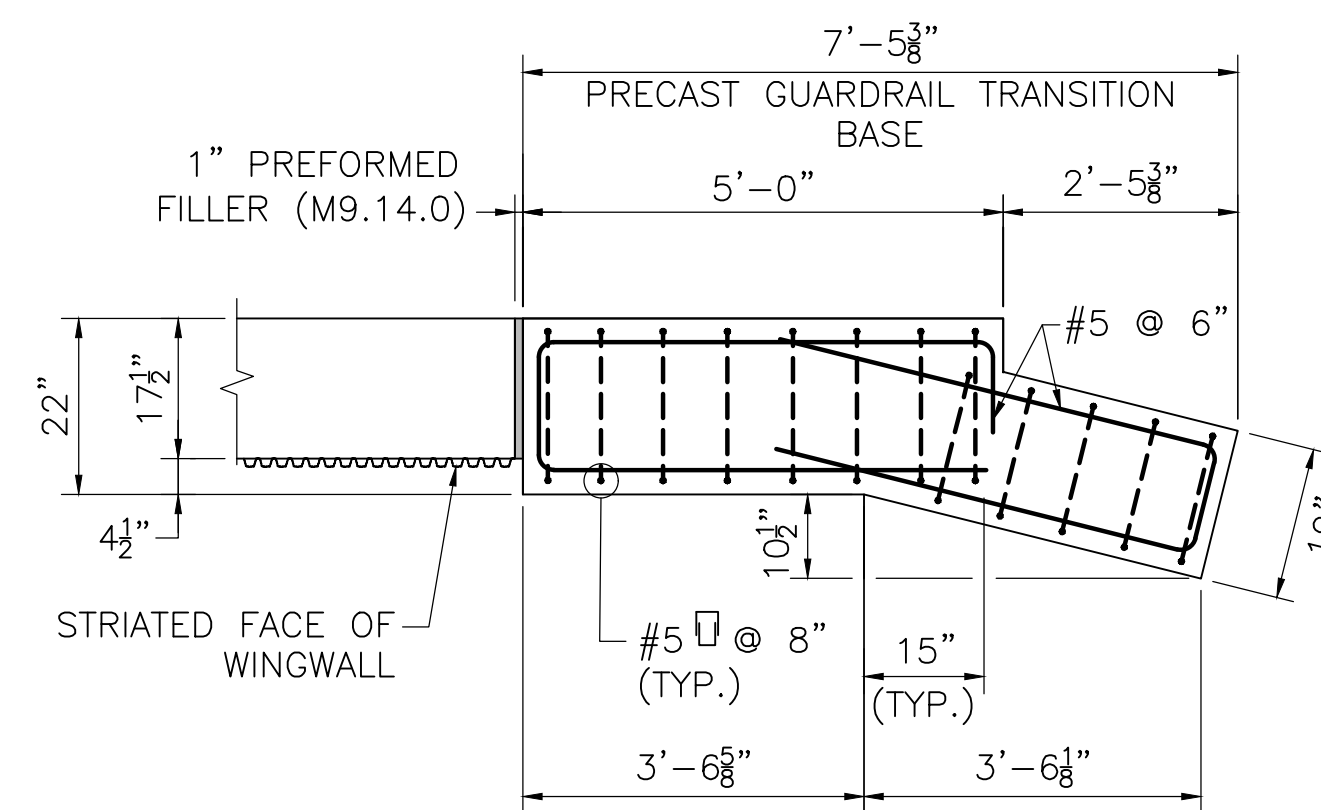


NOTES:

- 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.

SECTION 5 AT SAFETY CURB

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

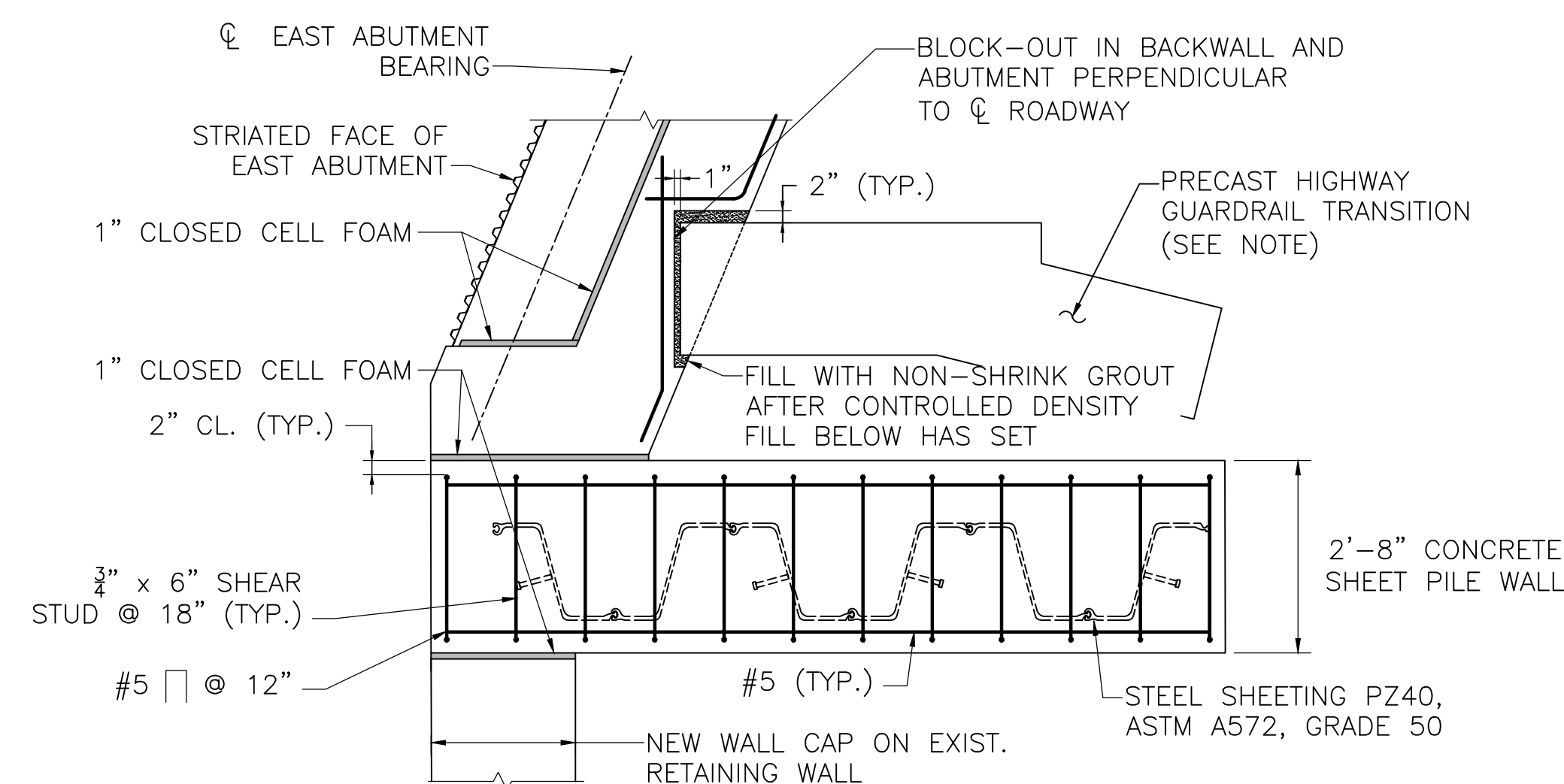


NOTE:

WINGWALL REINFORCEMENT AND STRIATIONS NOT SHOWN FOR CLARITY.

SECTION 6

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



NOTE:

ATTACH CLOSED CELL FOAM TO THE BACK AND SIDE OF THE EXTERIOR PRECAST BEAM PRIOR TO PLACING THE CONCRETE FOR THE BACKWALL AND CURTAIN WALL.

SECTION 7

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

NOTES:

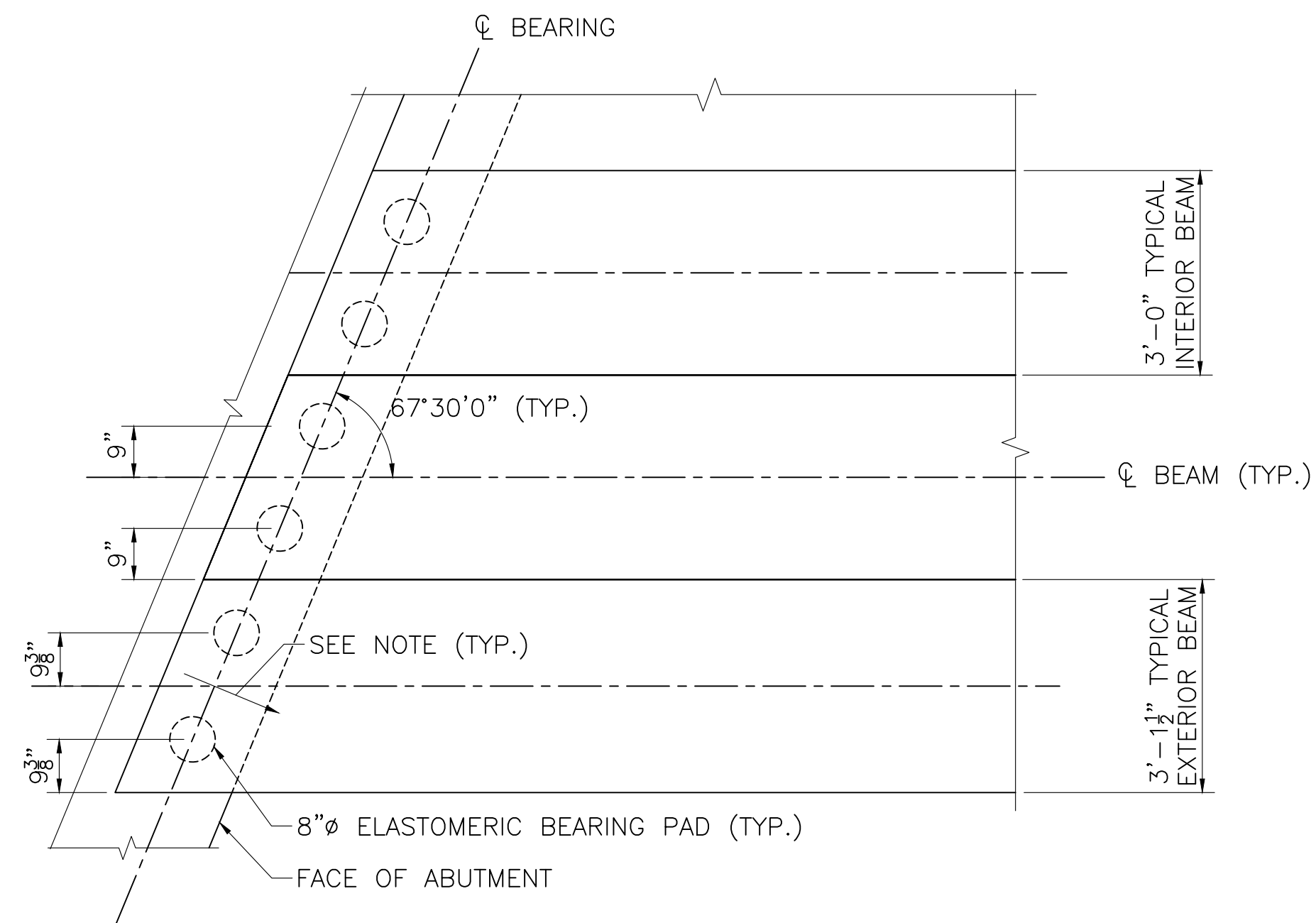
1. PRECAST GUARDRAIL TRANSITION SHALL BE 5000 PSI, 3/4 IN., 685 HP CEMENT CONCRETE.
2. GRAVEL BORROW SHALL BE PLACED AND THOROUGHLY COMPACTED TO THE GRADE OF 3" (MIN.) BELOW THE INTENDED BOTTOM OF THE PRECAST GUARDRAIL TRANSITION BASE AND TO A HEIGHT OF 2'-0" (MIN.) ON ALL SIDES OF THE TRANSITION BASE 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.
3. CONTRACTOR SHALL SET THE PRECAST GUARDRAIL TRANSITION TO THE REQUIRED ELEVATION AND ALIGNMENT, AND BACKFILL PRECAST GUARDRAIL TRANSITION WITH CONTROLLED LOW-STRENGTH MATERIAL (> 300 PSI) TO THE ELEVATION SHOWN.
4. FOR SOUTHEAST HIGHWAY GUARDRAIL TRANSITION, AFTER CONTROLLED LOW-STRENGTH MATERIAL (> 300 PSI) HAS SET FILL THE GAPS BETWEEN GUARDRAIL TRANSITION AND BLOCK-OUT IN BACKWALL AND ABUTMENT WITH NON-SHRINK GROUT UP TO THE TOP OF BACKWALL.
5. THE REST OF REINFORCEMENT IS NOT SHOWN FOR CLARITY.

DATE	DESCRIPTION
SEPT. 14, 2024	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	31	42
PROJECT FILE NO.		609078	

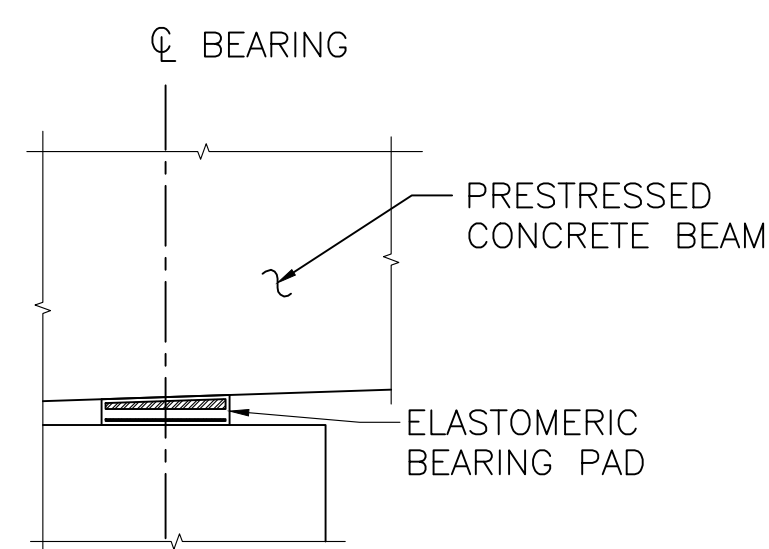
BRIDGE BEARING



**NOTE:**  
SLOPE BEAM SEAT 1%.

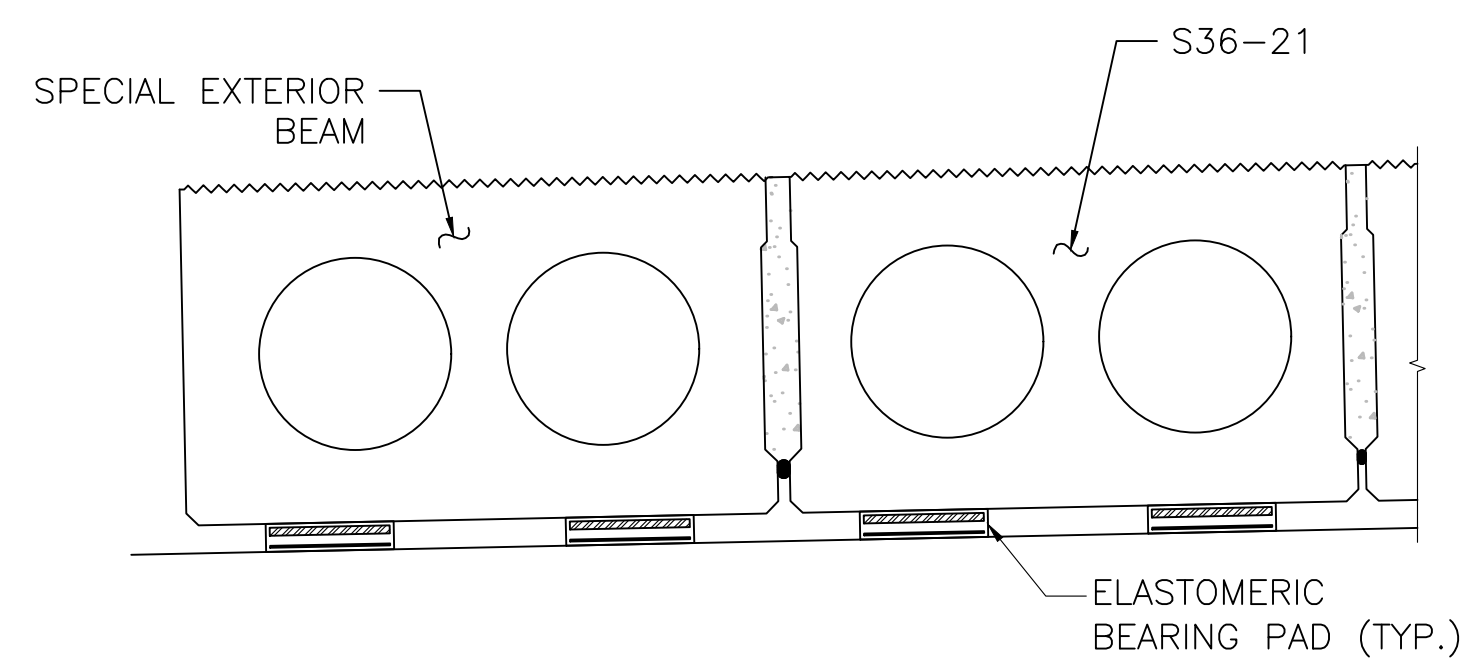
**LAYOUT OF BEARINGS**

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



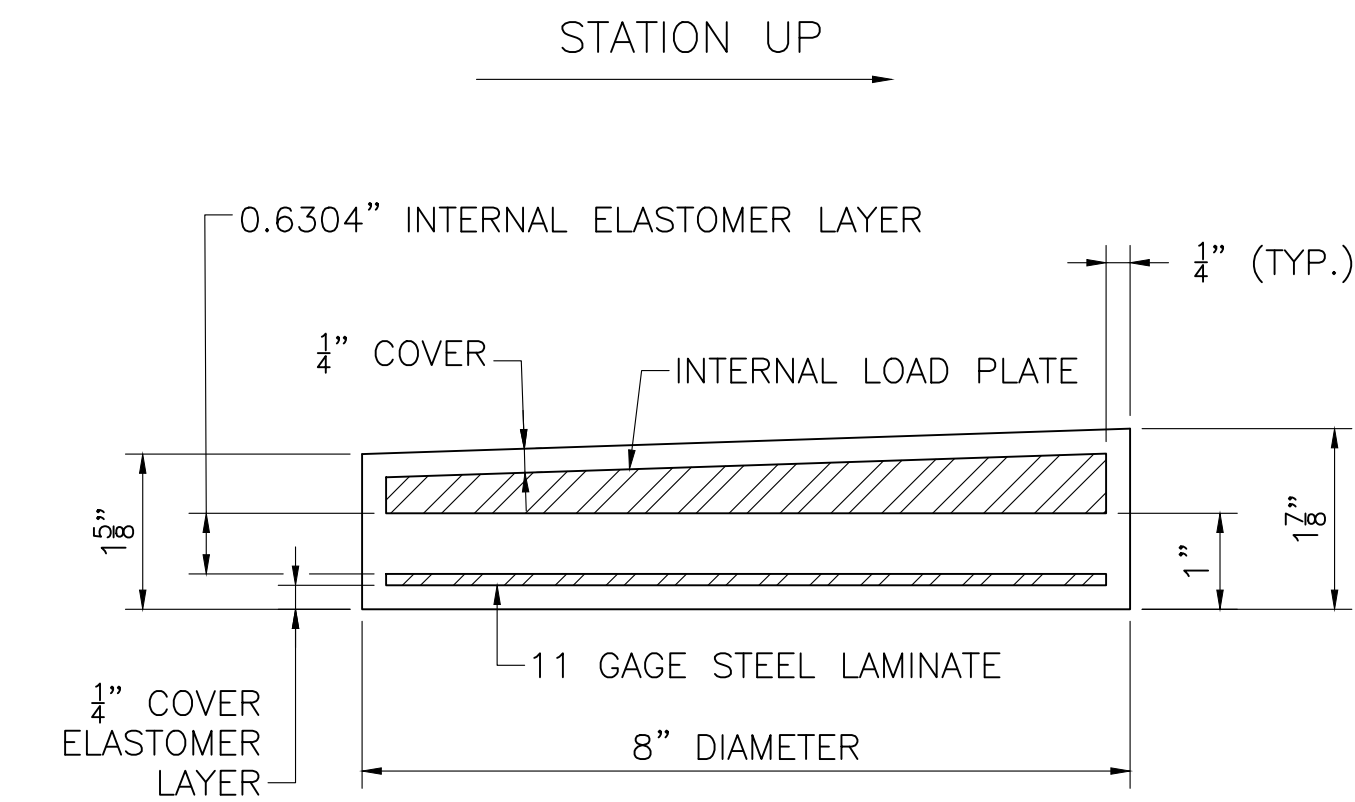
**BEARING ELEVATION**

SCALE: 1" = 1'-0"



**BEARING ELEVATION**

SCALE: 1" = 1'-0"

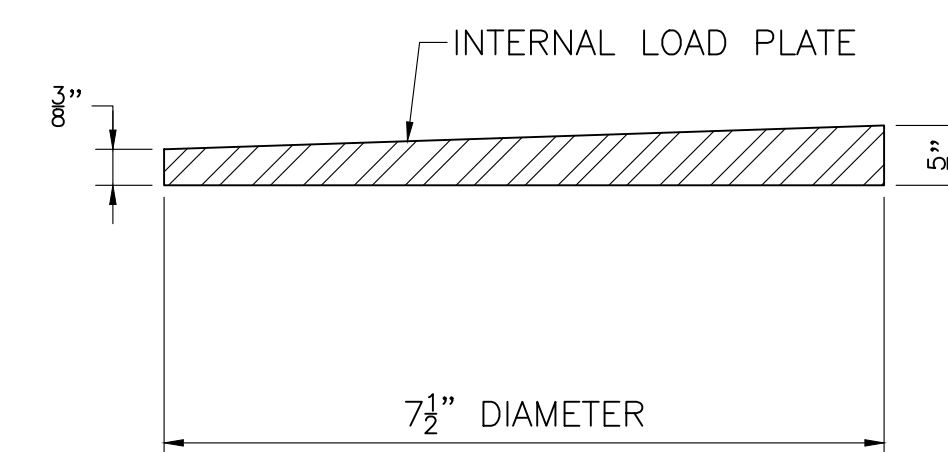


**NOTES:**

- THIS BEARING IS DESIGNED USING AASHTO METHOD B.
- ELASTOMER SHALL HAVE A SHEAR MODULUS OF 0.160 KSI.
- STEEL LAMINATES SHALL CONFORM TO ASTM A 1011 GRADE 36 OR HIGHER. ALL EDGES OF STEEL LAMINATES SHALL BE GROUND.
- THE COMPRESSIVE DESIGN LOAD ON THE BEARING PAD IS 31 KIPS. THE COMPRESSIVE DESIGN STRESS IS THE RESULT OF DIVIDING THE COMPRESSIVE DESIGN LOAD BY THE AREA OF THE PAD AND IS EQUAL TO 0.62 KSI.
- THE 25 YEAR CREEP STRAIN SHALL BE LIMITED TO 35%.
- TAPERED INTERNAL LOAD PLATE SHALL CONFORM TO AASHTO M 270 GRADE 36 OR GRADE 50. ALL EDGES OF TAPERED INTERNAL LOAD PLATE SHALL BE GROUND SMOOTH.
- ALL BEARINGS SHALL BE MARKED PRIOR TO SHIPPING. THE MARKS SHALL INCLUDE THE BEARING LOCATION ON THE BRIDGE, AND A 1/2" DEEP DIRECTION ARROW THE POINTS UP-STATION. ALL MARKS SHALL BE PERMANENT AND BE VISIBLE AFTER BEARING IS INSTALLED.
- BEAMS SHALL BE ERECTED WHEN THE AMBIENT TEMPERATURE IS BETWEEN 30°F AND 90°F. IF BEAMS ARE ERECTED AT OTHER AMBIENT TEMPERATURES, THEY WILL HAVE TO BE JACKED AND THE ELASTOMERIC BEARINGS RECENTERED WHEN THE TEMPERATURE RETURNS TO THAT RANGE.

**ELASTOMERIC BEARING PAD**

NOT TO SCALE



**INTERNAL LOAD PLATE DETAIL**

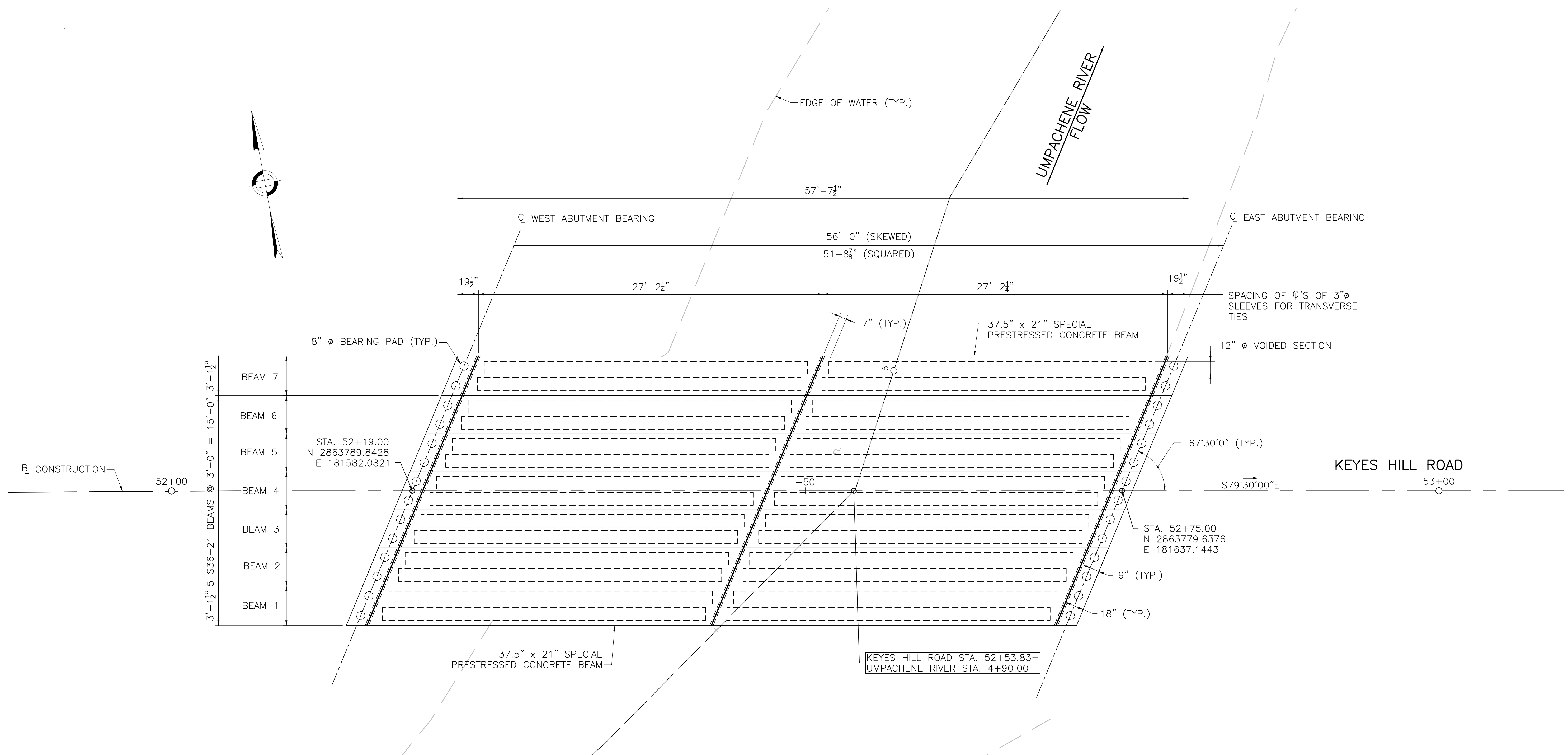
SCALE: 6" = 1'-0"

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NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	32	42
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FRAMING PLAN



NOTES:

- SEE STANDARD SPECIFICATIONS FOR BEAMS ERECTION AND LAYOUT.
- IT IS ANTICIPATED THAT AT LEAST BEAMS 1 TO 3 WILL NEED TO BE SET NEAR CENTERLINE AND LIFTED INTO PLACE WITH EXCAVATORS ON EACH SIDE OF THE BEAM TO MAINTAIN REQUIRED 10' CLEARANCE TO THE OVERHEAD ELECTRIC LINES.

FRAMING PLAN

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

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NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	33	42
PROJECT FILE NO.		609078	

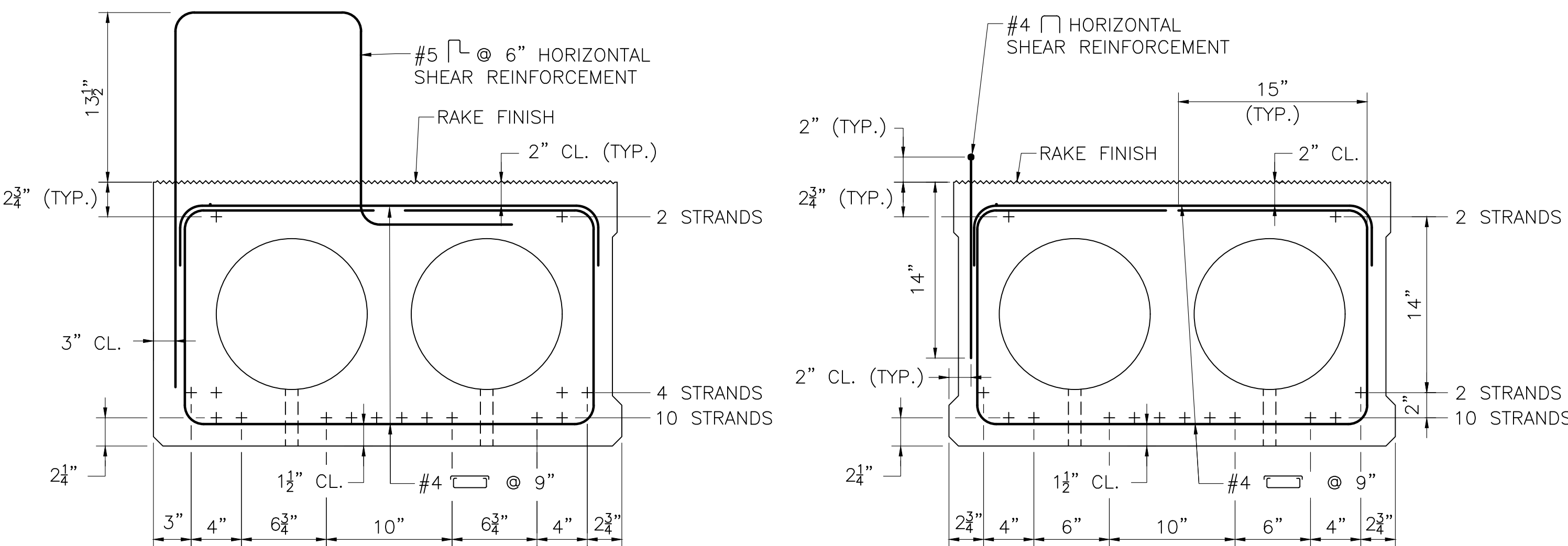
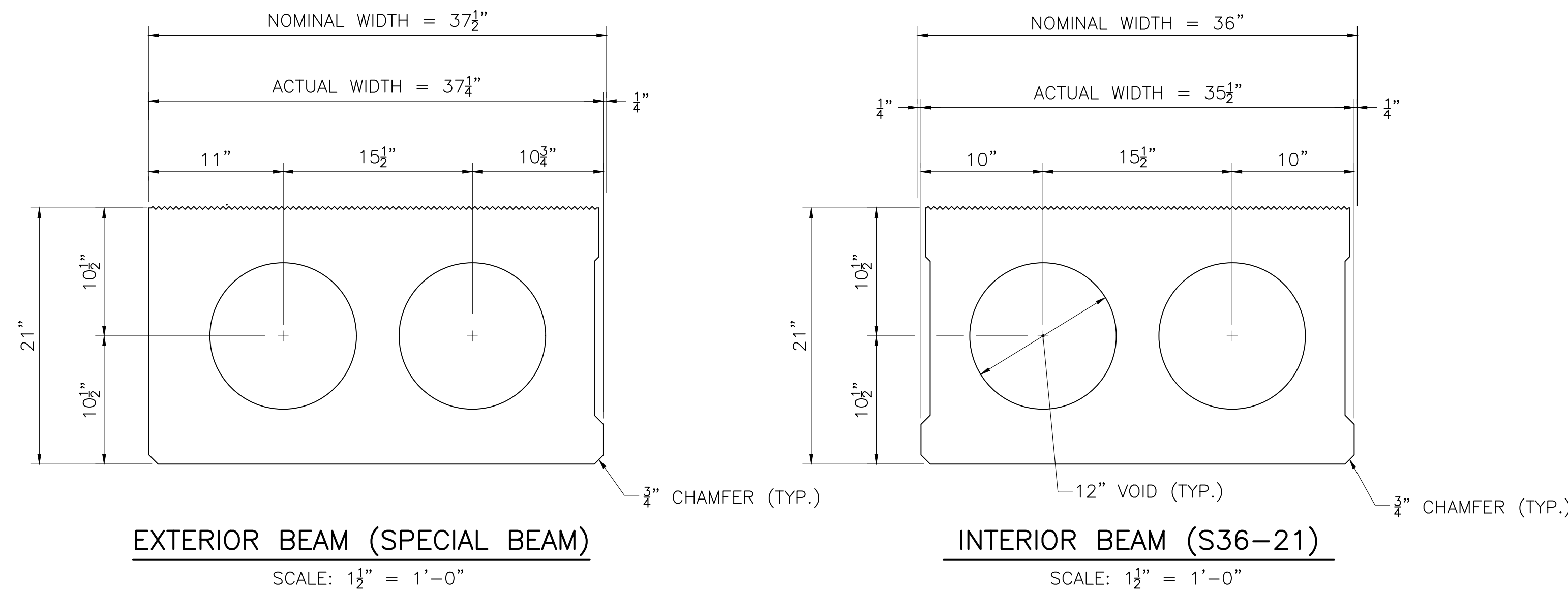
PRESTRESSED CONCRETE BEAM 1

CONSTRUCTION SEQUENCE NOTES:

1. AFTER ALL BEAMS HAVE BEEN ERECTED, TENSION EACH TRANSVERSE TIE TO 5 KIPS.
2. FILL ALL KEYWAYS WITH MORTAR (M4.04.5). IF THE KEYWAYS ARE NOT FILLED WITHIN FIVE (5) DAYS AFTER THE BEAMS ARE ERECTED, THE CONTRACTOR SHALL COVER AND PROTECT THE KEYWAYS FROM WEATHER AND DEBRIS UNTIL THEY ARE FILLED.
3. AFTER THE MORTAR HAS CURED (24 HOURS MINIMUM), TENSION EACH TRANSVERSE TIE TO 44 KIPS.
4. CONCRETE FOR DECK SLAB SHALL BE PLACED AFTER THE TRANSVERSE TIES HAVE BEEN FULLY TENSIONED.
5. NO TRAFFIC OR HEAVY EQUIPMENT WILL BE PERMITTED ON THE BRIDGE UNTIL ALL TRANSVERSE TIES HAVE BEEN PROPERLY TENSIONED AND THE DECK HAS BEEN CAST AND CURED PER THE STANDARD SPECIFICATIONS.

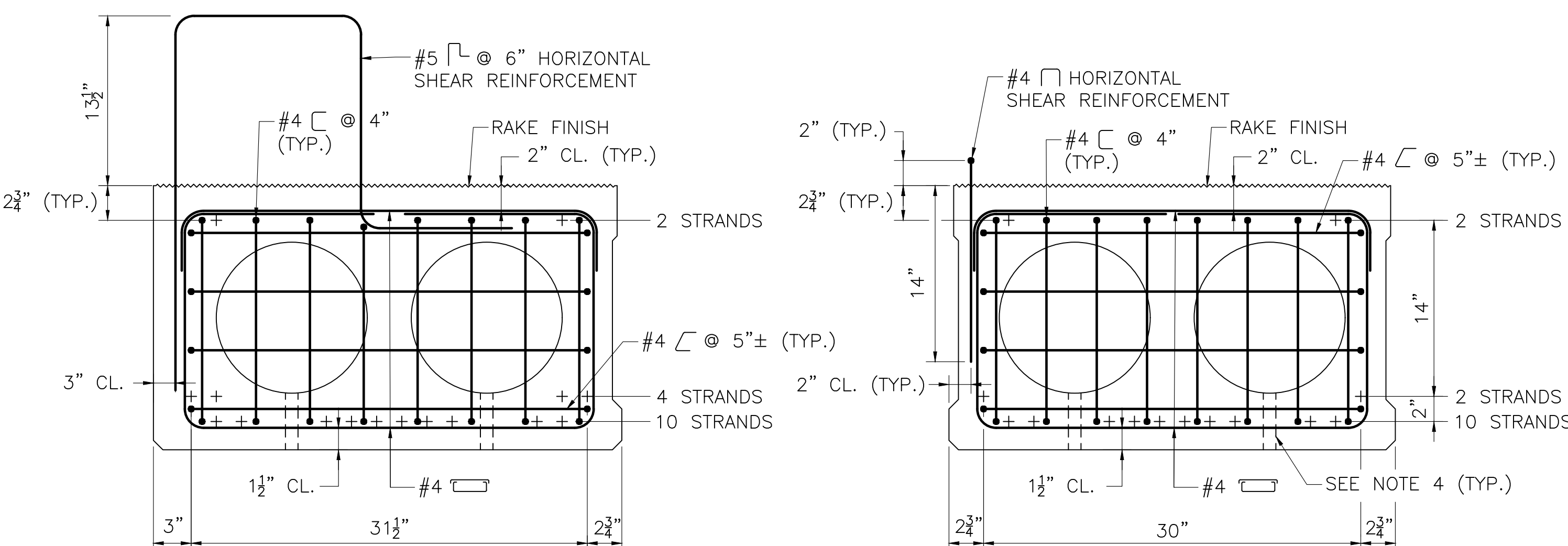
NOTES:

1. + DENOTES STRAIGHT STRANDS.
2. SEE SHEAR KEY DETAIL ON THIS SHEET.
3. SEE END OF BEAM PLAN ON SHEET 18 OF 22 FOR STIRRUP SPACING.
4. 1"Ø DRAIN, PLACED AT BOTH ENDS OF EACH VOID.
5. ALL PRETENSIONING ELEMENTS SHALL BE 0.6"Ø, UNCOATED, SEVEN-WIRE, LOW RELAXATION STEEL STRANDS AND SHALL CONFORM TO AASHTO M 203.
6. THE NOMINAL TENSILE STRENGTH OF THE PRETENSIONING STRANDS SHALL BE 270 KSI.
7. THE INITIAL TENSION PER 0.6"Ø STRAND SHALL BE 44 KIPS.
8. THE MINIMUM 28 DAY COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 6,500 PSI.
9. NO PRESTRESS SHALL BE TRANSFERRED TO THE CONCRETE UNIT IT HAS ATTAINED A COMPRESSIVE STRENGTH, AS SHOWN BY CYLINDER TEST, OF AT LEAST 4,500 PSI.
10. THE TOP OF ALL BEAMS SHALL BE GIVEN A RAKE FINISH (¼" AMPLITUDE) ACROSS THE WIDTH PERPENDICULAR TO THE BEAM'S AXIS.
11. THE FABRICATOR IS FULLY RESPONSIBLE FOR THE DESIGN OF THE LIFTING DEVICES AND BEAM STRESSES DURING LIFTING AND HANDLING WHICH SHALL BE ADEQUATE FOR THE SAFETY FACTORS REQUIRED BY THE ERECTION PROCEDURE.
12. TO CONTROL CRACKING AT THE END OF THE BEAM, THE FABRICATOR SHALL DEBOND APPROXIMATELY 50% OF THE STRANDS FOR THE FIRST 6" FROM THE END OF THE BEAM.



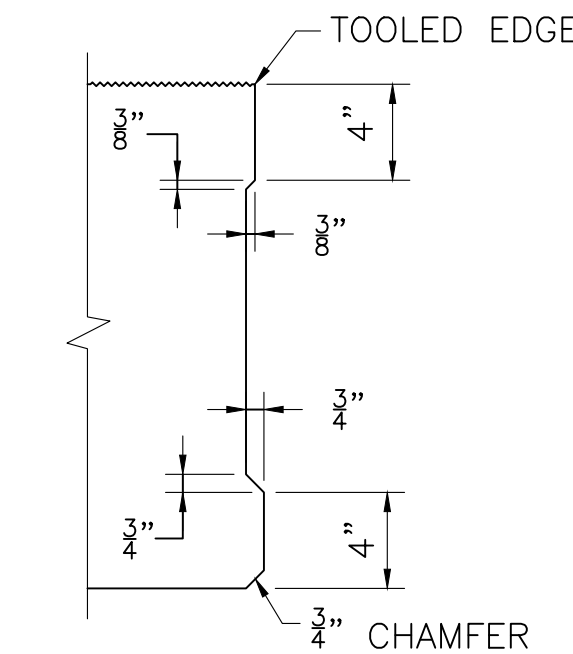
MIDSPAN SECTION – EXTERIOR BEAM (SPECIAL BEAM) SCALE: 1 1/2" = 1'-0"

MIDSPAN SECTION – INTERIOR BEAM (S36-21) SCALE: 1 1/2" = 1'-0"

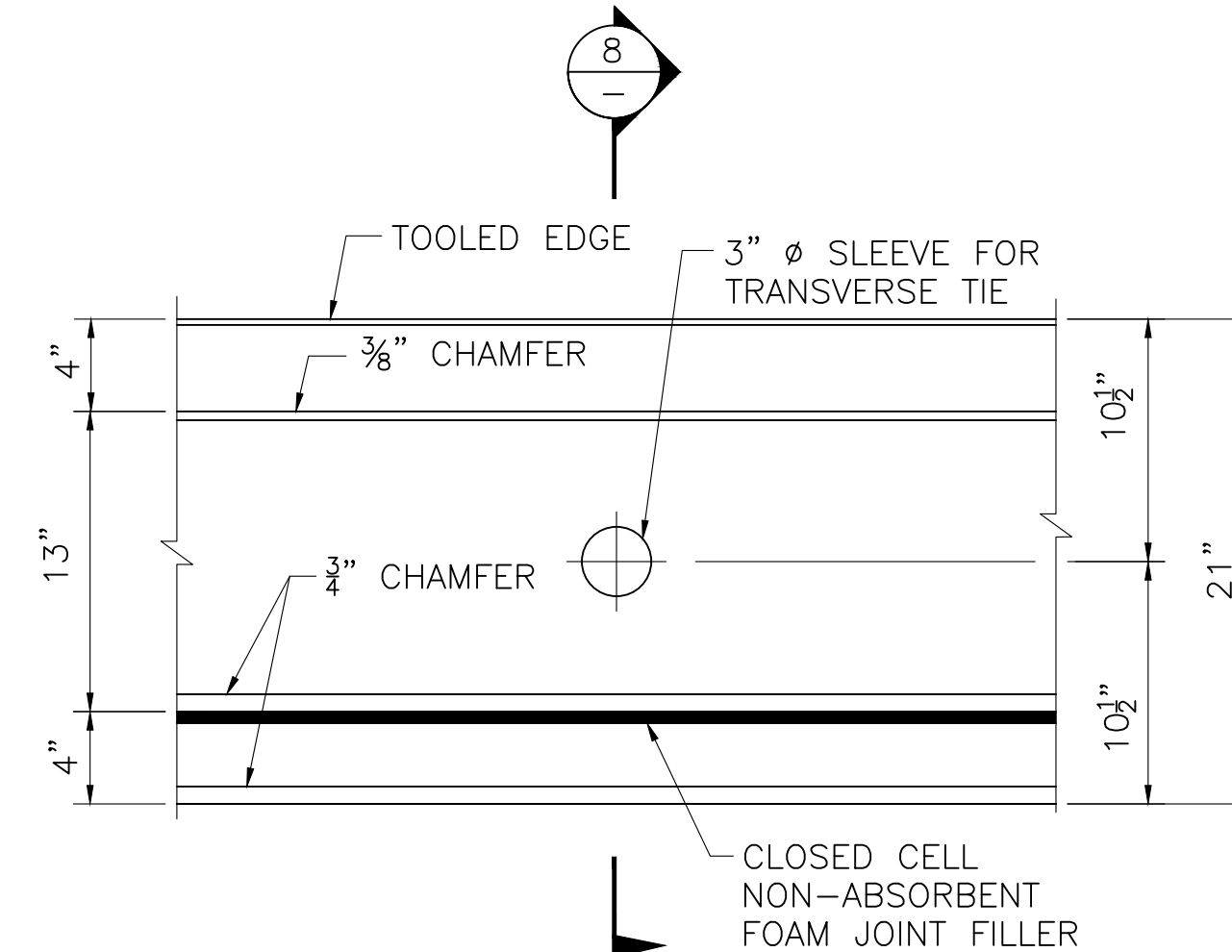


END SECTION – EXTERIOR BEAM (SPECIAL BEAM) SCALE: 1 1/2" = 1'-0"

END SECTION – INTERIOR BEAM (S36-21) SCALE: 1 1/2" = 1'-0"

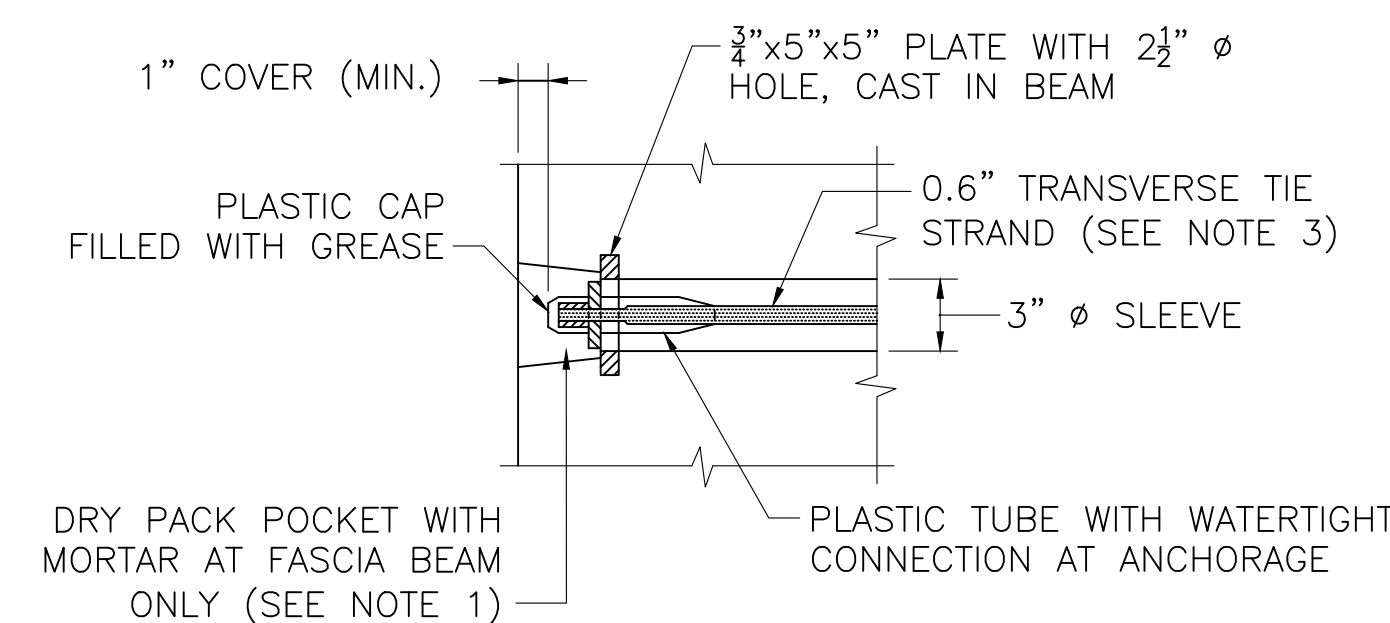


SHEAR KEY DETAIL SCALE: 1 1/2" = 1'-0"



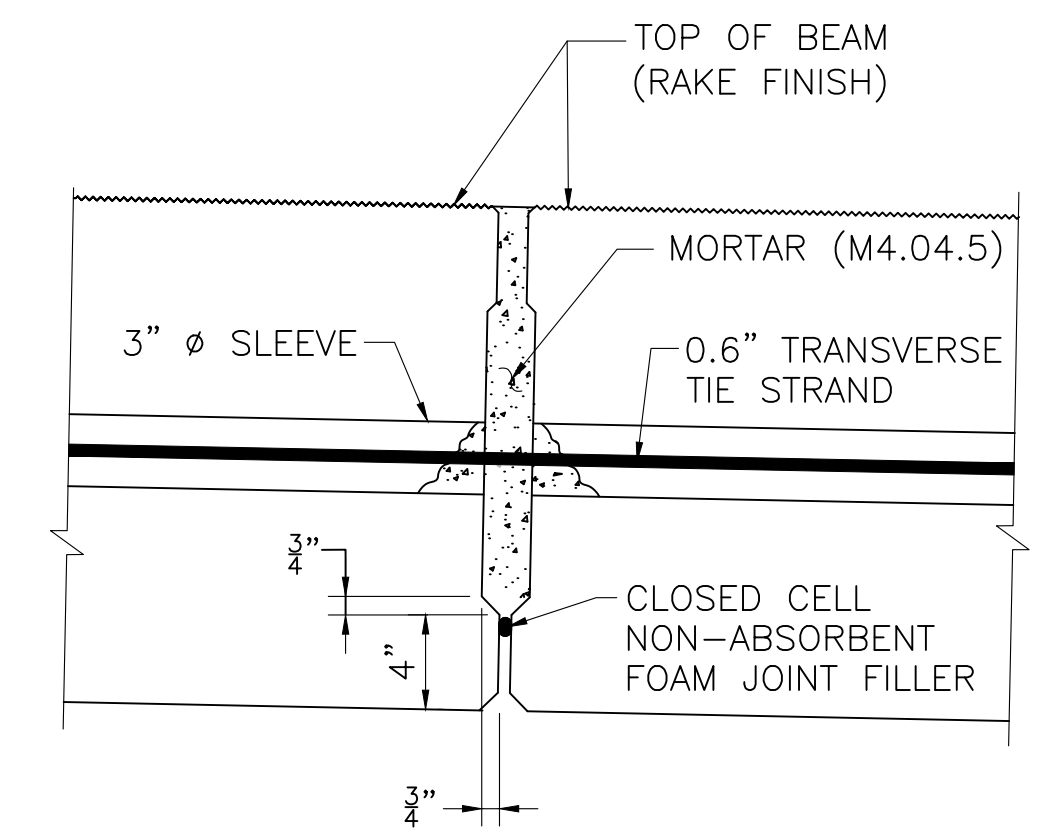
TYPICAL BEAM ELEVATION AT TRANSVERSE TIE LOCATIONS

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



TRANSVERSE TIE ANCHORAGE

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



SECTION 8

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

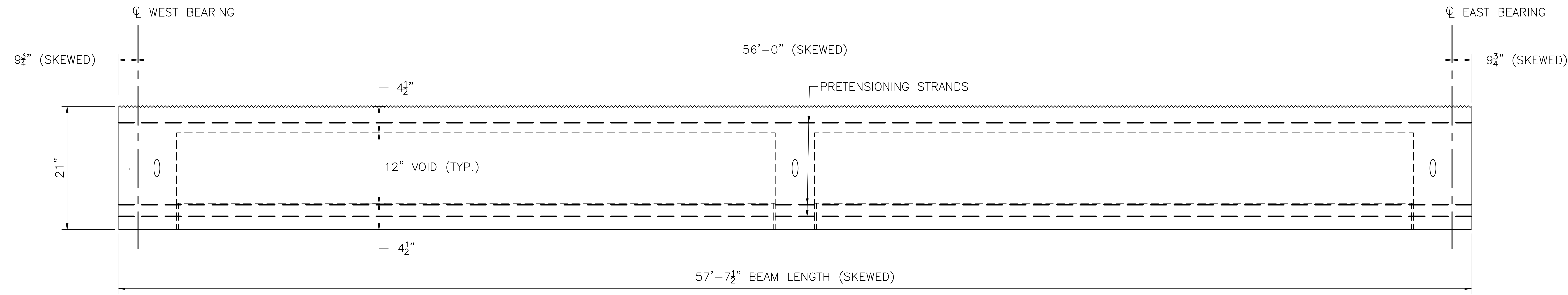
NOTES:

1. MORTAR FOR EXTERIOR POCKETS SHALL CONFORM TO M4.02.15 AND SHALL BE THE SAME COLOR AND TEXTURE AS THE BEAM CONCRETE.
2. OTHER ANCHORAGE SYSTEMS MAY BE SUBSTITUTED WITH THE APPROVAL OF THE ENGINEER. ALTERNATE ANCHORAGE SYSTEMS SHALL BE WATERTIGHT AND CORROSION PROOF.
3. TRANSVERSE TIES SHALL BE COVERED BY A SEAMLESS POLYPROPYLENE SHEATH (WITH CORROSION INHIBITING GREASE BETWEEN THE STRAND AND SHEATH) FOR THE FULL LENGTH OF THE STRAND, EXCEPT AT THE ANCHORAGE LOCATION.

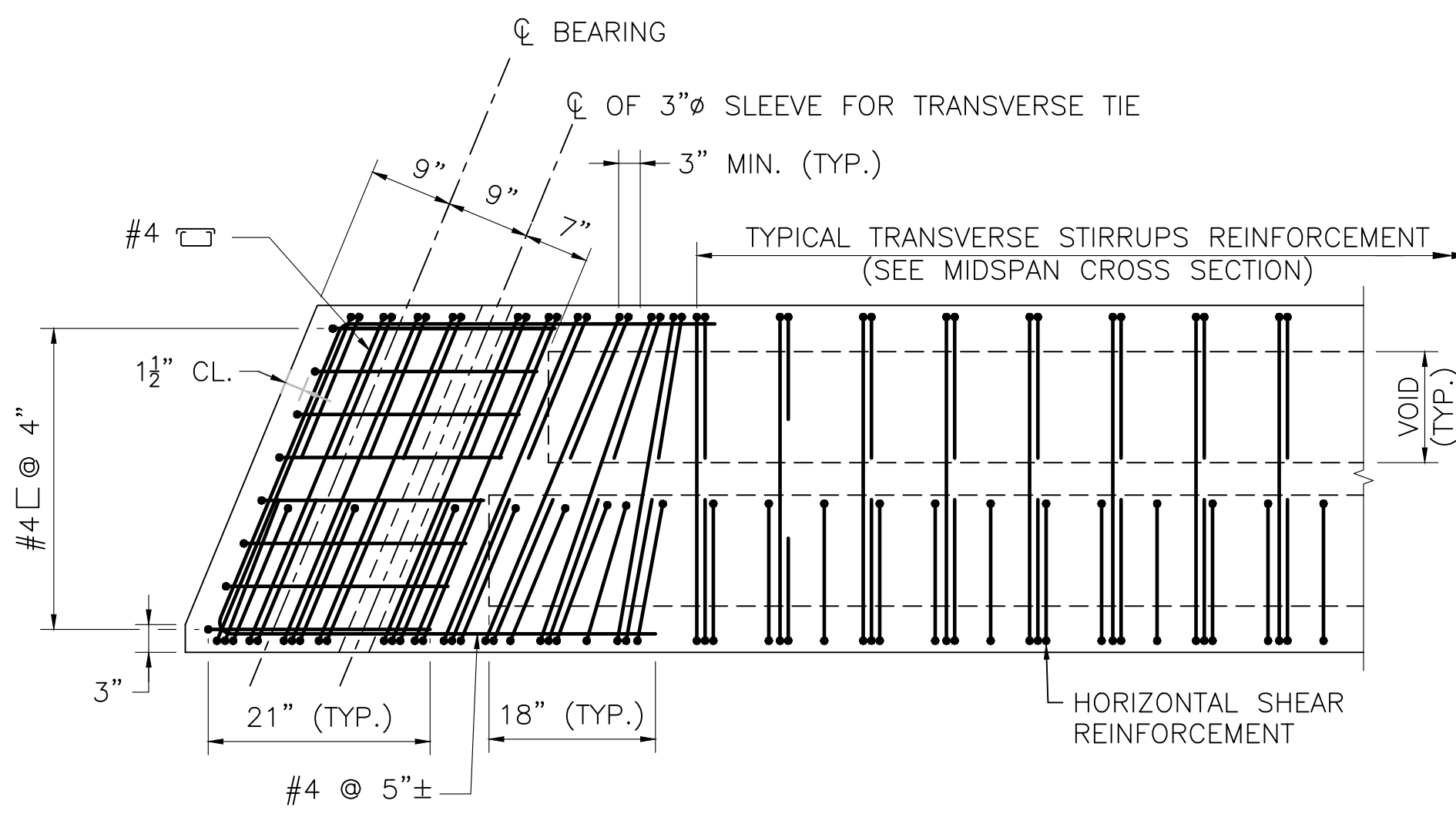
DATE	DESCRIPTION
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STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	34	42
PROJECT FILE NO.		609078	

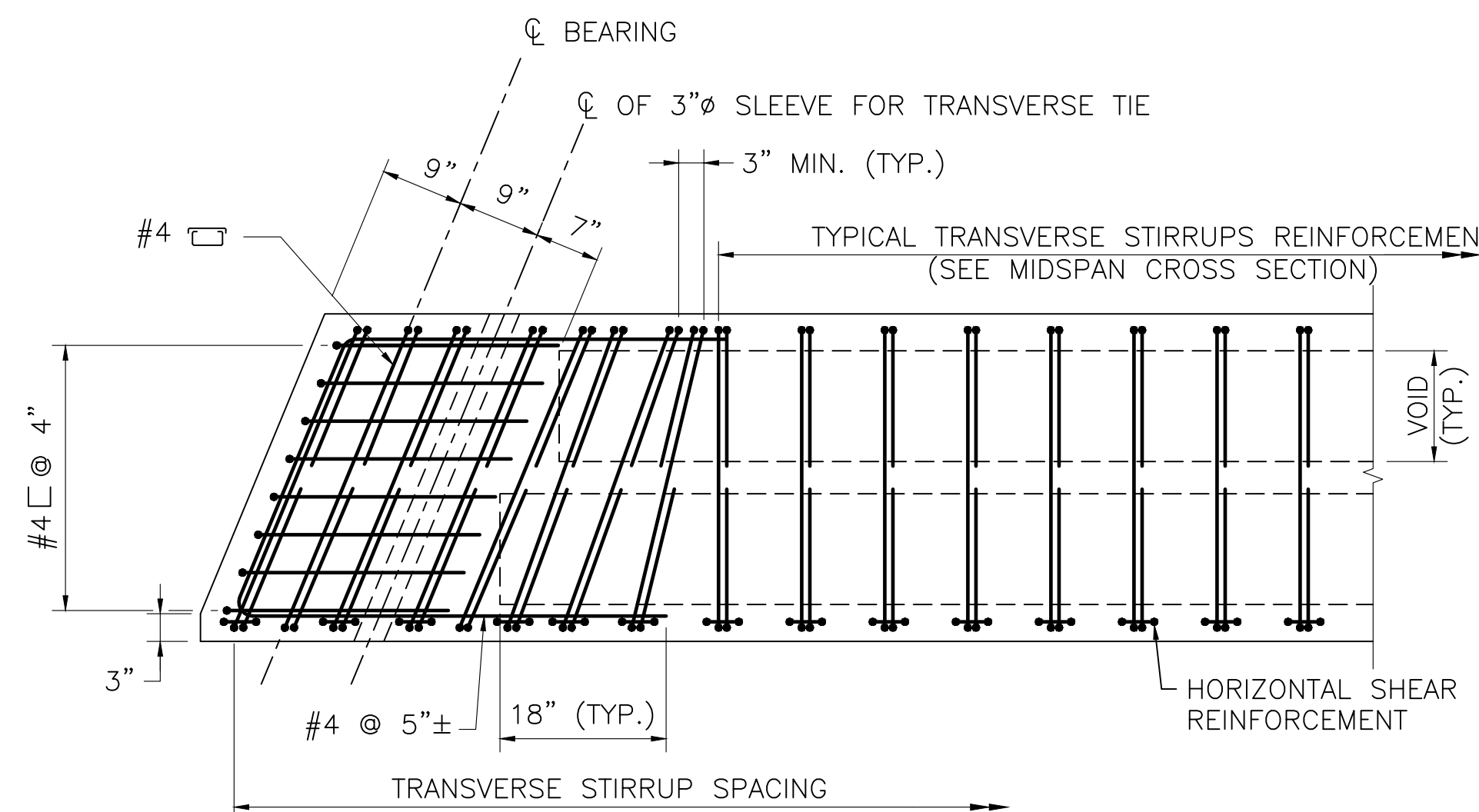
PRESTRESSED CONCRETE BEAM 2



TYPICAL BEAM ELEVATION  
NOT TO SCALE



END OF BEAM PLAN - EXTERIOR BEAM  
SCALE: 3/4" = 1'-0"



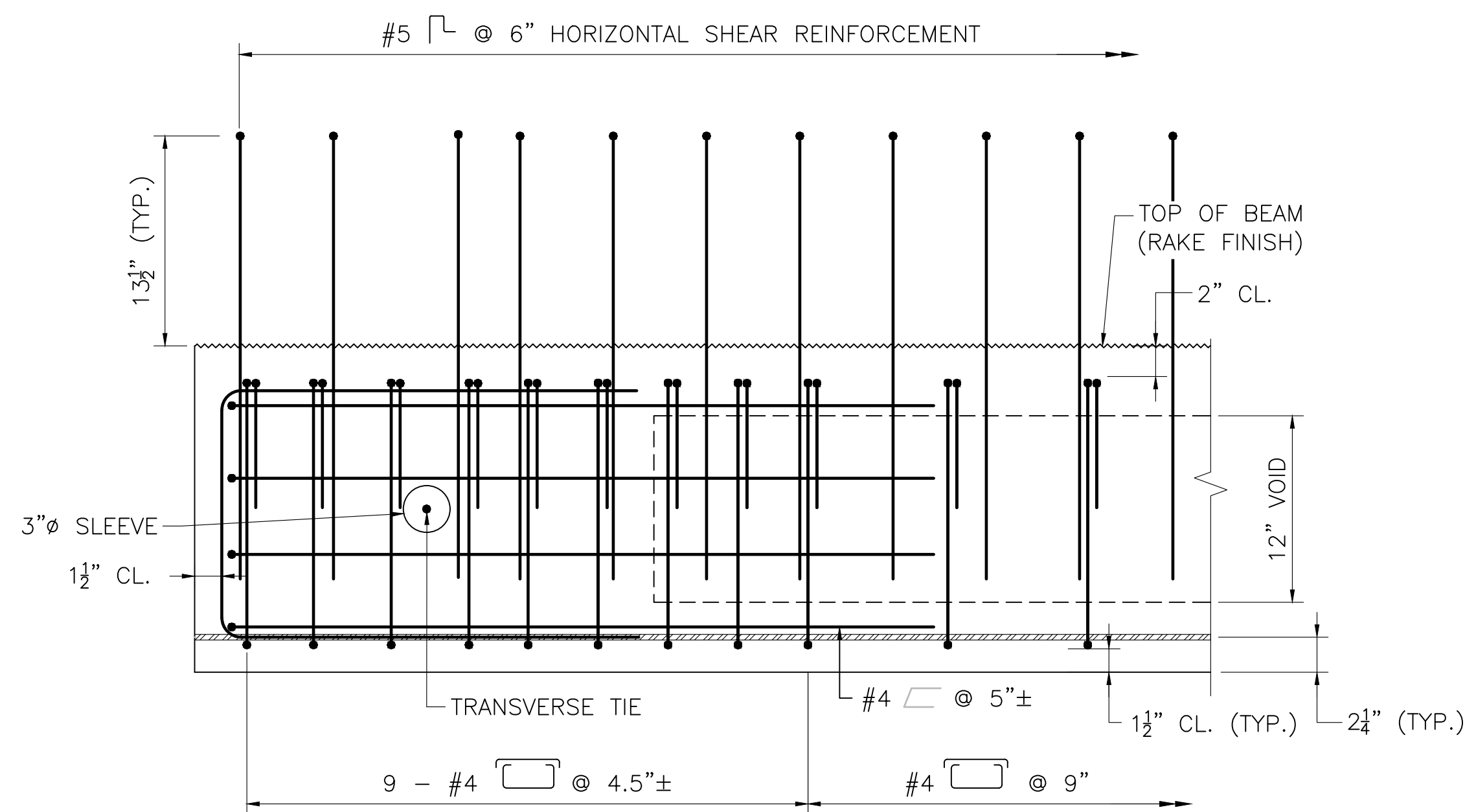
END OF BEAM PLAN - INTERIOR BEAM  
SCALE: 3/4" = 1'-0"

ESTIMATED CAMBER AND DEFLECTIONS AT MIDSPAN (INCHES)

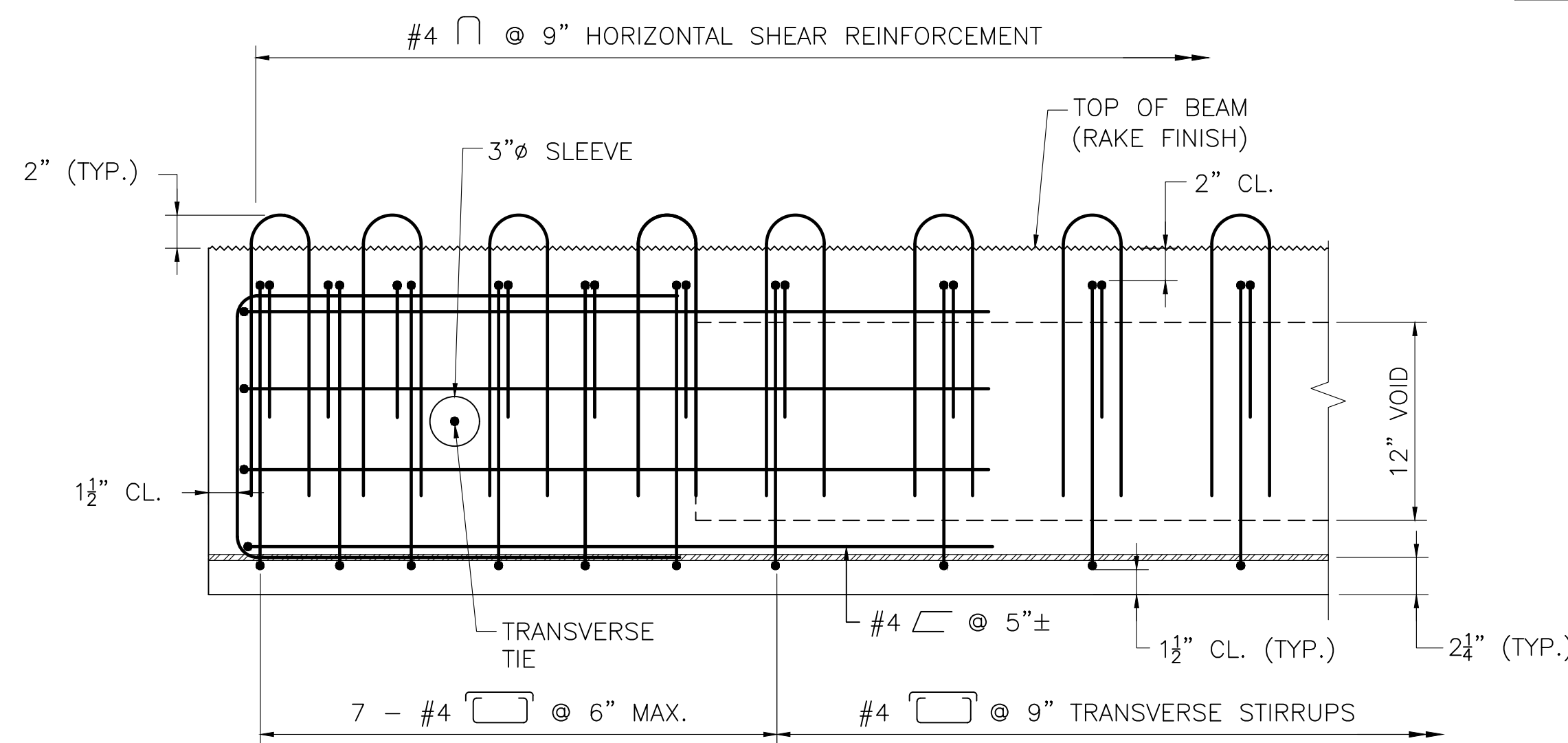
STATE OF BEAM	DIRECTION	BEAMS #1 & #7	BEAMS #2 TO #6
CAMBER AT TRANSFER <sup>(2)</sup>	UP	0.70	0.58
CAMBER AT ERECTION	UP	0.57	0.41
FINAL NCDL DEFLECTION <sup>(3)</sup>	DOWN	0.96	0.99
FINAL CDL DEFLECTION <sup>(3)</sup>	DOWN	0.69	0.52

NOTES:

- CAMBER AND DEFLECTIONS IN THE TABLE ARE NOT GUARANTEED AND ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY.
- THE BEAM CONCRETE MODULUS OF ELASTICITY AT TRANSFER USED IN THE ABOVE BEAM CAMBER IS ASSUMED TO BE 4,435 PSI.
- THE BEAM CONCRETE MODULUS OF ELASTICITY USED IN THE ABOVE BEAM DEFLECTION IS ASSUMED TO BE 5,008 PSI (AT 28 DAYS).



STRANDS IN THE BOTTOM ROW SHOWN.  
THE REMAINDER OF THE STRANDS NOT SHOWN FOR CLARITY.  
LONGITUDINAL SECTION - EXTERIOR BEAM  
SCALE: 1 1/2" = 1'-0"



STRANDS IN THE BOTTOM ROW SHOWN.  
THE REMAINDER OF THE STRANDS NOT SHOWN FOR CLARITY.  
LONGITUDINAL SECTION - INTERIOR BEAM  
SCALE: 1 1/2" = 1'-0"

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**NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER**

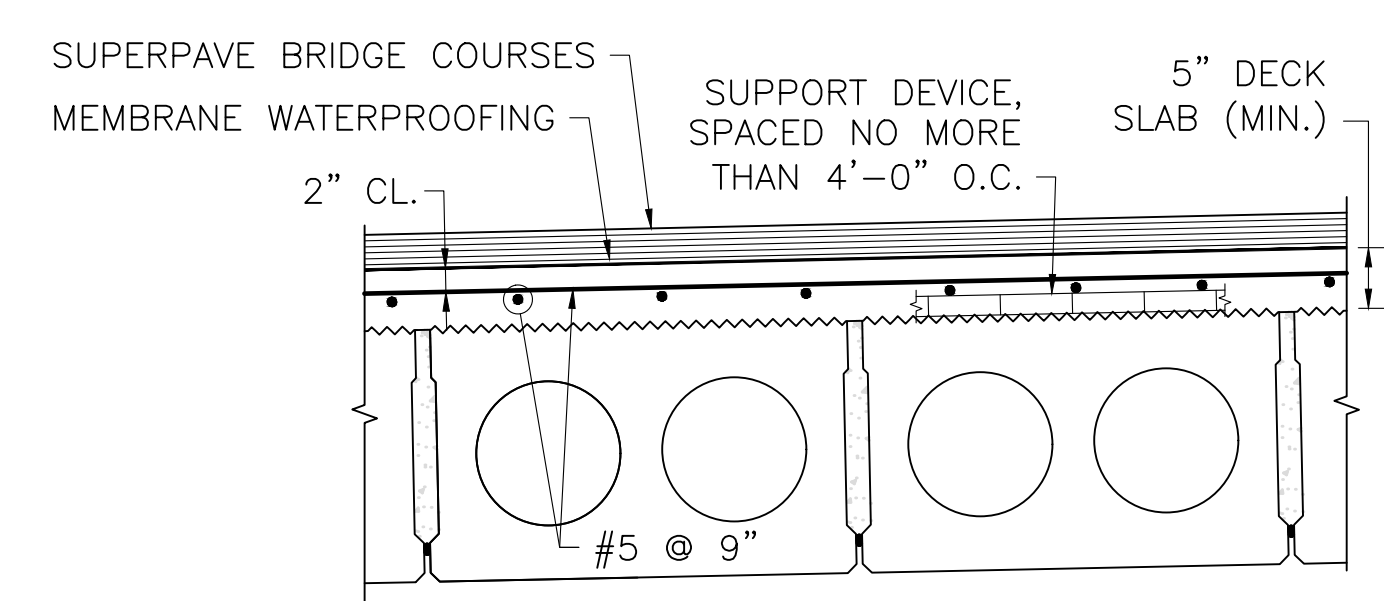
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	35	42
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**BRIDGE TRANSVERSE SECTION**

	THEORETICAL TOP OF DECK ELEVATIONS ALONG THE SPAN LENGTH										
	INCREASING STATIONS →										
	CL BRG.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	CL BRG.
LEFT CURBLINE	991.21	991.34	991.48	991.63	991.80	991.97	992.16	992.36	992.57	992.79	993.03
CROWN	991.33	991.44	991.57	991.71	991.87	992.03	992.21	992.40	992.60	992.81	993.04
RIGHT CURBLINE	991.09	991.20	991.32	991.45	991.59	991.75	991.91	992.09	992.28	992.48	992.70

**NOTES:**

- REFERENCE FOR RIGHT CURBLINE, CROWN, AND LEFT CURBLINE LOOKING UP STATION.
- THE THEORETICAL TOP OF DECK ELEVATIONS ARE PROVIDED FOR SETTING THE SCREED ELEVATIONS FOR DECK FINISHING. THESE VALUES ARE CALCULATED BY TAKING THE PROPOSED TOP OF HMA ELEVATION ALONG THE SPAN AT THE POINTS INDICATED IN THE TABLE, SUBTRACTING THE THICKNESS OF THE HMA AND ADDING THE DEFLECTIONS DUE TO THE DECK AND OTHER SUPERIMPOSED DEAD LOADS.

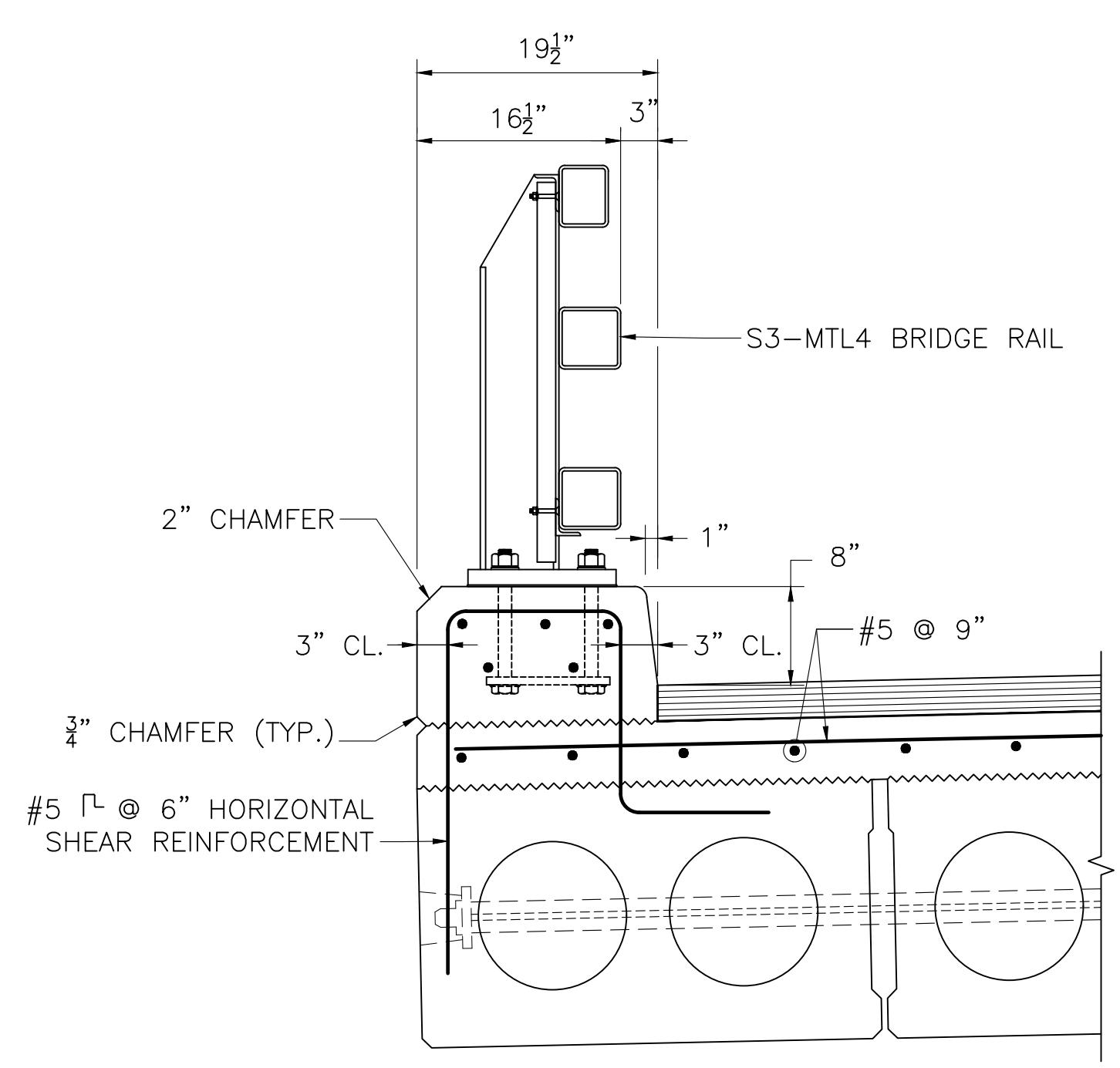


**NOTES:**

- 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 SHALL BE COATED.
- THE FINISHED SURFACE OF THE BRIDGE DECK SHALL BE SMOOTH AND WITHOUT ANY PROJECTIONS THAT COULD PUNCTURE THE MEMBRANE WATERPROOFING OR DEPRESSIONS THAT COULD RETAIN WATER.

**TYPICAL DECK REINFORCEMENT**

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

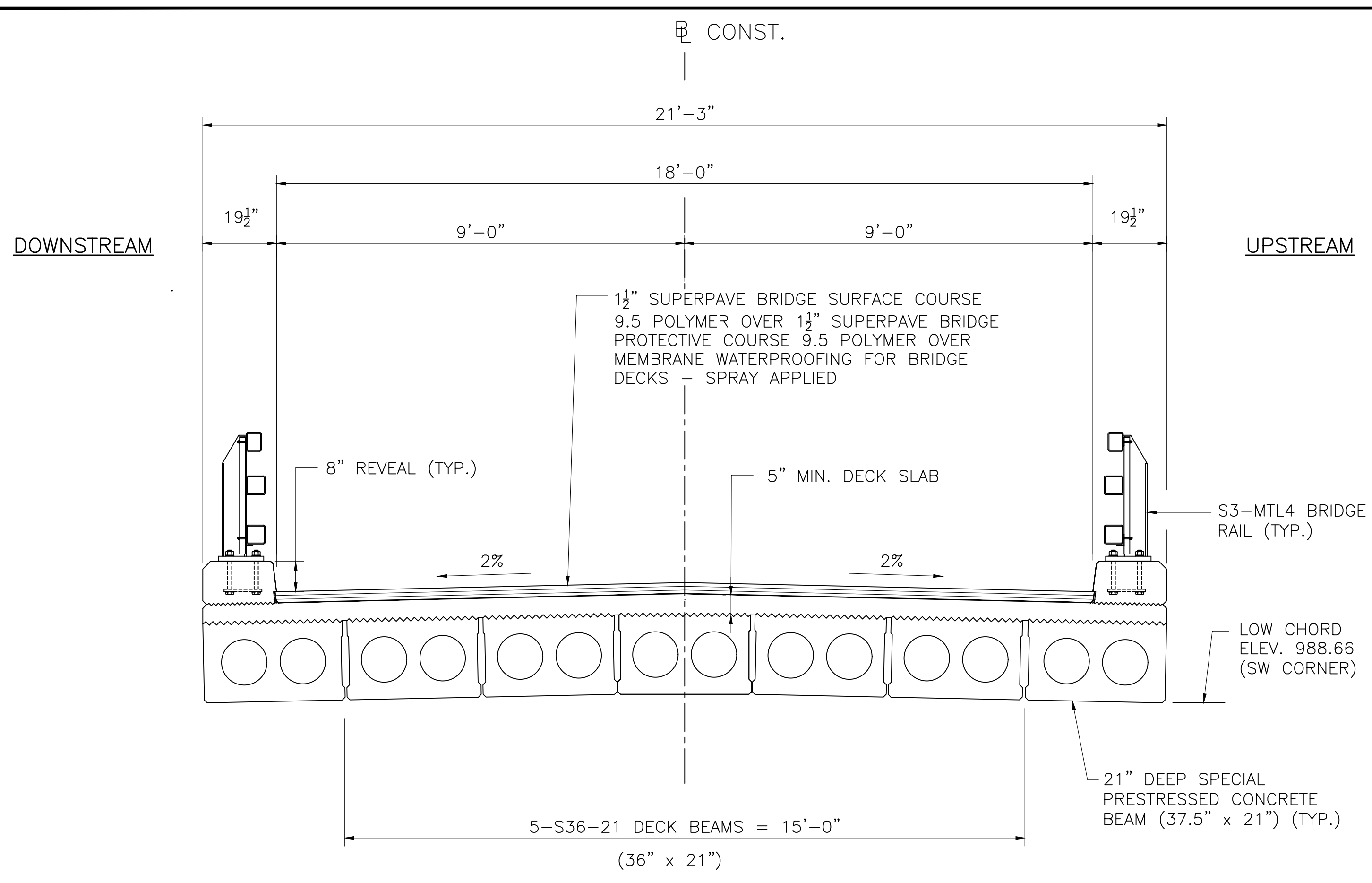


**NOTES:**

- DECK SLAB SHALL BE 5000 PSI, 3/4 IN, 685 HP CEMENT CONCRETE.
- SAFETY CURB CONCRETE SHALL BE 5000 PSI, 3/4 IN, 685 HP CEMENT CONCRETE.

**SAFETY CURB SECTION**

SCALE: 1" = 1'-0"



**TYPICAL TRANSVERSE SECTION**

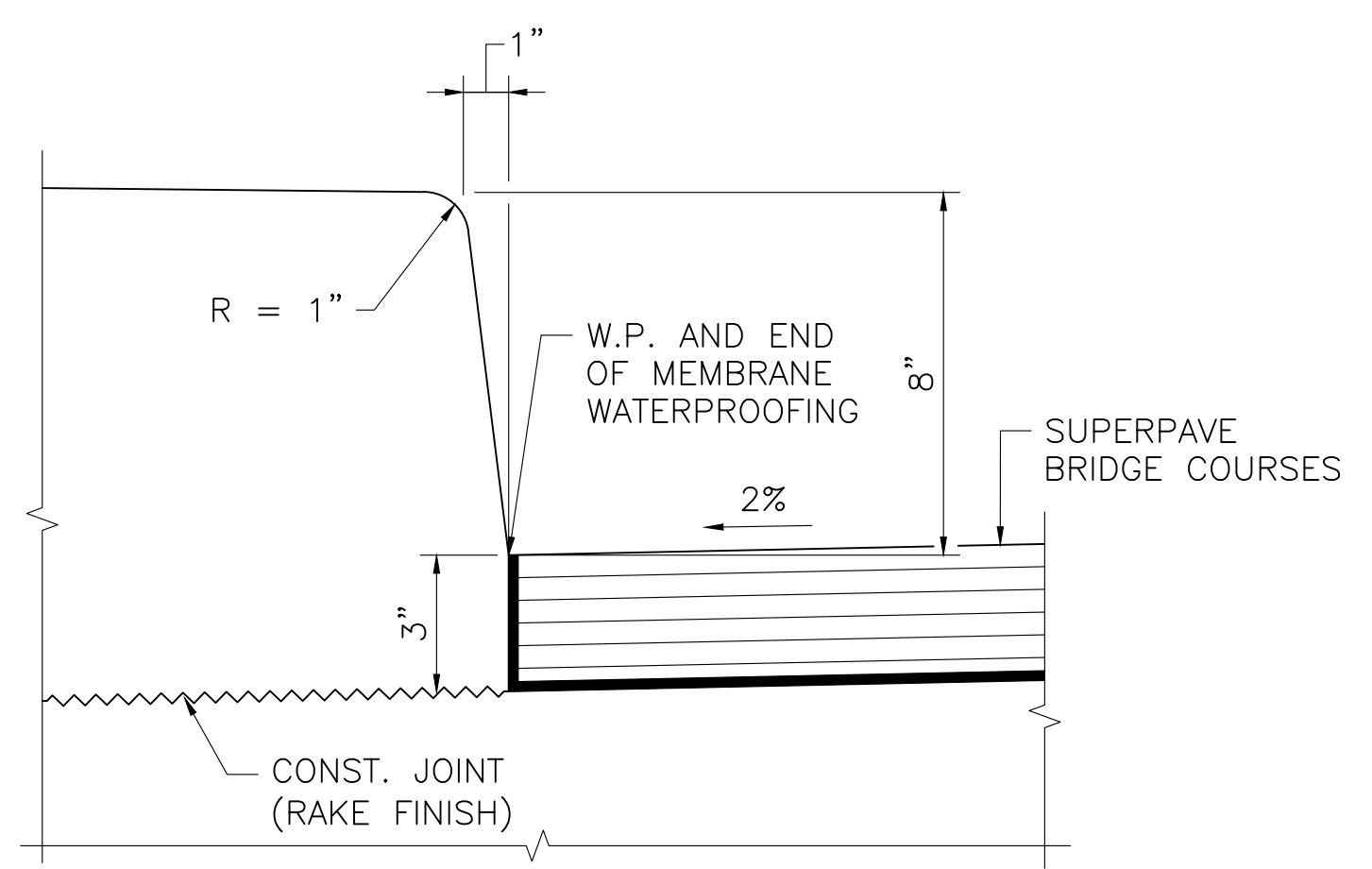
SCALE: 1/2" = 1'-0"

LOCATION	LEFT EDGE OF DECK SLAB	PROFILE GRADE/CROWN LINE	RIGHT EDGE OF DECK SLAB
CL BEARINGS @ WEST ABUTMENT	8"	8 1/4"	8"
MIDSPAN	5"	5 3/8"	5"
CL BEARINGS @ EAST ABUTMENT	8"	8 1/4"	8"

**NOTES:**

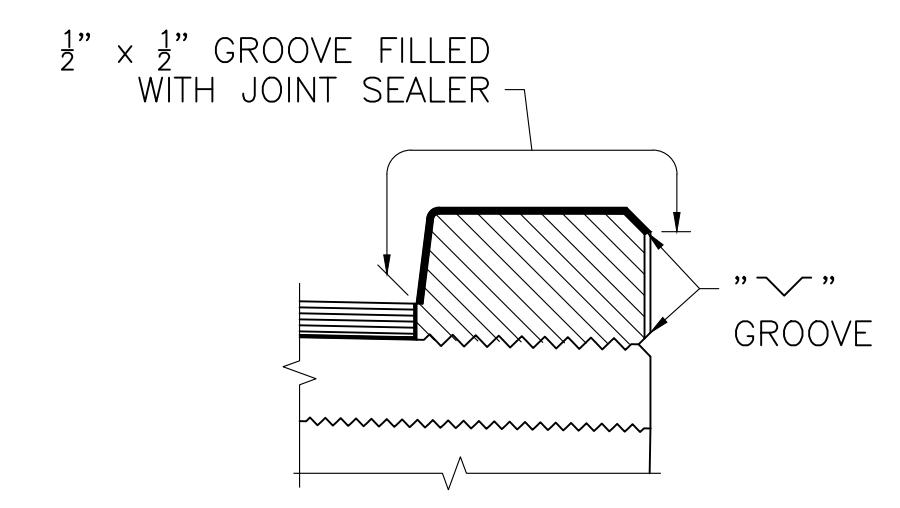
- THIS TABLE INDICATES THE THEORETICAL THICKNESS OF THE DECK SLAB IN INCHES BASED ON ASSUMED BEAM CAMBERS AT ERECTION.
- TABLE IS PROVIDED TO ASSIST IN ESTIMATING THE REQUIRED CONCRETE VOLUME.
- THE ACTUAL DECK THICKNESSES WILL BE AS REQUIRED TO MEET THE PROFILE GRADES.

**THEORETICAL DECK SLAB THICKNESS TABLE**



**FACE OF SAFETY CURB DETAILS**

SCALE: 3" = 1'-0"



**NOTES:**

- ALL CONCRETE ABOVE SLAB SHALL BE POURED IN ALTERNATING SECTIONS WITH NOT LESS THAN 3 DAYS BETWEEN POURS.
- DO NOT CARRY LONGITUDINAL BARS THROUGH THE PARAFFIN JOINTS. END THE REINFORCEMENT 2" CLEAR OF JOINT.
- JOINT SHALL BE SQUARE TO FACE OF CURB

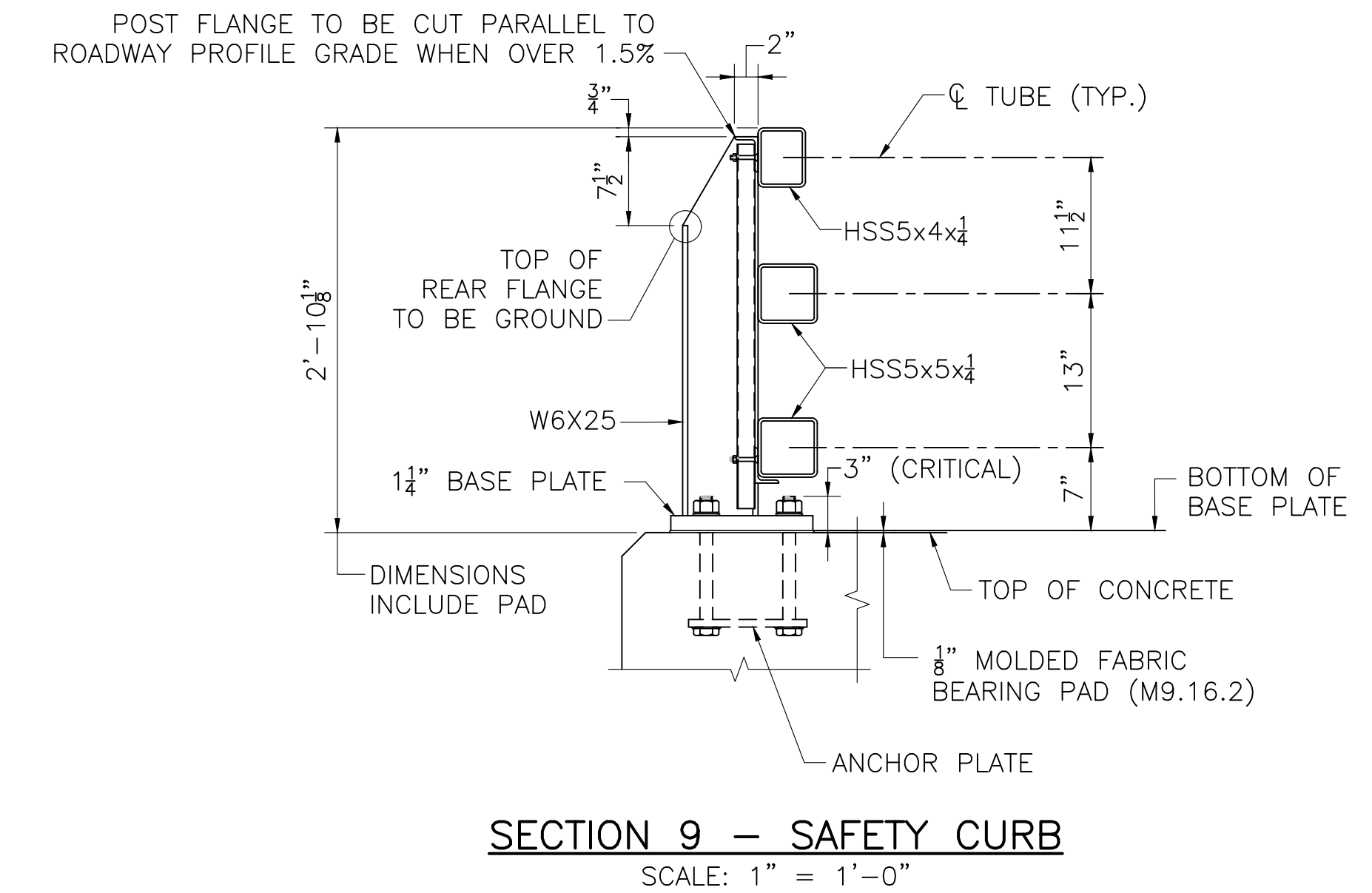
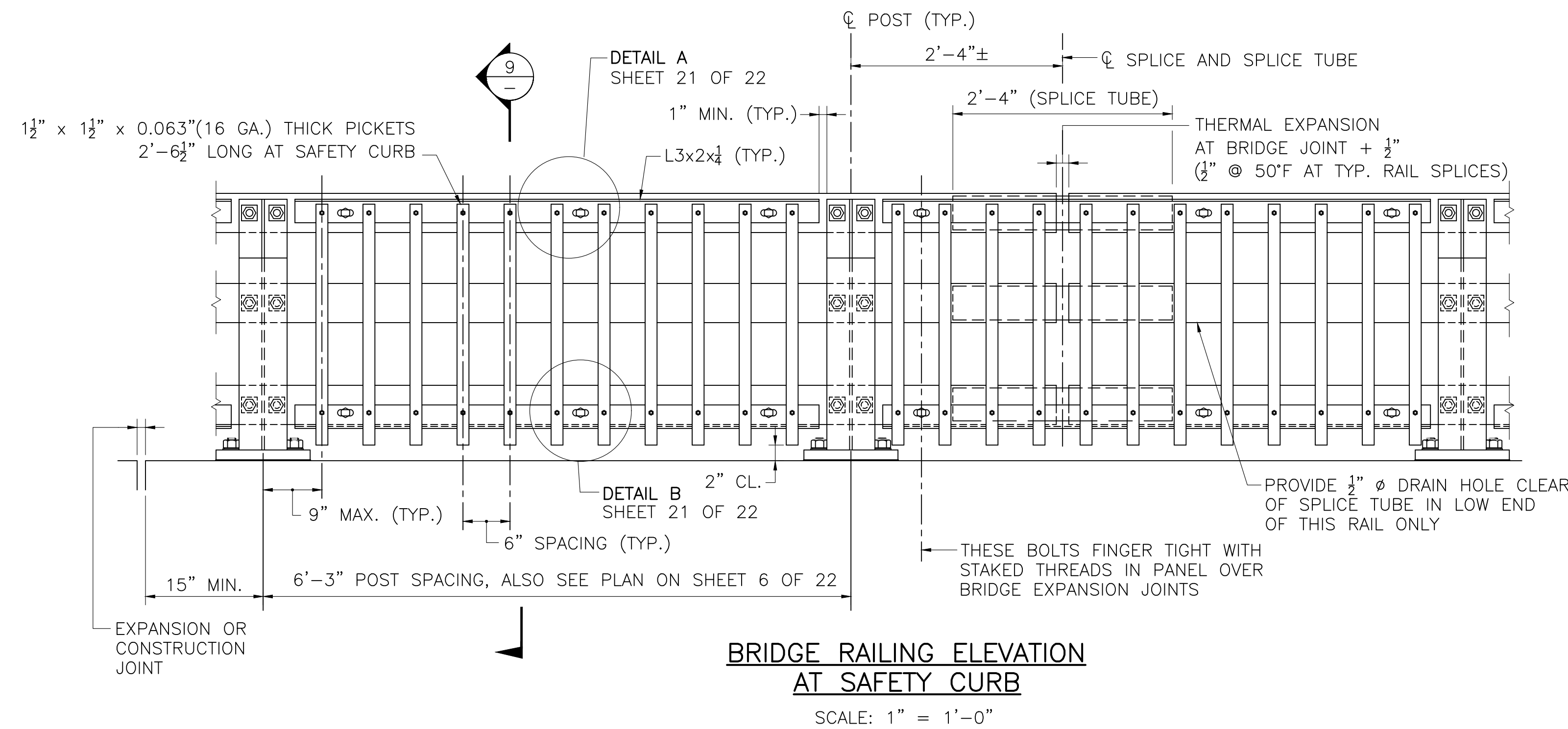
**PARAFFIN JOINT DETAILS**

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

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609078 Structural Plans Submittal (SF) 7-SEPTEMBER-2024 BRIDGE TRANSVERSE SECTION.DWG Plotted on 7-Sep-2024 9:24 AM

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
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**RAILING NOTES:**

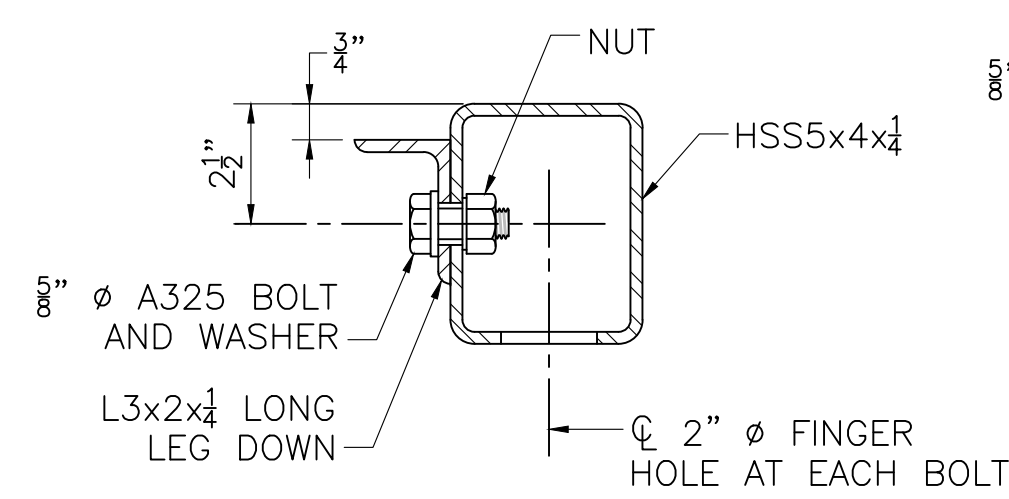
- RAIL POST AND BASE PLATES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 270 GRADE 50. HOLLOW RAILING STRUCTURAL TUBING (HSS) SHALL CONFORM TO THE REQUIREMENTS OF ASTM A 500 WITH A CERTIFIED  $F_y = 50$  KSI MINIMUM. THE MINIMUM HORIZONTAL BENDING RADIUS OF THE HSS TUBING SHALL BE 8 FEET. PICKET CARRIER ANGLES, ANCHOR PLATES, AND SPLICE TUBE PLATES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 270 GRADE 36. PICKET TUBING SHALL CONFORM TO ASTM A 513 WITH  $F_y = 36$  KSI MIN. OR A 500 GRADE B.
- ALL STEEL (EXCEPT THE  $3/8$ " ANCHOR PLATE AND FASTENERS) SHALL BE GALVANIZED AND PAINTED DARK BRONZE (FEDERAL STD. 595B COLOR NO. 10045). ANCHOR PLATE SHALL BE GALVANIZED ONLY. HEADS OF  $7/8$ "  $\phi$  ROUND HEAD BOLTS SHALL BE PAINTED TO MATCH RAIL.
- ANCHOR BOLTS SHALL BE SET WITH TEMPLATES. THE NUT SECURING THE POST BASE PLATE TO THE CONCRETE SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL  $1/8$  TURN AFTER STEEL IS IN PLACE.
- RAILS SHALL BE CONTINUOUS OVER A MINIMUM OF FOUR (4) POSTS WITHOUT SPLICES WHERE POSSIBLE. IN ADDITION SPLICES SHALL ALSO BE LOCATED IN RAILS OVER BRIDGE EXPANSION JOINTS.
- ENDS OF TUBE SECTIONS SHALL BE SAWED. GRIND SMOOTH EXPOSED EDGES. ALL CUT ENDS SHALL BE TRUE AND SMOOTH.
- ALL POSTS TO BE PLUMB WHEN PROFILE GRADE EXCEEDS 1.5%. FOR PROFILE GRADES LESS THAN 1.5%, POSTS SHALL BE SET PERPENDICULAR TO GRADE.
- POST TO FLANGE WELD DOES NOT REQUIRE MAGNETIC PARTICLE TESTING. BEVEL OUTSIDE FLANGES OF POST. FIT POST TO BASE PLATE. WELD  $3/8$ " FILLET ON INSIDE OF FLANGE AND WEB. BACKGOUGE OUTSIDE OF FLANGE TO SOUND METAL. COMPLETE GROOVE WELD WITH MINIMUM OF  $3/8$ " REINFORCEMENT. WELD IS THE SAME ON BOTH FLANGES.
- $7/8$ "  $\phi$  ROUND HEAD BOLTS SHALL CONFORM TO THE CHEMICAL AND PHYSICAL REQUIREMENTS OF ASTM F3125 GRADE 325 TYPE 1 GALVANIZED.

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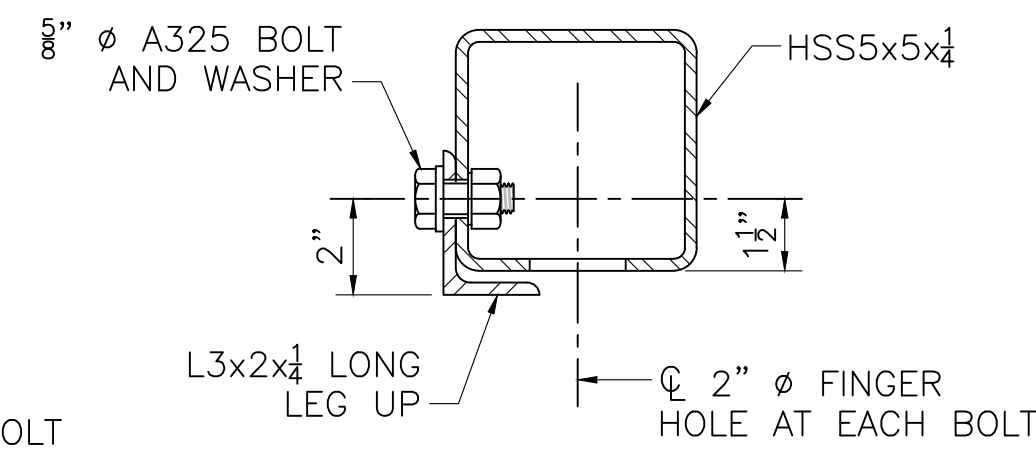
NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

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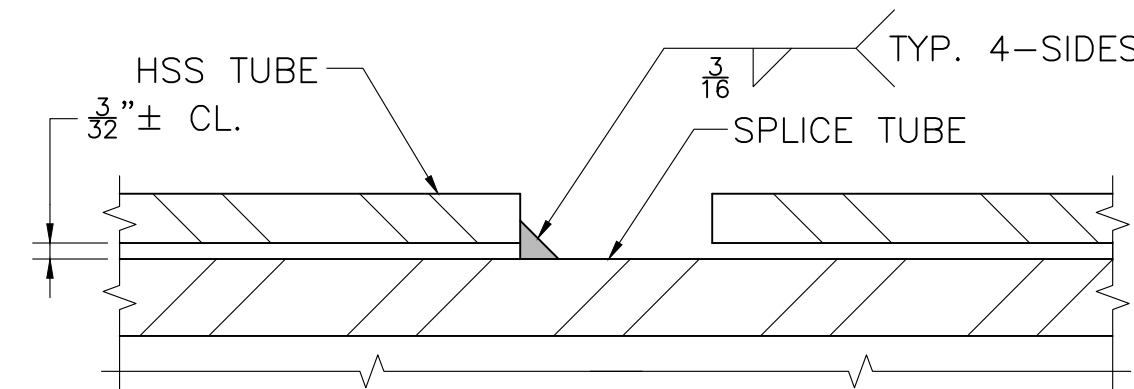
S3-MTL4 BRIDGE RAILING (2 OF 2)



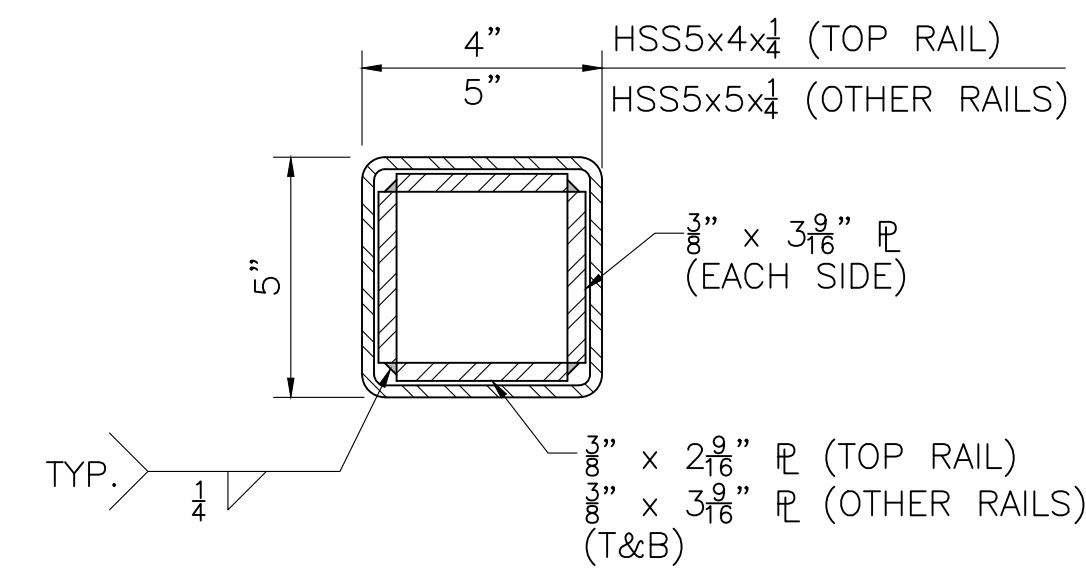
SECTION 10



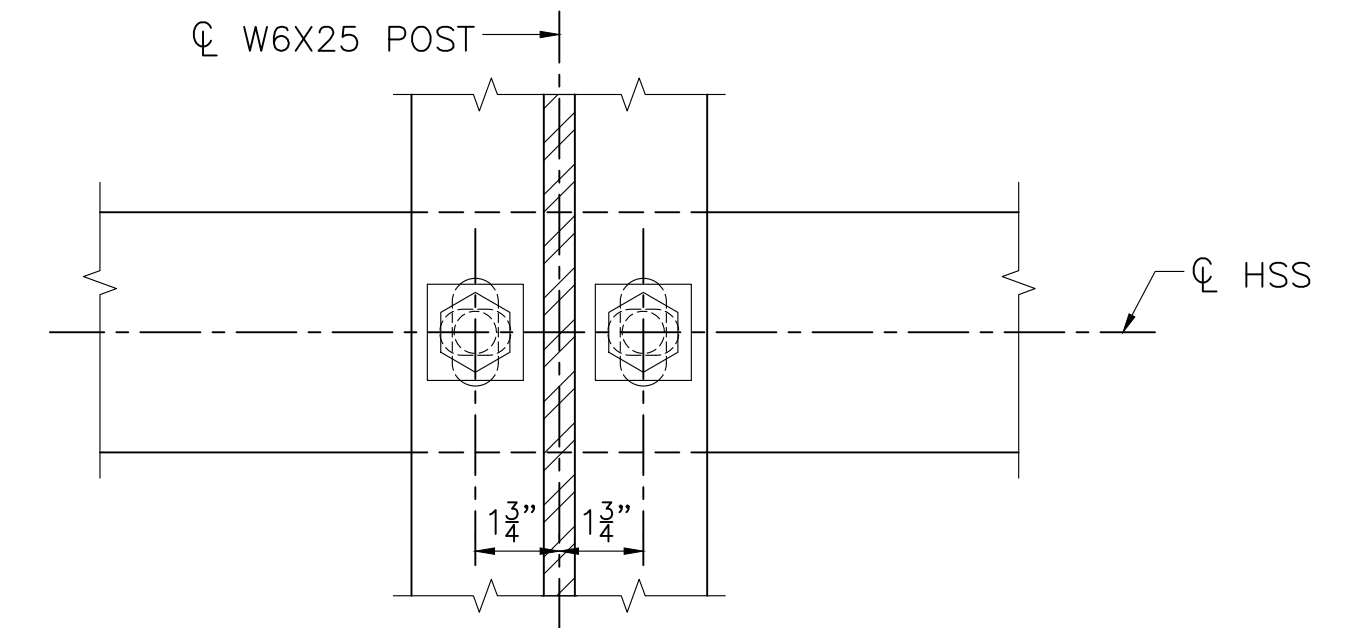
SECTION 12



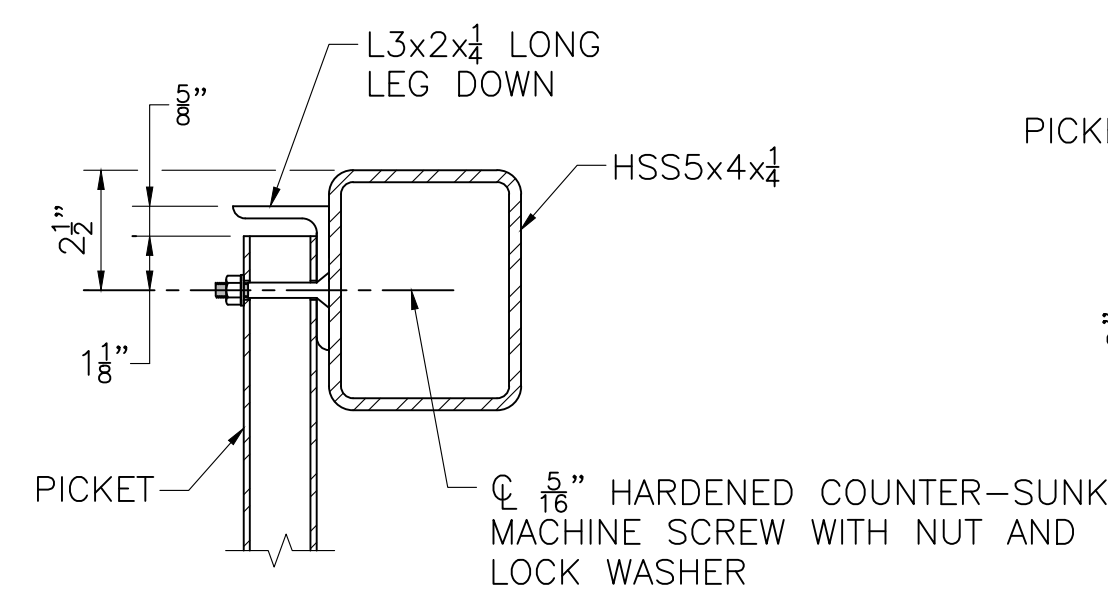
SPLICE DETAIL  
FULL SIZE



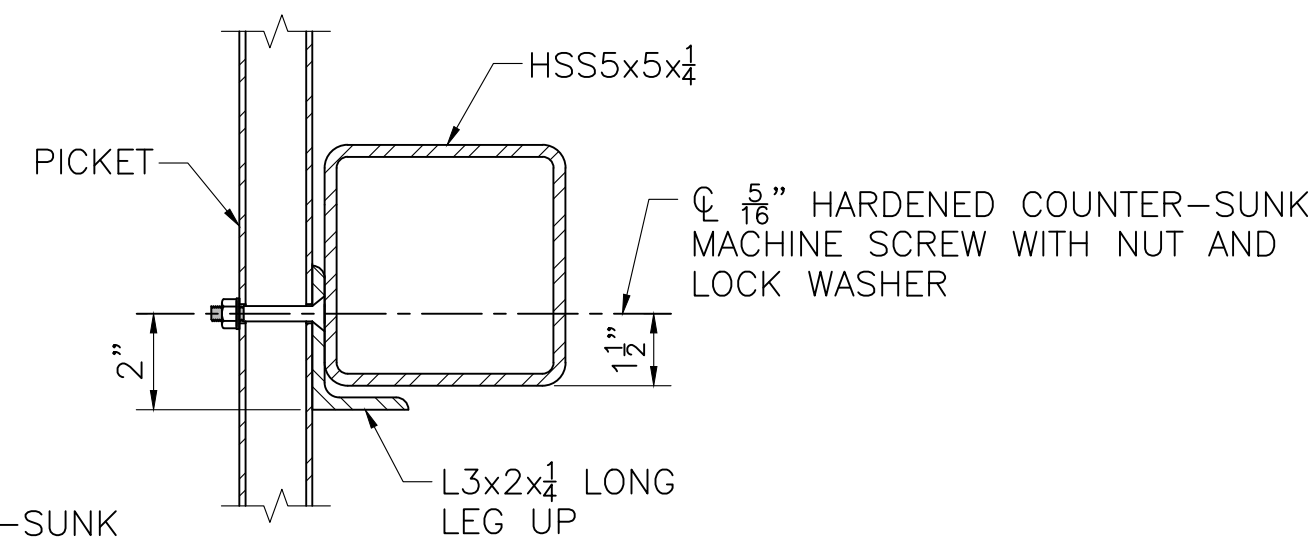
SPLICE TUBE DETAILS  
SCALE: 3" = 1'-0"



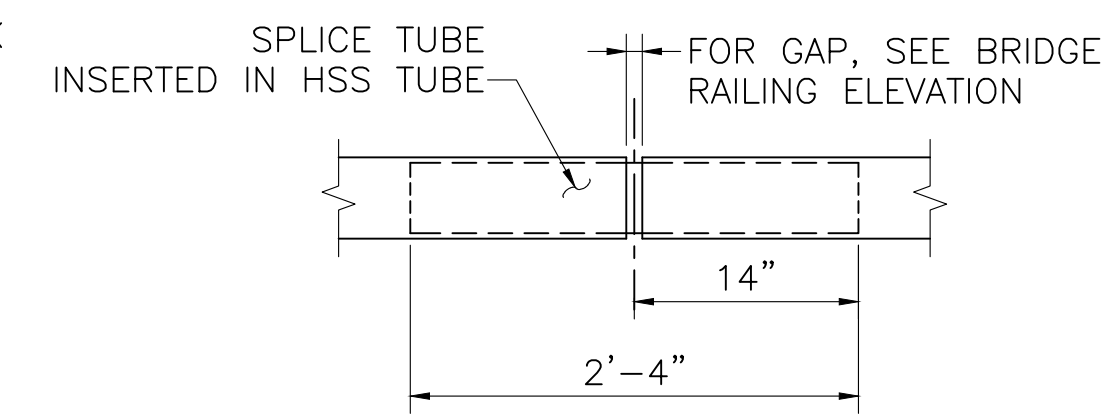
SECTION THRU POST WEB



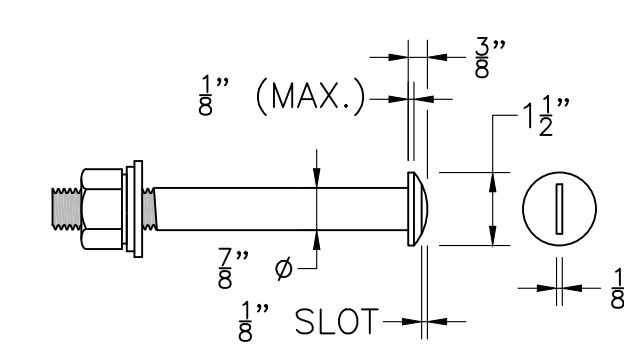
SECTION 11



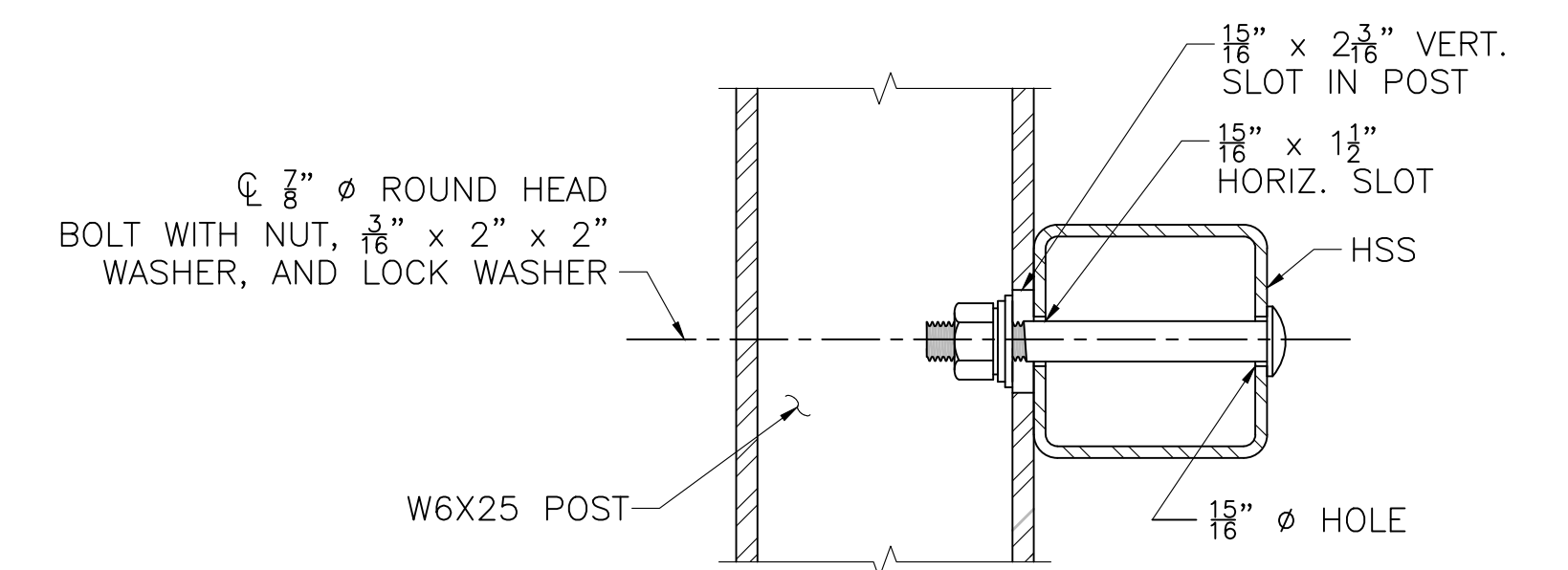
SECTION 13



TYPICAL SPLICE  
SCALE: 1" = 1'-0"



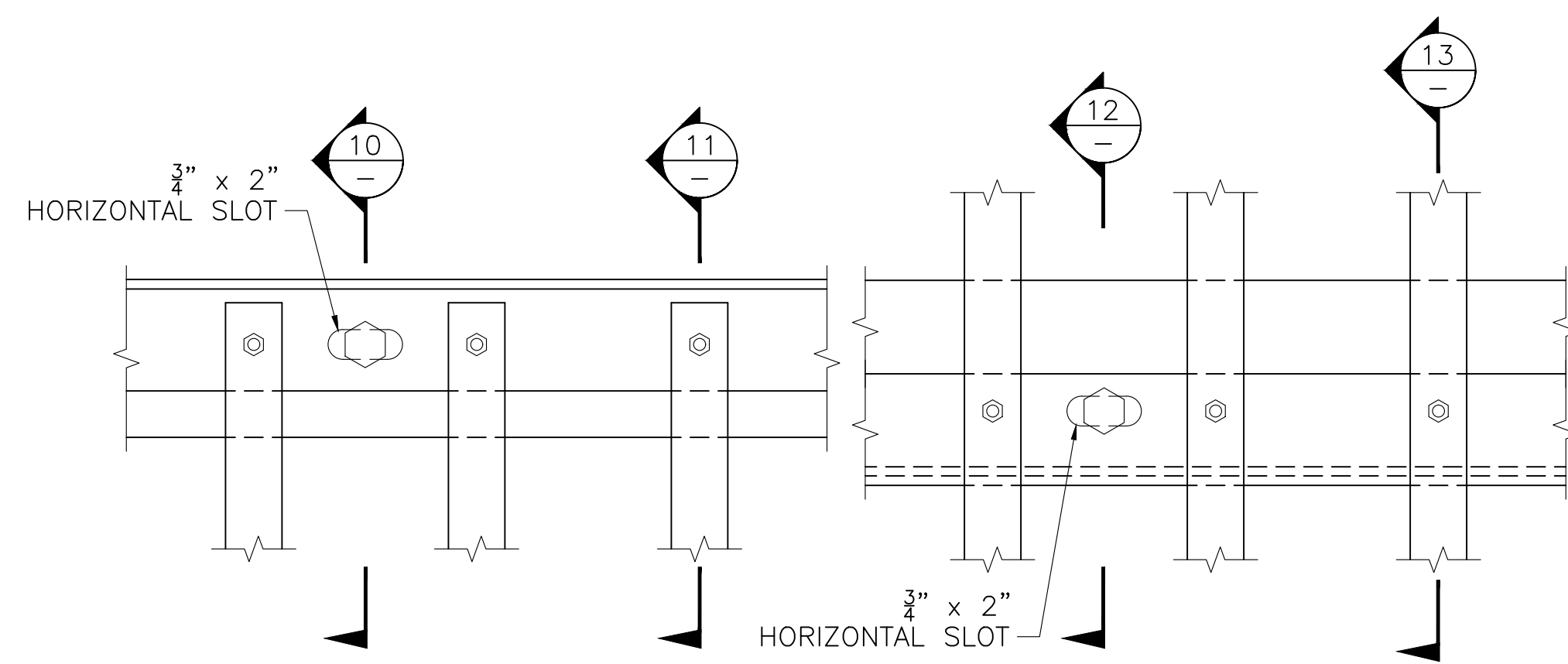
7/8" Ø ROUND HEAD BOLT  
SCALE: 3" = 1'-0"



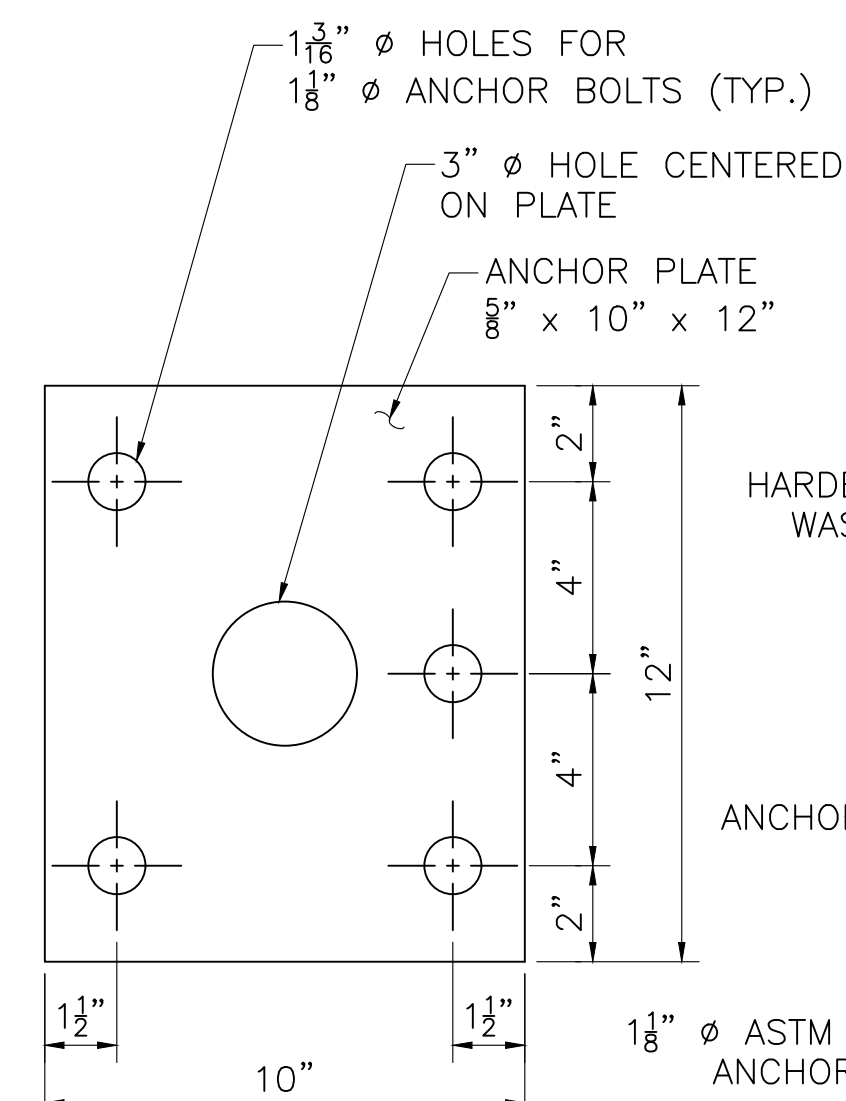
SECTION THRU RAIL

NOTE:  
CONNECTIONS AT LOWER RAILS SHOWN.  
CONNECTIONS AT TOP RAIL SIMILAR.

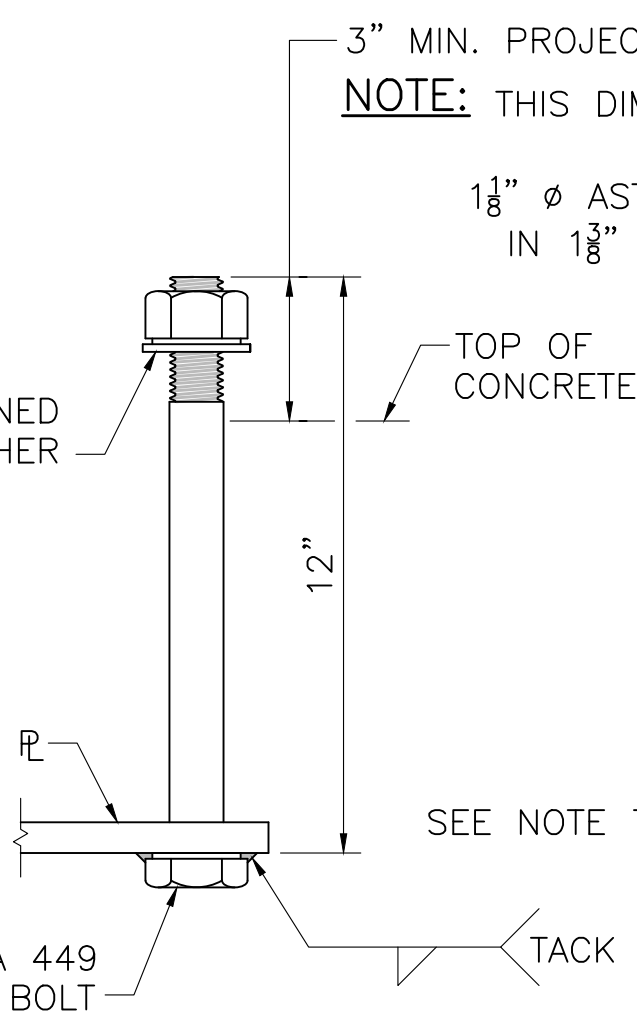
TYPICAL RAIL TO POST CONNECTIONS  
SCALE: 3" = 1'-0"



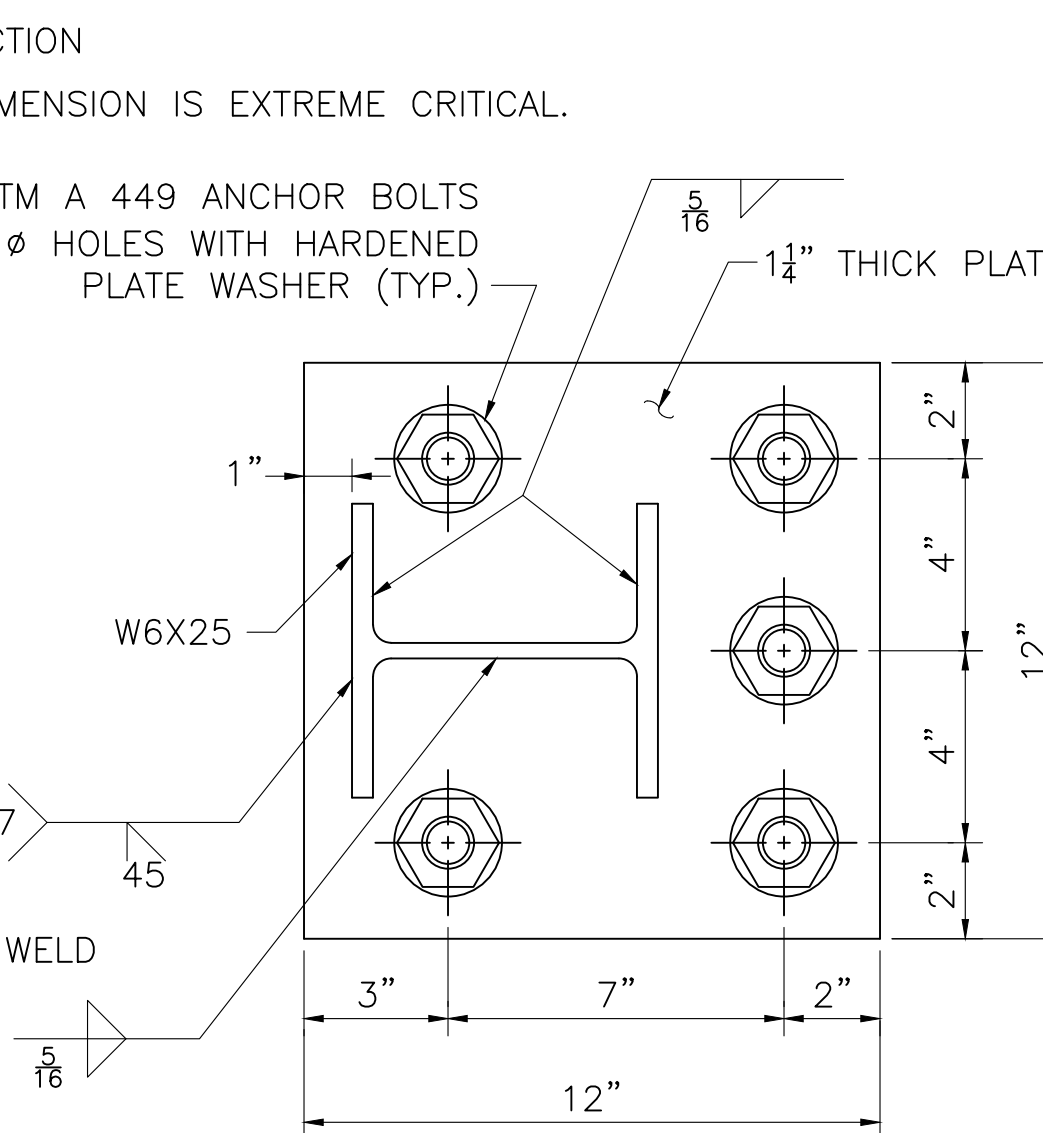
TYPICAL PICKET TO RAIL DETAILS  
SCALE: 3" = 1'-0"



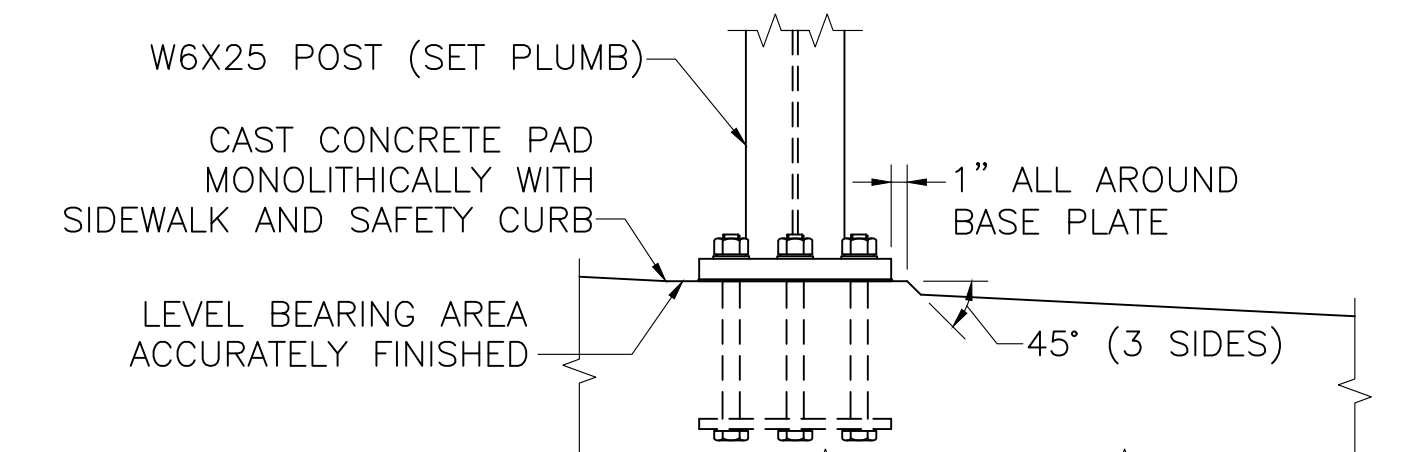
ANCHOR PLATE  
SCALE: 3" = 1'-0"



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



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



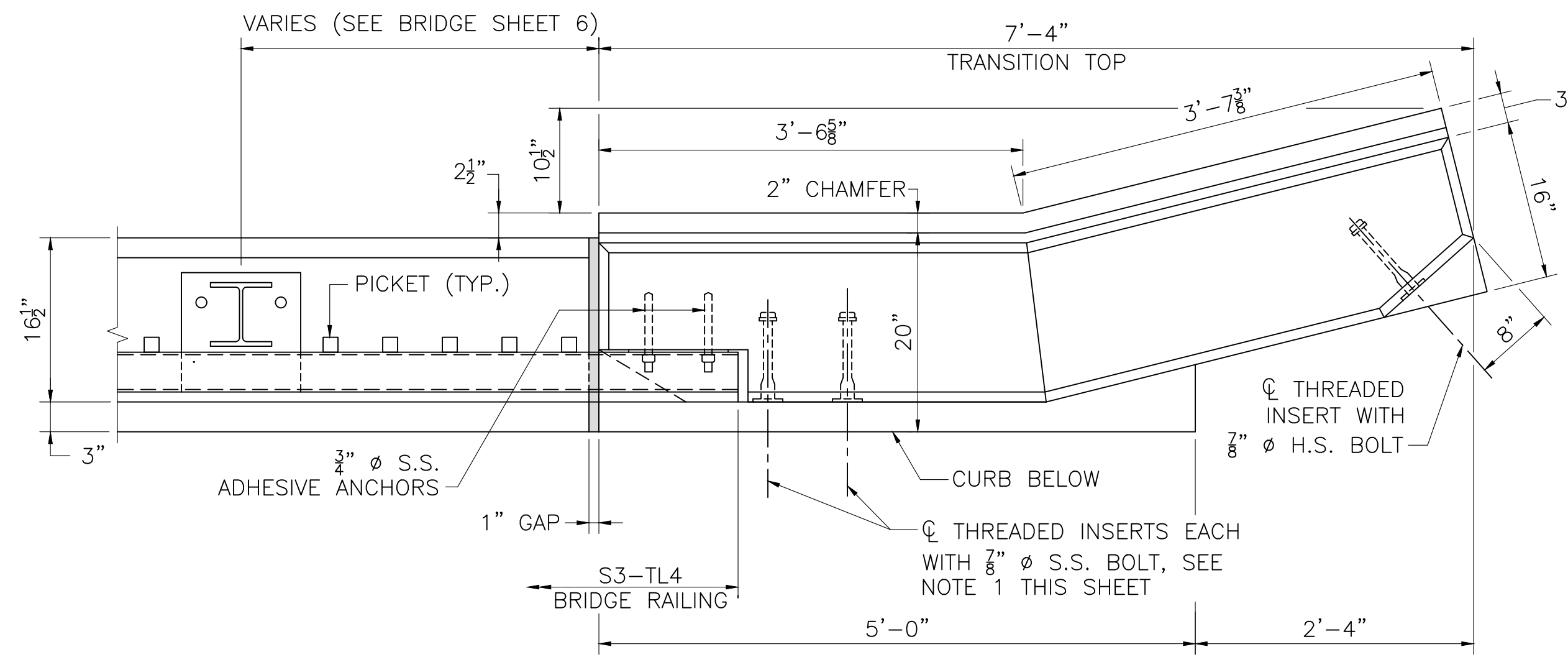
SETTING OF POSTS (PROFILE GRADE OVER 1.5%)  
SCALE: 1" = 1'-0"

SEPT. 14, 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	

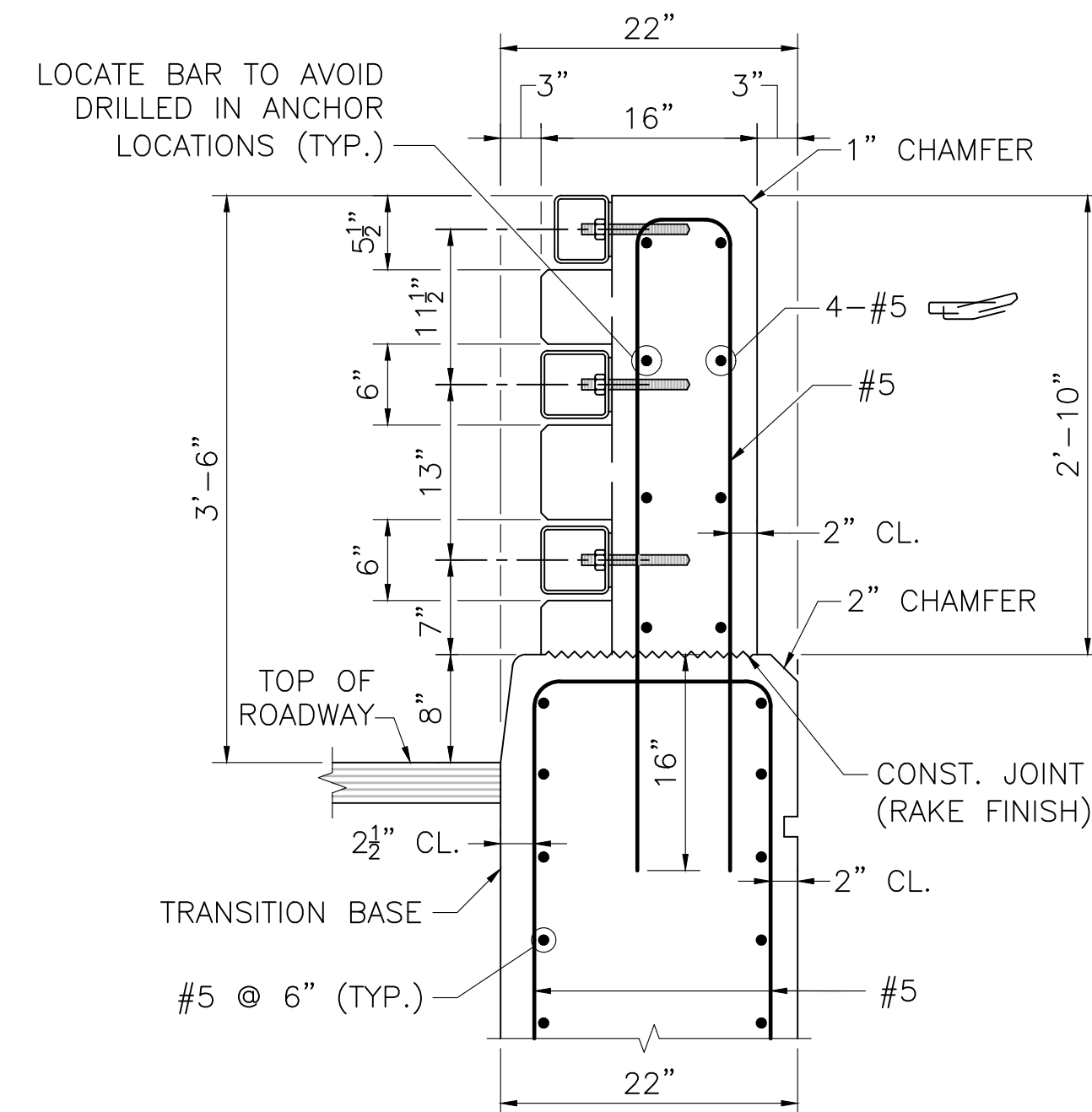
NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	38	42
PROJECT FILE NO.		609078	

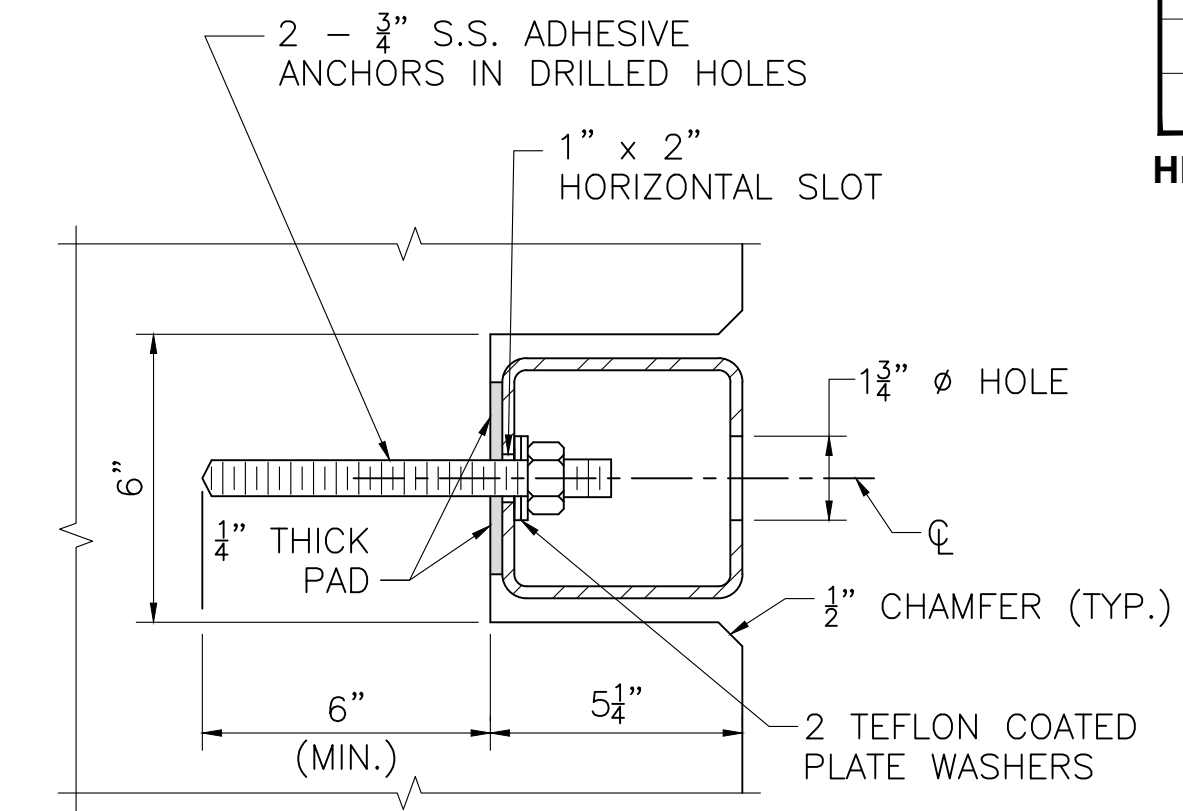
HIGHWAY GUARDRAIL TRANSITION



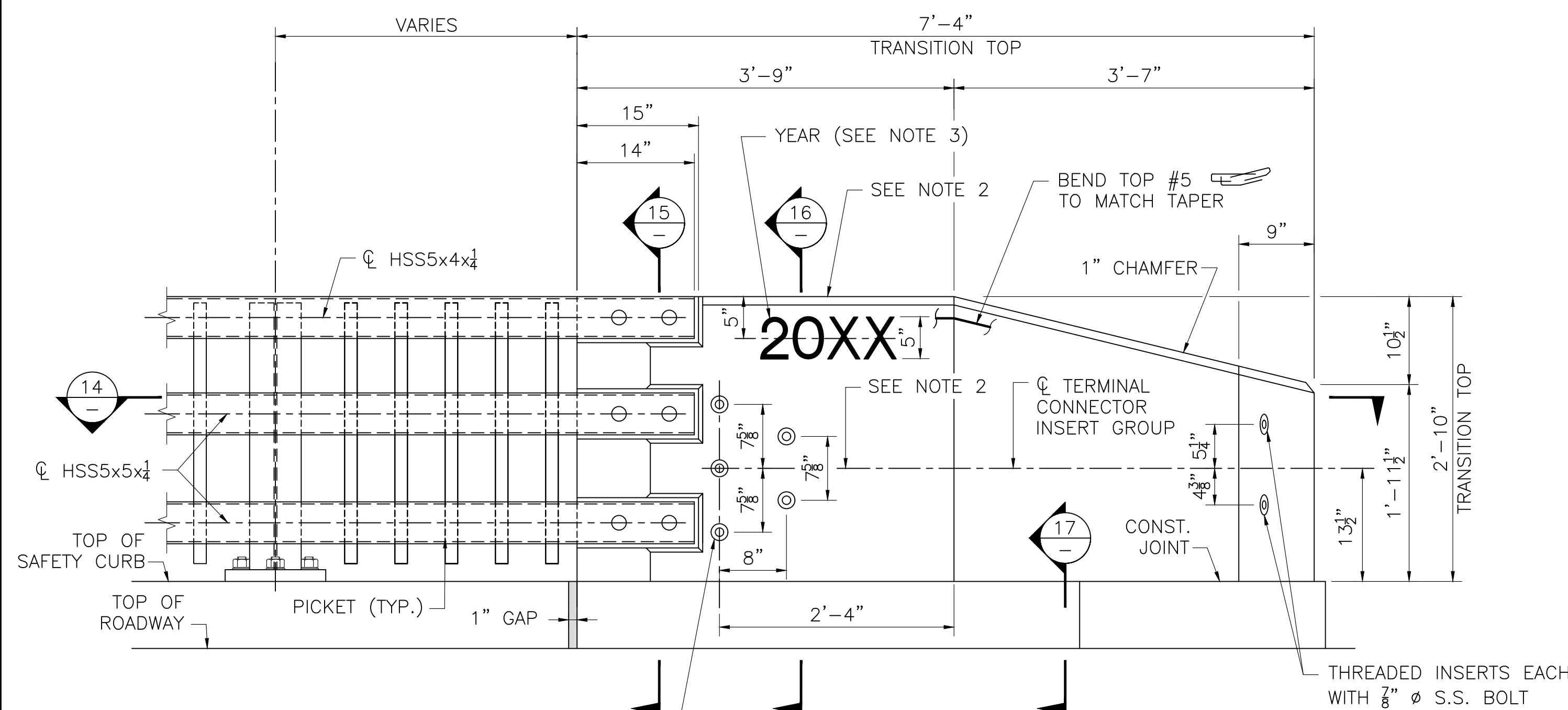
PLAN  
SCALE: 1" = 1'-0"



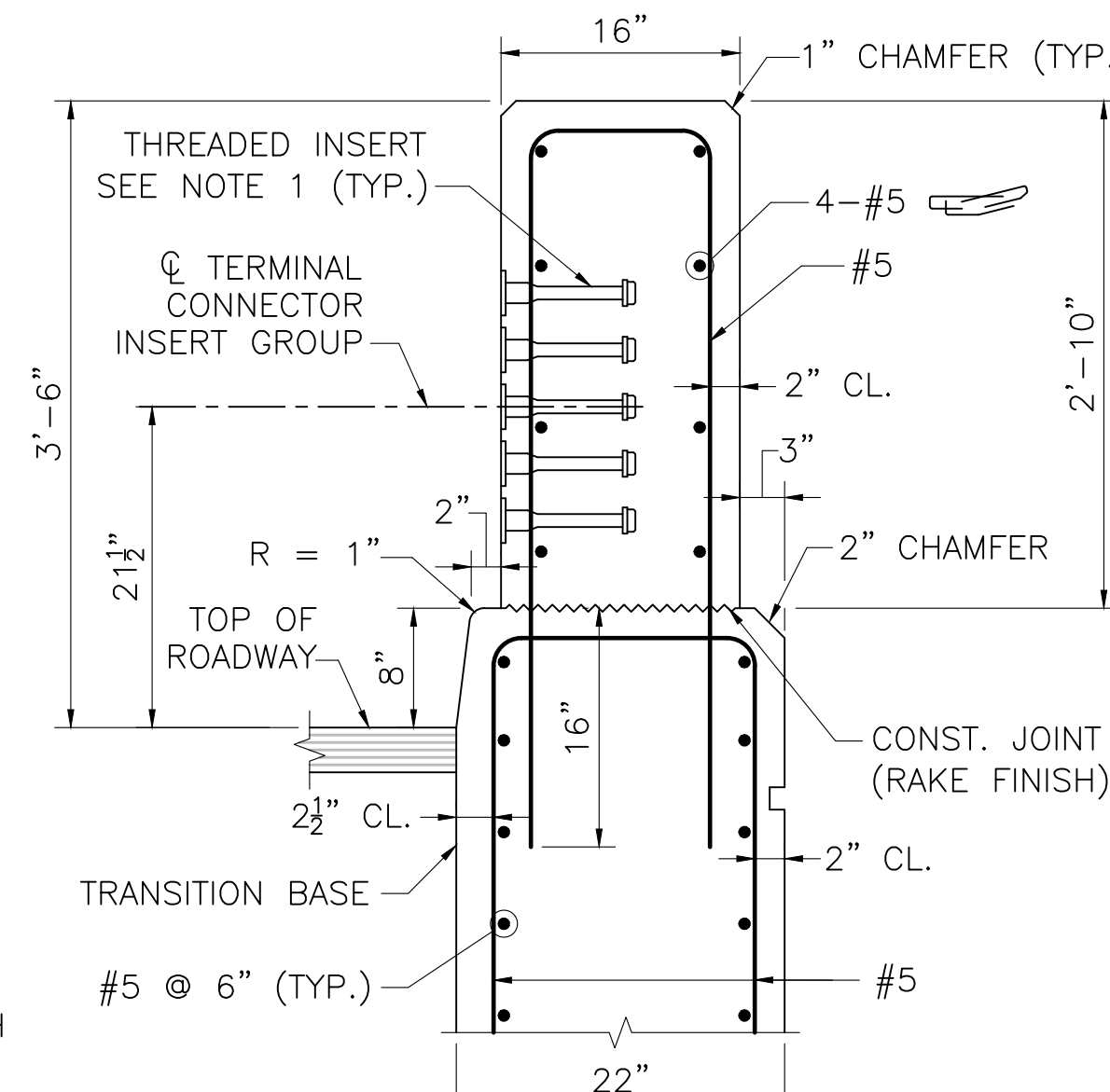
SECTION 15  
AT SAFETY CURB  
SCALE: 1" = 1'-0"



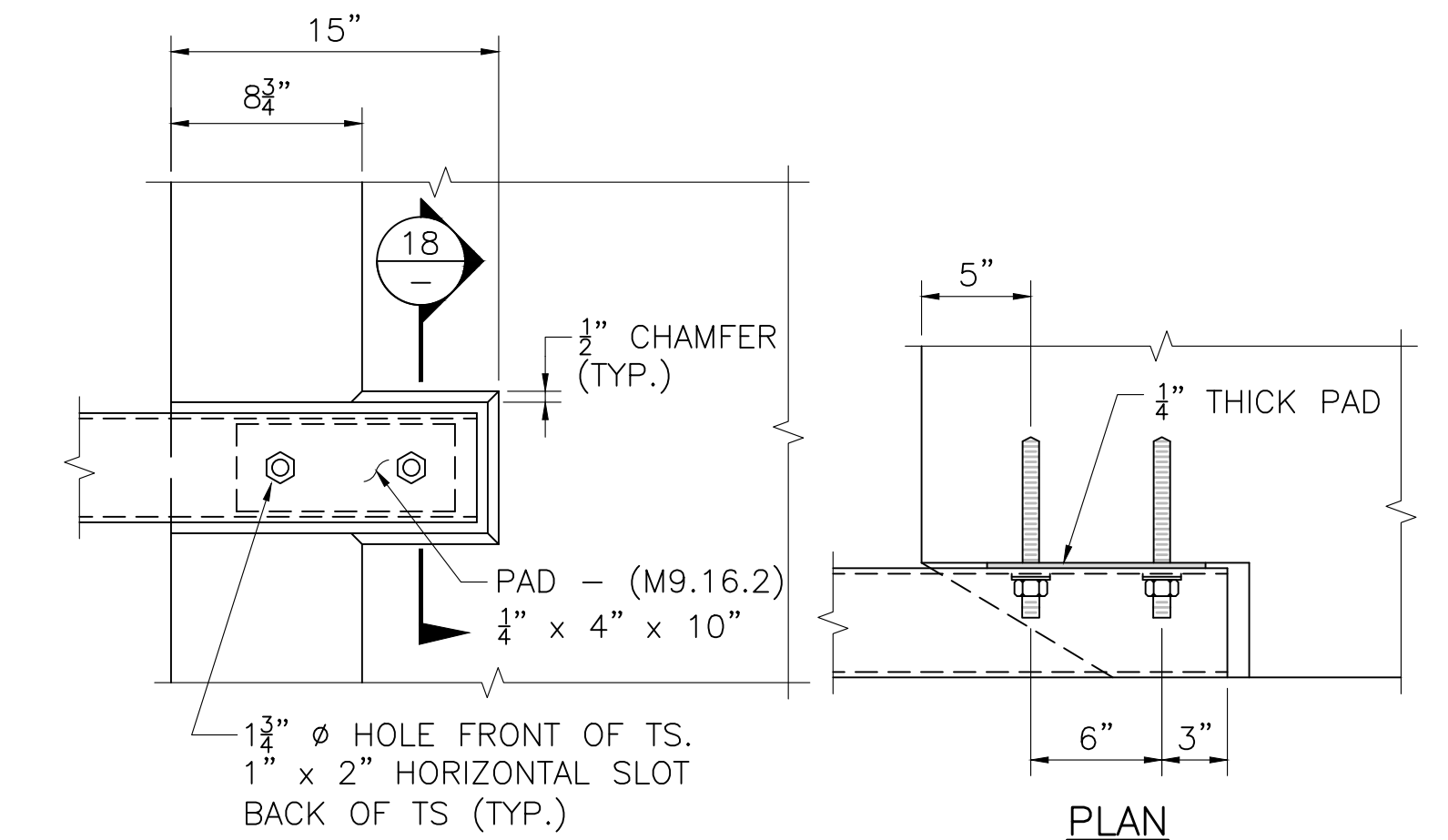
SECTION 18  
SCALE: 3" = 1'-0"



ELEVATION AT SAFETY CURB  
SCALE: 1" = 1'-0"



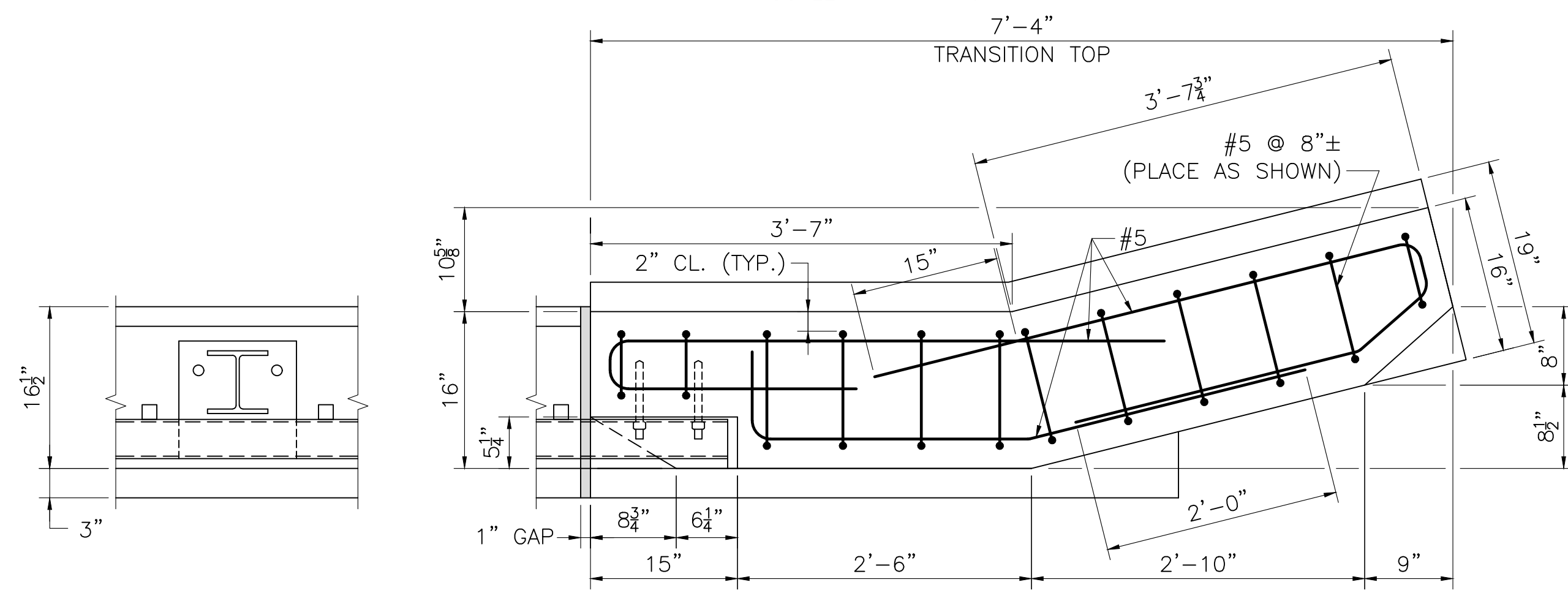
SECTION 16  
AT SAFETY CURB  
SCALE: 1" = 1'-0"



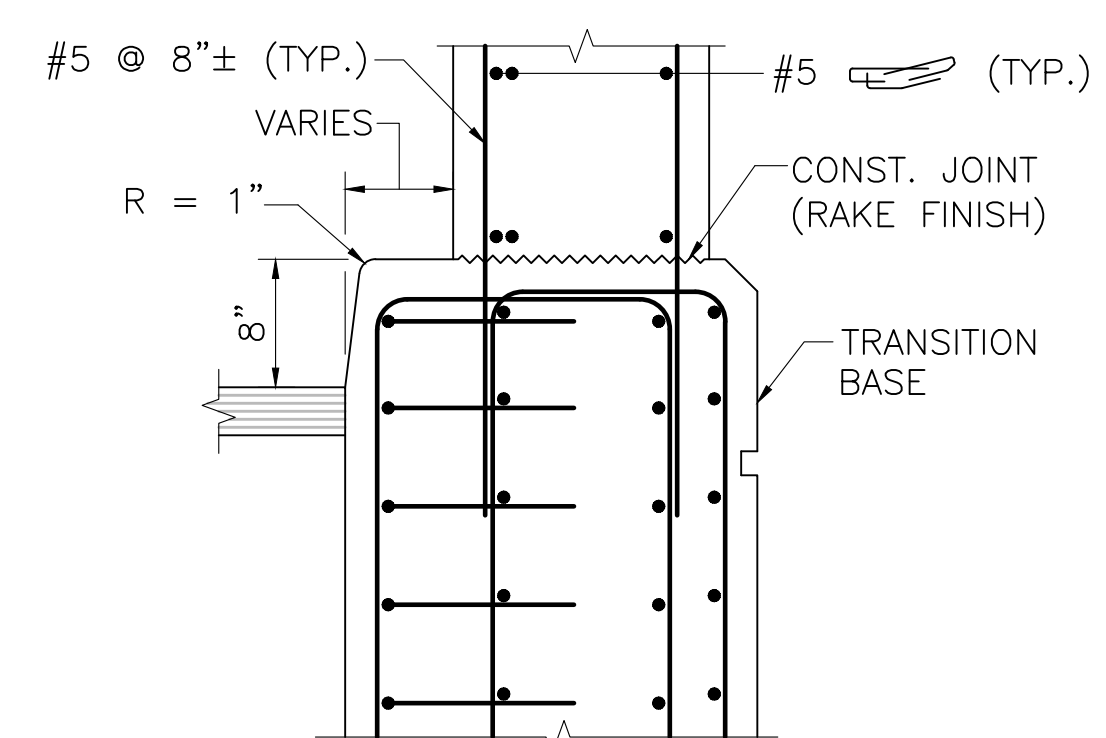
ELEVATION  
PLAN  
RAIL ATTACHMENT  
SCALE: 1 1/2" = 1'-0"

NOTES:

- THREADED INSERTS SHALL BE PREQUALIFIED BY THE MANUFACTURER AS BEING CAPABLE OF DEVELOPING A NOMINAL SHEAR RESISTANCE OF 20 KIPS PER 7/8" Ø S.S. (STAINLESS STEEL) BOLT. S.S. BOLTS SHALL BE 7/8" Ø x 1 1/2" LONG FULLY THREADED CONFORMING TO ASTM F593D WITH AISI TYPE 304N S.S. WASHERS. INSERTS FOR 7/8" S.S. BOLTS SHALL BE GALVANIZED AND CAST INTO THE TRANSITION.
- 7/8" Ø HIGH STRENGTH BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F3125 AND BE GALVANIZED. USE ADDITIONAL WASHERS AS REQUIRED TO PROPERLY ENGAGE THE BOLTS.
- FOR AN APPROACH GRADE IN EXCESS OF 3%, THE TRANSITION TOP AND THE TOP OF CURB SHALL FOLLOW THE APPROACH GRADE. THE HEIGHT OF THE TRANSITION TOP SHALL VARY PROVIDED THAT THE MINIMUM DIMENSIONS SHOWN ON THE CONSTRUCTION DRAWINGS ARE MET. THE BOTTOM OF THE TRANSITION BASE SHALL BE SET LEVEL WITH THE MINIMUM EMBEDMENT DEPTH SHOWN. THE TERMINAL CONNECTOR INSERT GROUP SHALL BE SLOPED TO FOLLOW THE APPROACH GRADE.
- FOR AN APPROACH GRADE UP TO 3%, THE TRANSITION MAY BE CAST SQUARE AND SET PLUMB WITH THE MINIMUM EMBEDMENT DEPTH SHOWN. THE TERMINAL CONNECTOR INSERT GROUP SHALL BE SQUARE TO THE POST.
- USE LATEST CONTRACT COMPLETION YEAR IN EFFECT WHEN THE FIRST GUARDRAIL TRANSITION IS CAST. USE THIS YEAR FOR ALL GUARDRAIL TRANSITIONS.
- ALL CONCRETE FOR THE PRECAST HIGHWAY GUARDRAIL TRANSITION SHALL BE 5000 HP CEMENT CONCRETE.
- LIFTING DEVICES (NOT SHOWN), INCLUDING THEIR NUMBER AND LOCATION, SHALL BE DESIGNED AND DETAILED BY THE PRECASTER. THEY SHALL BE GALVANIZED AND SHALL BE PLACED AND RECESSED IN POCKETS TO PROVIDE 1 1/2" CLEAR COVER TO THE FACE OF THE TRANSITION CONCRETE. THESE DEVICES SHALL BE CLEARLY SHOWN ON THE SHOP DRAWINGS ALONG WITH ALL SUPPORTING CALCULATIONS AND/OR CATALOG CUTS. ONCE THE PRECAST TRANSITION IS SET IN PLACE, THE LIFTING DEVICE POCKETS SHALL BE FILLED WITH A NON-SHRINK GROUT THAT MATCHES THE COLOR OF THE TRANSITION CONCRETE WHEN CURED AND THE FILLED POCKETS SHALL BE RUBBED WITH A CORUNDUM STONE TO BLEND OUT THE JOINTS.



SECTION 14  
SCALE: 1" = 1'-0"



SECTION 17  
AT SAFETY CURB  
SCALE: 1" = 1'-0"

DATE	DESCRIPTION
SEPT. 14, 2024	ISSUED FOR CONSTRUCTION
	CONSTRUCTION BY MASSDOT
	AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
	USE ONLY PRINTS OF LATEST DATE

**NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	39	42
PROJECT FILE NO.			609078

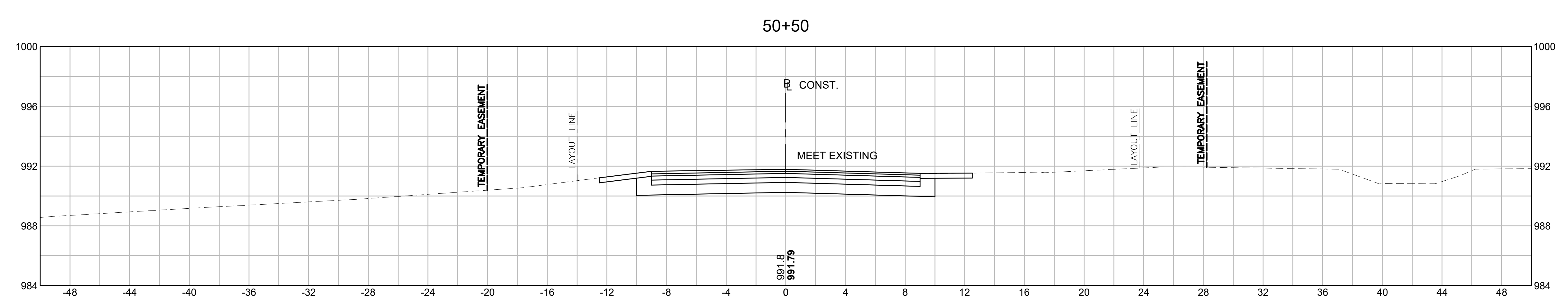
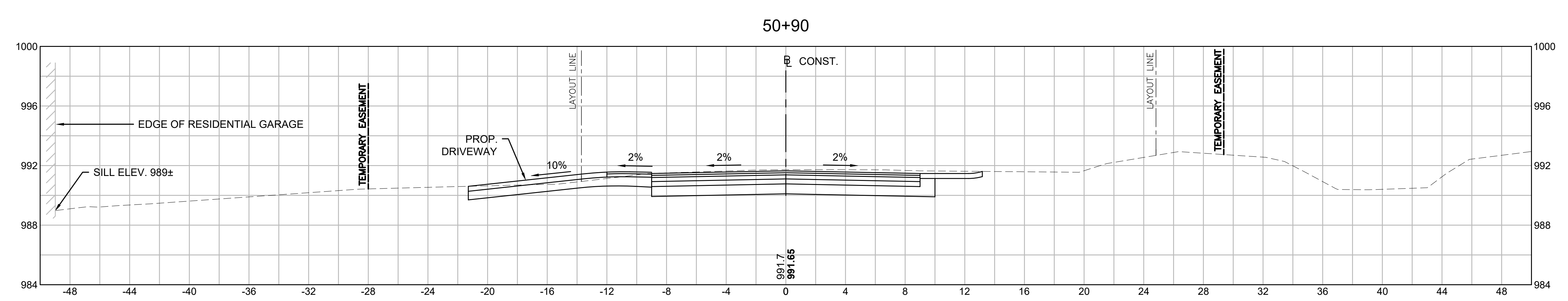
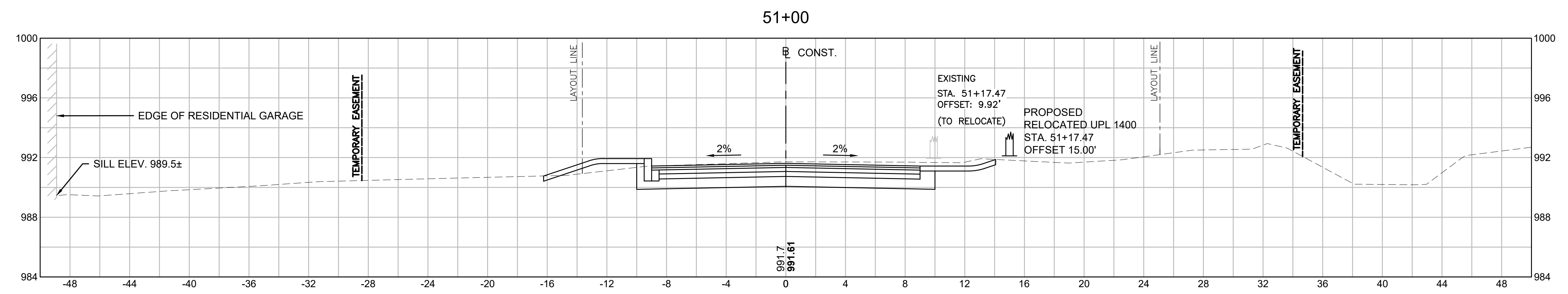
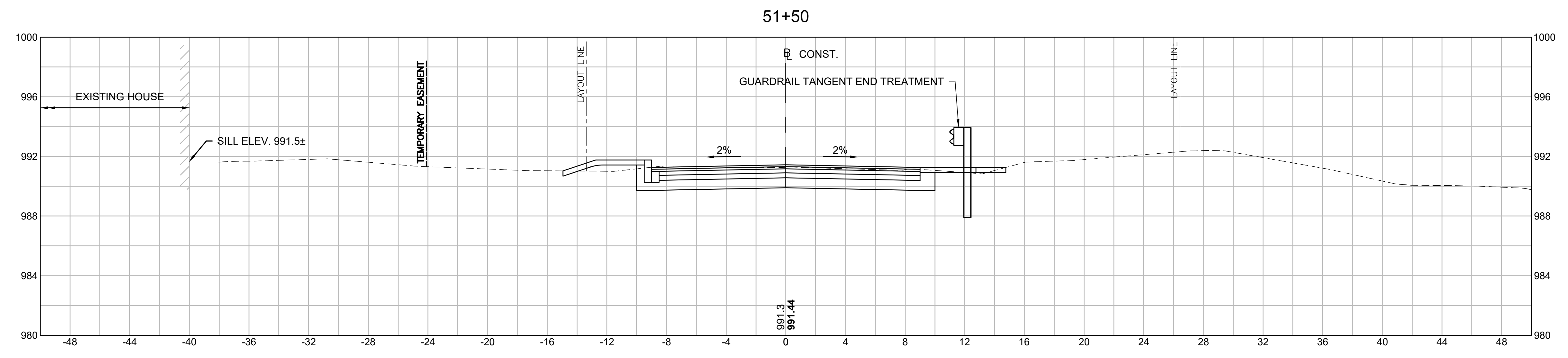
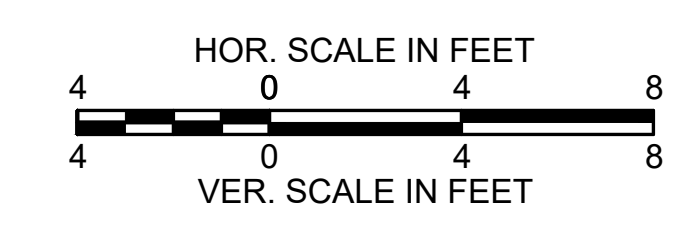
**CROSS SECTION 1**

CUT: 42.11 SF  
FILL: 1.25 SF

CUT: 35.91 SF  
FILL: 1.93 SF

CUT: 40.30 SF  
FILL: 0.00 SF

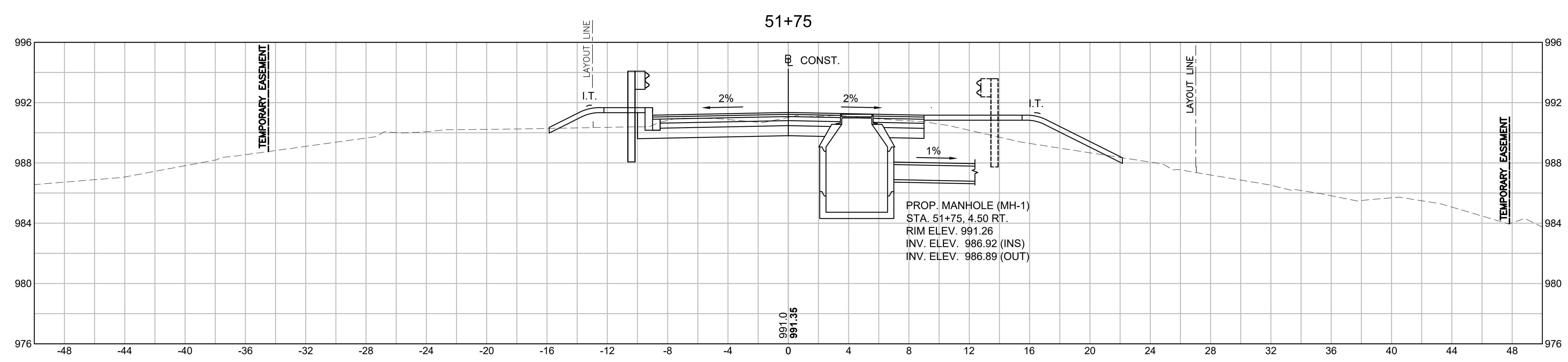
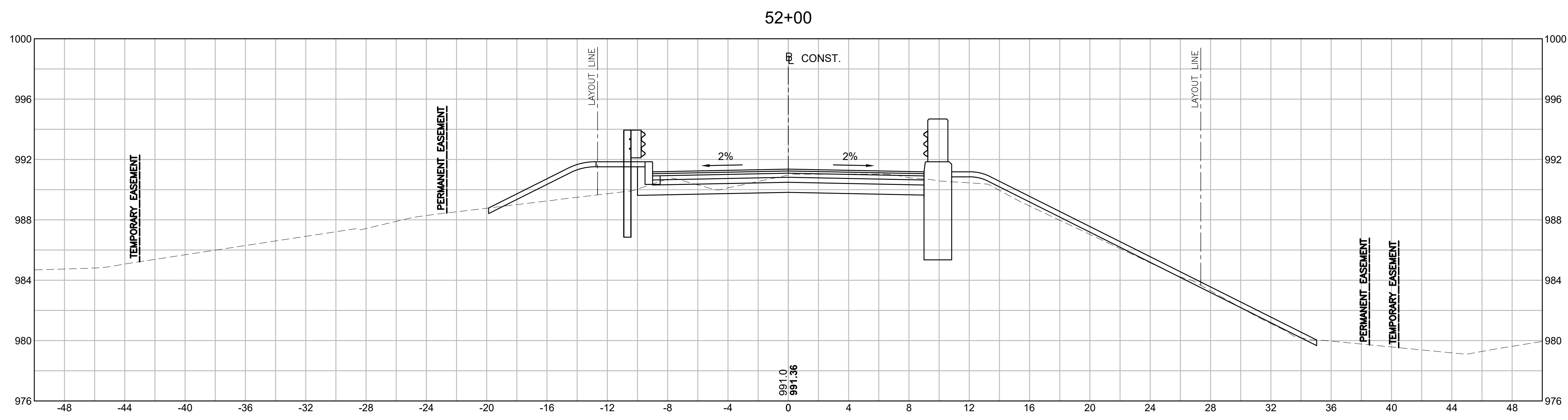
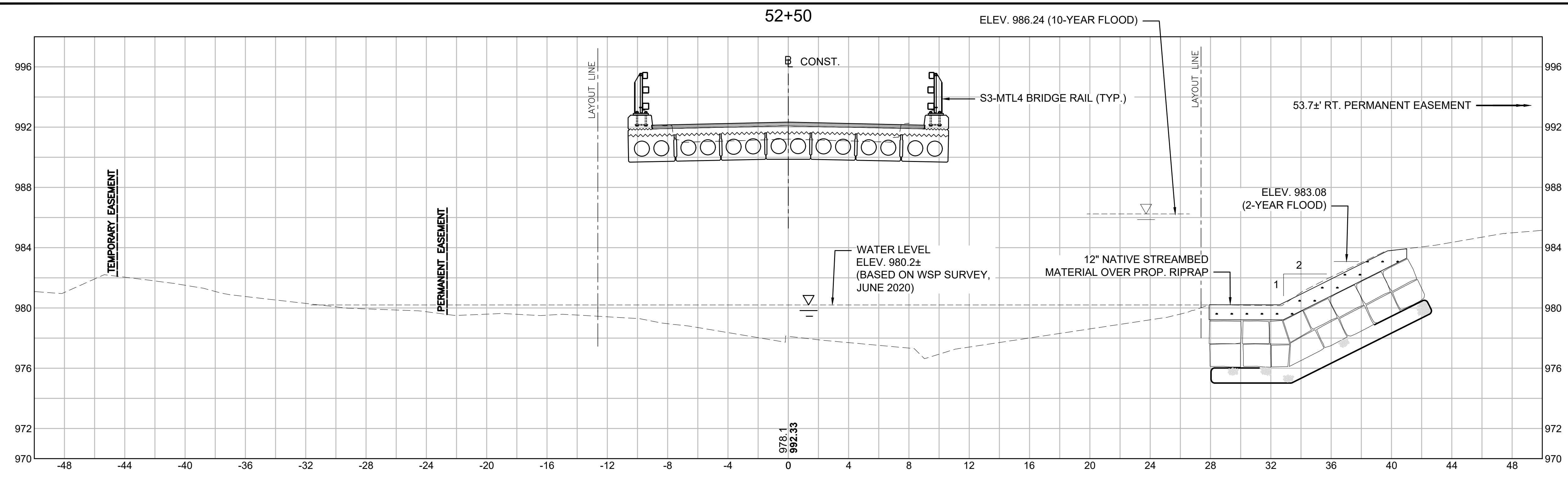
CUT: 33.00 SF  
FILL: 0.00 SF



**NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER**

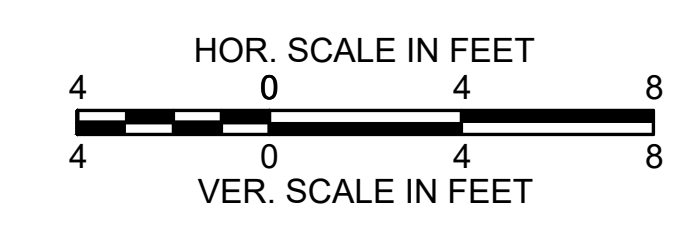
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	40	42
PROJECT FILE NO.		609078	

**CROSS SECTION 2**



CUT: 16.69 SF  
FILL: 17.43 SF

CUT: 28.81 SF  
FILL: 15.06 SF



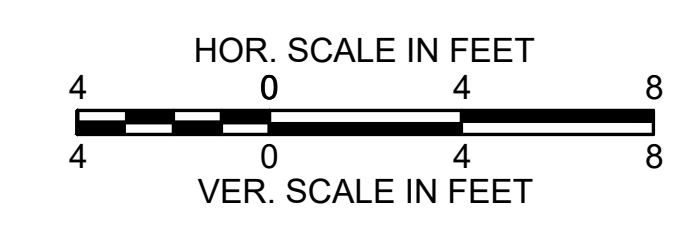


NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

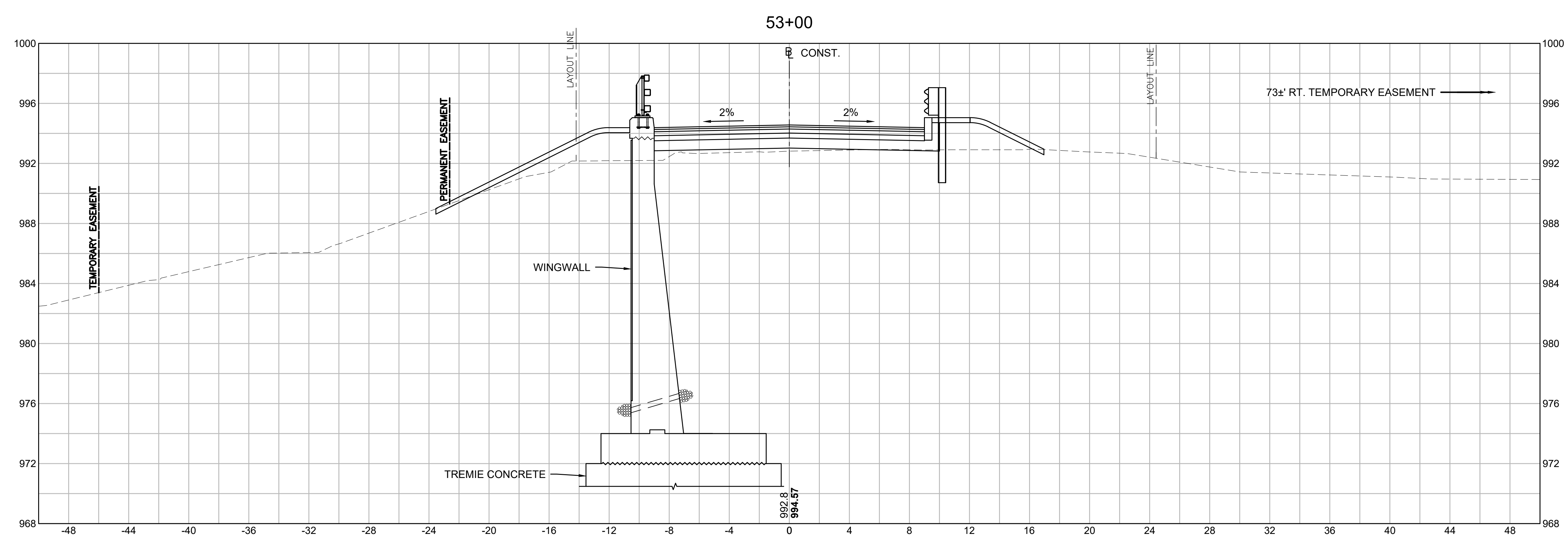
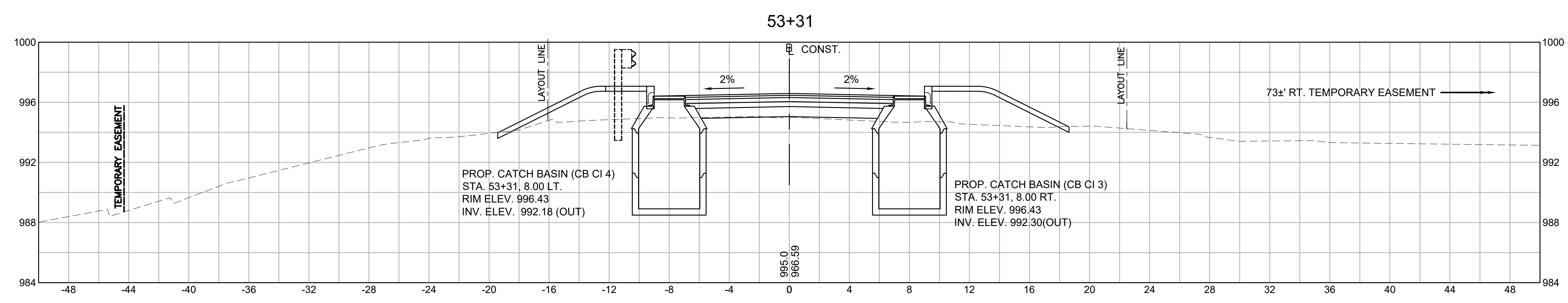
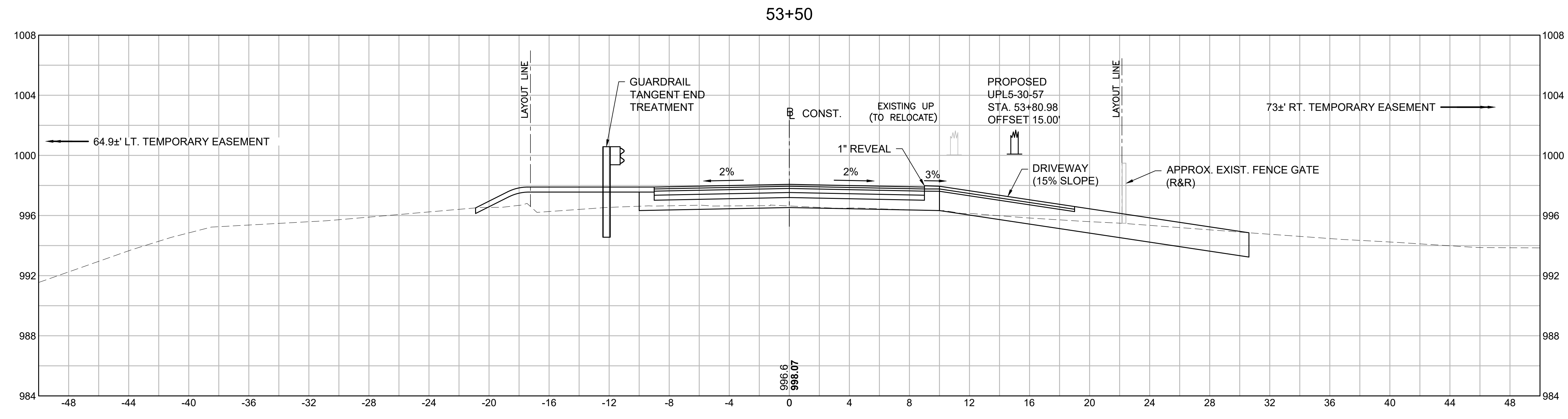
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	41	42
PROJECT FILE NO.		609078	

CROSS SECTION 3

CUT: 19.35 SF  
FILL: 12.07 SF



609078\_CROSS SECTION.DWG Plotted on 25-June-2022 5:00 PM



NEW MARLBOROUGH  
KEYES HILL ROAD OVER UMPACHENE RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	BFL(BR-OFF)-003S(798)X	42	42
PROJECT FILE NO.		609078	

CROSS SECTION 4

CUT: 34.32 SF  
FILL: 0.12 SF

CUT: 12.57 SF  
FILL: 1.71 SF

CUT: 11.70 SF  
FILL: 4.60 SF

