

# MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION

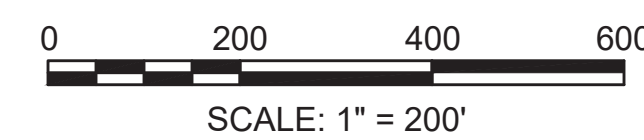
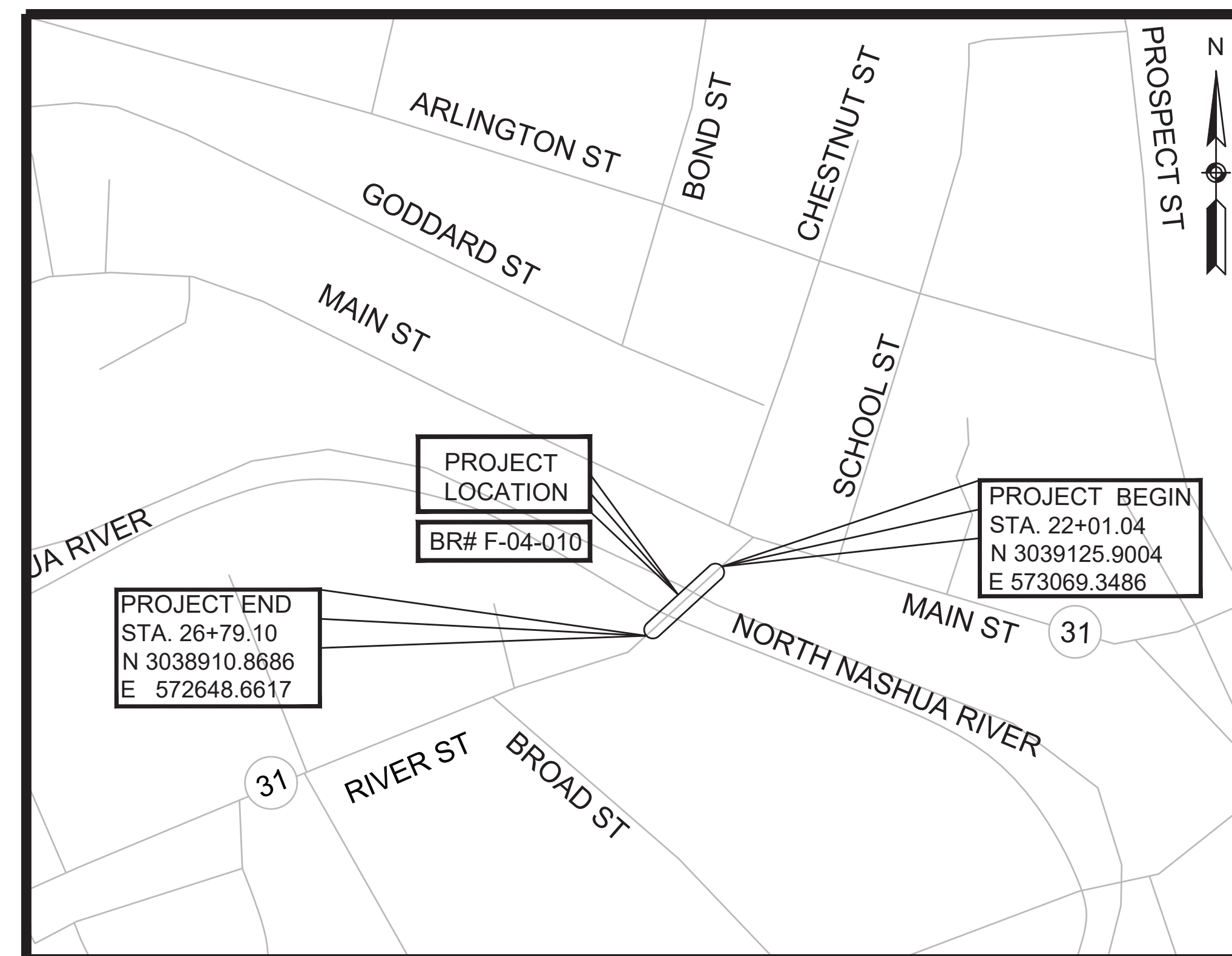
FITCHBURG RIVER STREET/ROUTE 31			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	1	67
PROJECT FILE NO.		607680	
TITLE SHEET & INDEX			

PLAN AND PROFILE OF  
RIVER STREET/ROUTE 31  
(BRIDGE NO. F-04-010)  
IN THE CITY OF  
FITCHBURG  
WORCESTER COUNTY  
FEDERAL AID PROJECT NO. N/A

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.

DESIGN DESIGNATION (RIVER STREET/RTE 31)	
DESIGN SPEED	25 MPH
ADT (2025)	12,302
ADT (2045)	15,010
K	8.7%
D	58%
T (PEAK HOUR)	6.37%
T (AVERAGE DAY)	5.13%
DHV	1243
DDHV	721
FUNCTIONAL CLASSIFICATION	Urban Principal Arterial

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SHEET NO.	DESCRIPTION
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LENGTH OF PROJECT = 478.06 FEET = 0.091 MILES

	DATE	DESCRIPTION	REV #
	APPROVED		
	Carrie Lavallee, P.E.	Digitally signed by Carrie Lavallee, P.E. Date: 2023.10.30 15:26:27 -04'00'	10/30/2023
	CHIEF ENGINEER		DATE



## GENERAL NOTES

1. THE EXISTING CONDITIONS SHOWN HEREON ARE THE RESULTS OF AN ON THE GROUND INSTRUMENT SURVEY PERFORMED ON JUNE 9, 2017 AND OCTOBER 12, 2017 BY C&C CONSULTING ENGINEERS, LLC. MASSDOT FIELD BOOK NUMBER 41300. US FEET UNITS USED.
2. HORIZONTAL DATUM IS BASED UPON THE NORTH AMERICAN DATUM OF 1983 (NAD-1983), MASSACHUSETTS STATE PLANE COORDINATE SYSTEM MAINLAND ZONE
3. VERTICAL DATUM IS BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD-1988).
4. THE SURVEY REFERENCES:  
MASS DEPT. OF PUBLIC WORKS 8-D-8408,  
LAYOUT DEC. 18, 1951, NO. 3917 RIVER STREET, PLBK. 91 PG 22  
MASS DEPT. OF PUBLIC WORKS, PLAN DATED JANUARY 22, 1952  
  
RECORD BASELINE IS FROM PLAN OF ROAD IN CITY OF FITCHBURG IN WORCESTER COUNTY LAID AS A STATE HIGHWAY LAYOUT BY THE DEPARTMENT OF PUBLIC WORKS, DATED DECEMBER 18, 1951 WITH SCALE 20 FEET TO THE INCH, AND RECORDED IN WORCESTER NORTHERN DISTRICT, REGISTRY OF DEEDS IN PLAN BOOK 91, PAGE 22. THE PLAN SHOWS LOCATION OF SHLO NO. 1951 FROM STATION 22+73.00 TO STATION 23+85.00.
5. THE LOCATION OF THE UTILITIES SHOWN HERON HAVE BEEN COMPILED FROM VISIBLE STRUCTURES AND INFORMATION OBTAINED FROM VARIOUS SOURCES. THE ACTUAL LOCATION OF ALL UTILITIES AND UNDERGROUND STRUCTURES SHALL BE CONSIDERED APPROXIMATE AND SHALL BE VERIFIED BY THE OWNER PRIOR TO ANY CONSTRUCTION. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. ADDITIONAL BURIED UTILITIES/STRUCTURES MAY BE ENCOUNTERED. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. MASSDOT ASSUMES NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN. IT IS ASSUMED THAT PIPES RUN STRAIGHT FROM STRUCTURE TO STRUCTURE. BEFORE PLANNING FUTURE CONNECTIONS, THE PROPER UTILITY ENGINEERING DEPARTMENT/COMPANY SHOULD BE CONSULTED AND THE ACTUAL LOCATIONS OF SUBSURFACE STRUCTURES SHOULD BE DETERMINED IN THE FIELD. SEVENTY-TWO NON-WEEKEND/NON-HOLIDAY HOURS PRIOR TO EXCAVATION, BLASTING, GRADING AND/OR PAVING, THE CONTRACTOR SHALL CONTACT THE DIG SAFE CALL CENTER AT 1-888-344-7233.
6. THE MASSACHUSETTS HIGHWAY RIGHT OF WAY DEPICTED HEREON IS BASED ON RECORD PLANS AND IS POSITIONED BASED ON MONUMENTS RECOVERED DURING FIELD SURVEY EFFORTS.
7. CITY/TOWN LINES AND ABUTTING PARCELS DEPICTED HEREON ARE APPROXIMATE ONLY AND ARE BASED UPON RECORD DEEDS, PLANS AND ASSESSORS INFORMATION.
8. IN THE EVENT THAT BENCHMARKS ESTABLISHED FOR THIS PROJECT AND PUBLISHED ON THIS SURVEY ARE DESTROYED, NOT RECOVERABLE OR A DISCREPANCY IS FOUND, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING PRIOR TO COMMENCING OR CONTINUING ANY WORK.
9. UNLESS OTHERWISE NOTED, DEED AND PLAN REFERENCES ARE TO THE WORCESTER COUNTY REGISTRY OF DEEDS.
10. CONTRACTOR SHALL CONFIRM EXISTING INVERTS BEFORE COMMENCING WORK.
11. 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.
12. THE CONTRACTOR SHALL ALTER THE MASONRY OF THE TOP SECTION OF ALL EXISTING DRAINAGE AND SEWER STRUCTURES AS NECESSARY FOR CHANGES IN GRADE, AND RESET ALL WATER, SEWER, AND DRAINAGE SURFACE CASTINGS (ETC.) WITHIN THE LIMITS OF CONSTRUCTION TO THE PROPOSED FINISH SURFACE GRADE. REQUIRED NEW MASONRY SHALL BE CLAY BRICK CONFORMING TO M4.05.2.
13. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE, AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.
14. THE CONTRACTOR SHALL ADJUST CASTINGS IN THE ROADWAY MULTIPLE TIMES AS DIRECTED TO MATCH TEMPORARY PAVEMENT SURFACES (E.G., MILLED PAVEMENT SURFACES) AND TO MAINTAIN ROADWAY DRAINAGE.
15. ITEMS NOTED AS TO BE REMOVED AND STACKED SHALL BE COORDINATED WITH THE RESPECTIVE OWNER.
16. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF PERMITS, CONDITIONS AND LICENSES ISSUED BY FEDERAL, STATE AND LOCAL AGENCIES HAVING JURISDICTION.
17. EXISTING SUBSURFACE UTILITIES SHALL BE RETAINED EXCEPT WHERE OTHERWISE NOTED.
18. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.
19. EXISTING SITE FEATURES AND LANDSCAPING WITHIN THE LIMITS OF WORK SHALL BE REMOVED AS REQUIRED TO PERFORM PROPOSED WORK EXCEPT WHERE OTHERWISE NOTED. AREAS IMPACTED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION EXCEPT WHERE OTHERWISE NOTED.
20. THE TERM "PROPOSED" (PROP) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR REUSING EXISTING MATERIALS IS IDENTIFIED AS "REMOVE AND RESET" (R&R).
21. THE CONTRACTOR SHALL REUSE EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET"

(R&R) TO THE MAXIMUM EXTENT POSSIBLE UNLESS THEY ARE DEEMED UNSUITABLE BY THE ENGINEER.

22. ALL MATERIAL SPECIFIED AS REMOVE AND STACK SHALL BE TRANSPORTED TO AND STACKED AT:  
MASSDOT MAINTENANCE DEPOT AT 14 CHOCKSETT ROAD, STERLING, MA.  
OR  
FITCHBURG DPW FACILITY AT 301 BROAD STREET, FITCHBURG, MA.  
AS DIRECTED BY THE ENGINEER.
23. JOINTS BETWEEN NEW HOT MIX ASPHALT CONCRETE ROADWAY PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH HMA JOINT SEALANT AND SANDED.
24. ALL EXISTING GRANITE CURBING SHALL BE REUSED TO THE MAXIMUM EXTENT POSSIBLE, EXCEPT WHERE CURVED STONES OF A DIFFERENT RADIUS THAN PROPOSED CURB ARE REQUIRED. IF A SECTION OF EXISTING CURBING IS DEEMED UNUSABLE BY THE ENGINEER, IT SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR. GRANITE CURB TO BE REUSED SHALL BE INSTALLED IN CONTINUOUS SECTIONS AND SHALL NOT BE INTERMIXED WITH NEW CURB.
25. ALL NEW VERTICAL GRANITE CURB SHALL BE MASSDOT TYPE VA-4, UNLESS SPECIFIED OTHERWISE.
26. ALL CURB TIE DIMENSIONS ARE TO THE FACE OF CURB (GUTTER LINE).
27. ALL PROPOSED RELOCATED UTILITY POLES, HYDRANTS AND OTHER ABOVE GROUND STRUCTURES TO BE LOCATED WITHIN SIDEWALK AREAS SHALL BE LOCATED SO AS TO CONFORM TO ARCHITECTURAL ACCESS BOARD (AAB), AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG), AND PUBLIC RIGHT-OF-WAY ACCESSIBILITY GUIDELINES (PROWAG) CLEARANCE REQUIREMENTS.
28. EXISTING GRAVEL BORROW DETERMINED TO BE SUITABLE BY THE ENGINEER AND MEETING THE REQUIREMENTS OF THE SPECIFICATIONS SHALL REMAIN.
29. CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITY SERVICES AND HIGHWAY LIGHTING THROUGHOUT CONSTRUCTION UNTIL AND UNLESS THEY ARE REPLACED PER THE CONTRACT.
30. ALL DRAINAGE PIPES SHALL BE CLASS III REINFORCED CONCRETE PIPE EXCEPT WHERE NOTED. MINIMUM PIPE SLOPES OF 0.5% SHALL BE MAINTAINED.
31. CONTRACTOR SHALL PROVIDE BRACKETS, ROLLERS, AND SLEEVE FOR GAS MAIN INSTALLATION ON BRIDGE. CONTRACTOR SHALL INSTALL BRACKETS, AND SHALL NOTIFY UNILIT GAS COMPANY OF THE SLEEVE SIZE TO BE PROVIDED (MINIMUM 12 INCH SLEEVE FOR 8 INCH PIPE). UNILIT TO PROVIDE PIPE, AND PERFORM ALL INSTALLATION WORK FOR PIPE AND WELDED FITTINGS, ROLLERS, AND CASING SPACERS AND END SEALS FOR SLEEVE.
32. TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY SITEWORK, SHALL BE MAINTAINED DURING CONSTRUCTION, AND SHALL REMAIN IN PLACE UNTIL ALL SITEWORK IS COMPLETED AND GROUND COVER IS ESTABLISHED (AT LEAST 75% UNIFORM COVERAGE BY NEW SEEDLINGS).
33. THE CONTRACTOR SHALL INSPECT THE EROSION CONTROLS DAILY AND CLEAN ACCUMULATED MATERIALS FROM BEHIND THEM, AS NECESSARY. ALL EROSION AND SEDIMENTATION CONTROL MEASURES FOUND TO BE IN NEED OF REPAIR OR REPLACEMENT SHALL BE IMMEDIATELY CORRECTED, SO AS TO MAINTAIN THE INTEGRITY OF THE EROSION AND SEDIMENTATION CONTROL SYSTEM.
34. ALL DISTURBED AREAS THAT WILL REMAIN EXPOSED OR UNDISTURBED FOR A PERIOD OF FOURTEEN (14) DAYS OR LONGER, SHALL BE STABILIZED WITH MULCH OR SEEDED FOR TEMPORARY VEGETATIVE COVER.
35. THE CONTRACTOR SHALL INSPECT ALL PORTIONS OF THE SITE IN ANTICIPATION OF RAINFALL EVENTS TO DETERMINE IF SITE GRADING IS SUFFICIENT TO PREVENT EROSION OF SLOPES AND/OR THE TRANSPORTATION OF SEDIMENTS WITHIN THE PROJECT LIMITS. SHOULD ADDITIONAL MEASURES BE REQUIRED, THEY ARE TO BE IMPLEMENTED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE. IN NO CASE SHALL THE INSTALLATION OF ADDITIONAL MEASURES, NECESSARY TO PROTECT SLOPES WITHIN THE PROJECT LIMITS, BE DELAYED BEYOND THE COMMENCEMENT OF PRECIPITATION.
36. WHEN THE CONTROL SYSTEMS ARE NO LONGER REQUIRED, CONTRACTOR SHALL REMOVE ALL EROSION AND SEDIMENTATION CONTROL SYSTEMS AND REMOVE ALL ACCUMULATED SEDIMENTS AND LOAM AND SEED OR OTHERWISE RESTORE THEM TO ORIGINAL CONDITIONS. CONTRACTOR SHALL REQUEST AND RECEIVE PERMISSION FROM THE ENGINEER PRIOR TO REMOVING ANY CONTROL SYSTEM.
37. THE MINIMUM MOUNTING HEIGHT OF POST-MOUNTED SIGNS, MEASURED VERTICALLY FROM THE BOTTOM OF THE SIGN TO THE TOP OF THE CURB OR SIDEWALK, SHALL BE 7 FEET UNLESS OTHERWISE SPECIFIED.
38. PERMANENT PAVEMENT MARKINGS SHALL BE THERMOPLASTIC.
39. HYDRAULIC DATA SHOWN HEREON WAS PROVIDED BY THE MASSDOT HYDRAULIC SECTION IN THE HYDRAULIC STUDY REPORT DATED 02/08/2022.
40. CONTRACTOR SHALL OFFSET LONGITUDINAL PAVEMENT JOINTS BY 4" (MIN.) FROM PROPOSED PAVEMENT MARKINGS.
41. PROPOSED TEMPORARY SIDEWALKS SHALL PROVIDE A MINIMUM ACCESSIBLE WIDTH OF 5 FEET EXCEPT AT POINT OBSTRUCTIONS WHERE A WIDTH OF 4 FEET WILL BE ACCEPTED. MAXIMUM CROSS SLOPE SHALL BE 1.5% AND THE MAXIMUM LONGITUDINAL SLOPE SHALL BE 4.5% (0.5% CONSTRUCTION TOLERANCE).
42. CONTRACTOR TO REMOVE SEDIMENT AND CLEAN ALL DRAINAGE STRUCTURES AND PIPES WITHIN PROJECT LIMITS.
43. CONTRACTOR SHALL PERFORM PRE- AND POST-CONSTRUCTION VIDEO INSPECTION OF EXISTING SANITARY SEWER SYSTEM WITHIN THE PROJECT LIMITS BEFORE BEGINNING CONSTRUCTION ACTIVITIES AND AFTER SUBSTANTIAL COMPLETION, RESPECTIVELY. ANY

DAMAGE SUFFERED DURING CONSTRUCTION SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

## FITCHBURG RIVER STREET/ROUTE 31

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	3	67
PROJECT FILE NO.		607680	

### GENERAL NOTES

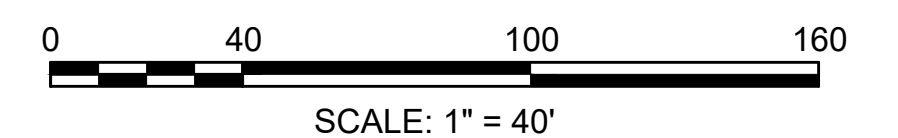
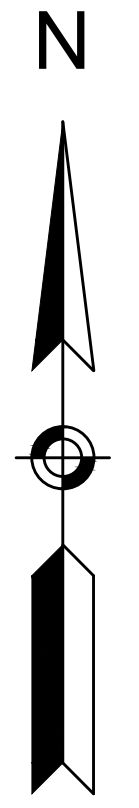
## PEDESTRIAN CURB RAMP NOTES

1. ALL SIDEWALKS AND PEDESTRIAN CURB RAMPS SHALL CONFORM TO THE REQUIREMENTS OF THE ARCHITECTURAL ACCESS BOARD (AAB), AMERICAN WITH DISABILITIES ACT (ADA), AND THE LATEST STANDARDS OF THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION. SIDEWALK CROSS SLOPES, AS INDICATED IN THE STANDARD SPECIFICATIONS, WILL BE 1.5% MAXIMUM, CEMENT CONCRETE. LEVEL LANDINGS SHALL NOT EXCEED A SLOPE OF 1.5% IN ANY DIRECTION.
2. AN UNOBSTRUCTED PATH OF TRAVEL WITH A MINIMUM WIDTH OF 36" SHALL BE MAINTAINED PAST ALL OBSTRUCTIONS (UTILITY POLES, SIGNS, SIGNAL FOUNDATIONS AND MASTS, MAILBOXES, ALONG DRIVE OPENINGS, ETC.).
3. ALL EXISTING CURB TO BE REMOVED AND RESET (R&R) OR PROPOSED CURB FOR PEDESTRIAN CURB RAMP TRANSITIONS SHALL BE CUT AND TRANSITIONED AS NECESSARY TO PROVIDE THE CORRECT TRANSITION LENGTHS FOR EACH PEDESTRIAN CURB RAMP, AS SHOWN ON THE PEDESTRIAN CURB RAMP DETAILS OR AS DIRECTED BY THE ENGINEER. ANY EXISTING CURB INLETS IN AREAS OF NEW PEDESTRIAN CURB RAMP TRANSITIONS SHALL BE REMOVED AND REPLACED WITH APPROPRIATE TRANSITION CURB, AS DIRECTED BY THE ENGINEER.
4. IN NO CASE, EXCEPT MAXIMUM LENGTH HIGH SIDE TRANSITIONS, SHALL ANY TRANSITION SLOPE OF ANY PEDESTRIAN CURB RAMP EXCEED 7.5% WITH A MAXIMUM CONSTRUCTION TOLERANCE OF +/-0.5%. PROPOSED PEDESTRIAN CURB RAMP SLOPES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO THE POURING OF CONCRETE, AND ADJUSTED, IF NECESSARY, AT THE DIRECTION OF THE ENGINEER.
5. HIGH SIDE TRANSITION LENGTHS, AS SHOWN ON THE PLANS, SHALL BE VERIFIED BY THE CONTRACTOR BY CHECKING THE NEW GUTTER GRADE, AND ANY NEW ADJUSTMENT SHALL BE MADE AT THE DIRECTION OF THE ENGINEER.
6. PEDESTRIAN CURB RAMP OFFSET FROM THE FINISH GRADE PAVEMENT NO GREATER THAN  $\frac{1}{2}$ " AND NO LESS THAN  $\frac{1}{4}$ " (PER CITY OF FITCHBURG REQUEST).
7. DETECTABLE WARNING PANELS SHALL BE INSTALLED PER MASSDOT STANDARD DETAIL E 107.6.5 FOR ALL PEDESTRIAN CURB RAMPS. DETECTABLE WARNING PANELS SHALL BE REPLACEABLE TYPE AND "RED" IN COLOR EXCEPT WHERE OTHERWISE NOTED. PROPOSED PANEL TO BE FURNISHED MUST BE SUBMITTED TO THE ENGINEER FOR APPROVAL... DETECTABLE WARNING PANELS ARE TO BE CAST IRONS AND CONFORM WITH ADA REQUIREMENTS FOR DETECTABLE WARNING PANELS ON CURB RAMPS (PER CITY OF FITCHBURG REQUEST).
8. IN INSTANCES WHERE AN EXISTING MANHOLE, HANDHOLE, OR OTHER "SURFACE" TYPE STRUCTURE THAT CANNOT BE REMOVED OR RESET IS WITHIN THE PROPOSED OR EXISTING ACCESSIBLE SURFACE, THE STRUCTURE SHALL BE CAREFULLY ADJUSTED SUCH THAT THE TOPMOST SURFACES OR THE STRUCTURE COVER SHALL BE FLUSH WITH THE ACCESSIBLE SURFACE.

**FITCHBURG  
RIVER STREET/ROUTE 31**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	4	67
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**KEY PLAN & BORING PLAN**



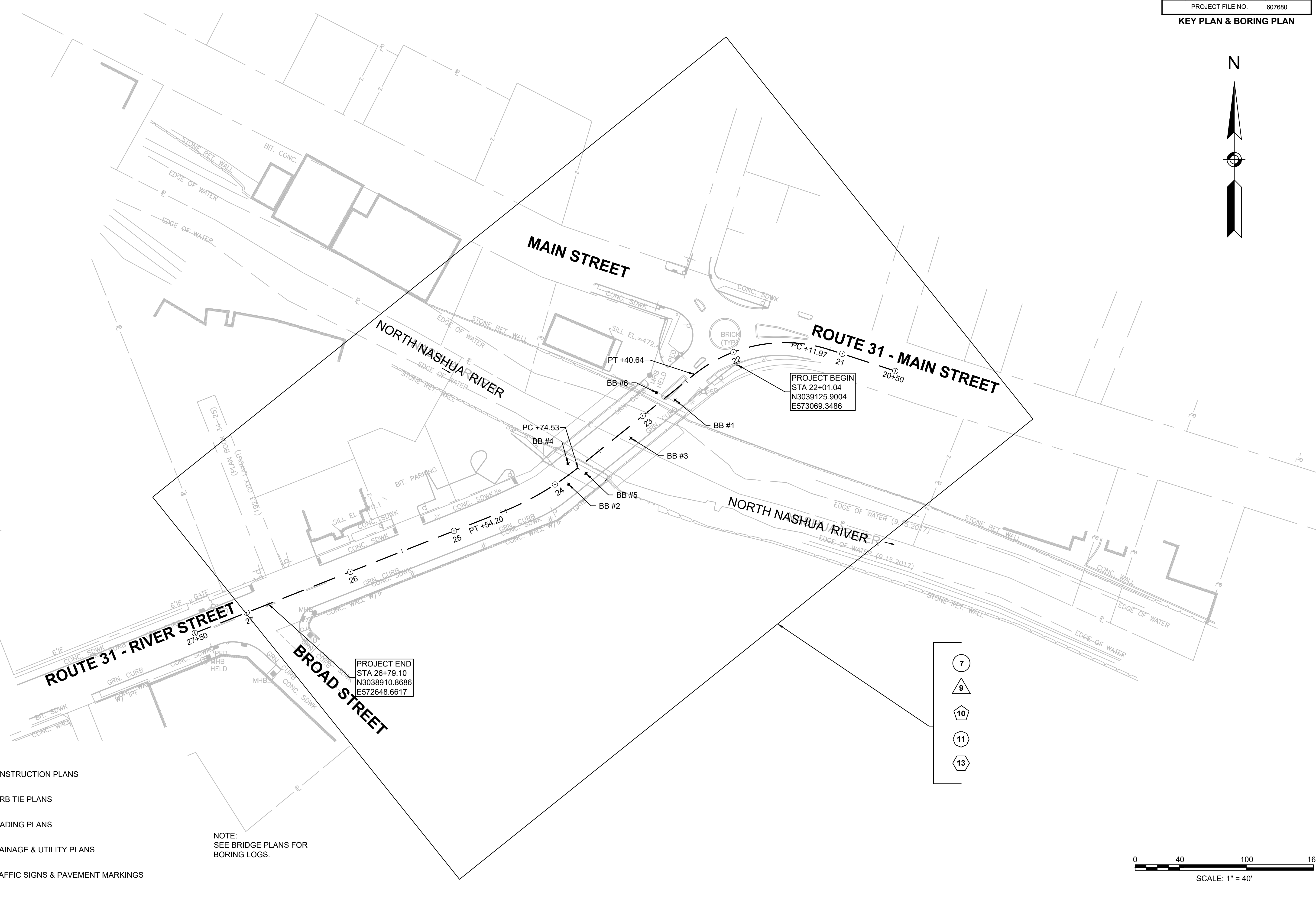
- LEGEND**
- CONSTRUCTION PLANS
  - CURB TIE PLANS
  - GRADING PLANS
  - DRAINAGE & UTILITY PLANS
  - TRAFFIC SIGNS & PAVEMENT MARKINGS

NOTE:  
SEE BRIDGE PLANS FOR  
BORING LOGS.

PROJECT END  
STA 26+79.10  
N3038910.8686  
E572648.6617

PROJECT BEGIN  
STA 22+01.04  
N3039125.9004  
E573069.3486

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**FITCHBURG  
RIVER STREET/ROUTE 31**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	5	67
PROJECT FILE NO.		607680	

**TYPICAL SECTIONS & PAVEMENT NOTES**

**PAVEMENT NOTES**

**PROPOSED FULL DEPTH PAVEMENT CONSTRUCTION (RIVER STREET)**

- SURFACE COURSE: 1.5" SUPERPAVE SURFACE COURSE - 9.5 POLYMER (SSC-9.5-P) OVER ASPHALT EMULSION FOR TACK COAT (RS-1H) OVER
- INTERMEDIATE COURSE: 1.5" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5) OVER ASPHALT EMULSION FOR TACK COAT (RS-1H) OVER
- BASE COURSE: 5.0" SUPERPAVE BASE COURSE - 37.5 (SBC-37.5) OVER
- SUB-BASE COURSE: 4" DENSE GRADE CRUSHED STONE FOR SUB-BASE OVER 8" GRAVEL BORROW - TYPE B OVER SPECIAL BORROW COMPACTED IN 8" LIFTS

**PROPOSED FULL DEPTH PAVEMENT CONSTRUCTION OVER APPROACH SLAB**

- SURFACE COURSE: 1.5" SUPERPAVE SURFACE COURSE - 9.5 POLYMER (SSC-9.5-P) OVER ASPHALT EMULSION FOR TACK COAT (RS-1H) OVER
- INTERMEDIATE COURSE: 1.5" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5) OVER ASPHALT EMULSION FOR TACK COAT (RS-1H) OVER
- BASE COURSE: 4.5" SUPERPAVE BASE COURSE - 37.5 (SBC-37.5) OVER ASPHALT EMULSION FOR TACK COAT (RS-1H) OVER
- SUB-BASE COURSE: 10" CONCRETE SLAB

**PROPOSED BRIDGE SPAN PAVEMENT CONSTRUCTION**

- SURFACE COURSE: 1.5" SUPERPAVE BRIDGE SURFACE COURSE - 9.5 (SSC-B-9.5) OVER ASPHALT EMULSION FOR TACK COAT (RS-1H) OVER
- BASE COURSE: 1.5" SUPERPAVE BRIDGE PROTECTIVE COURSE - 9.5 (SPC-B-9.5) OVER ASPHALT EMULSION FOR TACK COAT (RS-1H) OVER SPRAY APPLIED MEMBRANE OVER
- SUB-BASE COURSE: BRIDGE DECK

**PROPOSED CEMENT CONCRETE SIDEWALK AND PEDESTRIAN CURB RAMPS**

- SURFACE COURSE: 4" CEMENT CONCRETE (AIR ENTRAINED 4000 PSI - 3" - 610 LB.) OVER
- BASE COURSE: 8" GRAVEL BORROW TYPE B

\* CONSTRUCTION TOLERANCES OF 0.5%± FOR SIDEWALK CROSS SLOPES

**PROPOSED FULL DEPTH HOT MIX ASPHALT DRIVEWAY**

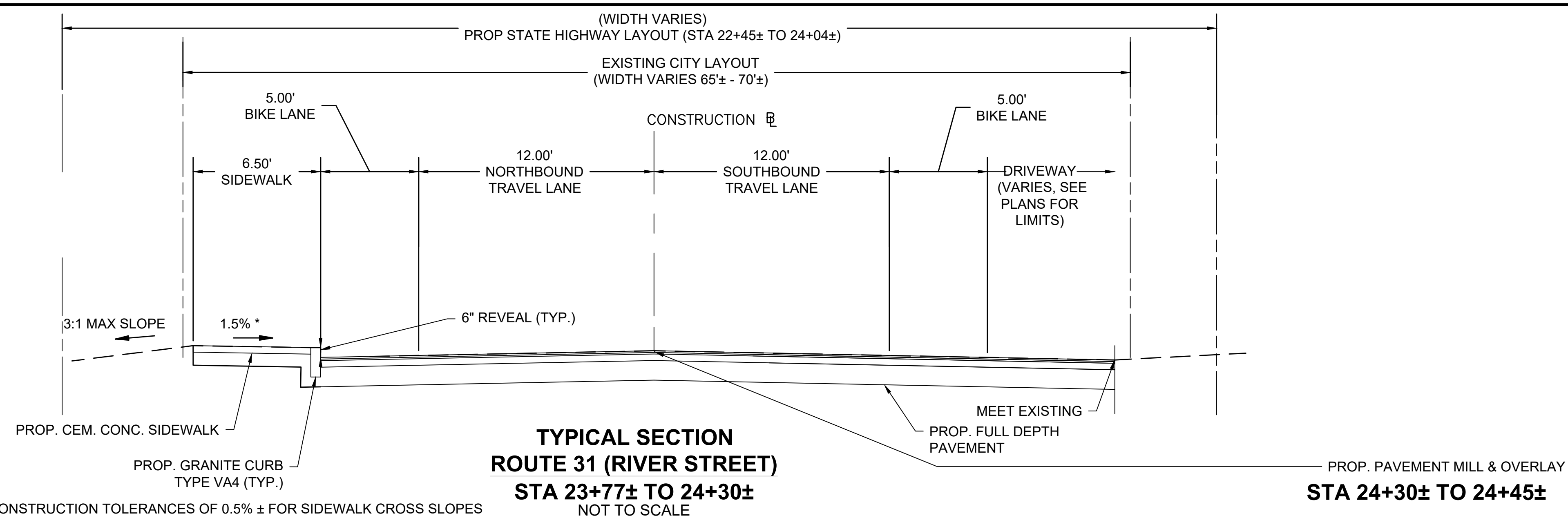
- SURFACE COURSE: 1.5" SUPERPAVE SURFACE COURSE - 9.5 POLYMER (SSC-9.5-P) OVER ASPHALT EMULSION FOR TACK COAT (RS-1H) OVER
- INTERMEDIATE COURSE: 2.5" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5)
- BASE COURSE: 8" GRAVEL BORROW TYPE B

**PROPOSED MILL & OVERLAY**

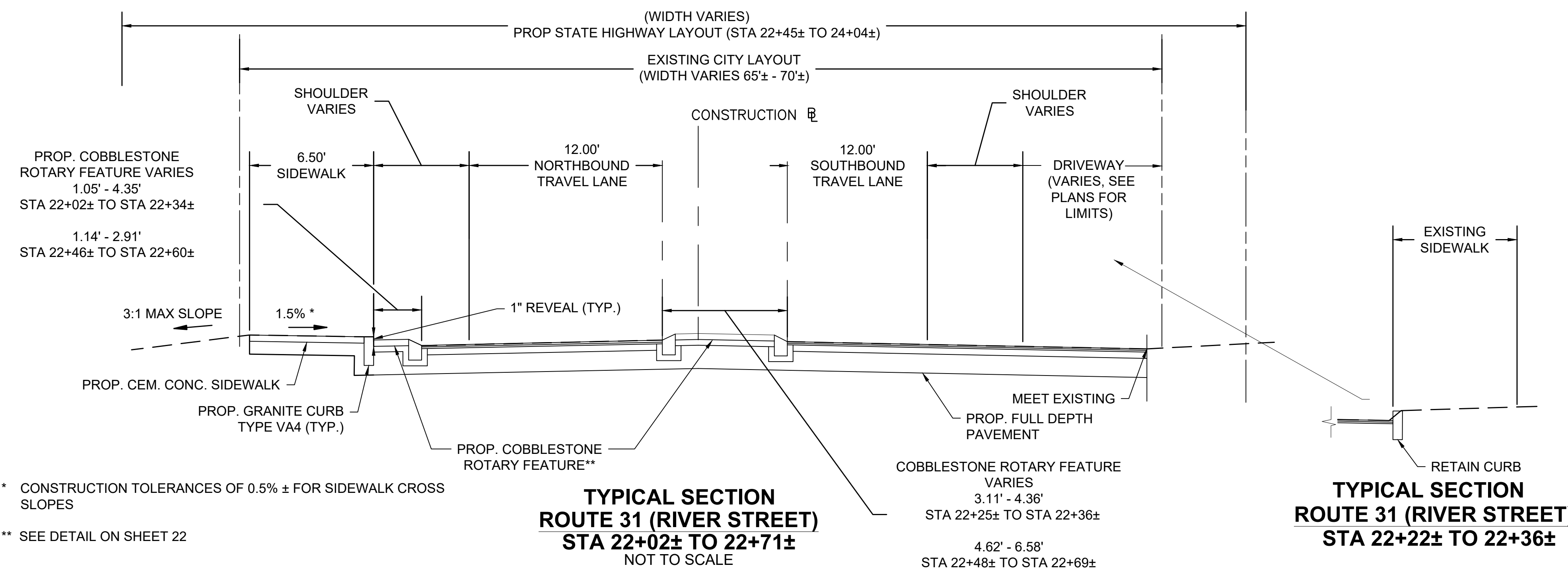
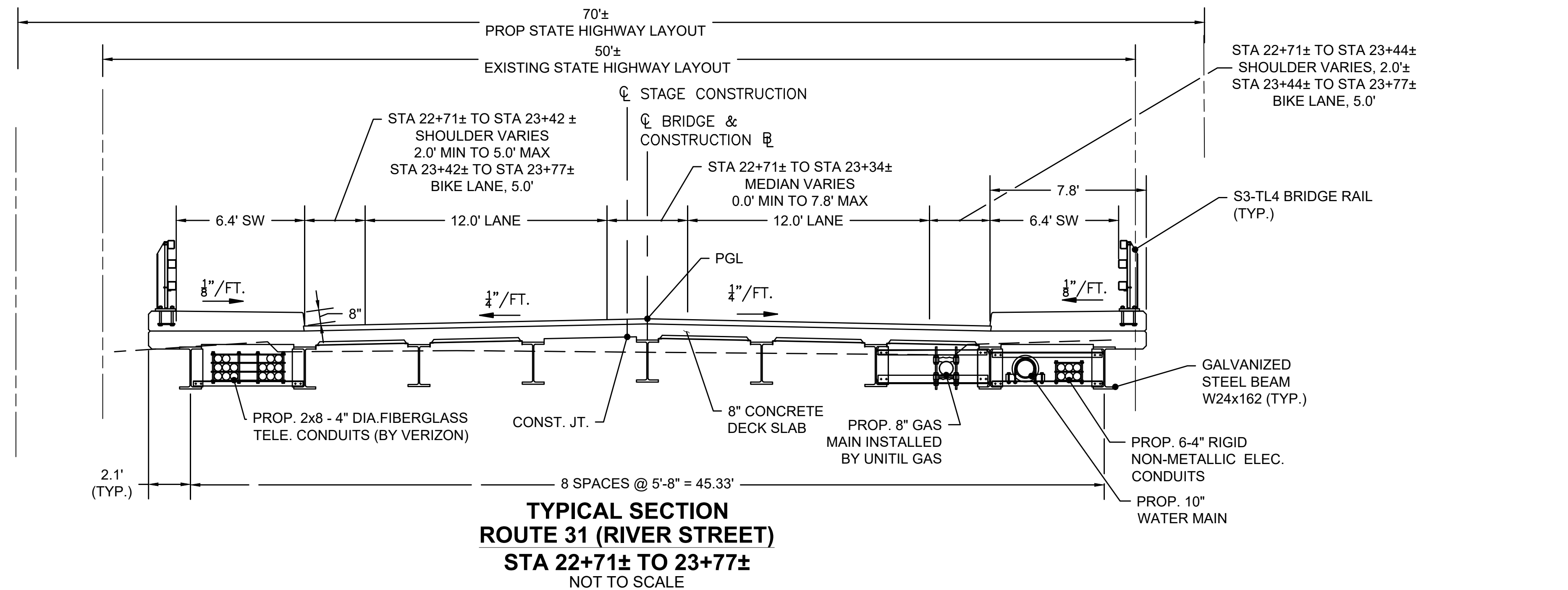
- SURFACE COURSE: 1.5" SUPERPAVE SURFACE COURSE - 9.5 POLYMER (SSC-9.5-P) OVER ASPHALT EMULSION FOR TACK COAT (RS-1H)
- INTERMEDIATE COURSE: 2" SUPERPAVE INTERMEDIATE COURSE 12.5 (SIC-12.5) OVER ASPHALT EMULSION FOR TACK COAT (RS-1H)
- MILLING: 3" PAVEMENT FINE MILLING

**NOTES**

1. THE SURFACE COURSE FOR EACH OF THE PAVEMENT SECTIONS SHALL BE PLACED IN ONE CONTINUOUS LAYER UNLESS OTHERWISE SPECIFIED.
2. ON A NEW HMA SURFACE, NOT OPENED TO TRAFFIC, THE ASPHALT EMULSION APPLICATION RATE SHALL EQUAL 0.06 TO 0.08 GALS. PER SQUARE YARD. ON A MILLED SURFACE, THE EMULSION APPLICATION RATE SHALL EQUAL 0.07 TO 0.09 GALS. PER SQUARE YARD.
3. CONTRACTOR SHALL APPLY JOINT ADHESIVE ON LONGITUDINAL VERTICAL (BUTT) JOINTS AND ALL TRANSVERSE JOINTS IN NEW SURFACE COURSES. APPLY TACK COAT ON ADJOINING EDGE SUCH AS EXISTING PAVEMENT, CURB, GUTTER, DRAINAGE OR UTILITY STRUCTURE, OR ANY METAL SURFACE.
4. PROPOSED PROFILE LINES AND GRADES AND PROPOSED FULL DEPTH CONSTRUCTION OF THE EXISTING PAVEMENT WILL NEED TO BE REPLACED WITH EQUAL DEPTH OF GRAVEL, SPECIAL BORROW, OR RECLAIMED BORROW AND COMPACTED.
5. FOR DRIVEWAY AND PEDESTRIAN CURB RAMP LOCATIONS AND LIMITS SEE CONSTRUCTION PLANS.
6. ALL TEMPORARY ASPHALT WILL BE PAID FOR AS HOT MIX ASPHALT FOR MISCELLANEOUS WORK REGARDLESS OF THE MIX USED.
7. THE METHOD OF ROUNDING CUT AND FILL SLOPES FOR THE PROPOSED ROADWAY SHALL CONFORM TO MASSDOT STANDARD DETAIL E103.1.0.



\* CONSTRUCTION TOLERANCES OF 0.5%± FOR SIDEWALK CROSS SLOPES



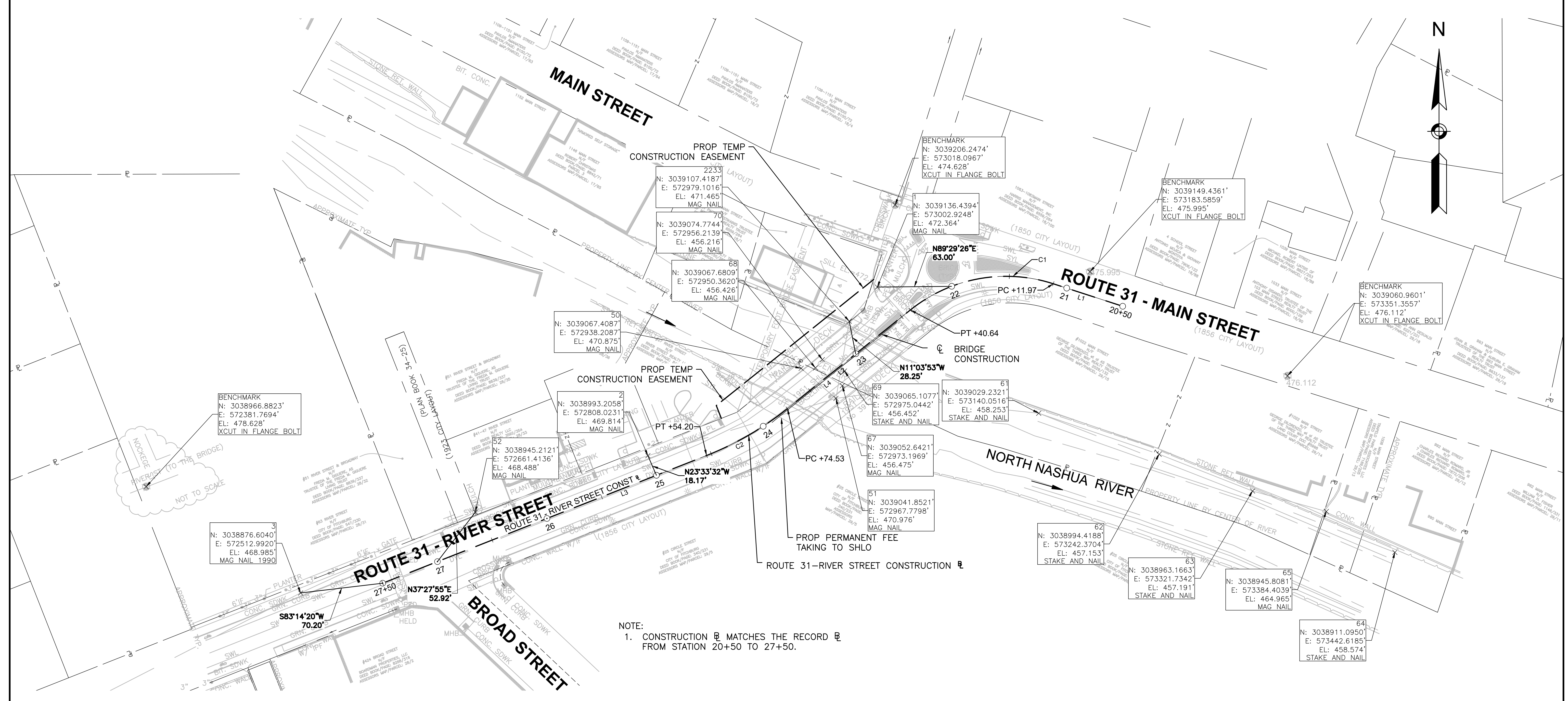
\* CONSTRUCTION TOLERANCES OF 0.5%± FOR SIDEWALK CROSS SLOPES

\*\* SEE DETAIL ON SHEET 22

FITCHBURG  
RIVER STREET/ROUTE 31

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	6	67
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SURVEY CONTROL & CONSTRUCTION BASELINE TIES



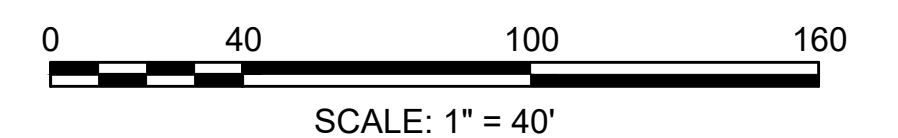
NOTE:  
1. CONSTRUCTION  $\square$  MATCHES THE RECORD  $\square$  FROM STATION 20+50 TO 27+50.

RIVER STREET CONSTRUCTION BASELINE DATA

NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	20+50.00	3039120.0994	573211.3863		N72°01'39"W 61.97'	21+11.97	3039139.2208	573152.4402
C1	21+11.97	3039139.2208	573152.4402	R=130.00' Δ=56°42'40" L=128.67' T=70.16'		22+40.64	3039116.9651	573030.9774
L2	22+40.64	3039116.9651	573030.9774		S51°15'41"W 133.89'	23+74.53	3039033.1808	572926.5422
C2	23+74.53	3039033.1808	572926.5422	R=265.00' Δ=17°13'30" L=79.67' T=40.14' MIN HSO=11.25' MIN SSD=155'		24+54.20	3038993.3455	572857.8950
L3	24+54.20	3038993.3455	572857.8950		S68°29'11"W 295.80'	27+50.00	3038884.8687	572582.7034

CL STAGED CONSTRUCTION

LINE #	DIRECTION	LENGTH	START NORTHING	START EASTING	END NORTHING	END EASTING
L4	S51°15'41"W	135.89	3039106.45	573019.47	3039021.41	572913.47



HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

DRAINAGE & UTILITY PLANS

SEE SHEET 11

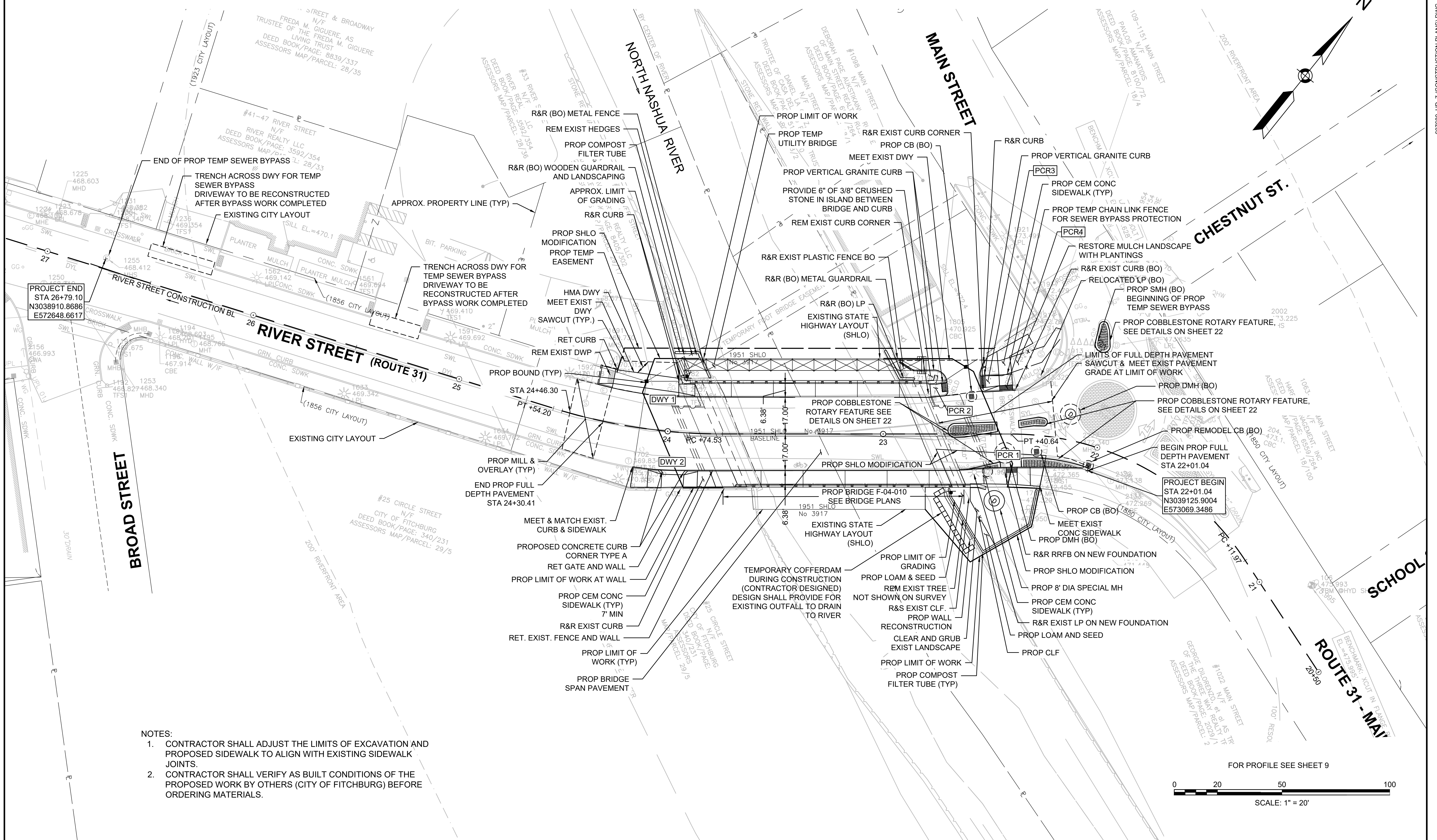
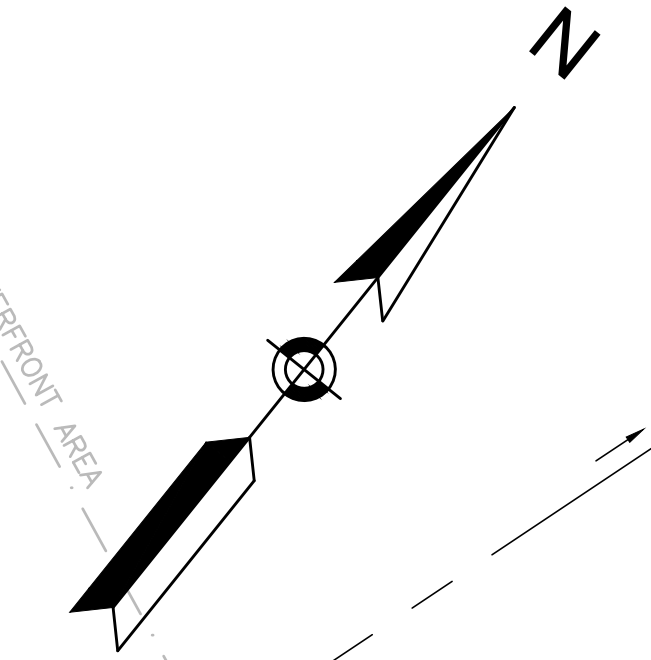
DRAINAGE DETAILS

SEE SHEET 12-13

FITCHBURG  
RIVER STREET/ROUTE 31

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	7	67
PROJECT FILE NO.		607680	

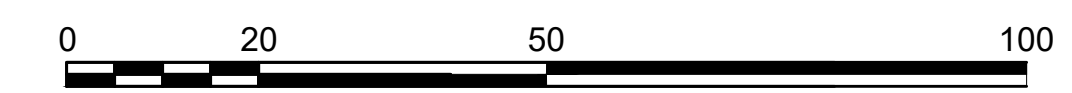
CONSTRUCTION PLANS



NOTES:

1. CONTRACTOR SHALL ADJUST THE LIMITS OF EXCAVATION AND PROPOSED SIDEWALK TO ALIGN WITH EXISTING SIDEWALK JOINTS.
2. CONTRACTOR SHALL VERIFY AS BUILT CONDITIONS OF THE PROPOSED WORK BY OTHERS (CITY OF FITCHBURG) BEFORE ORDERING MATERIALS.

FOR PROFILE SEE SHEET 9



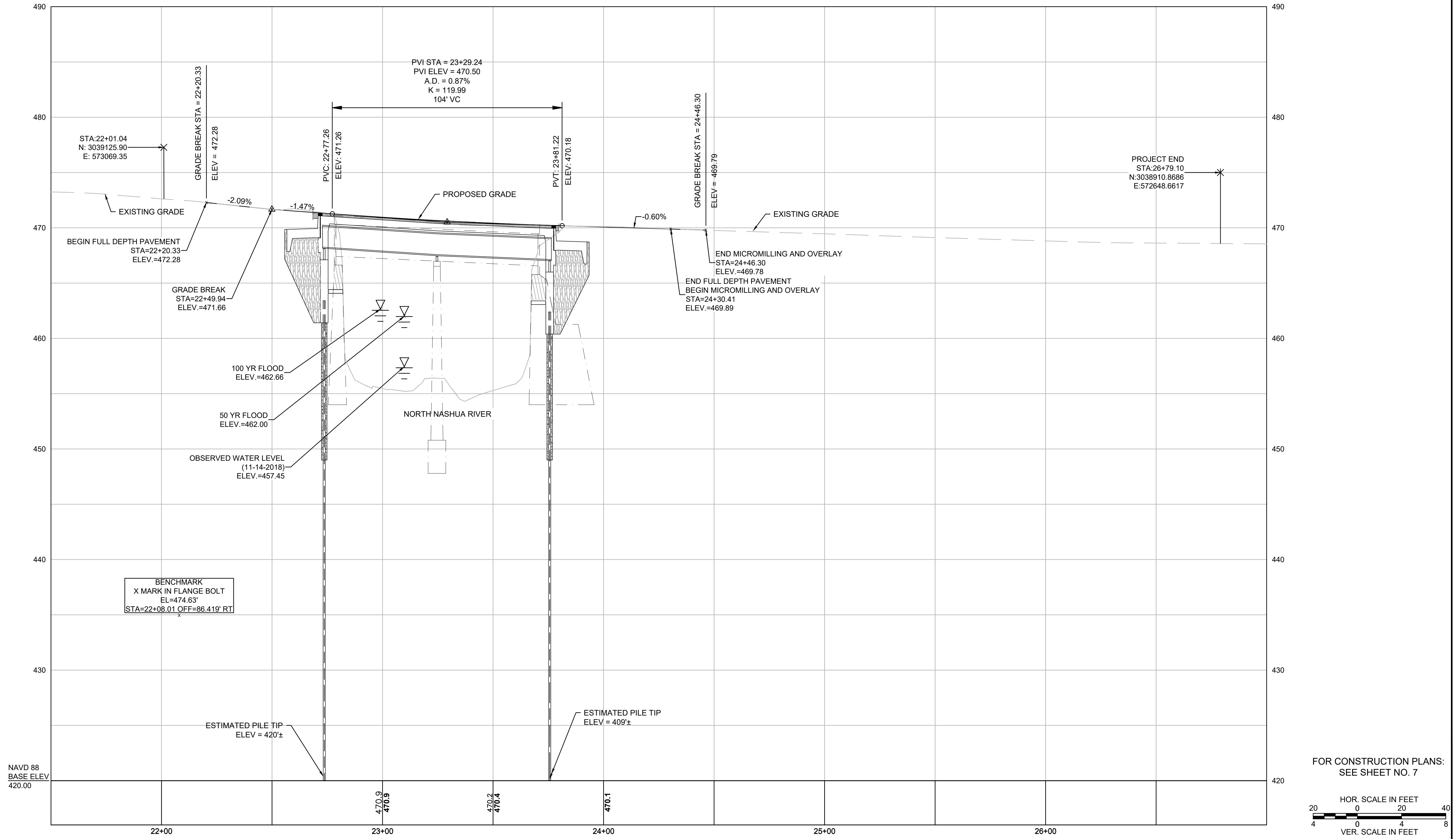
SCALE: 1" = 20'

# RIVER STREET CONSTRUCTION BASELINE

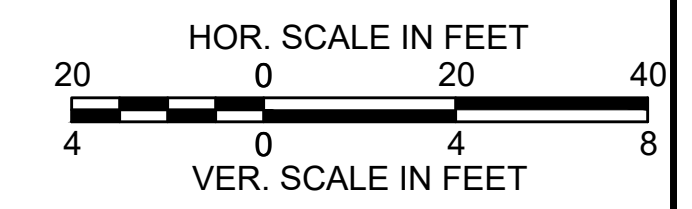
FITCHBURG  
RIVER STREET/ROUTE 31

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	8	67
PROJECT FILE NO. 607680			

## PROFILE



FOR CONSTRUCTION PLANS:  
SEE SHEET NO. 7

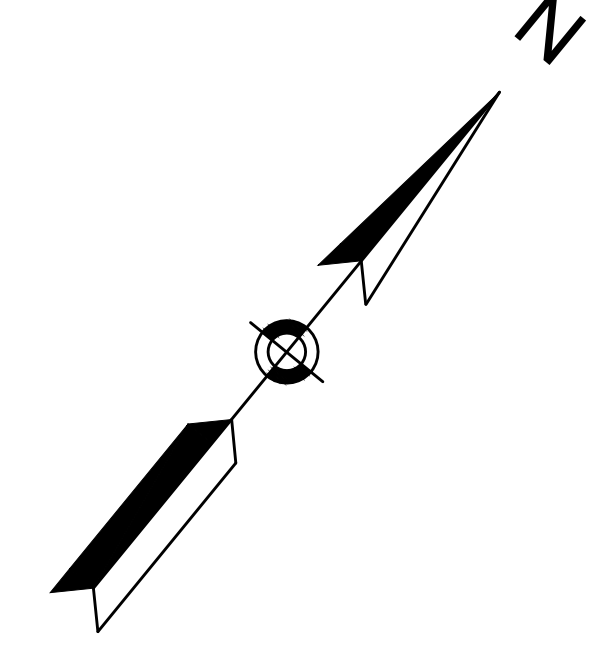




**FITCHBURG  
RIVER STREET/ROUTE 31**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	9	67
PROJECT FILE NO. 607680			

**CURB TIE PLANS**



**CURVE/LINE TABLE**

NUMBER	DELTA/ BEARING	Radius	Length
C6	34°25'11"	4.50	2.70
C7	78°55'42"	5.50	7.58
C8	93°27'37"	0.50	0.82
C10	2°49'54"	150.82	7.45
C13	96°02'28"	0.25	0.42
C15	90°00'00"	2.00	3.14
L12	N38°44'19"W		3.24
L13	N51°14'01"W		5.12
L15	N84°41'53"E		6.36
L16	N48°09'22"E		1.30
L19	N50°16'42"E		8.14
L24	S42°40'01"W		3.99
L28	N51°13'15"E		105.77
L29	N48°15'45"E		10.17
L30	N49°00'58"E		8.90
L31	N48°04'16"E		8.01
L32	N50°17'32"E		2.64
L33	N51°15'26"E		6.01
L34	N51°15'26"E		6.31
L35	N51°26'25"E		5.04
L36	N52°32'25"E		12.56
L37	N65°21'22"E		1.83
L38	N65°09'22"E		16.65
L40	S45°33'03"W		6.86

PROJECT END  
STA 26+79.10  
N303890.8686  
E572648.6617

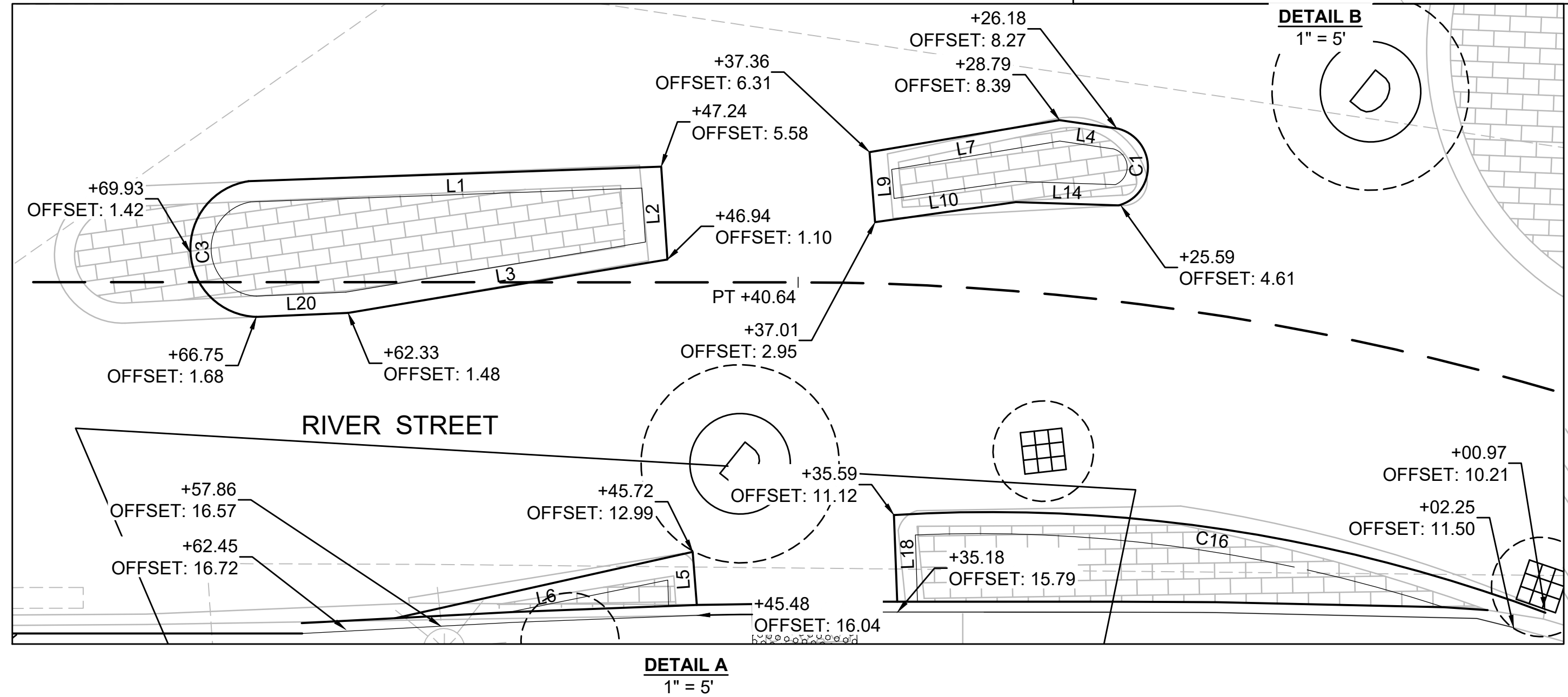
PROJECT BEGIN  
STA 22+01.04  
N3039125.9004  
E573069.3486

**CURVE/LINE TABLE**

NUMBER	DELTA/ BEARING	Radius	Length
C1	152°37'56"	1.91	5.08
C3	169°33'15"	3.29	9.74
C4	145°10'41"	2.04	5.17
C5	87°46'20"	3.00	4.60
C11	95°29'03"	4.00	6.67
C16	24°05'16"	76.08	31.98
L1	S49°13'00"W		19.91
L2	N42°33'50"W		4.48
L3	N41°44'23"E		15.60
L4	S59°34'17"W		2.79
L7	S41°39'49"W		9.29
L9	S43°21'54"E		3.38

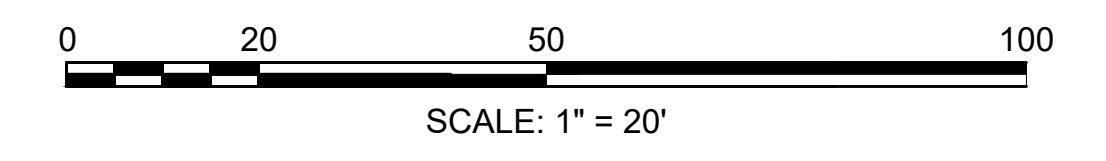
**CURVE/LINE TABLE**

NUMBER	DELTA/ BEARING	Radius	Length
L10	N43°06'20"E		6.85
L14	N53°06'45"E		4.95
L18	S40°54'16"E		4.18
L20	N48°41'43"E		4.43
L23	N26°19'59"W		3.56
L25	S55°09'38"E		3.03
L26	S40°39'43"E		7.27
L39	N24°13'07"W		5.06



**DETAIL A  
1" = 5'**

**DETAIL B  
1" = 5'**

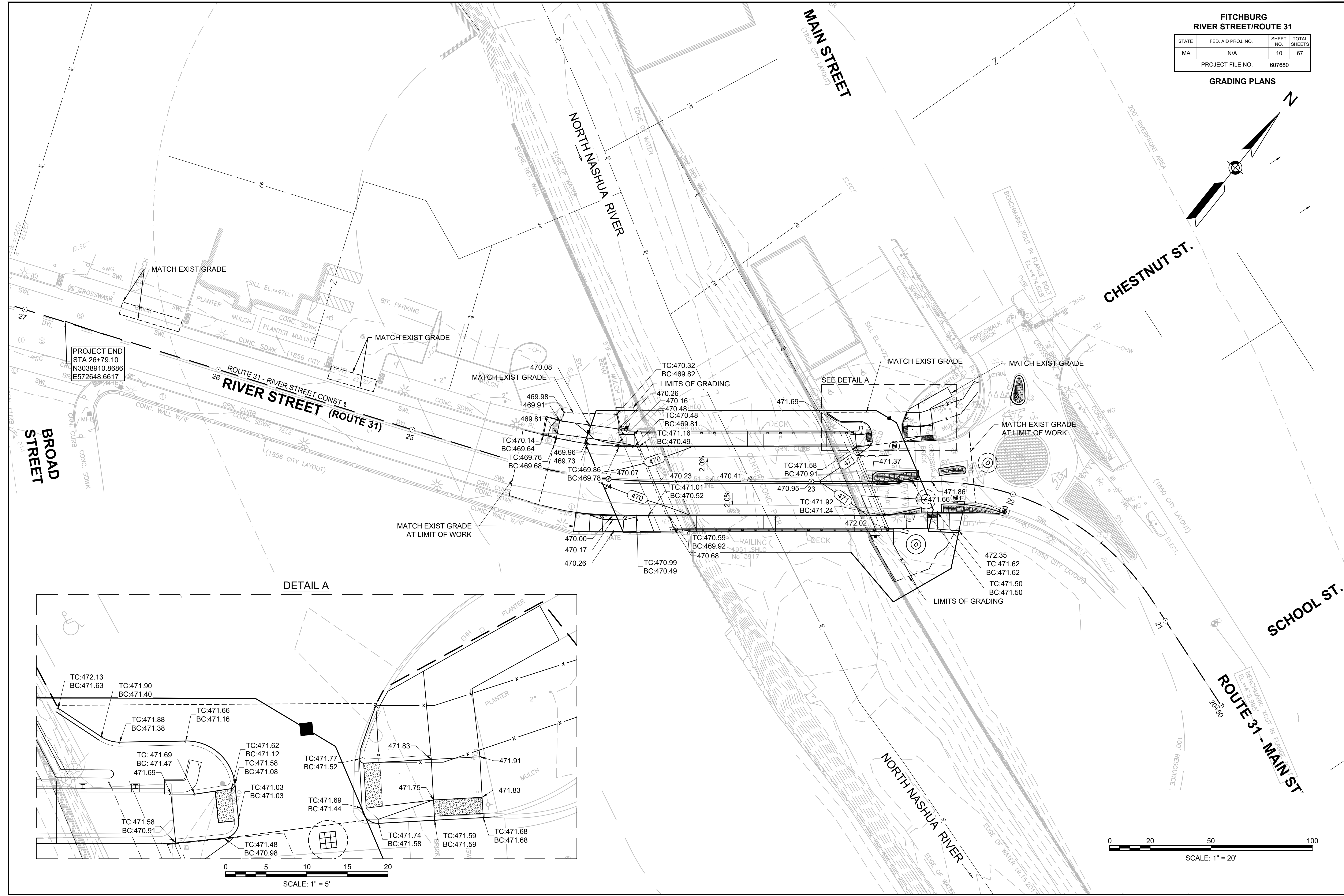
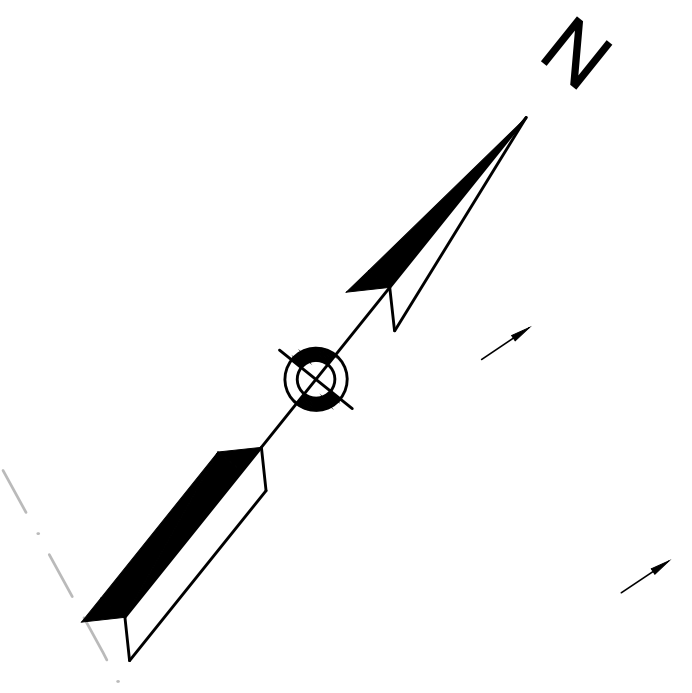


**FITCHBURG  
RIVER STREET/ROUTE 31**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	10	67

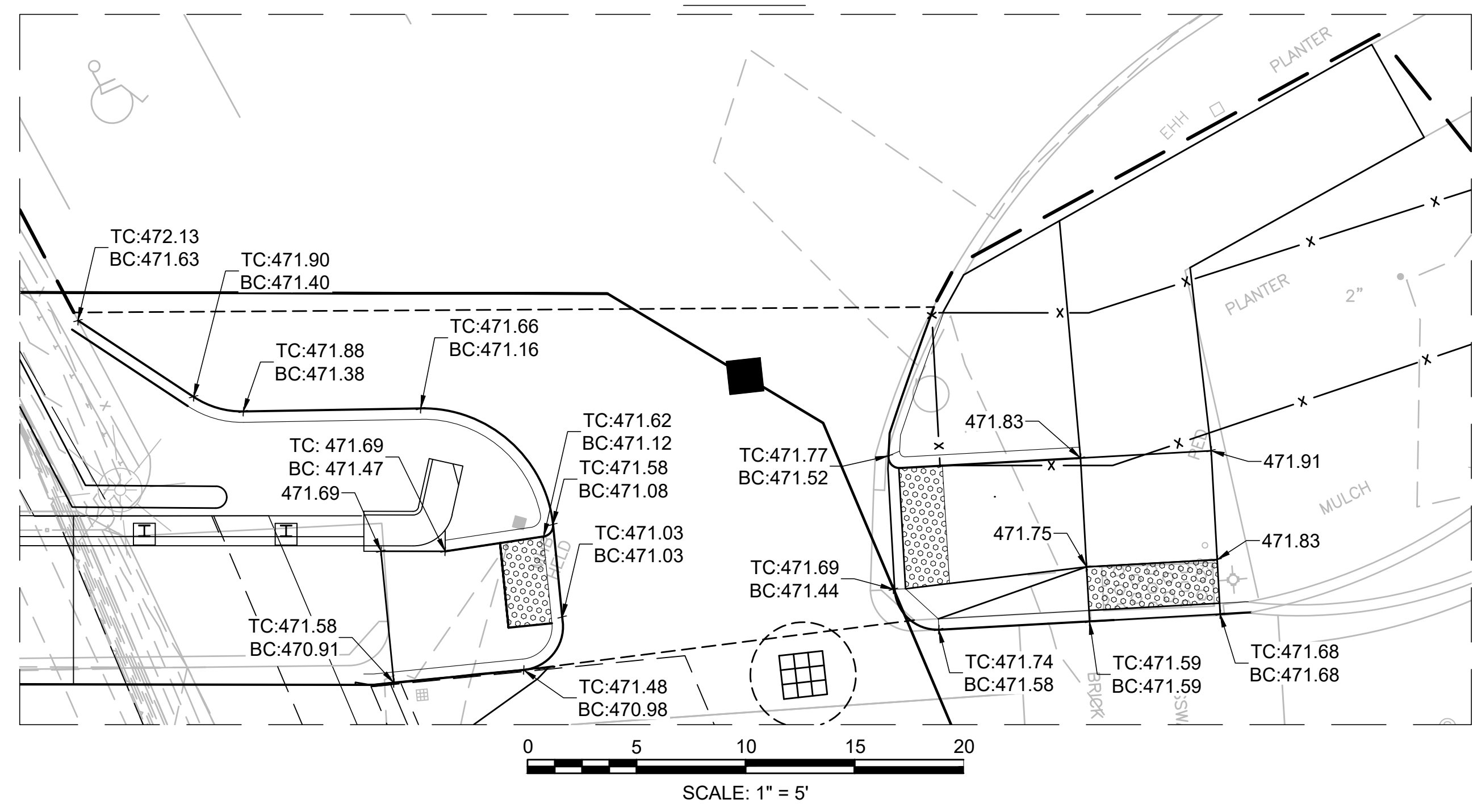
PROJECT FILE NO. 607680

**GRADING PLANS**



PROJECT END  
STA 26+79.10  
N3038910.8686  
E572648.6617

**DETAIL A**



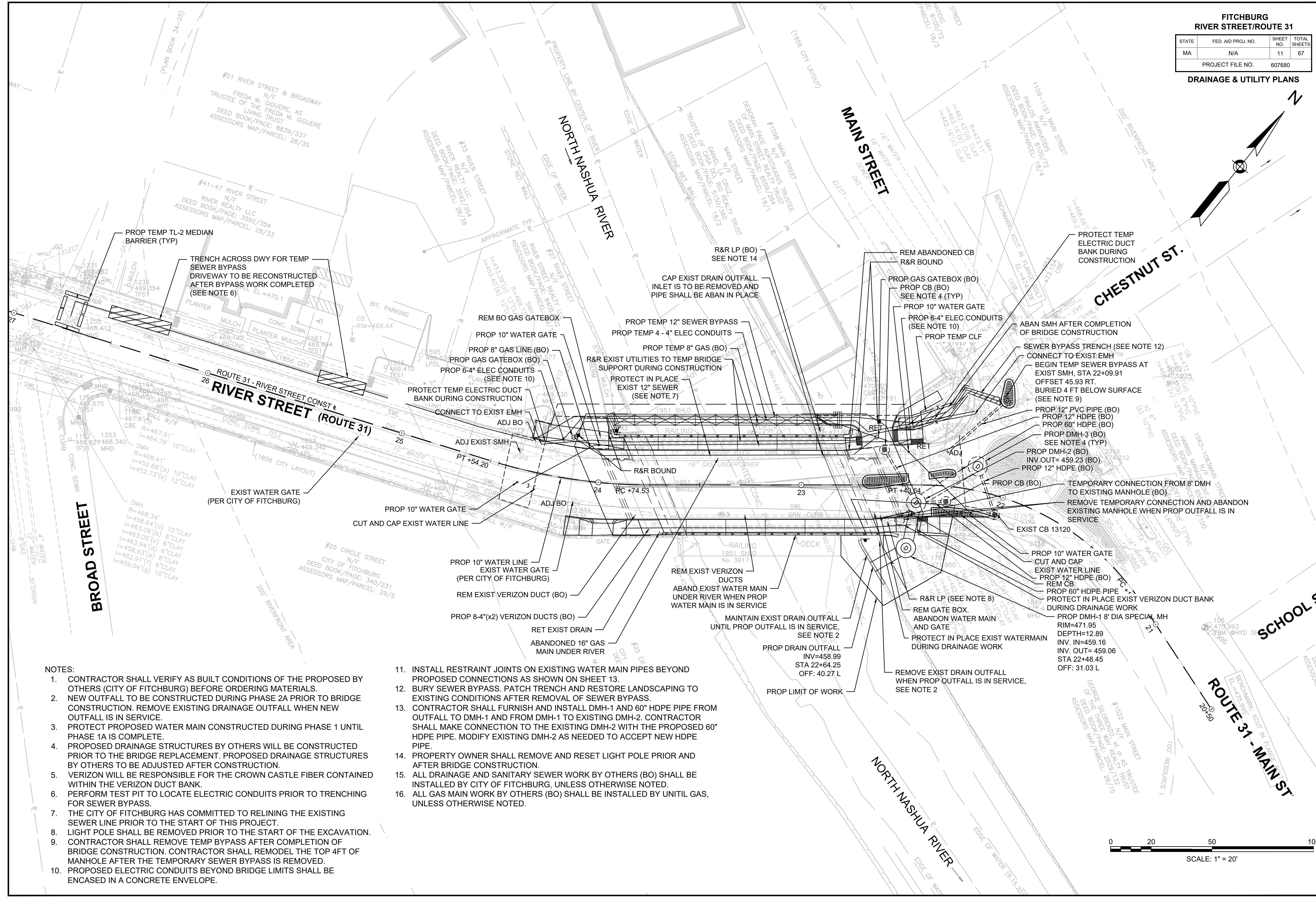
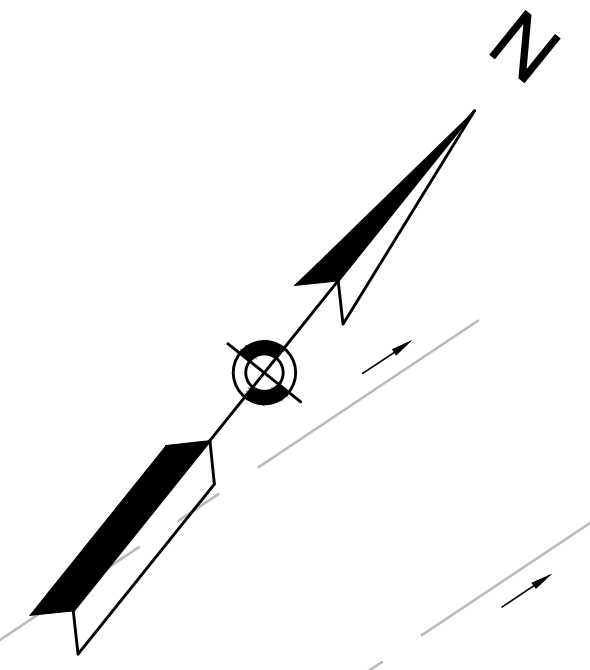
0 5 10 15 20  
SCALE: 1" = 5'

0 20 50 100  
SCALE: 1" = 20'

**FITCHBURG**  
**RIVER STREET/ROUTE 31**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	11	67
PROJECT FILE NO.		607680	

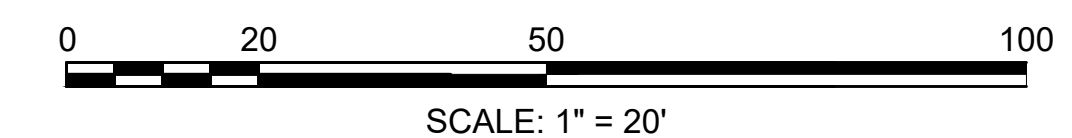
**DRAINAGE & UTILITY PLANS**



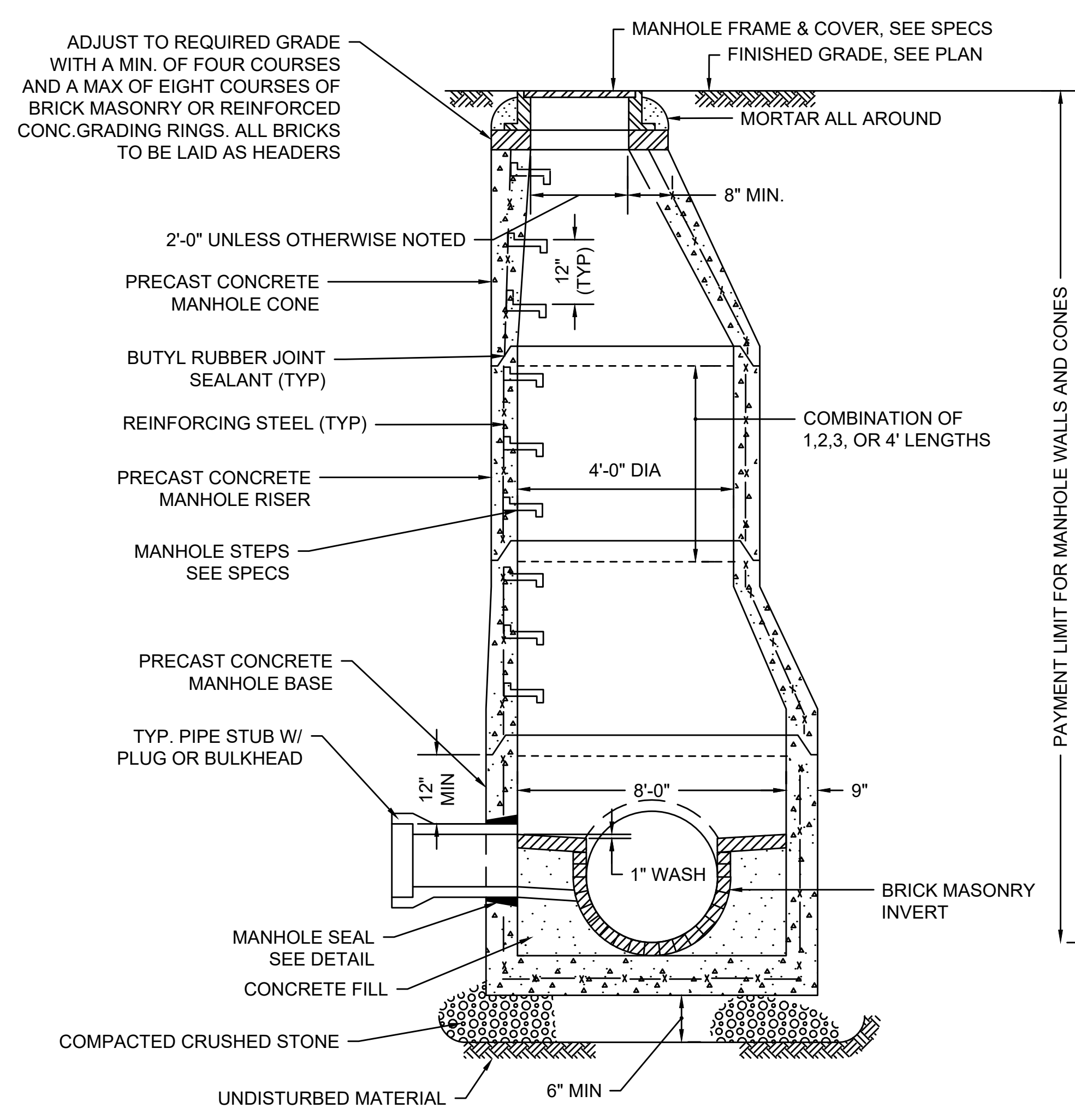
**NOTES:**

- CONTRACTOR SHALL VERIFY AS BUILT CONDITIONS OF THE PROPOSED BY OTHERS (CITY OF FITCHBURG) BEFORE ORDERING MATERIALS.
- NEW OUTFALL TO BE CONSTRUCTED DURING PHASE 2A PRIOR TO BRIDGE CONSTRUCTION. REMOVE EXISTING DRAINAGE OUTFALL WHEN NEW OUTFALL IS IN SERVICE.
- PROTECT PROPOSED WATER MAIN CONSTRUCTED DURING PHASE 1 UNTIL PHASE 1A IS COMPLETE.
- PROPOSED DRAINAGE STRUCTURES BY OTHERS WILL BE CONSTRUCTED PRIOR TO THE BRIDGE REPLACEMENT. PROPOSED DRAINAGE STRUCTURES BY OTHERS TO BE ADJUSTED AFTER CONSTRUCTION.
- VERIZON WILL BE RESPONSIBLE FOR THE CROWN CASTLE FIBER CONTAINED WITHIN THE VERIZON DUCT BANK.
- PERFORM TEST PIT TO LOCATE ELECTRIC CONDUITS PRIOR TO TRENCHING FOR SEWER BYPASS.
- THE CITY OF FITCHBURG HAS COMMITTED TO RELINING THE EXISTING SEWER LINE PRIOR TO THE START OF THIS PROJECT.
- LIGHT POLE SHALL BE REMOVED PRIOR TO THE START OF THE EXCAVATION.
- CONTRACTOR SHALL REMOVE TEMP BYPASS AFTER COMPLETION OF BRIDGE CONSTRUCTION. CONTRACTOR SHALL REMODEL THE TOP 4FT OF MANHOLE AFTER THE TEMPORARY SEWER BYPASS IS REMOVED.
- PROPOSED ELECTRIC CONDUITS BEYOND BRIDGE LIMITS SHALL BE ENCASED IN A CONCRETE ENVELOPE.

- INSTALL RESTRAINT JOINTS ON EXISTING WATER MAIN PIPES BEYOND PROPOSED CONNECTIONS AS SHOWN ON SHEET 13.
- BURY SEWER BYPASS. PATCH TRENCH AND RESTORE LANDSCAPING TO EXISTING CONDITIONS AFTER REMOVAL OF SEWER BYPASS.
- CONTRACTOR SHALL FURNISH AND INSTALL DMH-1 AND 60" HDPE PIPE FROM OUTFALL TO DMH-1 AND FROM DMH-1 TO EXISTING DMH-2. CONTRACTOR SHALL MAKE CONNECTION TO THE EXISTING DMH-2 WITH THE PROPOSED 60" HDPE PIPE. MODIFY EXISTING DMH-2 AS NEEDED TO ACCEPT NEW HDPE PIPE.
- PROPERTY OWNER SHALL REMOVE AND RESET LIGHT POLE PRIOR AND AFTER BRIDGE CONSTRUCTION.
- ALL DRAINAGE AND SANITARY SEWER WORK BY OTHERS (BO) SHALL BE INSTALLED BY CITY OF FITCHBURG, UNLESS OTHERWISE NOTED.
- ALL GAS MAIN WORK BY OTHERS (BO) SHALL BE INSTALLED BY UNITAL GAS, UNLESS OTHERWISE NOTED.

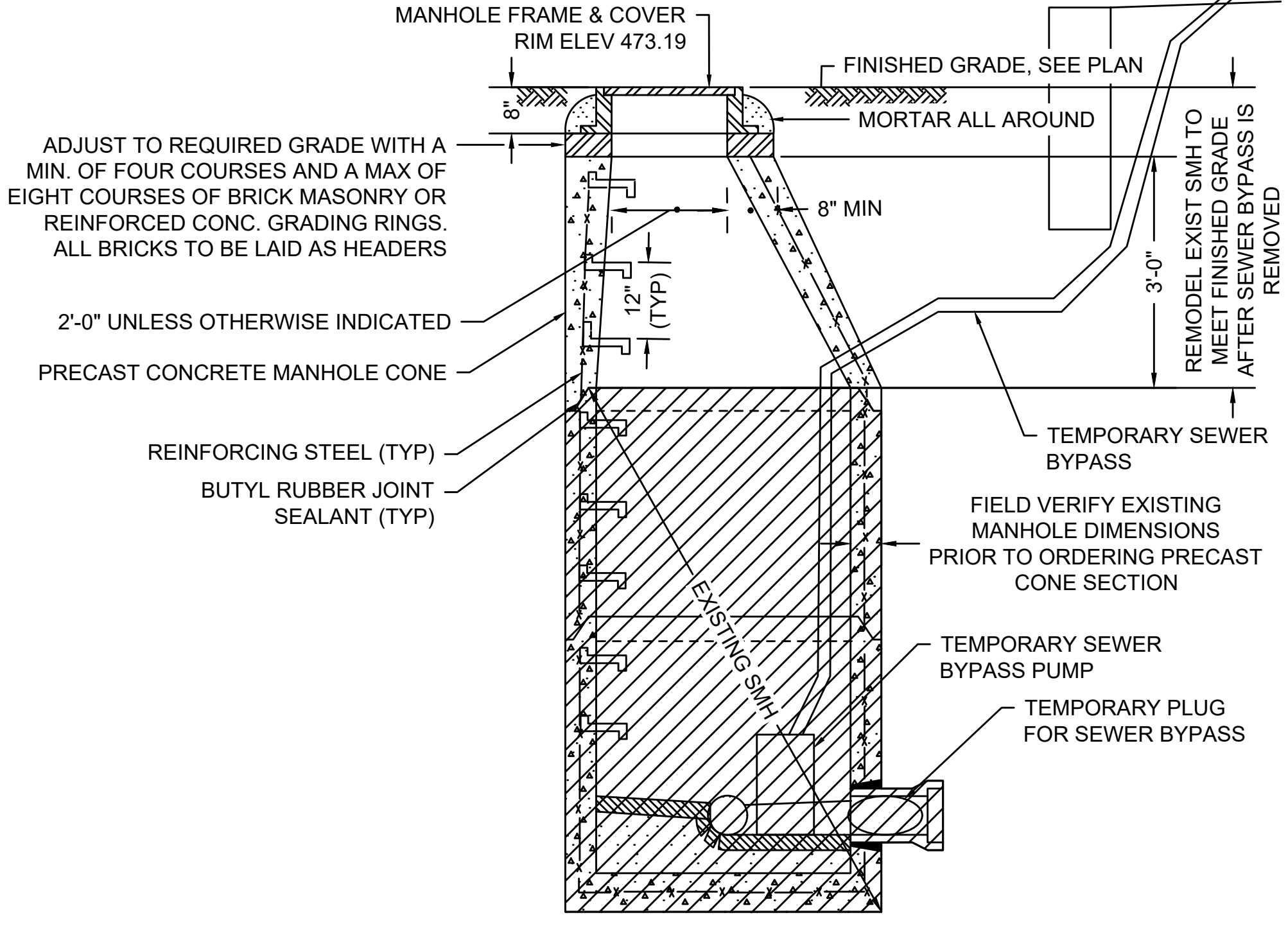


STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	12	67
PROJECT FILE NO. 607680			



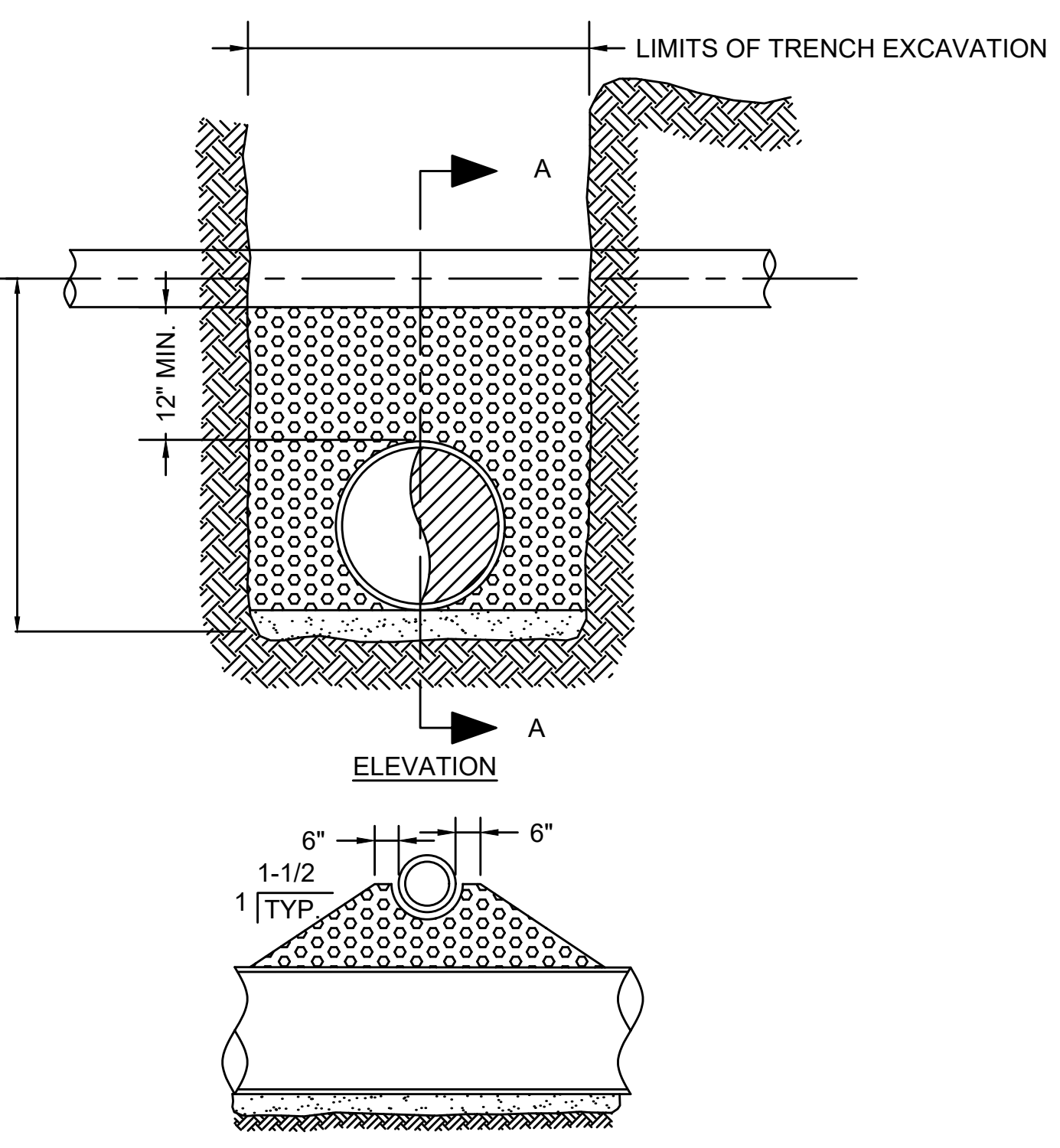
8' DIA PRECAST CONCRETE MANHOLE

N.T.S.



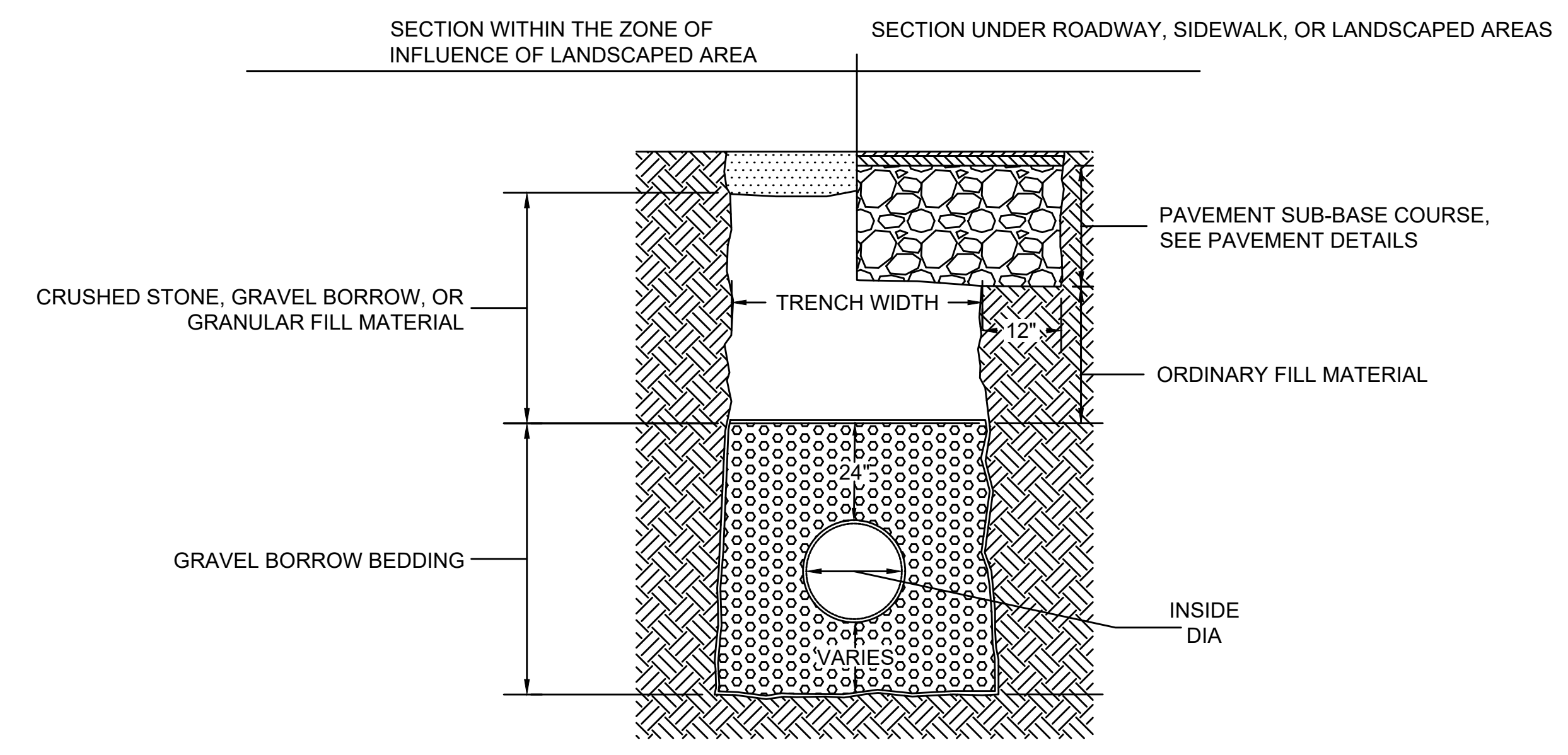
4' DIA PRECAST CONCRETE SMH REMODEL DETAIL

N.T.S.



UTILITY CROSSING DETAIL

NOT TO SCALE

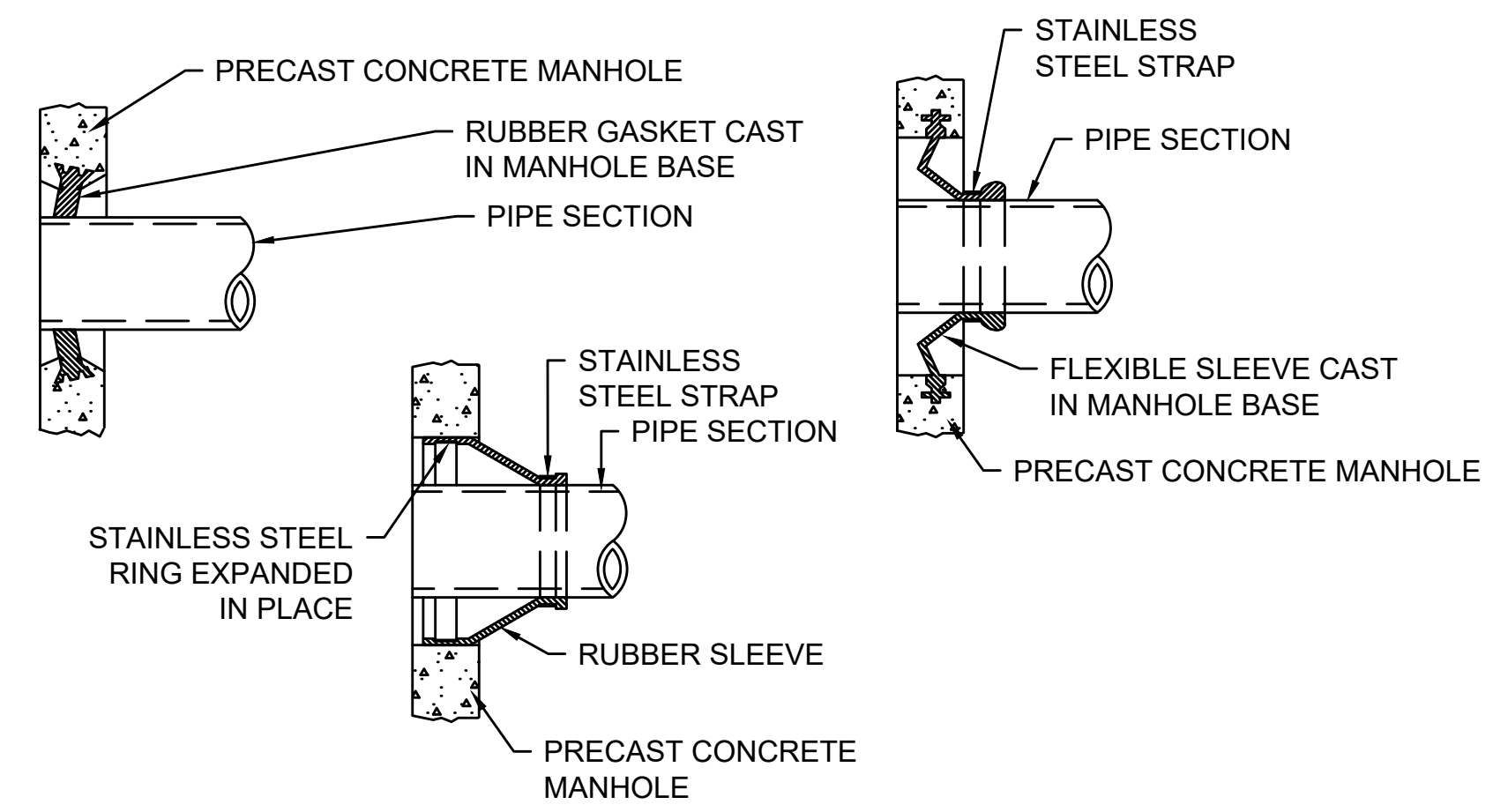


NOTE:

1. MINIMUM 12" OF BEDDING MATERIAL BELOW AND AROUND HDPE / RCP / PVC PIPES FOR BEDROCK SUBGRADES AND EXTENDING TO THE OUTSIDE WIDTH OF THE TRENCH EXCAVATION.
2. AT EACH HDPE / RCP / PVC BELL JOINT LOCATION, THE BEDDING SHOULD BE OVEREXCAVATED TO ACCOMMODATE THE JOINT, SO THERE IS CONTINUOUS PIPE SUPPORT, AND THE PIPE DOES NOT REST SOLELY ON THE COUPLINGS OR BELLS.
3. CONTRACTOR SHALL PROVIDE SHEETING, TRENCH BOX, OR SLOPED WALLS IN ACCORDANCE WITH APPLICABLE SAFETY REGULATIONS.
4. BEDDING AND TRENCH BACKFILL SHALL CONFORM TO MANUFACTURER REQUIREMENTS.

UTILITY TRENCH

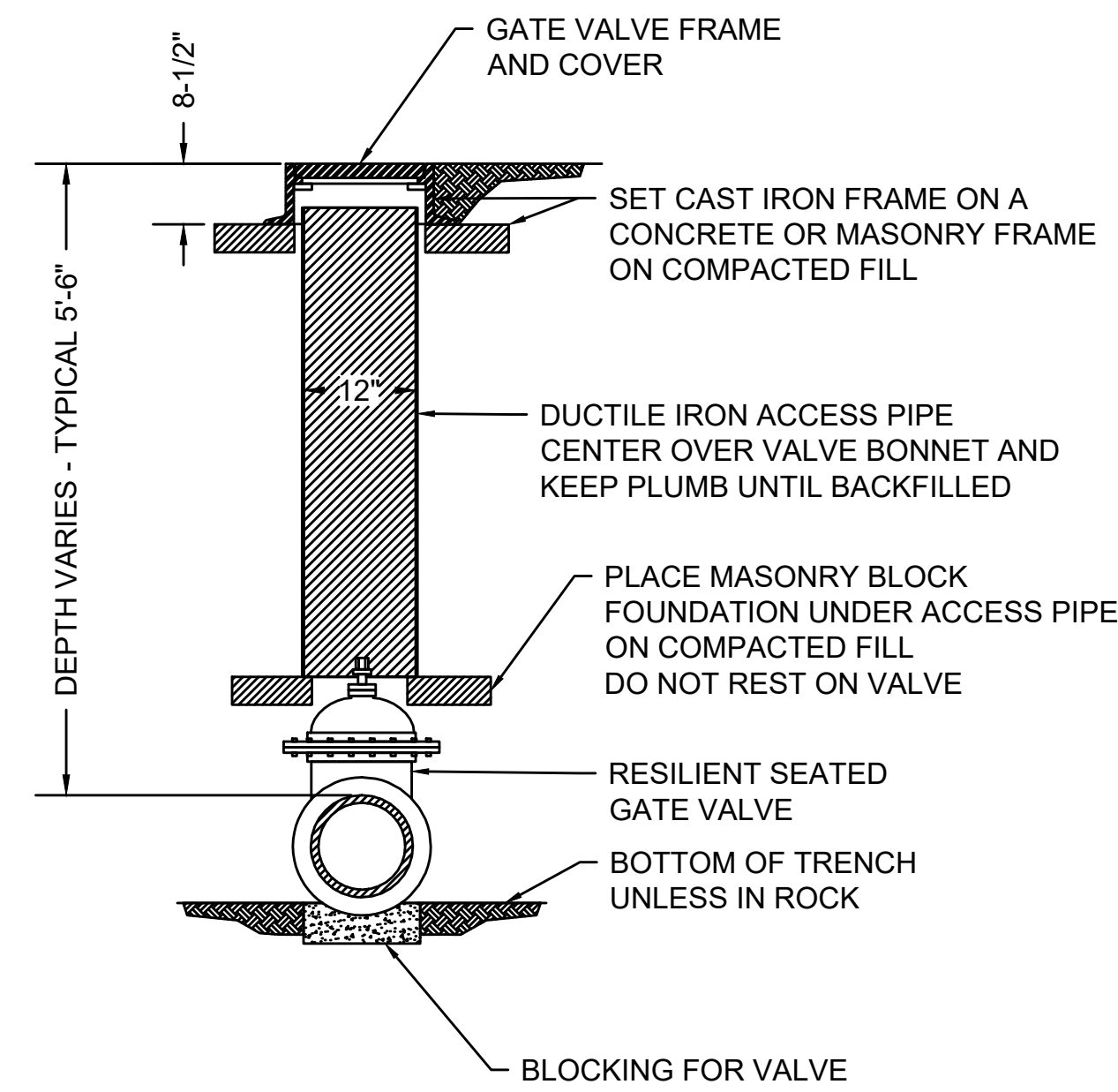
NOT TO SCALE



MANHOLE SEAL DETAILS

N.T.S.

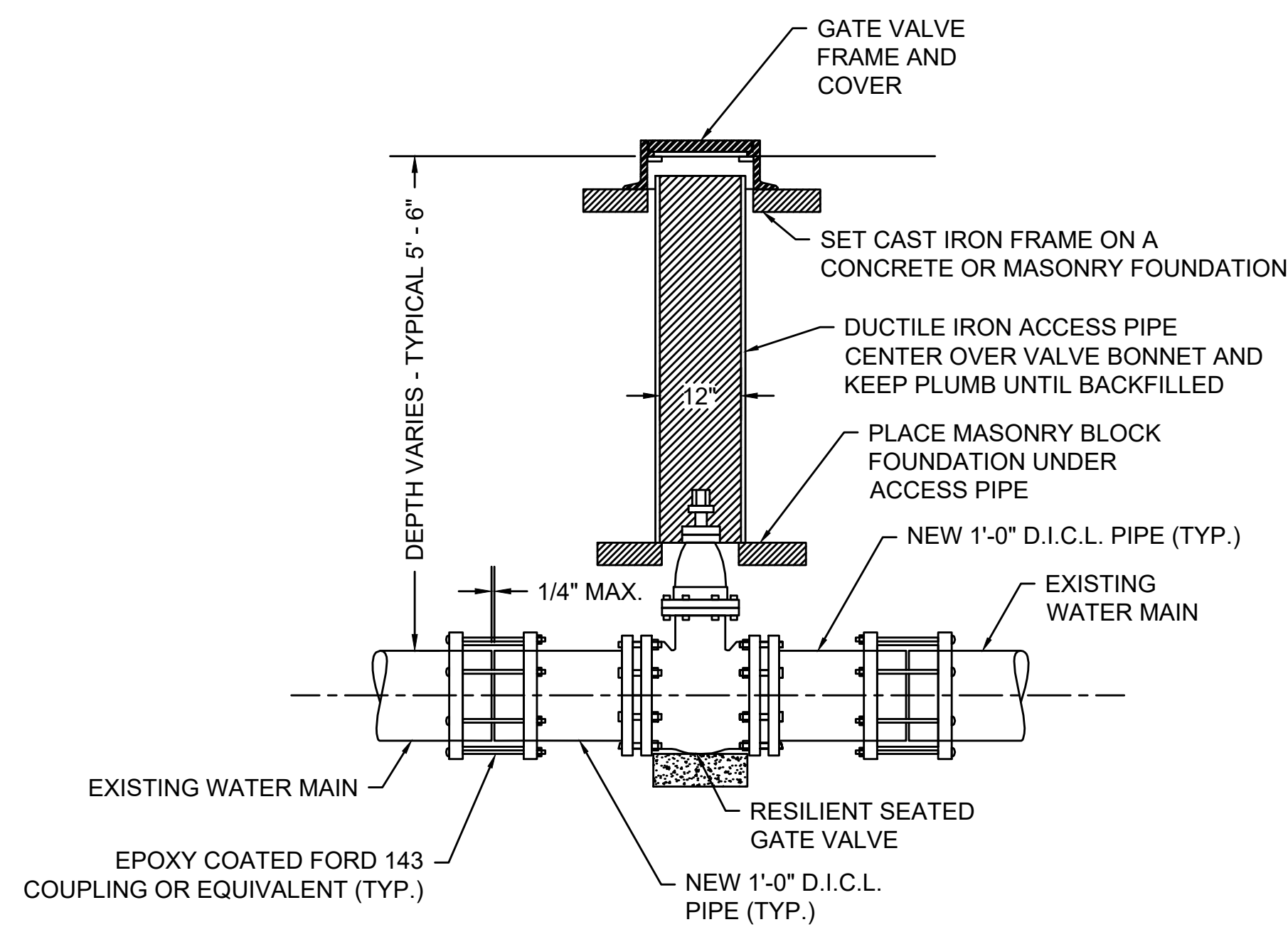
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	13	67
PROJECT FILE NO.		607680	



**NOTE:**

ALL GATE VALVES 8" OR LARGER REQUIRE A 12" DIAMETER STANDPIPE AND A 16"x18" STANDARD FRAME AND COVER.

**GATE VALVE DETAIL - CROSS SECTION VIEW**  
SCALE: N.T.S.



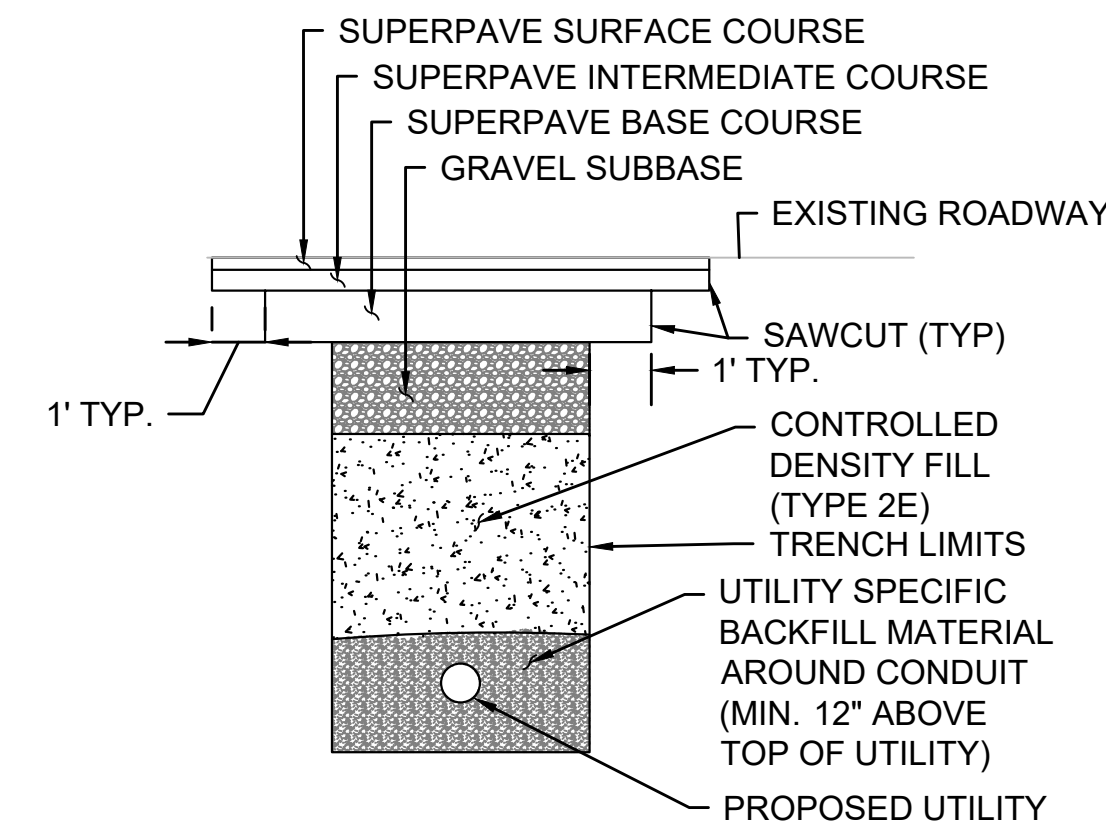
**GATE VALVE DETAIL - ELEVATION VIEW**  
SCALE: N.T.S.

REQUIRED LENGTH OF RESTRAINED JOINTS FROM FITTINGS (FEET)

PIPE SIZE	90° BEND	45° BEND OR WYE BRANCH	22 1/2° BEND	11 1/4° BEND	PLUG, CAP OR IN-LINE VALVE	TEE (BRANCH)
6"	25 (30.5)	10.5 (12.5)	5 (6)	2.5 (3)	43 (64)	34 (51)
8"	33 (40)	13.5 (16.5)	6.5 (8)	3 (4)	55 (82)	47 (70)
10"	40 (48.5)	16.5 (20)	8 (9.5)	4 (5)	67 (100)	58 (87)
12"	47 (56.5)	19.5 (23.5)	9.5 (11.5)	4.5 (5.5)	79 (118)	70 (105)
16"	59.5 (72)	24.5 (30)	12 (14.5)	6 (7)	101 (152)	92 (139)
20"	72 (86.5)	30 (36)	14.5 (17)	7 (8.5)	123 (184)	114 (171)
24"	84 (100)	35 (41)	16.5 (20)	8 (10)	144 (216)	134 (202)
30"	100 (120)	41 (50)	20 (24)	10 (12)	174 (261)	165 (247)

**NOTES:**

- RESTRAINED LENGTHS LISTED IN PARENTHESES ARE FOR PIPE WRAPPED IN POLYETHYLENE. THE OTHER ASSOCIATED LENGTHS ARE FOR PLAIN UNWRAPPED DUCTILE IRON PIPE.
- THE CONTRACTOR SHALL USE THIS TABLE IN CONJUNCTION WITH THE APPROPRIATE PIPE SPECIFICATION SECTION.



**PAVEMENT NOTES\***

PAVEMENT MIX DEPTH SHALL MATCH OR EXCEED THE EXISTING DEPTH OF HMA.

1.75" SUPERPAVE SURFACE COURSE 12.5 (SSC-12.5)

2.25" SUPERPAVE INTERMEDIATE COURSE 19.0 (SIC-19.0)

3.5" SUPERPAVE BASE COURSE 37.5 (SBC - 37.5)

MINIMUM 12" GRAVEL SUB-BASE: (MAXIMUM 3" AGGREGATE SIZE)

\*TRENCHES ON FREEWAYS SHALL REQUIRE A PAVEMENT DESIGN TO BE SUBMITTED FOR APPROVAL

ALL HOT MIX ASPHALT SHALL BE PRODUCED WITH A WARM MIX ADDITIVE

**NOTES:**

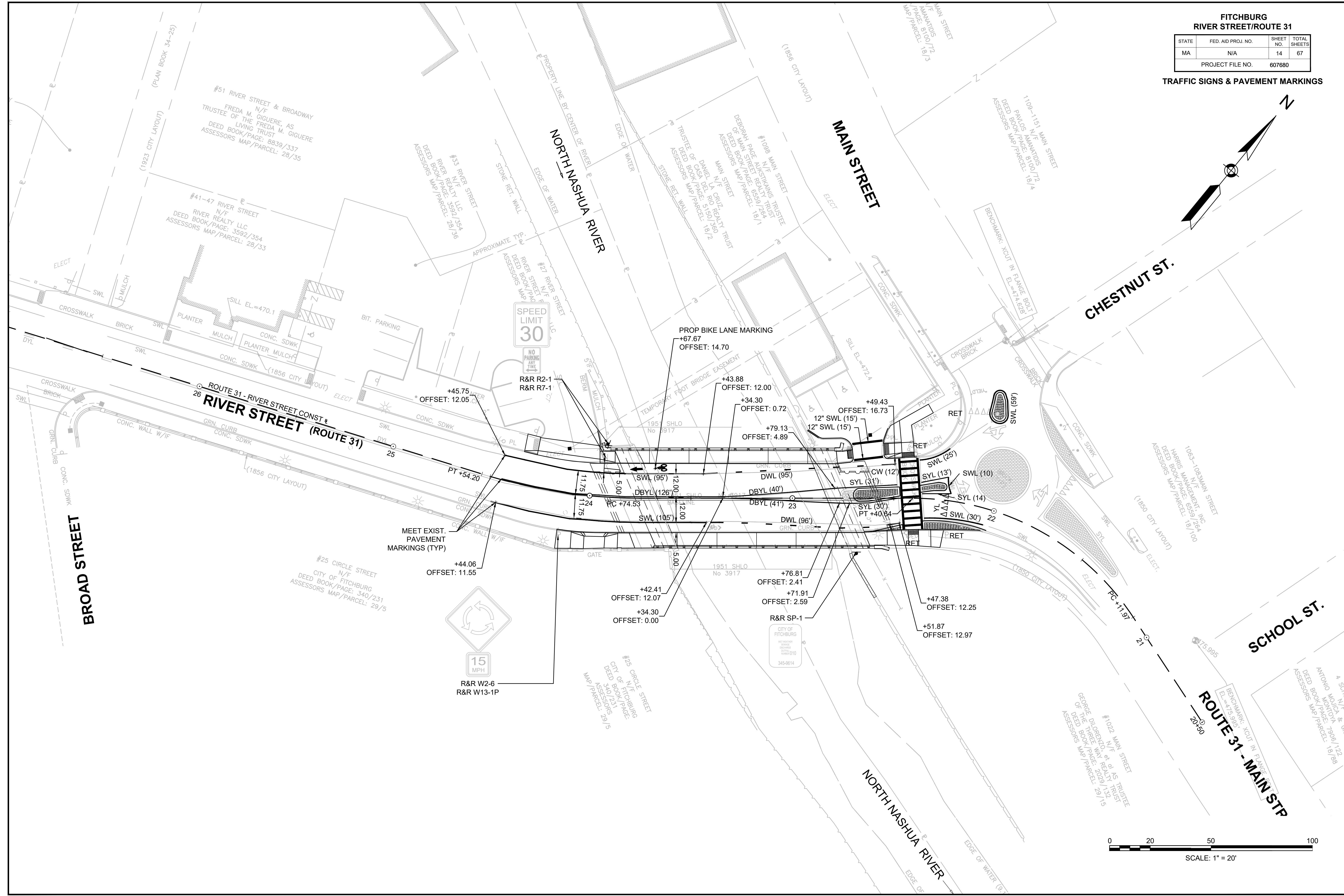
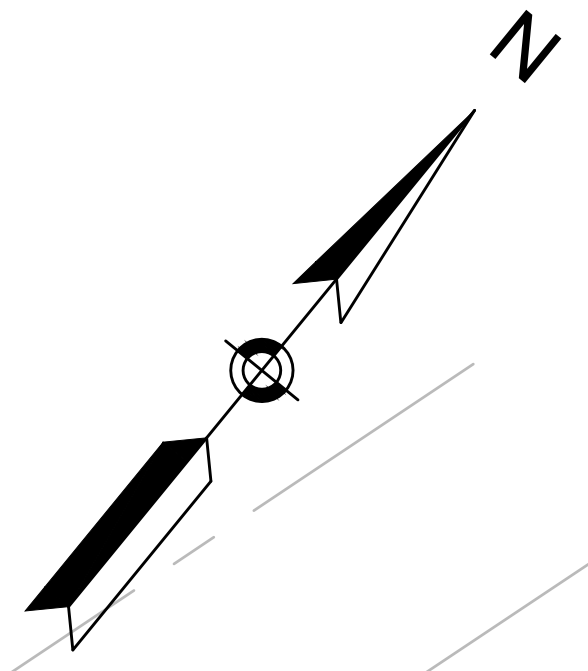
- IF A TEMPORARY PATCH IS TO BE USED, THE CDF SHALL BE PLACED TO THE ELEVATION OF THE ADJOINING SUBGRADE, THEN GRAVEL SHALL BE PLACED AND COMPACTED TO WITHIN 3 1/2 INCHES OF THE FINISHED GRADE. THE LAST 3 1/2 INCHES SHALL BE HOT MIX ASPHALT PLACED IN TWO LAYERS:  
1 1/2" SURFACE COURSE OVER 2" INTERMEDIATE COURSE.
- MATERIAL WHICH MEETS THE SPECIFICATION FOR GRAVEL BORROW TYPE C, PLACED AND COMPACTED IN LAYERS NO GREATER THAN 6", MAY BE USED IN PLACE OF THE CDF WITH APPROVAL FROM THE DISTRICT HIGHWAY DIRECTOR.
- THE EXPOSED EDGES OF ALL LONGITUDINAL AND TRANSVERSE SAW CUT JOINTS SHALL BE TREATED WITH HOT POURED RUBBERIZED ASPHALT JOINT SEALANT MEETING MASSDOT SPECIFICATIONS.
- YELLOW METAL FOIL MARKING TAPE SHALL BE PLACED 18" OVER THE CONDUIT (METAL MARKING TAPE/WIRE SHOULD BE USED FOR NON-METALLIC CONDUIT.)
- FOR ROADS WITH AN EXISTING CEMENT CONCRETE BASE, A REINFORCED, HIGH EARLY STRENGTH AIR ENTRAINED, CLASS "F" CEMENT CONCRETE SLAB SHALL BE CAST IN PLACE TO MEET THE EXISTING PAVEMENT. SPECIFIC JOINT DETAILS WITH THE EXISTING PAVEMENT SHALL BE APPROVED DEPENDENT ON THE EXISTING SITE CONDITIONS.
- ALL TRENCH DIMENSIONS SHALL BE IN ACCORDANCE WITH SUB-SECTION 140.80 OF THE MASSDOT STANDARDS AND SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.
- SIC 19.0 MAY BE SUBSTITUTED FOR SBC-37.5

**UTILITY TRENCH PERMANENT PAVEMENT REPAIR**  
N.T.S.

**FITCHBURG  
RIVER STREET/ROUTE 31**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	14	67
PROJECT FILE NO.		607680	




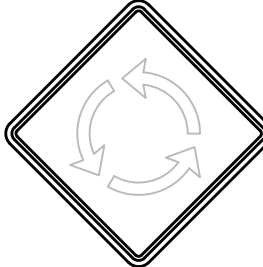

**TRAFFIC SIGNS & PAVEMENT MARKINGS**



**FITCHBURG  
RIVER STREET/ROUTE 31**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	15	67
PROJECT FILE NO.		607680	

**TRAFFIC SIGN SUMMARY SHEET**

SIGN SUMMARY TABLE													
IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE MKR.		BACKGROUND	LEGEND	BORDER			
R2-1	24	30		SEE 2009 MUTCD			1 R&R	WHITE	BLACK	BLACK	P-5	5	5
R7-1	12	18		SEE 2009 MUTCD ↓			1 R&R	WHITE	RED	RED	P-5	1.5	1.5
SP-1	9	12					SEE SP-1 DETAIL			1 R&R	GREEN	WHITE	-
W2-6	30	30		SEE 2009 MUTCD			1 R&R	YELLOW	BLACK	BLACK	P-5	6.25	6.25
W13-1P	18	18		SEE 2009 MUTCD			1 R&R	YELLOW	BLACK	BLACK	P-5	2.25	2.25

**CITY OF  
FITCHBURG**

WET WEATHER  
SEWAGE  
DISCHARGE  
OUTFALL  
NUMBER **010**

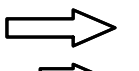


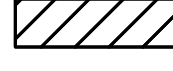



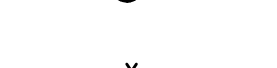
**345-9614**

SP-1 SIGN  
N.T.S.

FITCHBURG RIVER STREET/ROUTE 31			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	16	67
PROJECT FILE NO.		607680	

**TEMPORARY TRAFFIC CONTROL PLAN  
GENERAL NOTES**

**TEMPORARY TRAFFIC DEVICE LEGEND**

-  DIRECTION OF TRAVEL / NUMBER OF TRAVEL LANES
-  PEDESTRIAN FLOW
-  STACKABLE REFLECTORIZED TRAFFIC DRUM
-  WORK AREA
-  SINGLE SIGN POST
-  TL-2 TEMPORARY BARRIER
-  TL-2 TEMPORARY IMPACT ATTENUATOR
-  TEMPORARY FENCE

**TEMPORARY TRAFFIC CONTROL GENERAL NOTES:**

1. THE TEMPORARY TRAFFIC CONTROL PLANS (TTCP) DEPICT, IN SCHEMATIC FORM, THE ELEMENTS OF ONE APPROACH TO THE LAYOUT AND PLANNING OF THE WORK DURING THE PROGRESS OF THE CONSTRUCTION OPERATIONS.  
THE TTCP CONTAIN NO EXPRESS OR IMPLIED REPRESENTATIONS AS TO THE CONSTRUCTABILITY OF ANY ASPECT OF THE WORK. THE CONSTRUCTION CONTRACTOR REMAINS EXCLUSIVELY RESPONSIBLE FOR THE PLANNING, MEANS, METHODS, SEQUENCES, PROCEDURES AND EXECUTION OF THE WORK, AND FOR THE PROPER AND TIMELY IMPLEMENTATION OF ALL INCIDENTAL AND/OR REQUIRED SAFETY PRECAUTIONS AND PROGRAMS.  
NOTHING IN THE TTCP SHALL RELIEVE, OR OTHERWISE DIMINISH THE RESPONSIBILITY OF THE CONTRACTOR FOR THIS EXCLUSIVE RESPONSIBILITY.  
THE PREPARER OF THESE TTCP HAS NO ROLE IN THE OVERSIGHT OR IMPLEMENTATION OF THIS PLAN.
2. CONTRACTOR SHALL SUBMIT TO THE RESIDENT ENGINEER TEMPORARY TRAFFIC CONTROL PLANS FOR REVIEW AND APPROVAL. CONTRACTOR SHALL COORDINATE THE CONSTRUCTION EFFORT WITH OTHER PROJECTS IN THE VICINITY IN ORDER TO MINIMIZE POTENTIAL TRAFFIC AND PARKING IMPACTS.
3. 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 M.U.T.C.D. MASSDOT'S TRAFFIC MANAGEMENT PLANS AND DETAILS, AND AS APPROVED OR DIRECTED BY MASSDOT RESIDENT ENGINEER.
4. SHORT DURATION LANE RESTRICTIONS 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 MOTORISTS. IN CERTAIN CIRCUMSTANCES, AND ONLY WITH THE APPROVAL OF MASSDOT CAN LANE RESTRICTIONS REMAIN OVERNIGHT.
5. FOR ANY TAPER LEFT IN PLACE OVERNIGHT, THE FIRST TEN DRUMS IN A TAPER SHALL BE MOUNTED WITH SEQUENTIAL FLASHING LIGHTS.
6. CONTRACTOR SHALL PROVIDE SAFE TEMPORARY ADA AND MASS AAB COMPLIANT PEDESTRIAN ACCESS WHERE EXISTING SIDEWALKS, CROSSWALKS, OR OTHER PEDESTRIAN AREAS ARE AFFECTED BY CONSTRUCTION WORK. MAINTAIN ABUTTER ACCESS AT ALL TIMES EXCEPT FOR SHORT PERIODS APPROVED BY MASSDOT.
7. PLACE ALL CONSTRUCTION SIGNING, TRAFFIC CONTROL DEVICES AND TEMPORARY PAVEMENT MARKINGS FOR EACH PHASE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
8. 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.
9. CONTRACTOR SHALL SECURE WORK AREAS ACCORDING TO CURRENT CONDITIONS TO ENSURE PUBLIC SAFETY AND CONVENIENCE. THIS SHALL INCLUDE INSURING THAT ALL EXCAVATIONS ARE PROTECTED AT ALL TIMES AND WHEN WORKSHIFT IS COMPLETED.
10. THE CONTRACTOR SHALL SUBMIT TO THE RESIDENT ENGINEER FOR REVIEW AND APPROVAL BY MASSDOT AND THE DESIGNER 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.
11. THE CONTRACTOR SHALL SUBMIT TO THE MASSDOT RESIDENT ENGINEER ALL PAPERWORK REQUIRED FOR PERMIT APPLICATIONS PRIOR TO CONSTRUCTION. THE MASSDOT RESIDENT ENGINEER WILL COORDINATE WITH APPROPRIATE AGENCIES FOR REVIEW AND APPROVAL
12. 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.
13. TYPICAL DAYTIME WORK HOURS ARE FROM 7:00 AM TO 3:30 PM, UNLESS OTHERWISE PERMITTED BY 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 ENGINEER.
14. CONTRACTOR SHALL PROVIDE DETAILS FOR TRAFFIC CONTROL AS DIRECTED BY THE MASSDOT RESIDENT ENGINEER AND IN ACCORDANCE WITH THE SPECIFICATIONS. CONTRACTOR SHALL BE GUIDED BY TRAFFIC MANAGEMENT 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 AND THE MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAILS.
15. 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 MASSDOT AT COMPLETION OF THE WORK INDICATED.
16. ADVISORY SPEED LIMIT SHALL BE SET IN THE FIELD IN ACCORDANCE WITH TRAFFIC MANAGEMENT PLANS.
17. CONTRACTOR SHALL COORDINATE WITH MASSDOT AND THE CITY OF FITCHBURG CONCERNING ALL SCHEDULED SPECIAL EVENTS WHICH MAY IMPACT ITS WORK OPERATIONS.
18. MINIMUM CLEAR WIDTH BETWEEN BARRIERS/ CURB SHALL BE 11'.

19. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, CHANNELIZING DEVICES, BARRIERS, AND CRASH ATTENUATORS MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES" AND/OR "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH).
20. CONTRACTORS SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE SHORT-TERM TEMPORARY CLOSURE OF ACCESS. NO LONG-TERM CLOSURE OF ABUTTER ACCESS IS ALLOWED EXCEPT AT THE EXISTING DRIVEWAY GATE TO CROCKER FIELD DURING PHASE 2 OF CONSTRUCTION. MINIMUM DRIVEWAY WIDTHS OF 10' SHALL BE PROVIDED THROUGHOUT CONSTRUCTION MUST BE MAINTAINED.
21. DISTANCES SHOWN ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD WITH APPROVAL FROM THE ENGINEER.
22. CONTRACTOR SHALL PROVIDE PEDESTRIAN CHANNELIZING DEVICES ALONG TEMPORARY PEDESTRIAN ROUTES.

**GRADE DIFFERENCES:**

1. WHERE THERE IS A LONGITUDINAL DIFFERENCE IN ELEVATION BETWEEN EXISTING PAVEMENT AND COLD PLANED OR NEW PAVEMENT, THE CONTRACTOR SHALL PATCH A TEMPORARY HMA WEDGE WITH A 12:1 (OR FLATTER) SLOPE FOR A SMOOTH TEMPORARY PAVEMENT RAMP. SEE DETAIL ON SHEET 21
2. CROSS-SECTIONAL GRADE DIFFERENCED IN EXCESS OF 2" DURING NON-WORKING HOURS WILL REQUIRE DELINEATION BY USE OF REFLECTORIZED DRUMS OR CONES.
3. CROSS-SECTIONAL GRADE DIFFERENCES IN EXCESS OF 4" DURING NON-WORKING HOURS SHALL BE PROTECTED BY BACKFILLING WITH A WEDGE OF EARTHWORK TO BE COMPACTED AT 4:1 SLOPE AND WILL ALSO REQUIRE DELINEATION BY USE OF DRUMS. SEE DETAIL ON SHEET 21.
4. A MAXIMUM SLOPE OF 4:1 MUST BE MAINTAINED AFTER WORKING HOURS DURING SUBBASE AND BASE COURSE INSTALLATION ALONG EDGE OF THE TRAVELWAY (SEE DETAIL). A MAXIMUM SLOPE OF 8:1 MUST BE MAINTAINED ON ALL ABUTTER ACCESS DRIVES AND A MAXIMUM SLOPE OF 12:1 MUST BE MAINTAINED ON ALL SIDEWALKS.

**CONSTRUCTION SIGNING:**

1. 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 M.U.T.C.D.
2. EXISTING SIGNING WHICH CONFLICTS WITH PROPOSED TEMPORARY TRAFFIC CONTROL SIGNING SHALL BE REMOVED AND STACKED OR COVERED AND RESTORED AT THE END OF THE WORK.
3. ALL SIGNS SHALL BE COVERED OR REMOVED WHEN CONDITION IS NOT IN EFFECT.
4. ALL PARKING LANES WITHIN WORK ZONE OR TAPERED AREAS SHALL BE POSTED WITH 'NO PARKING' SIGNS.

**TEMPORARY PAVEMENT MARKINGS:**

1. UNLESS OTHERWISE NOTED, ALL PAVEMENT MARKINGS, SIGNS AND OTHER TRAFFIC EQUIPMENT REMOVED OR DAMAGED AS A RESULT OF THE CONTRACTOR'S OPERATIONS SHALL BE REPLACED IN ACCORDANCE WITH THE REQUIREMENTS OF MASSDOT.
2. CONTRACTOR SHALL INSTALL, RENEW AND MAINTAIN ALL TRAFFIC CONTROL DEVICES INCLUDING PAVEMENT MARKINGS AS SHOWN ON THE DRAWINGS, IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND AS REQUIRED BY THE MASSDOT RESIDENT ENGINEER.
3. ALL TEMPORARY PAVEMENT MARKINGS SHALL BE MAINTAINED THROUGHOUT ALL PHASES OF CONSTRUCTION.
4. EXISTING MARKING REMOVED BEYOND THE LIMITS OF WORK SHALL BE REPLACED IN KIND.

**CHANNELIZATION:**

1. CHANNELIZATION SHALL BE ACCOMPLISHED THROUGH THE USE OF REFLECTORIZED PLASTIC DRUMS IN ACCORDANCE WITH THE M.U.T.C.D. ALL LANE TAPERS SHALL BE IN ACCORDANCE WITH M.U.T.C.D.
2. ALL DRUMS SHALL BE PLACED AND MOVED AS NECESSARY TO MAINTAIN ADEQUATE ABUTTER ACCESS AT ALL TIMES. WORK MAY REQUIRE ADDITIONAL SIGNS, DRUMS, AND OTHER TRAFFIC CONTROL DEVICES.
3. THE MAXIMUM SPACING BETWEEN CHANNELIZATION DEVICES (DRUMS) SHALL BE APPROXIMATELY EQUAL IN FEET TO THE POSTED SPEED LIMIT OR AS DIRECTED BY THE ENGINEER.
4. METAL DRUMS ARE PROHIBITED AS CHANNELIZATION DEVICES.



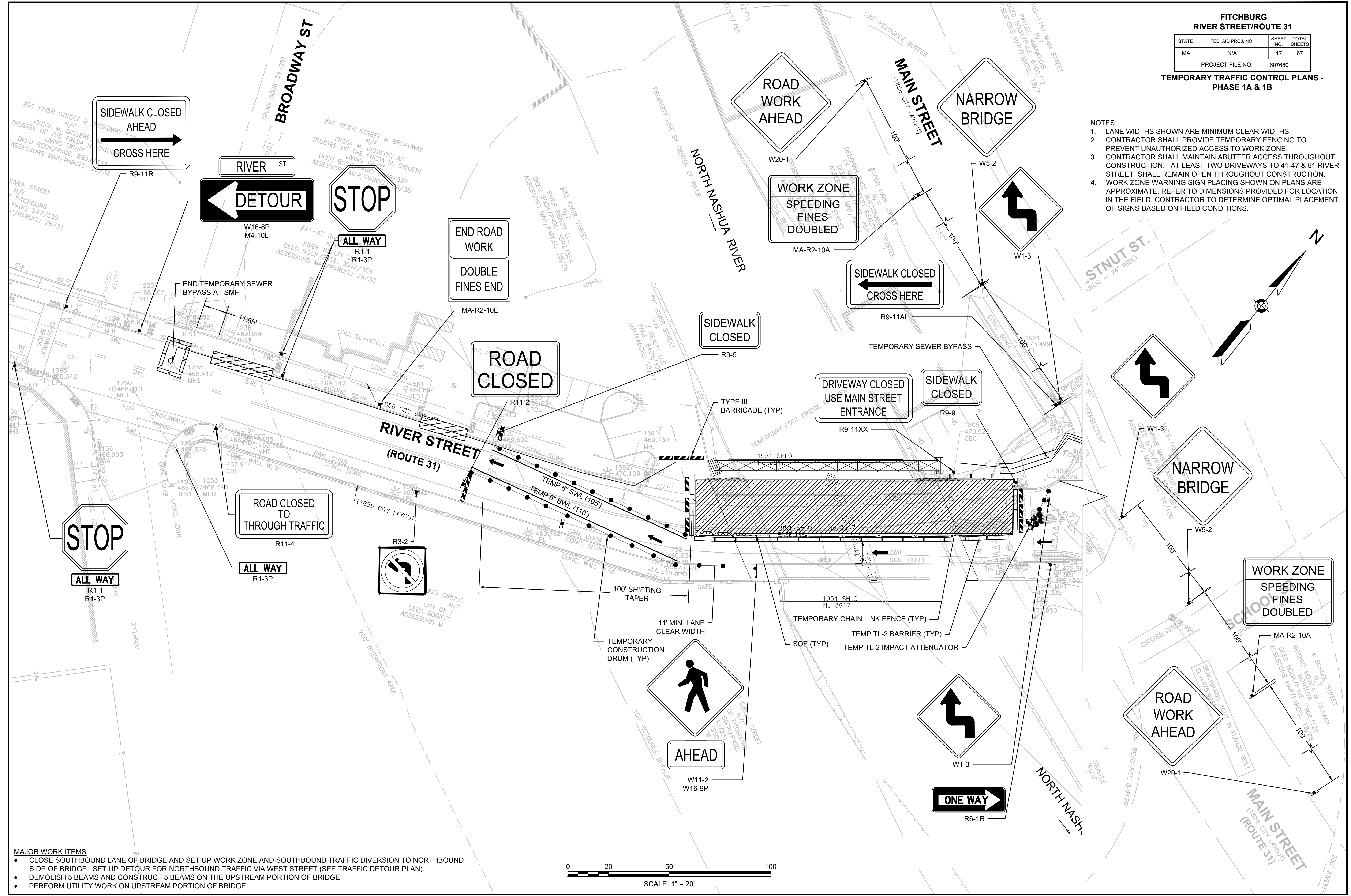
**FITCHBURG  
RIVER STREET/ROUTE 31**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	17	67

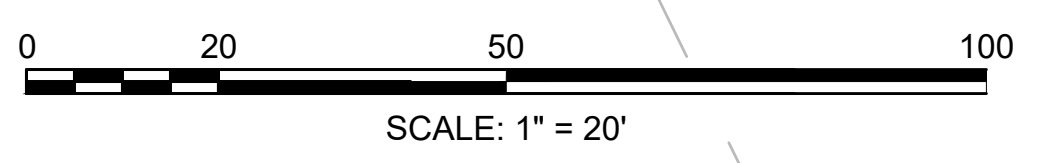
PROJECT FILE NO. 607680

**TEMPORARY TRAFFIC CONTROL PLANS -  
PHASE 1A & 1B**

- NOTES:
- LANE WIDTHS SHOWN ARE MINIMUM CLEAR WIDTHS.
  - CONTRACTOR SHALL PROVIDE TEMPORARY FENCING TO PREVENT UNAUTHORIZED ACCESS TO WORK ZONE.
  - CONTRACTOR SHALL MAINTAIN ABUTTER ACCESS THROUGHOUT CONSTRUCTION. AT LEAST TWO DRIVEWAYS TO 41-47 & 51 RIVER STREET SHALL REMAIN OPEN THROUGHOUT CONSTRUCTION.
  - WORK ZONE WARNING SIGN PLACING SHOWN ON PLANS ARE APPROXIMATE. REFER TO DIMENSIONS PROVIDED FOR LOCATION IN THE FIELD. CONTRACTOR TO DETERMINE OPTIMAL PLACEMENT OF SIGNS BASED ON FIELD CONDITIONS.



- MAJOR WORK ITEMS**
- CLOSE SOUTHBOUND LANE OF BRIDGE AND SET UP WORK ZONE AND SOUTHBOUND TRAFFIC DIVERSION TO NORTHBOUND SIDE OF BRIDGE. SET UP DETOUR FOR NORTHBOUND TRAFFIC VIA WEST STREET (SEE TRAFFIC DETOUR PLAN).
  - DEMOLISH 5 BEAMS AND CONSTRUCT 5 BEAMS ON THE UPSTREAM PORTION OF BRIDGE.
  - PERFORM UTILITY WORK ON UPSTREAM PORTION OF BRIDGE.

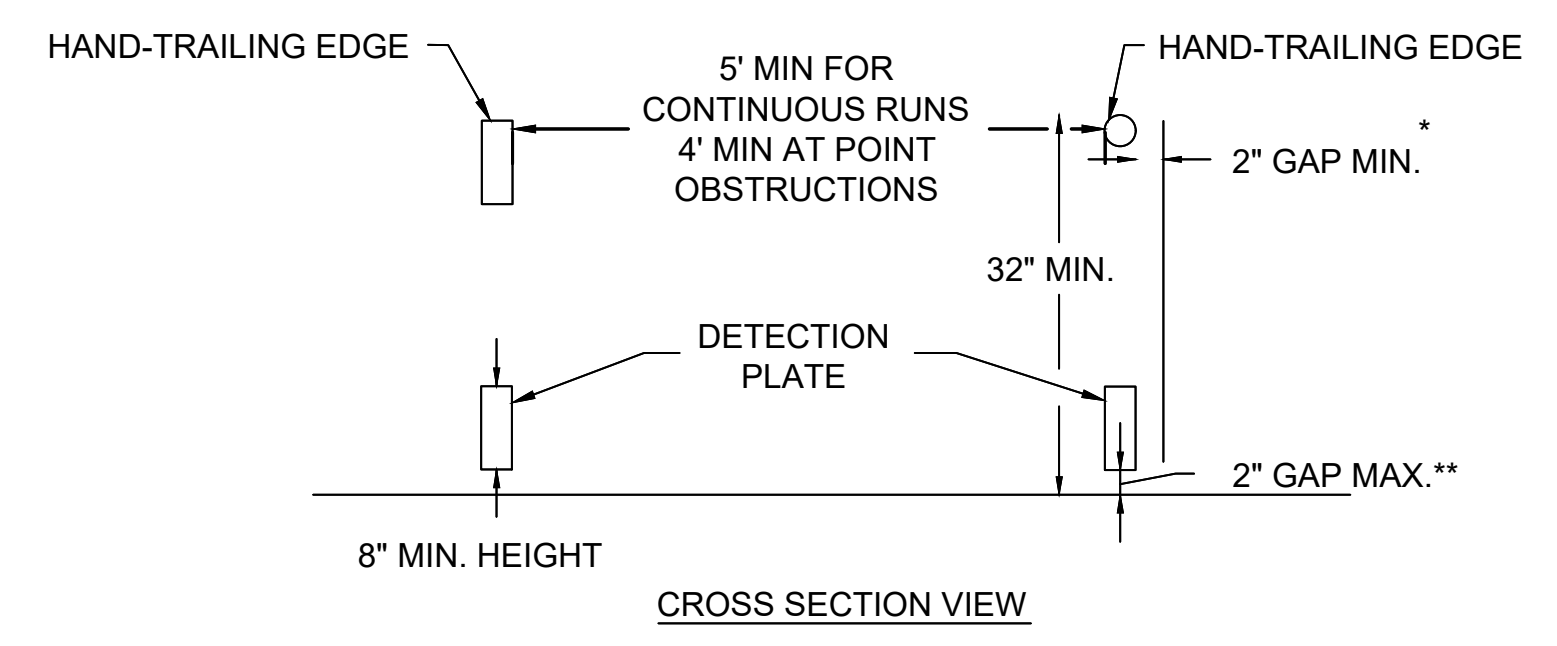




**FITCHBURG  
RIVER STREET/ROUTE 31**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	19	67
PROJECT FILE NO.		607680	

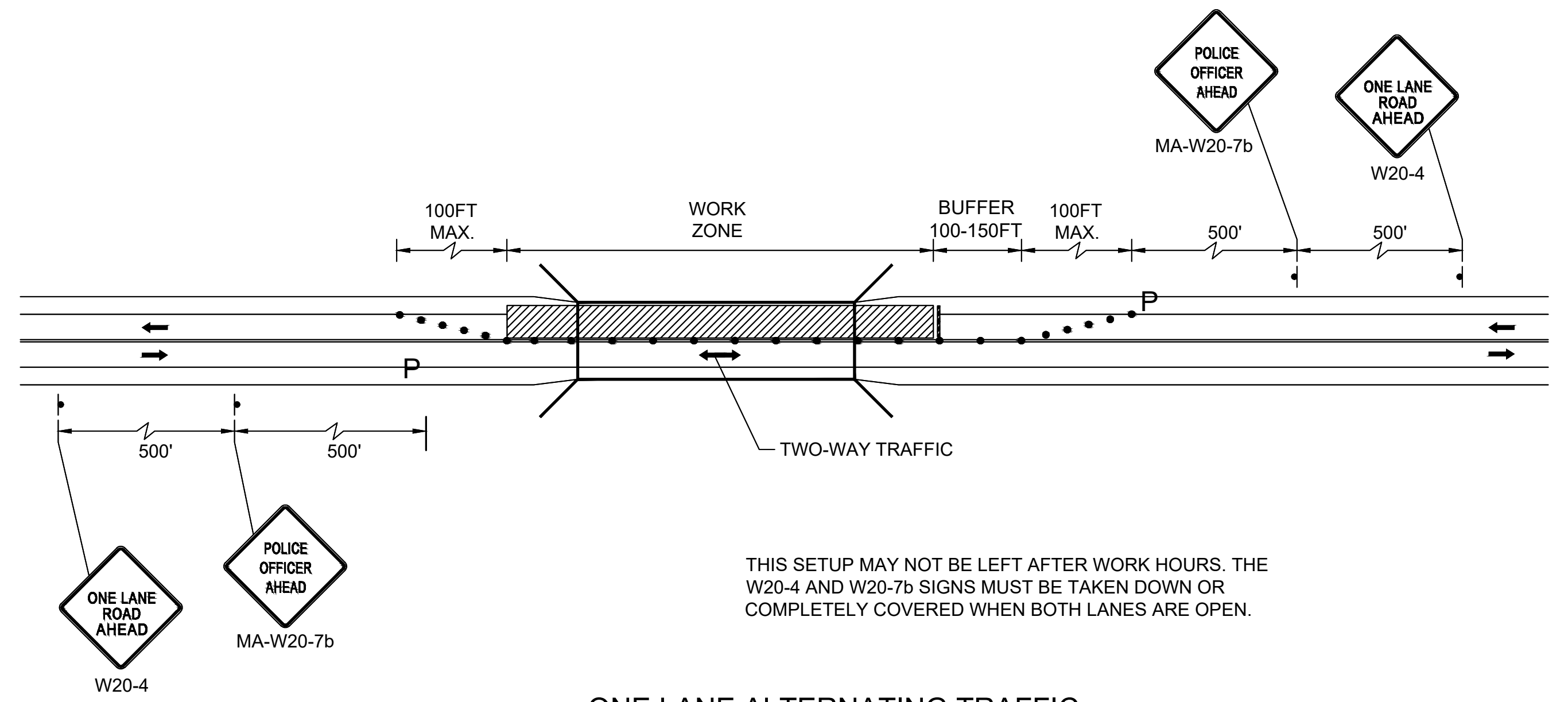
**TEMPORARY TRAFFIC CONTROL  
PLANS - TYPICAL DETAILS**



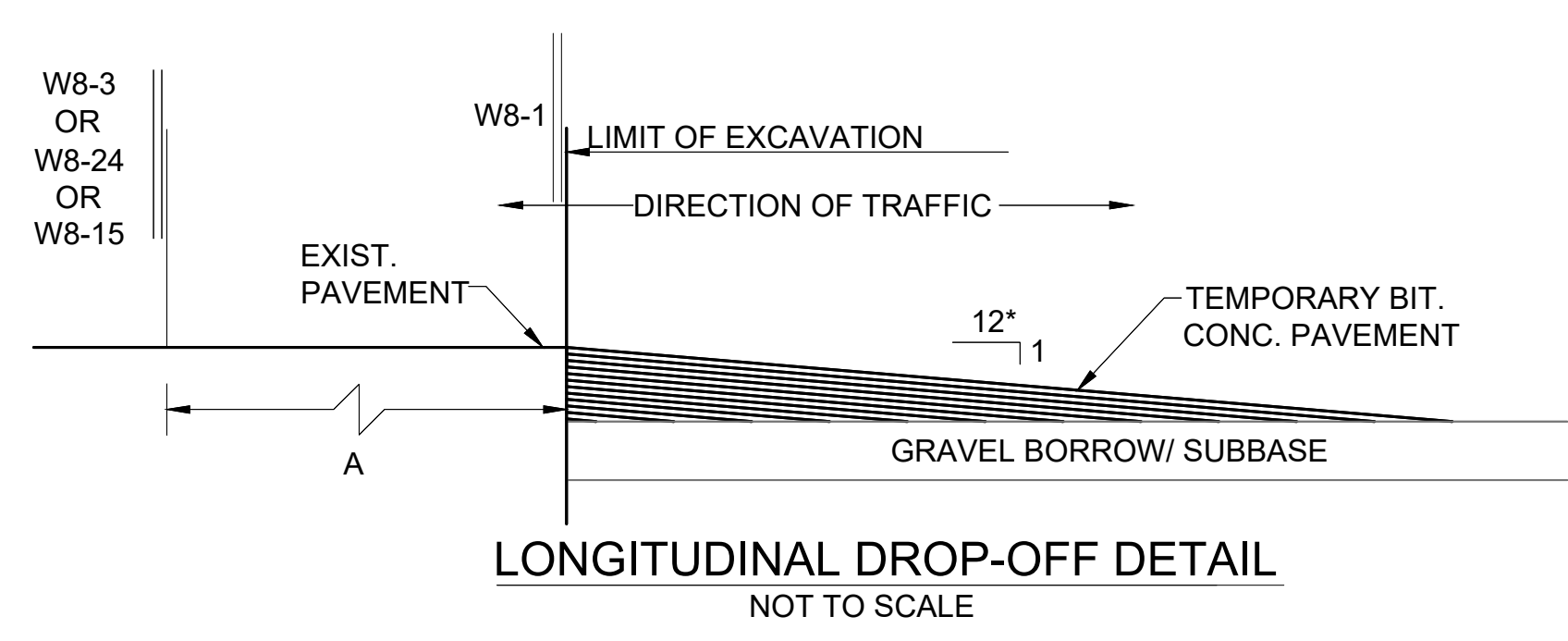
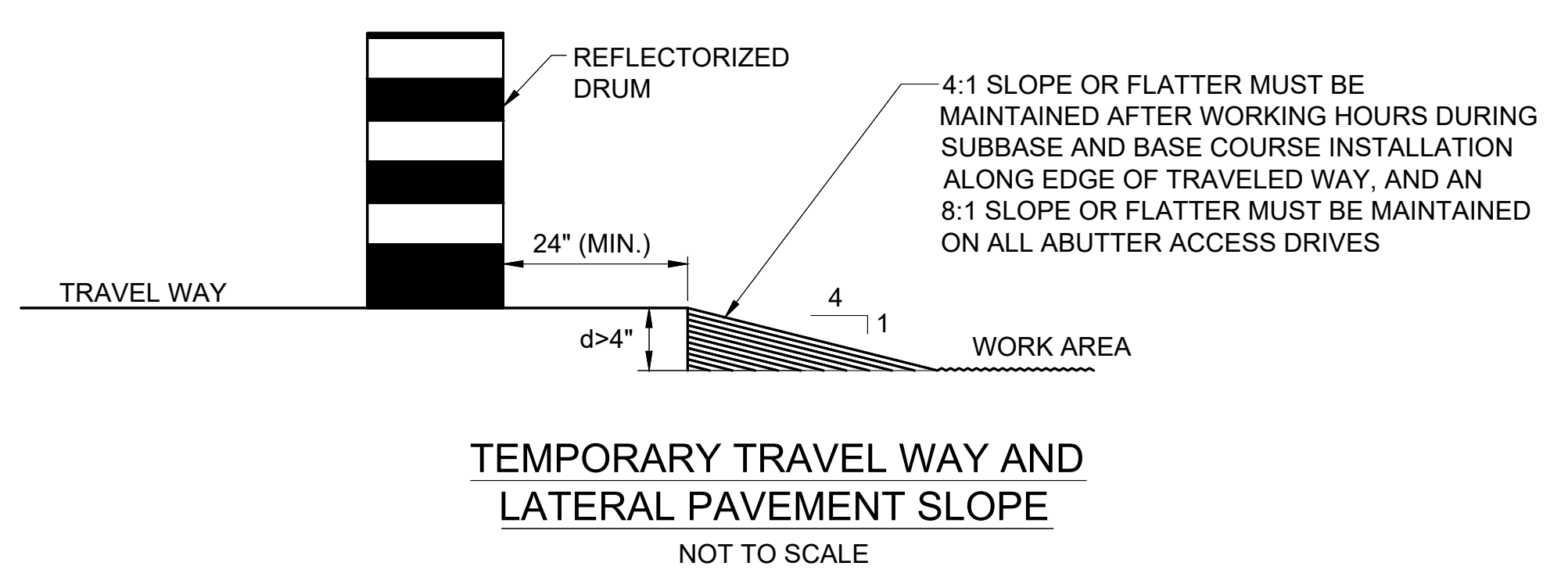
**PEDESTRIAN CHANNELIZING DEVICE**

**NOTES:**

- \*THERE SHALL BE A 2 INCH GAP BETWEEN THE HAND-TRAILING EDGE AND ITS SUPPORT.
- \*\*A MAXIMUM 2 INCH GAP BETWEEN THE BOTTOM OF THE BOTTOM RAIL AND THE SURFACE MAY BE USED TO PROVIDE DRAINAGE.



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

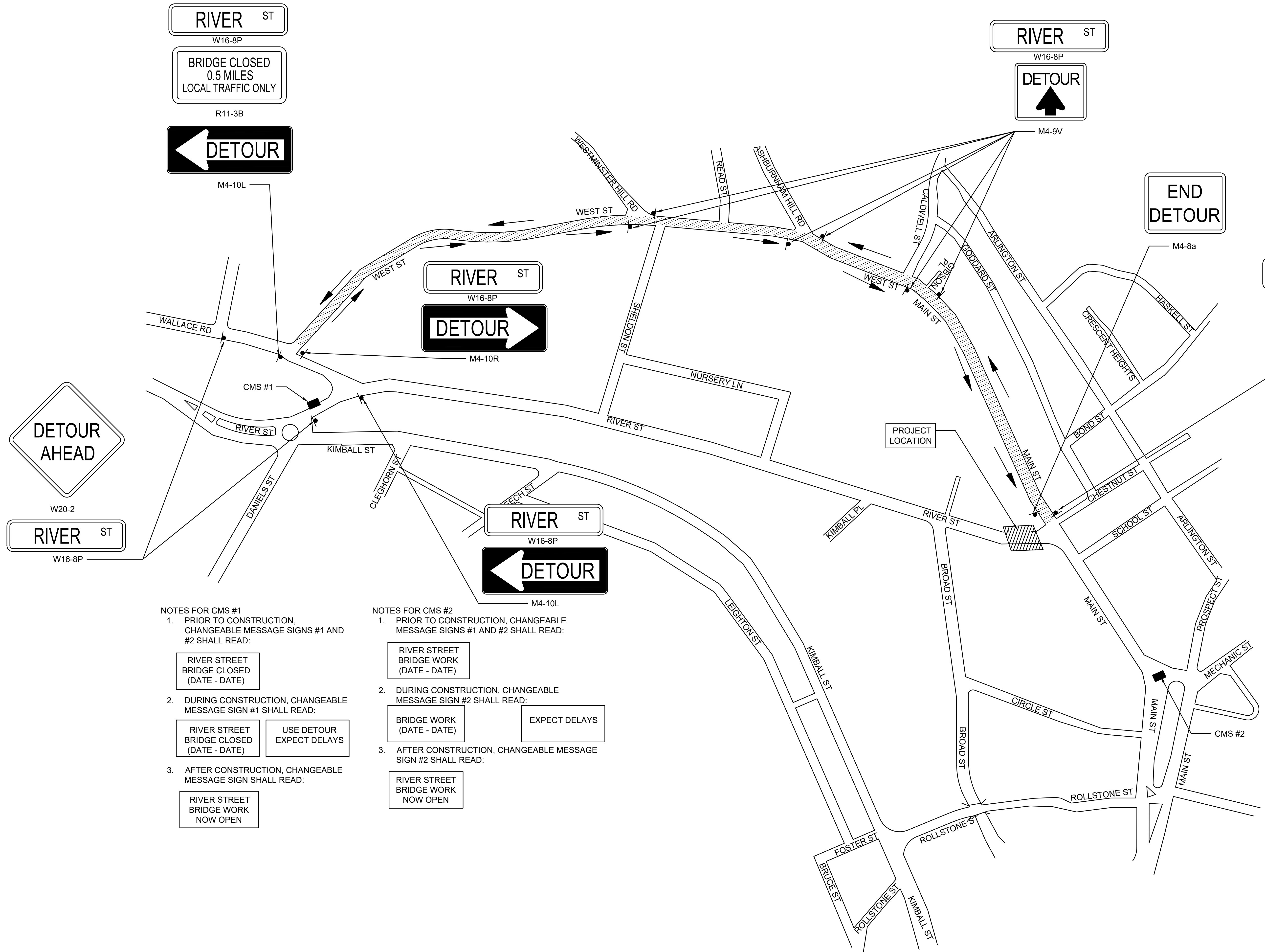


# DETOUR PLAN

FITCHBURG RIVER STREET/ROUTE 31			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	20	67
PROJECT FILE NO. 607680			

**TEMPORARY TRAFFIC CONTROL PLANS - TRAFFIC DETOUR**

607680\_HD\_19 (TRAFFIC DETOUR).DWG Plotted on 14-Sep-2023 1:51 PM



- NOTES FOR CMS #1**
- PRIOR TO CONSTRUCTION, CHANGEABLE MESSAGE SIGNS #1 AND #2 SHALL READ:  

RIVER STREET BRIDGE CLOSED (DATE - DATE)	USE DETOUR EXPECT DELAYS
--	-----------------------------
  - DURING CONSTRUCTION, CHANGEABLE MESSAGE SIGN #1 SHALL READ:  

RIVER STREET BRIDGE CLOSED (DATE - DATE)	RIVER STREET BRIDGE WORK NOW OPEN
--	---
  - AFTER CONSTRUCTION, CHANGEABLE MESSAGE SIGN SHALL READ:  

RIVER STREET BRIDGE WORK NOW OPEN
---

- NOTES FOR CMS #2**
- PRIOR TO CONSTRUCTION, CHANGEABLE MESSAGE SIGNS #1 AND #2 SHALL READ:  

RIVER STREET BRIDGE WORK (DATE - DATE)	EXPECT DELAYS
--	---------------
  - DURING CONSTRUCTION, CHANGEABLE MESSAGE SIGN #2 SHALL READ:  

BRIDGE WORK (DATE - DATE)	RIVER STREET BRIDGE WORK NOW OPEN
------------------------------	---
  - AFTER CONSTRUCTION, CHANGEABLE MESSAGE SIGN #2 SHALL READ:  

RIVER STREET BRIDGE WORK NOW OPEN
---

**NOTE:**  
1. ALL DETOUR SIGNS TO BE INSTALLED WITHIN THE RIGHT OF WAY.



N

↑

RIVER ST  
W16-8P  
DETOUR

RIVER ST  
W16-8P  
DETOUR

M4-9V

SIGNS TO BE COVERED WHEN NORMAL TRAFFIC CONTROL CAN BE MAINTAINED, AND UNCOVERED DURING TEMPORARY FULL BRIDGE CLOSURES TO DIRECT TRAFFIC ONTO WESTBOUND DETOUR ROUTE

# TRAFFIC SIGN SUMMARY

IDENTIFICATION NUMBER	SIZE OF SIGN (INCHES)		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			UNIT AREA IN SQUARE FEET	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER		
R6-1R	36	12		SEE 2009 MUTCD			1	WHITE	BLACK	BLACK	3	3
R9-11AL	48	24		SEE 2009 MUTCD			1	WHITE	BLACK	BLACK	8	8
W16-8P	VARIABLE	12		SEE 2009 MUTCD			7	FLUOR-ESCENT YELLOW	BLACK	BLACK	VARIABLE	VARIABLE
R9-11XX	48	24		SEE 2009 MUTCD			1	WHITE	BLACK	BLACK	8	8
R11-2	48	30		SEE 2009 MUTCD			2	WHITE	BLACK	BLACK	10	20
M4-9V	30	24		SEE 2009 MUTCD			2	FLUOR-ESCENT ORANGE	BLACK	BLACK	5	10
M4-10L	48	18		SEE 2009 MUTCD			3	FLUOR-ESCENT ORANGE	BLACK	BLACK	6	18
M4-10R	48	18		SEE 2009 MUTCD			1	FLUOR-ESCENT ORANGE	BLACK	BLACK	6	6
W1-3	30	30		SEE 2009 MUTCD			3	FLUOR-ESCENT ORANGE	BLACK	BLACK	6.25	18.75
R9-11L	24	18		SEE 2009 MUTCD			1	WHITE	BLACK	BLACK	3	3
R9-11R	24	18		SEE 2009 MUTCD			1	WHITE	BLACK	BLACK	3	3
W5-2	36	36		SEE 2009 MUTCD			4	FLUOR-ESCENT ORANGE	BLACK	BLACK	9	36
W20-2	36	36		SEE 2009 MUTCD			1	FLUOR-ESCENT ORANGE	BLACK	BLACK	9	9
W16-9P	24	12		SEE 2009 MUTCD			1	FLUOR-ESCENT YELLOW	BLACK	BLACK	2	2
R9-9	24	12		SEE 2009 MUTCD			2	WHITE	BLACK	BLACK	2	4
W11-2	30	30		SEE 2009 MUTCD			1	FLUOR-ESCENT YELLOW	BLACK	BLACK	6.25	6.25
MA-R2-10E	36	48		SEE 2009 MUTCD			1	FLUOR-ESCENT ORANGE / WHITE	BLACK	BLACK	12	12
TOTAL AREA OF SIGNS (SQUARE FEET) =											149.00	

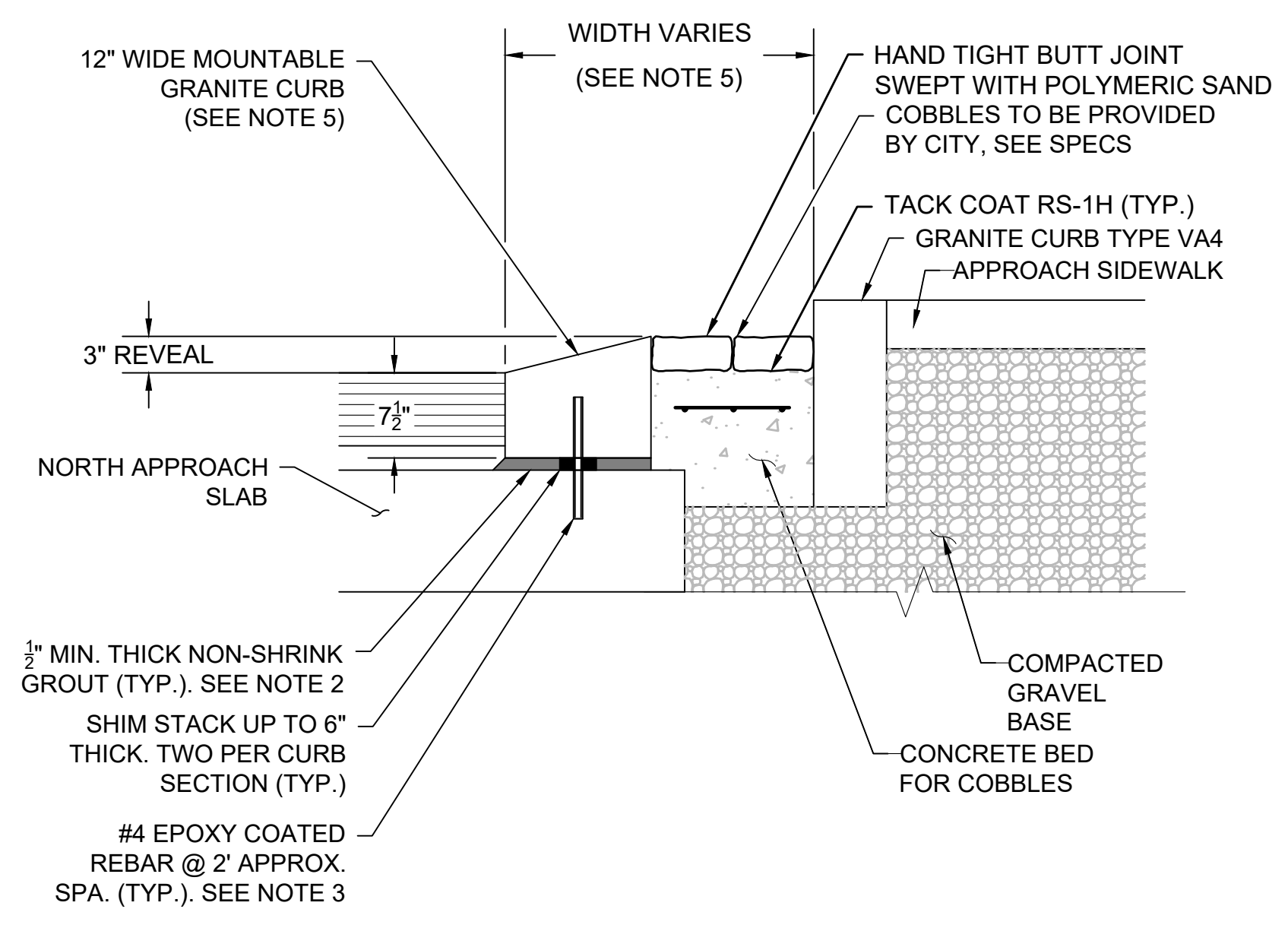
IDENTIFICATION NUMBER	SIZE OF SIGN (INCHES)		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			UNIT AREA IN SQUARE FEET	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER		
M4-8a	24	18		SEE 2009 MUTCD			1	FLUOR-ESCENT ORANGE	BLACK	BLACK	3	3
MA-R2-10A	48	36		SEE 2009 MUTCD			2	FLUOR-ESCENT ORANGE / WHITE	BLACK	BLACK	12	24
R11-4	48	24		SEE 2009 MUTCD			1	FLUOR-ESCENT ORANGE	BLACK	BLACK	8	8
W20-1	36	36		SEE 2009 MUTCD			2	FLUOR-ESCENT ORANGE	BLACK	BLACK	9	18
R11-3B	48	24		SEE 2009 MUTCD			1	WHITE	BLACK	BLACK	8	8
R3-2	24	24		SEE 2009 MUTCD			1	WHITE	BLACK / RED	BLACK	4	4
R1-1	30	30		SEE 2009 MUTCD			2	RED	WHITE	WHITE	6.25	12.5
R1-3P	18	6		SEE 2009 MUTCD			3	RED	WHITE	WHITE	0.75	2.25
TOTAL AREA OF SIGNS (SQUARE FEET) =											79.75	

FITCHBURG RIVER STREET/ROUTE 31			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	21	67
PROJECT FILE NO.		607680	

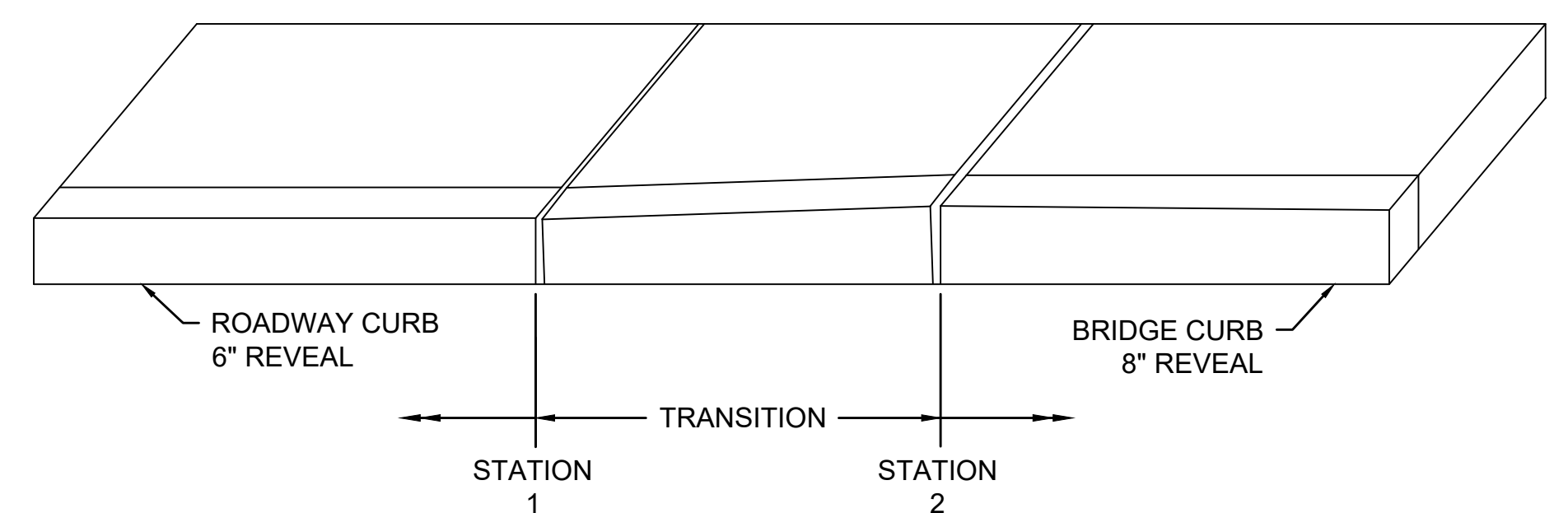
**TEMPORARY TRAFFIC CONTROL PLANS -  
SIGN SUMMARY TABLE**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	22	67
PROJECT FILE NO. 607680			

CONSTRUCTION DETAILS

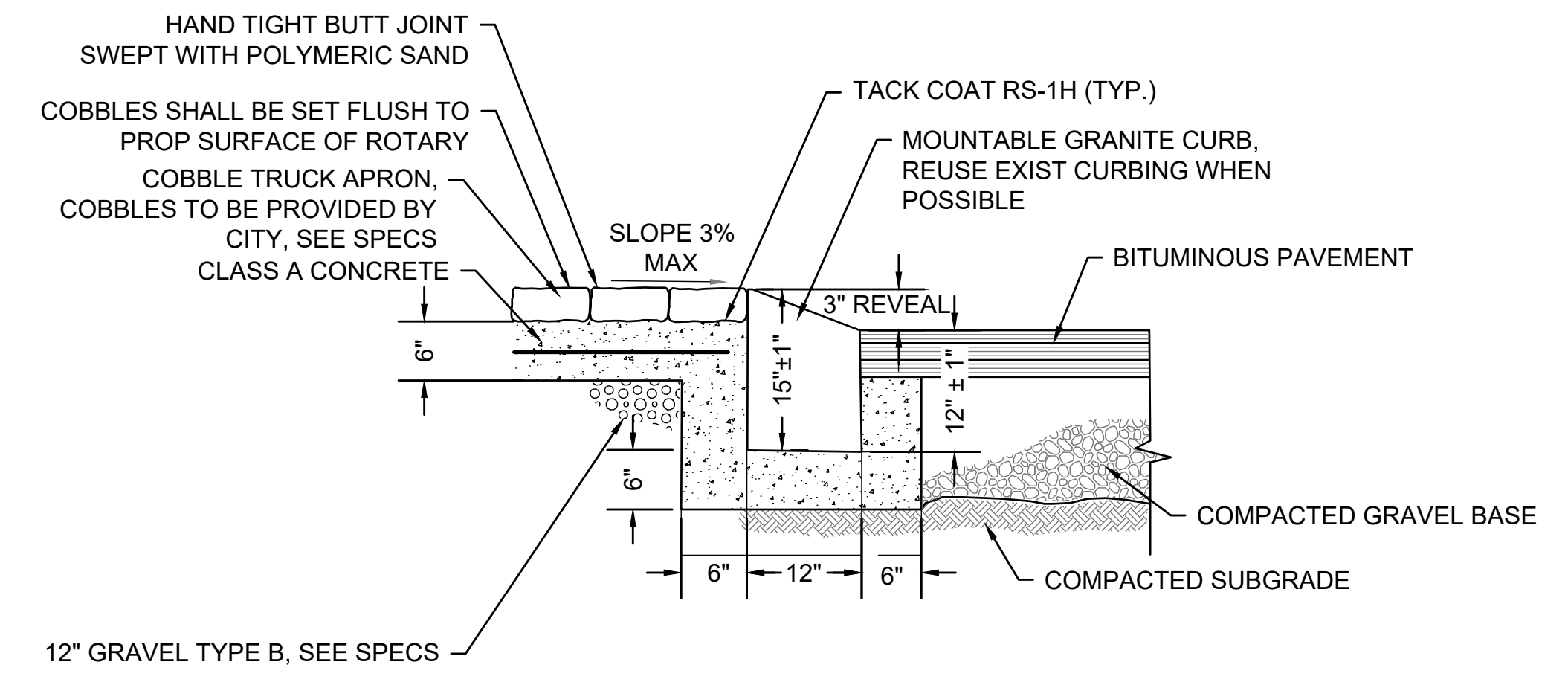


CURBLINE ROTARY FEATURE  
AT NORTH APPROACH SLAB

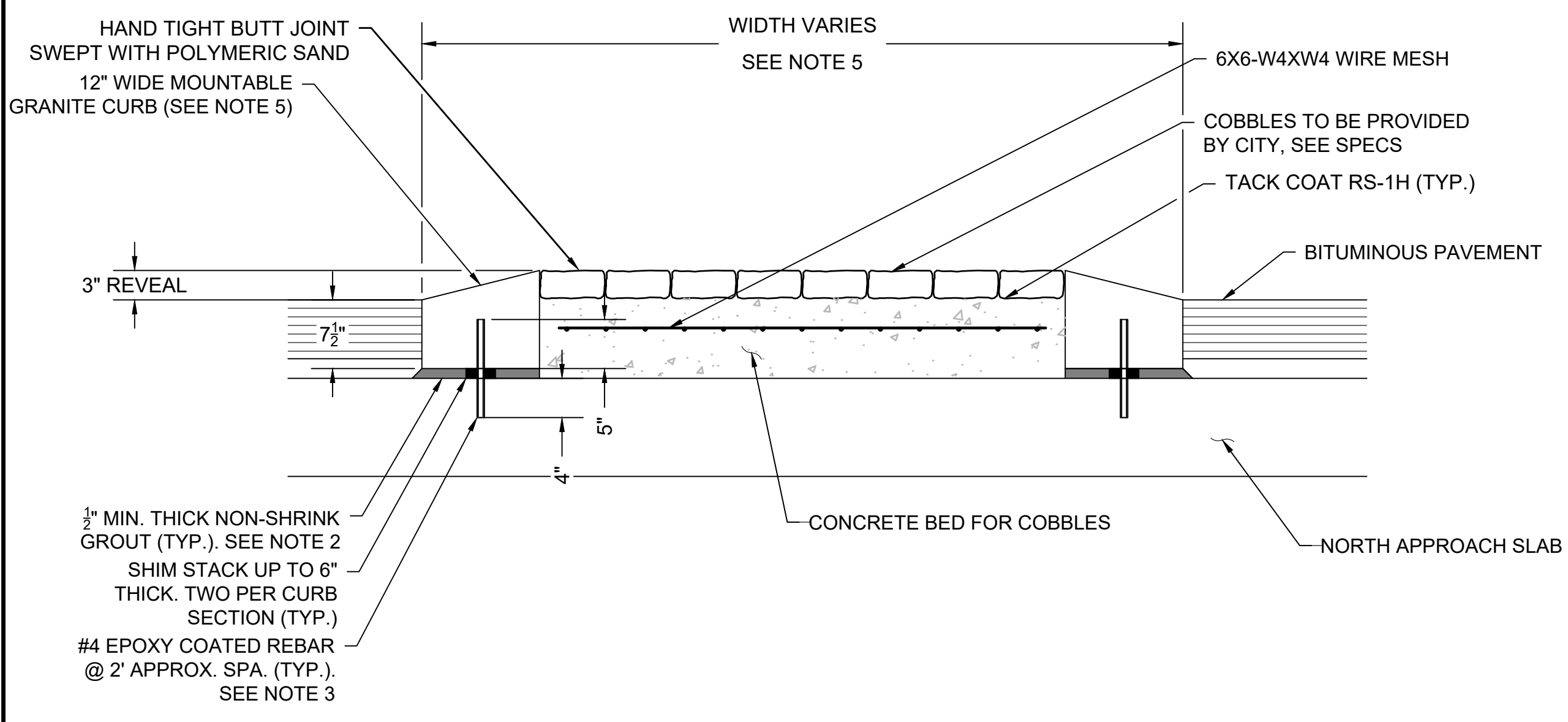


NOTES:  
1. FOR RIGHT SIDE, SEE PCR 2 FOR TRANSITION AT 22+75+/-

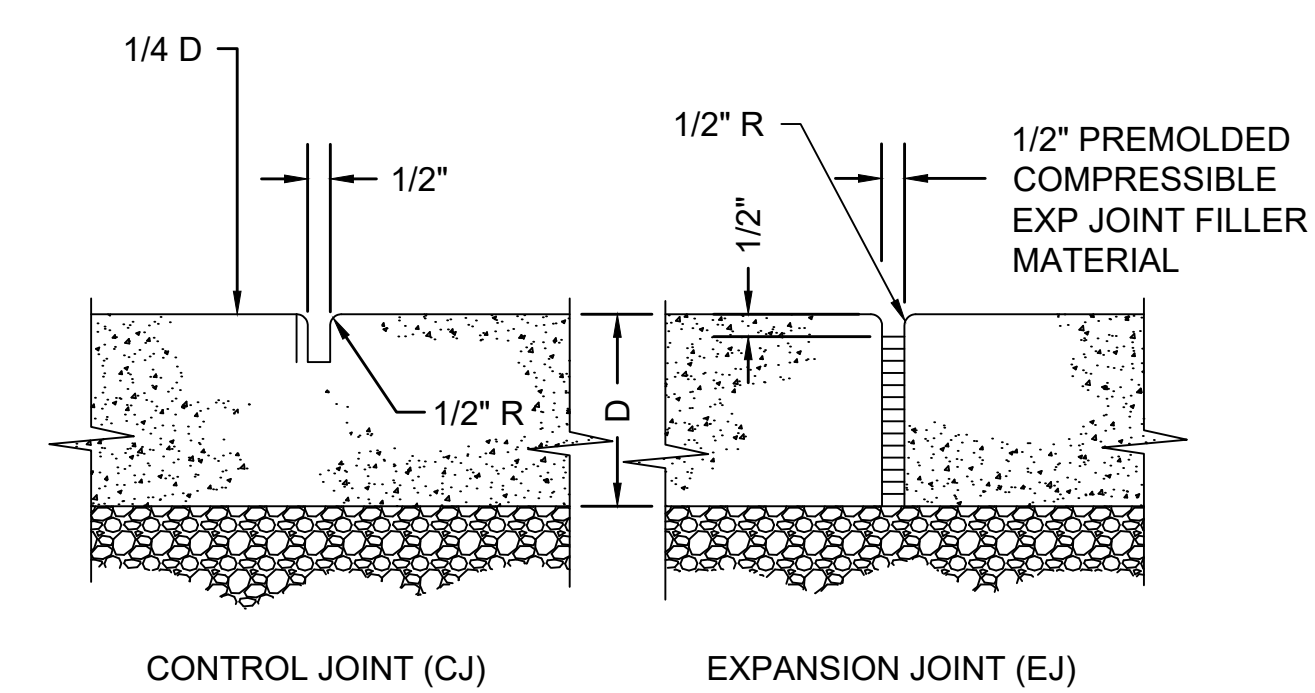
VERTICAL GRANITE CURB TYPE VA4  
TRANSITION TO BRIDGE CURB  
N.T.S.



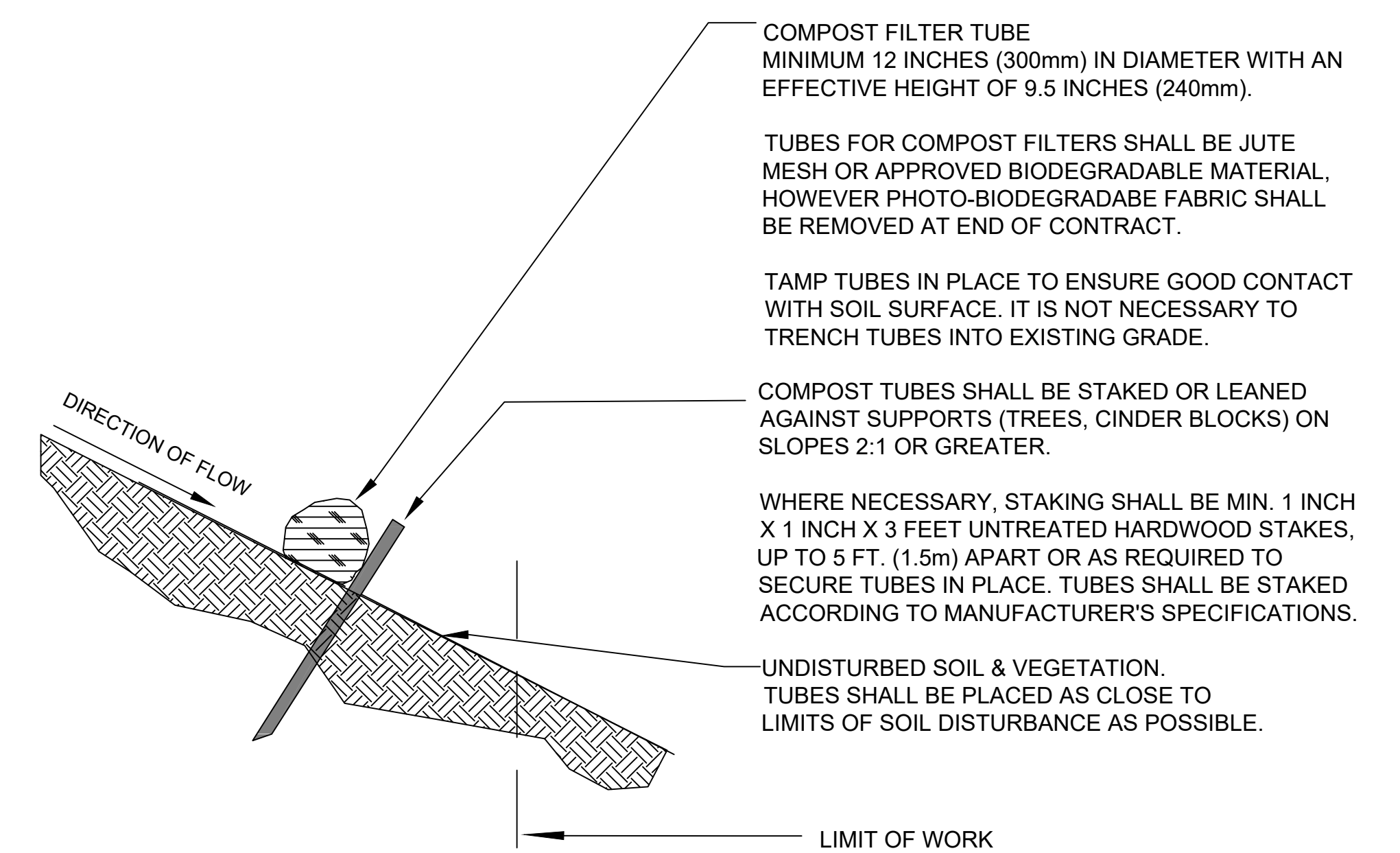
TYPICAL ROTARY FEATURE DETAIL  
N.T.S.



MEDIAN ROTARY FEATURE AT  
NORTH APPROACH SLAB



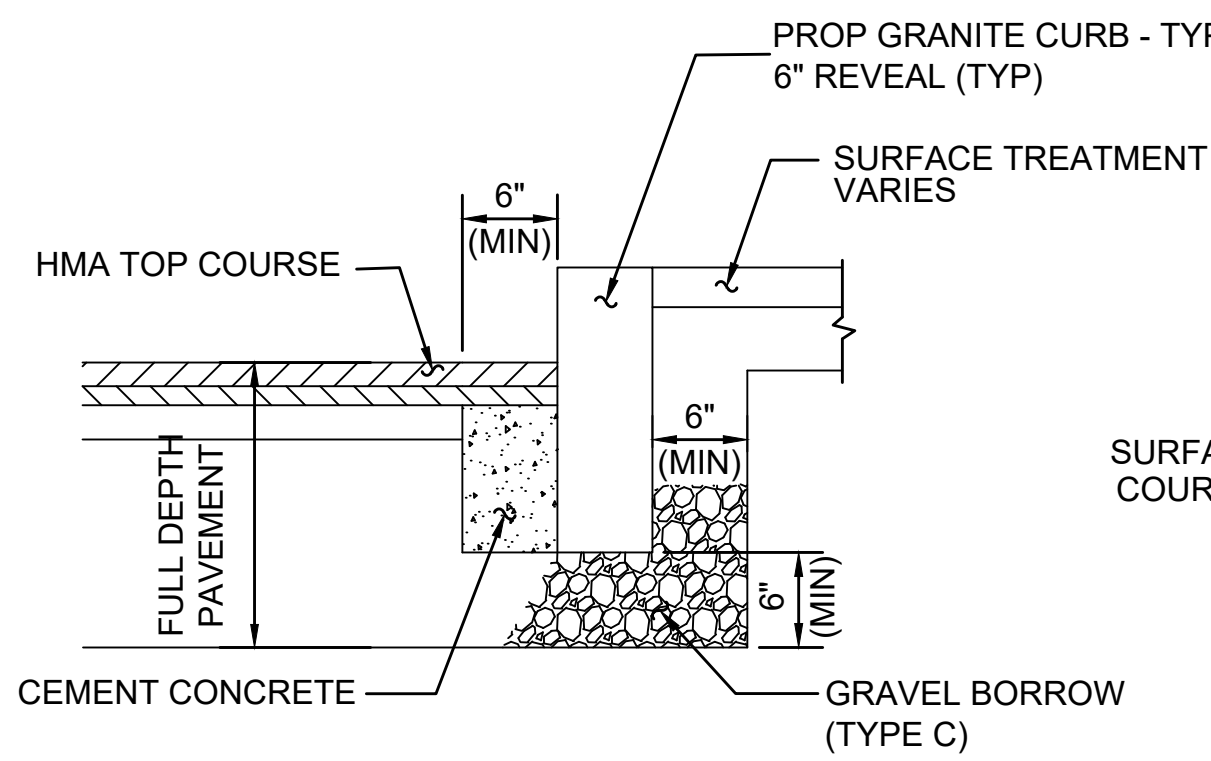
CONCRETE SIDEWALK JOINTS  
N.T.S.



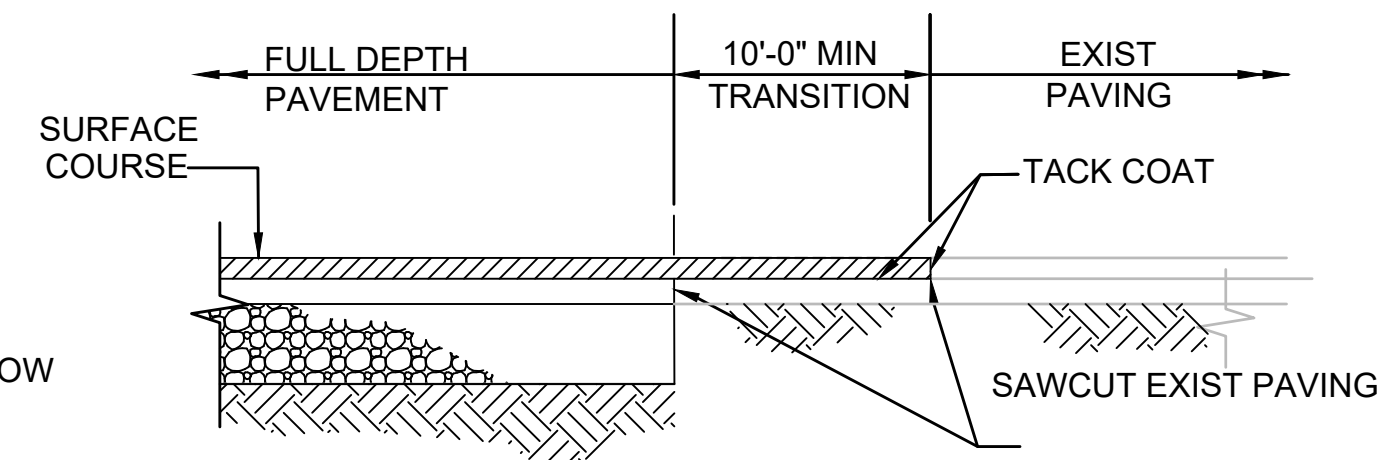
GENERAL NOTES:  
1. PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES (300mm) FOR SLOPES UP TO 50 FEET (15.24m) IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.  
2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.  
3. TUBE LOCATION MAY BE SHIFTED TO ADJUST TO LANDSCAPE FEATURES, BUT SHALL PROTECT UNDISTURBED AREA AND VEGETATION TO MAXIMUM EXTENT POSSIBLE.  
4. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.  
5. ADDITIONAL TUBES SHALL BE USED AT THE DIRECTION OF THE ENGINEER.  
6. ADDITIONAL STAKING SHALL BE USED AT THE DIRECTION OF THE ENGINEER.

- NOTES:
1. ROTARY FEATURE CONCRETE BED TO BE 4000 PSI, 1 1/2 INCH, 565 CEMENT CONCRETE.
  2. NON-SHRINK GROUT SHALL HAVE A MIN. COMPRESSIVE STRENGTH OF 4000 PSI AND BE SELECTED FROM MASSDOT'S QUALIFIED CONSTRUCTION MATERIALS LIST. PRE-BED WITH GROUT THICKNESS SLIGHTLY MORE THAN THE SHIM STACK.
  3. STEEL REBAR DOWELS SHALL BE GRADE 60 CONFORMING TO AASHTO M31 AND EPOXY COATED IN ACCORDANCE WITH ASTM A775. MINIMUM EMBEDMENT IN APPROACH SLAB AND GRANITE CURB IS 4". CUT AND ADJUST LENGTH OF REBAR AFTER VERTICAL POSITION OF CURB IS FIXED WITH THE SHIM STACKS. 5" HOLE DEPTH PROVIDED IN CURB FOR ADDITIONAL ADJUSTMENT IN FIELD.
  4. WELDED WIRE REINFORCEMENT SHALL BE GRADE 65 CONFORMING AASHTO M336 AND EPOXY COATED IN ACCORDANCE WITH ASTM A884.
  5. SEE SHEET 9 FOR CURB GEOMETRY IN PLAN.
  6. SEE "ROTARY REPLACEMENT DETAIL" ON THIS SHEET FOR CALLOUTS NOT SHOWN ON THIS DETAIL.

ROTARY FEATURE DETAILS AT NORTH APPROACH SLAB  
N.T.S.



GRANITE CURB IN FULL DEPTH PAVEMENT  
N.T.S.



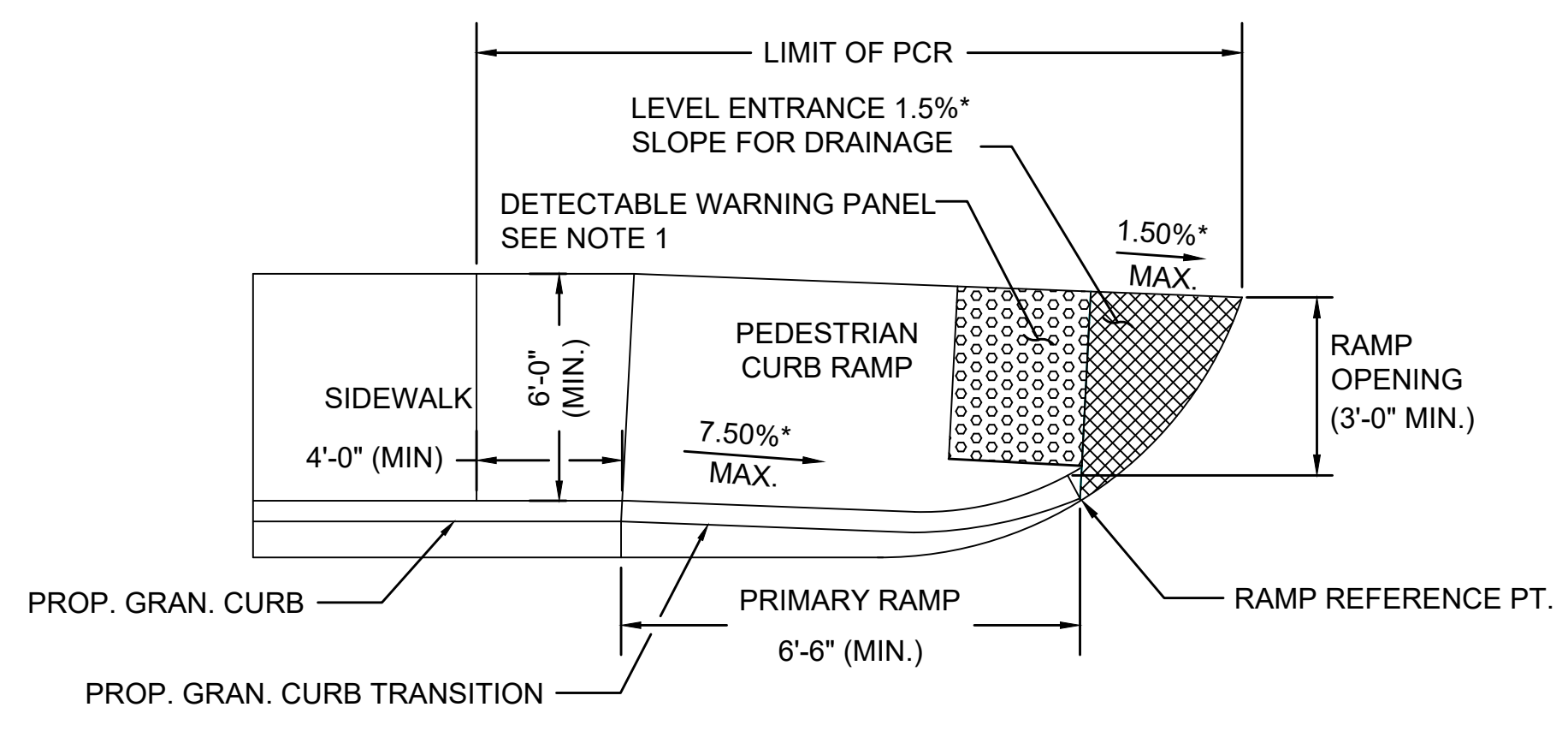
NOTE:  
1. TRANSITION IS NOT REQUIRED AT STA 22+19.79

PAVEMENT TRANSITION DETAIL  
N.T.S.

\* SEE TYPICAL SECTION FOR PAVEMENT NOTES

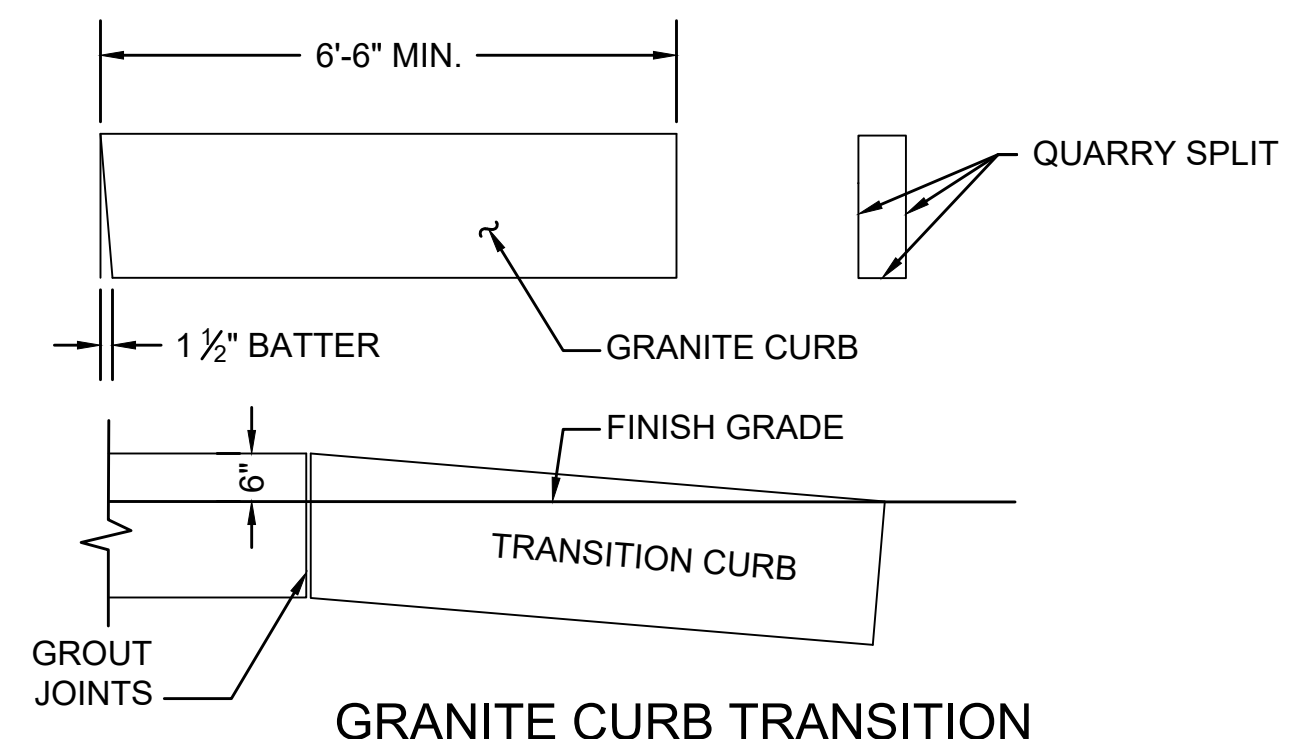
COMPOST FILLER TUBE DETAIL  
N.T.S.

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	23	67
PROJECT FILE NO.		607680	



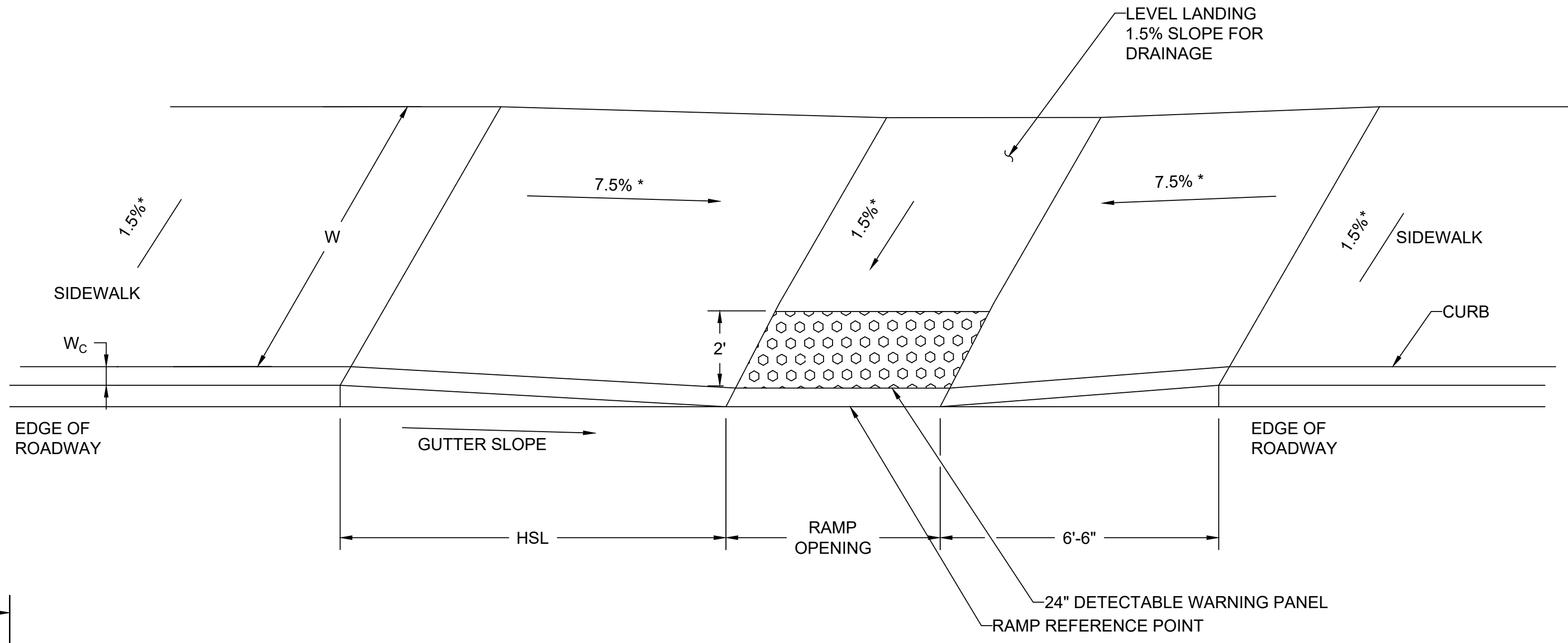
**PEDESTRIAN CURB RAMP E107.6.0**  
(CONTINUOUS DIRECTION OF PEDESTRIAN TRAVEL)  
N.T.S.

\* CONSTRUCTION TOLERANCE IS ±0.5%  
1. PCR 2 SHALL CONSIST OF A CURVED GRANITE TRANSITION AS SHOWN IN DETAIL E107.6.0

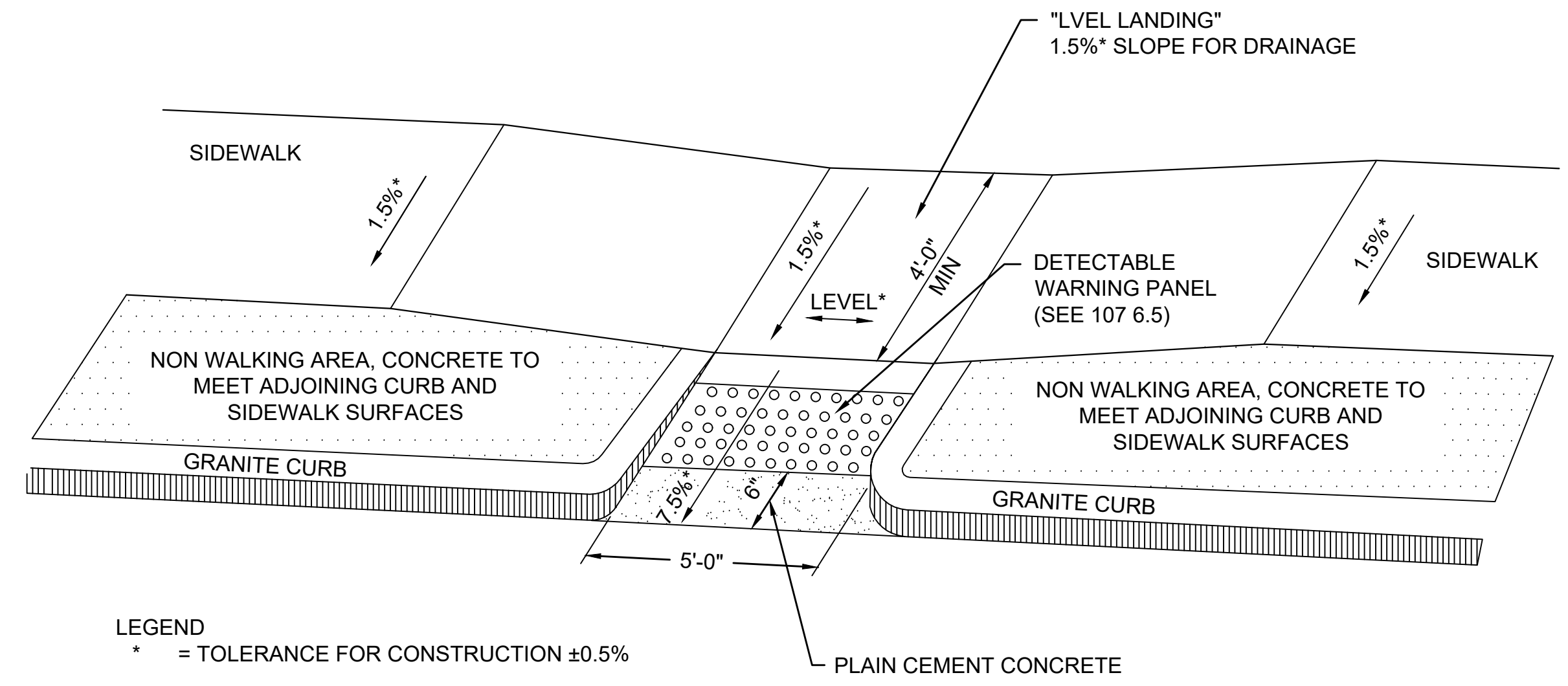


**GRANITE CURB TRANSITION**  
N.T.S.

\* CONSTRUCTION TOLERANCE IS ±0.5%



**PEDESTRIAN CURB RAMP E107.2.1**  
N.T.S.



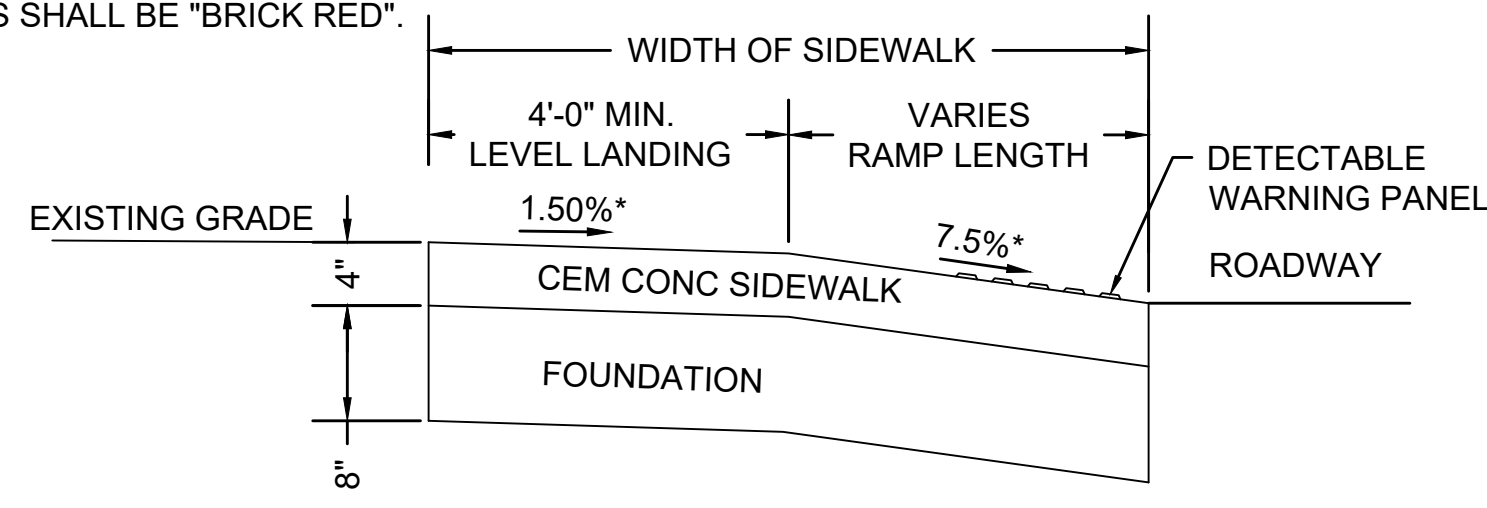
**PEDESTRIAN CURB RAMP E107.6.9**  
N.T.S.

PCR #	TYPE	STATION	OFFSET	LENGTH OF PRIMARY RAMP (FT.)	WIDTH OF SIDEWALK (FT.)	RAMP OPENING WIDTH (FT.)	ROADWAY GUTTER SLOPE	DEPTH OF LEVEL LANDING	TRANSITION LENGTH (FT.)		NOTES
									LEFT SIDE	RIGHT SIDE	
1	E 107.2.1	22+40.30	14.44 LT	7.9'	7.3'	5.0'	2.33%	4'	6'	11'	
2	E 107.6.9	22+70.52	19.87 RT.	8.0'	6.33'	4.0'	0.50%	4'	N/A	N/A	MEET 8" BRIDGE CURB AT TOP OF PRIMARY RAMP
3	E 107.6.9	22+55.60	21.35 RT	5.8'	11.5'	4.0'	0.50%	4'	N/A	N/A	3" CURB REVEAL
4	E 107.2.0	22+39.97	20.26 RT	7.0'	4.0'	6.0'	1.50%	4'	6.92'	N/A	3" CURB REVEAL LEFT SIDE

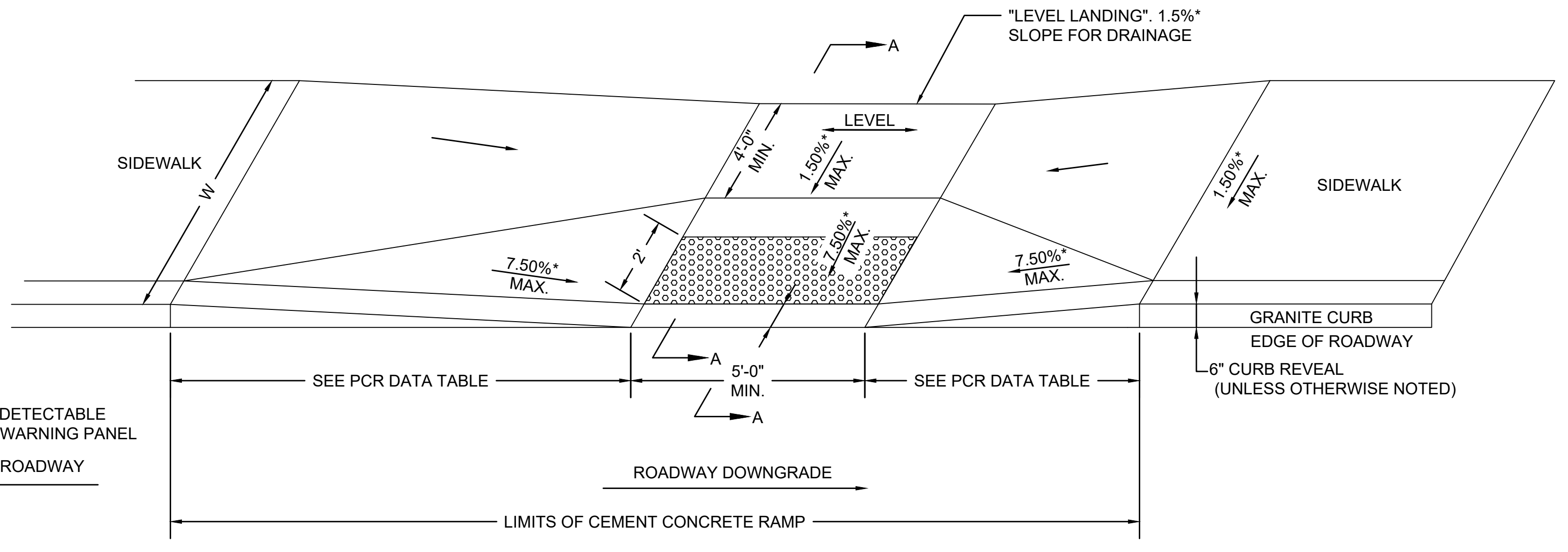
**PEDESTRIAN CURB RAMP DATA**

- LEGEND**
- HSL = HIGH SIDE TRANSITION LENGTH (SEE E 107.9.0)
  - LSL = LOW SIDE TRANSITION LENGTH (6.50' - UNLESS OTHERWISE NOTED)
  - 1. CROSS SLOPE IN ACCESSIBLE PATHS NOT TO EXCEED 2% MAX.
  - 2. LEVEL LANDING SLOPE SHALL NOT EXCEED 1.5% IN ANY DIRECTION.

- NOTES:**
- DETECTABLE WARNING PANELS (25" ± 1") ARE REQUIRED ON ALL PROPOSED PEDESTRIAN CURB RAMPS AND ARE TO BE INSTALLED IN ACCORDANCE WITH ENGINEERING DIRECTIVE E-012-005 AND E 107.6.5 AND ARE TO BE CAST INTO THE CONCRETE.
  - THE COLOR OF THE DETECTABLE WARNING PANELS SHALL BE "BRICK RED".

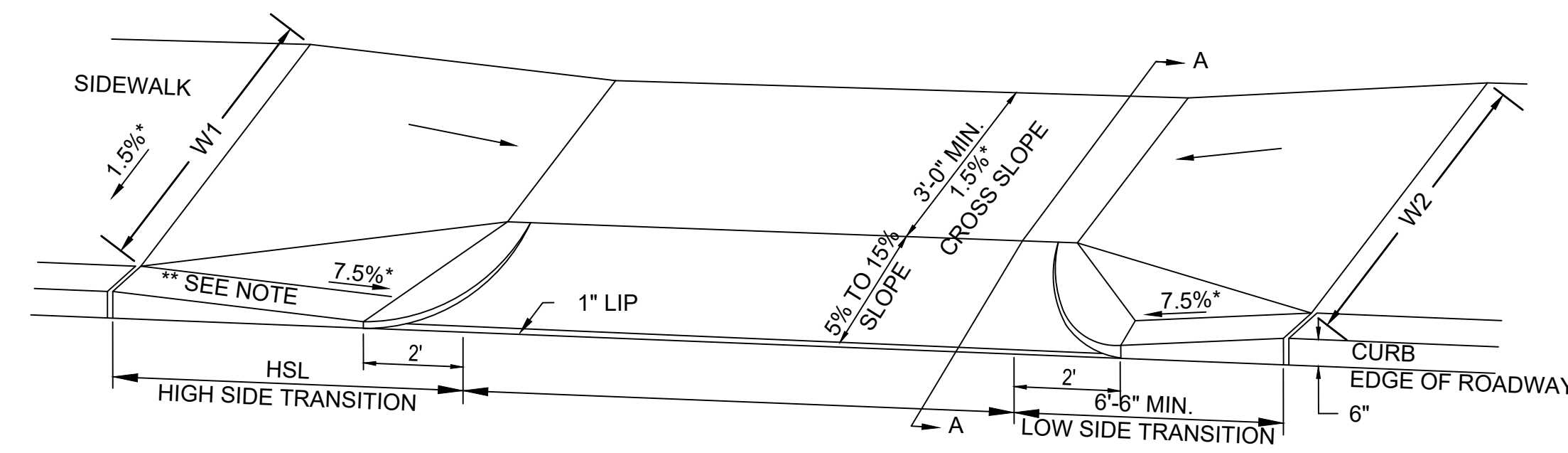


**SECTION A-A**  
N.T.S.



**PEDESTRIAN CURB RAMP E107.2.0**  
N.T.S.

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	24	67
PROJECT FILE NO.		607680	



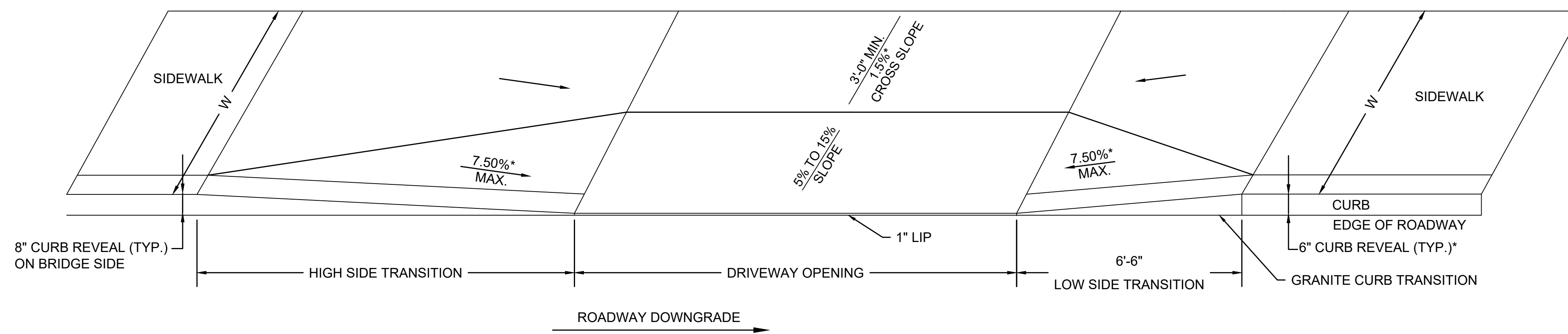
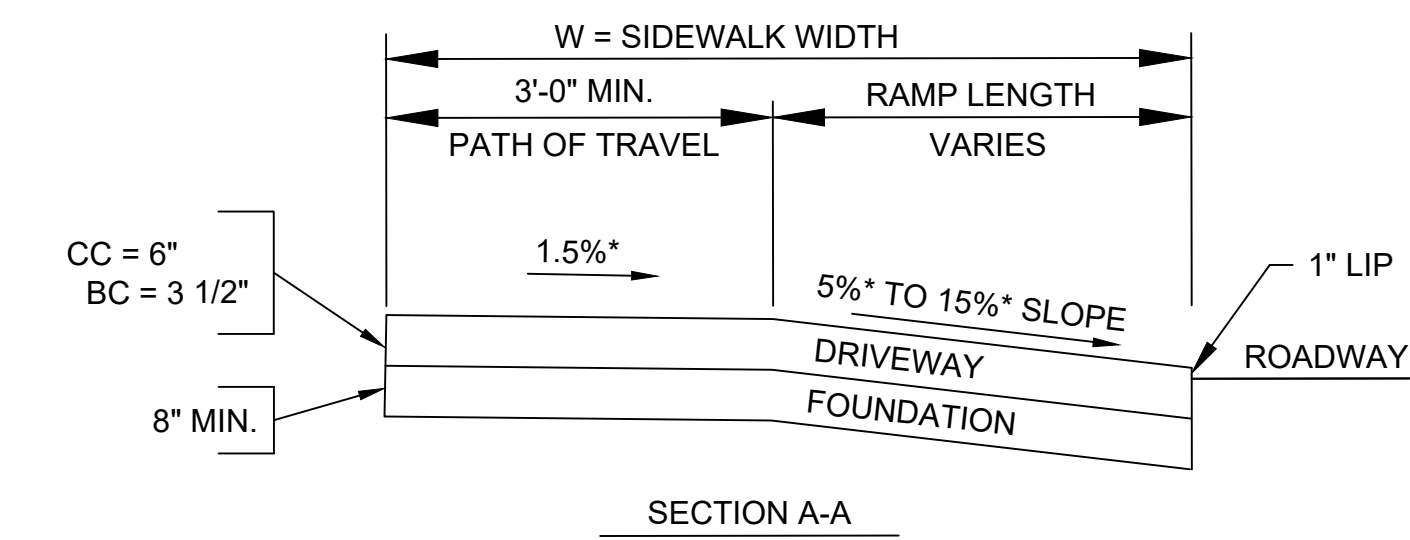
LEGEND

W = SIDEWALK WIDTH  
HSL = HIGH SIDE TRANSITION LENGTH  
\* = TOLERANCE FOR CONSTRUCTION ± 0.5%  
CC = CEMENT CONCRETE  
HMA = HOT MIX ASPHALT

SIDEWALK THICKNESS  
AS DRIVEWAYS

DRIVEWAY DETAIL WITH 2' CURB RETURNS E 107.8.0

N.T.S.



SIDEWALK THROUGH DRIVEWAYS WITHOUT CURB RETURNS E 107.7.0

N.T.S.

DRIVEWAY #	STATION	OFFSET	WIDTH OF SIDEWALK (W1) (FT.)	WIDTH OF SIDEWALK (W2) (FT.)	DRIVEWAY OPENING WIDTH (FT.)	ROADWAY GUTTER SLOPE	TRANSITION LENGTH	
							LEFT SIDE	RIGHT SIDE
1	24+12.81	15.98 RT	9.0'	8.63'	29'-7"	0.54%	6'-6"	7'-9"
2	23+97	17.98 LT	8.34'	7.97'	10'-0"	0.75%	6'-6"	6'-6"

DRIVEWAY DATA



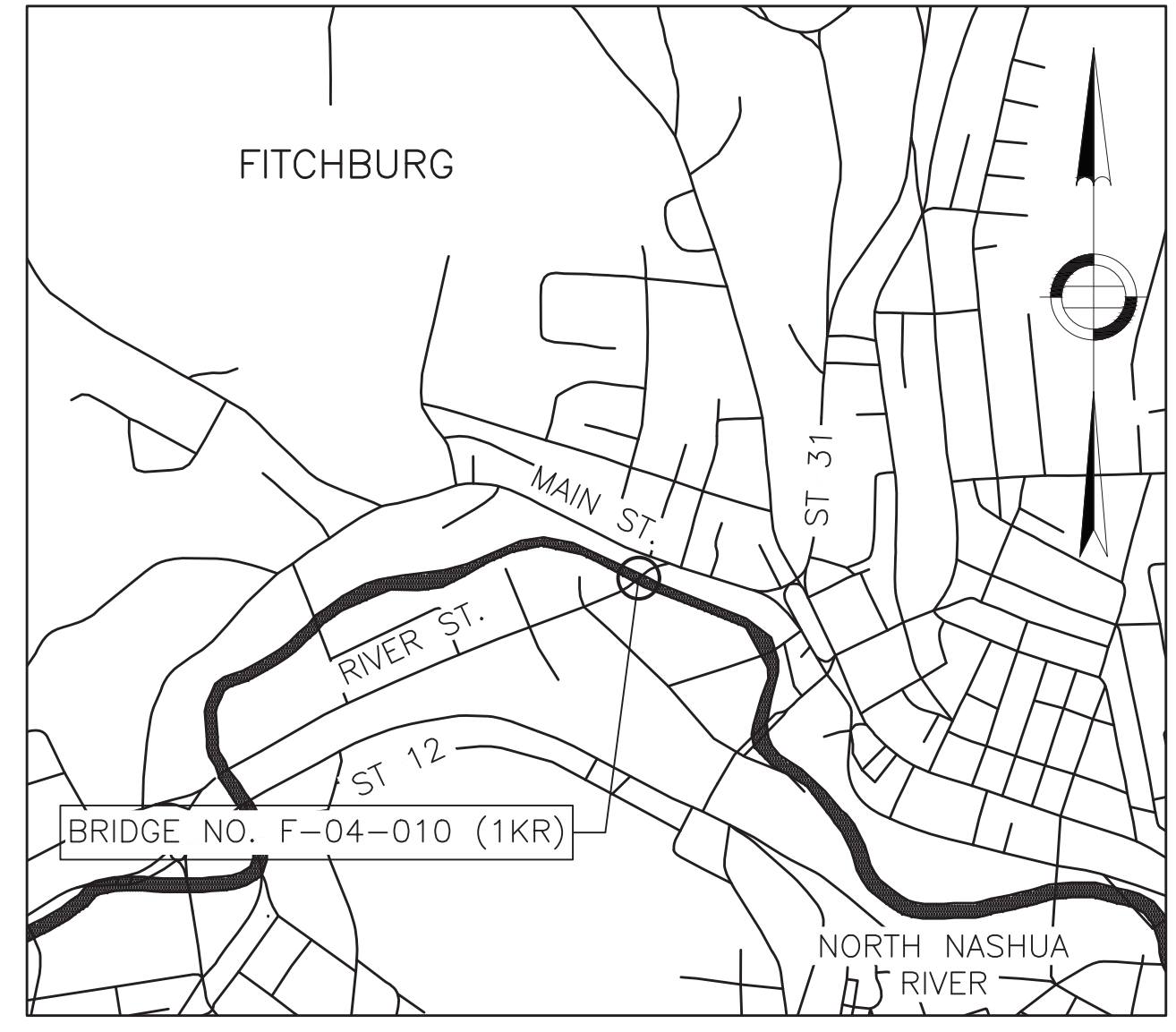
**FITCHBURG**  
**ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	25	67
PROJECT FILE NO.		607680	

**TITLE SHEET & INDEX**

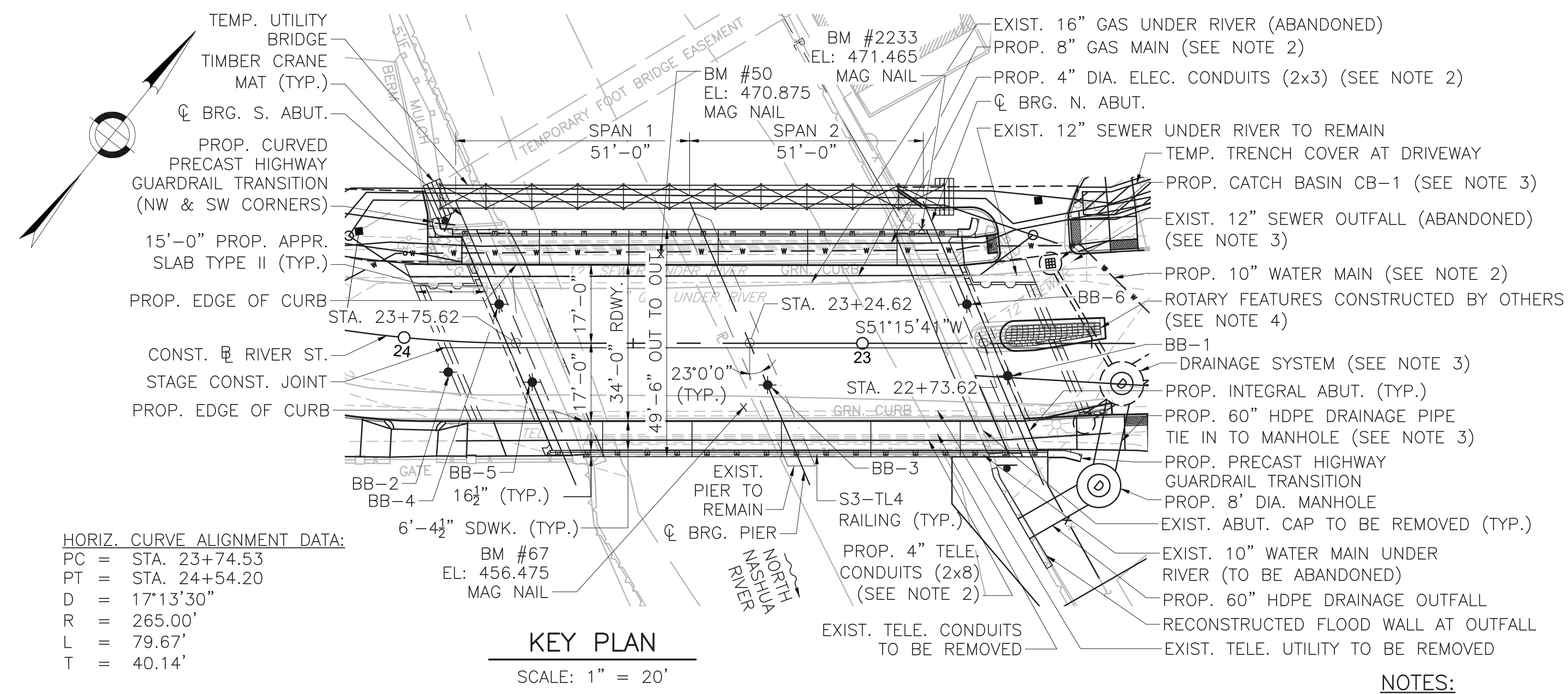
**INDEX OF SHEETS**

1. TITLE SHEET & INDEX
2. GENERAL NOTES AND ESTIMATED QUANTITIES
3. BORING LOGS (1 OF 6)
4. BORING LOGS (2 OF 6)
5. BORING LOGS (3 OF 6)
6. BORING LOGS (4 OF 6)
7. BORING LOGS (5 OF 6)
8. BORING LOGS (6 OF 6)
9. PLAN AND ELEVATION
10. STAGE CONSTRUCTION DETAILS - PHASE 1A
11. STAGE CONSTRUCTION DETAILS - PHASE 1B
12. STAGE CONSTRUCTION DETAILS - PHASE 2A
13. STAGE CONSTRUCTION DETAILS - PHASE 2B
14. TEMPORARY UTILITY BRIDGE DETAILS
15. EXISTING SOUTH ABUTMENT DEMOLITION LIMITS
16. EXISTING NORTH ABUTMENT DEMOLITION LIMITS
17. NORTH FLOOD WALL DEMOLITION AND RECONSTRUCTION FOR OUTFALL PIPE
18. SOUTH ABUTMENT PLAN AND ELEVATION
19. NORTH ABUTMENT PLAN AND ELEVATION
20. PILE LAYOUT AND NOTES
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22. ABUTMENT DETAILS (1 OF 2)
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24. CONCRETE AND STONE MASONRY REPAIR DETAILS
25. EXISTING PIER DETAILS
26. BEARING DETAILS AT PIER
27. FRAMING PLAN AND BEAM ELEVATION
28. STEEL DETAILS
29. BEAM DETAILS
30. DECK DETAILS (1 OF 3)
31. DECK DETAILS (2 OF 3)
32. DECK DETAILS (3 OF 3)
33. APPROACH SLAB DETAILS
34. STEEL RAILING DETAILS
35. GUARDRAIL TRANSITION BASE DETAILS
36. CURVED GUARDRAIL TRANSITION BASE DETAILS
37. GUARDRAIL TRANSITION TOP DETAILS
38. CURVED GUARDRAIL TRANSITION TOP DETAILS



**LOCUS PLAN**

SCALE: 1:1000



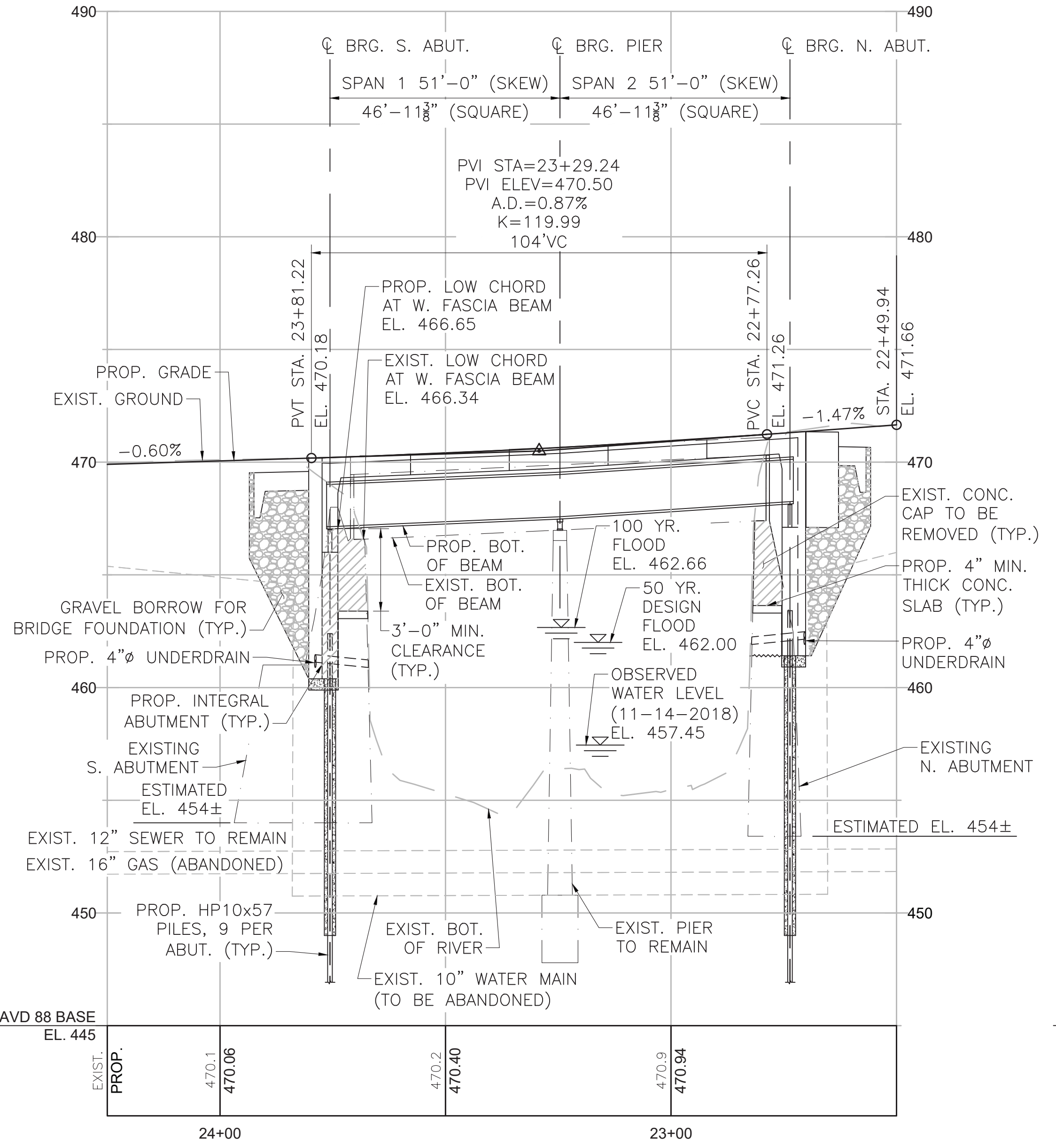
**KEY PLAN**

SCALE: 1" = 20'

**HORIZ. CURVE ALIGNMENT DATA:**  
 PC = STA. 23+74.53  
 PT = STA. 24+54.20  
 D = 17°13'30"  
 R = 265.00'  
 L = 79.67'  
 T = 40.14'

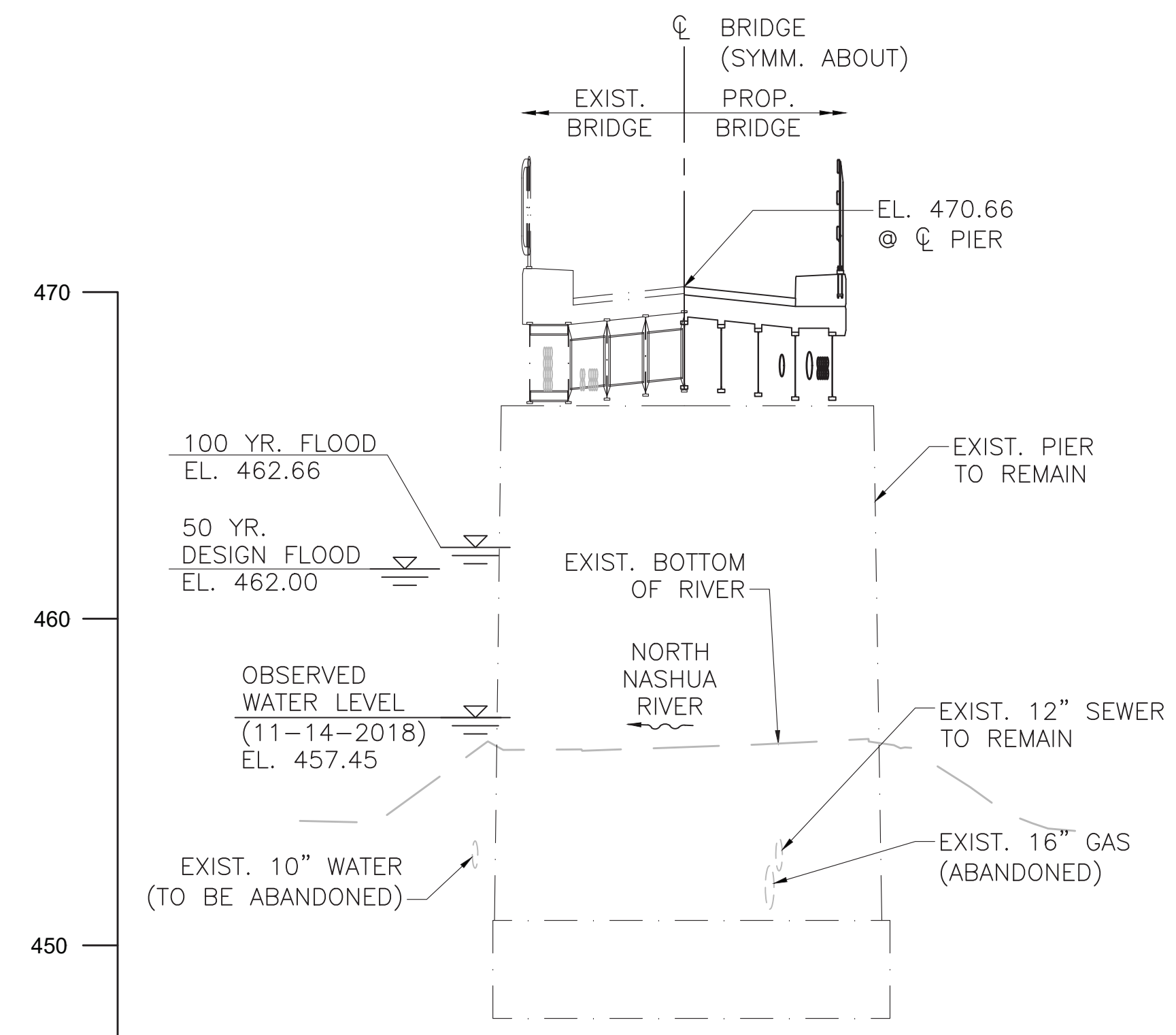
**NOTES:**

1. SEE HIGHWAY PLANS FOR DISPOSITION OF EXISTING DRAINAGE STRUCTURES AND OUTFALLS.
2. SEE SHEETS 10 THRU 13 FOR TEMPORARY AND PERMANENT UTILITY RELOCATION DURING STAGE CONSTRUCTION.
3. DRAINAGE SYSTEM (SHOWN IN DASHED LINES) WILL BE CONSTRUCTED AS PART OF A CSO 010 SEPARATION/REHABILITATION PROJECT BY THE CITY OF FITCHBURG, IN ADVANCE OF THIS PROJECT. AS PART OF THE MASSDOT PROJECT, THE CONTRACTOR SHALL PROVIDE AND INSTALL A NEW 60" HDPE PIPE TYING INTO THE 8' DIA. MANHOLE (INSTALLED BY THE CITY), A NEW 8' DIA. MANHOLE AND A NEW 60" HDPE DRAINAGE OUTFALL. PORTION OF THE EXISTING FLOOD WALL SHALL BE RECONSTRUCTED TO ACCOMMODATE THE NEW 60" HDPE DRAINAGE OUTFALL.
4. SELECT ROTARY FEATURES AT THE NORTH SIDE OF THE BRIDGE WILL BE CONSTRUCTED AS PART OF THIS PROJECT. SEE CIVIL DRAWINGS FOR DETAILS.



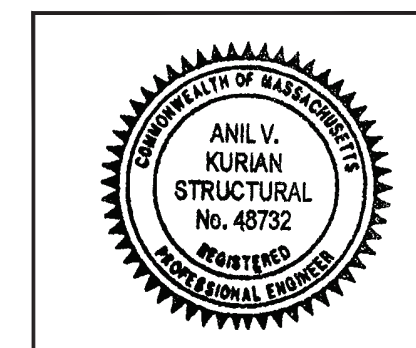
**PROFILE - ST 31 (RIVER STREET)**

SCALE: VERT. 1" = 4'  
HORIZ. 1" = 20'



**PROFILE - NORTH NASHUA RIVER**  
**UNDER ST 31 (RIVER STREET)**

SCALE: VERT. 1" = 4'  
HORIZ. 1" = 20'



Anil Kurian  
Digitally signed by Anil Kurian  
Date: 2023.09.14 16:41:39 -0400



SEPT 23, 2023 ISSUED FOR CONSTRUCTION



**PROPOSED SUPERSTRUCTURE REPLACEMENT**

**FITCHBURG**  
**ST 31 (RIVER STREET)**  
**OVER NORTH NASHUA RIVER**

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

Alexander K. Bardow, P.E. Digitally signed by Alexander K. Bardow, P.E. Date: 2023.09.18 15:10:48 -0400  
 Carrie Lavallee, P.E. Digitally signed by Carrie Lavallee, P.E. Date: 2023.10.19 15:56:53 -0400

STATE BRIDGE ENGINEER CHIEF ENGINEER

GENERAL NOTES:

DESIGN:

IN ACCORDANCE WITH THE 2020 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS LRFD BRIDGE DESIGN SPECIFICATIONS, FOR HL-93 LOADING.

PROJECT BENCH MARKS:

MAG #2
N:3038993.206 E:572808.023
EL:469.814

MAG #50
N:3039067.442 E:572938.151
EL:470.875

MAG #67
N:3039052.642 E:572973.197
EL:456.475

MAG #2233
N:3039107.419 E:572979.102
EL:471.465

EXISTING CONDITIONS:

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 MEASUREMENTS AND SURVEY.

EXISTING BRIDGE PLANS:

PLANS FOR THE EXISTING BRIDGE "FITCHBURG-RIVER STREET OVER NORTH NASHUA RIVER, F-4-10, 1952" MAY BE SEEN AT THE OFFICE OF THE BRIDGE SECTION, MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, 10 PARK PLAZA, BOSTON, MA.

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

DATE:

TO BE PLACED ON THE INSIDE FACE OF THE SW, NW, AND NE HIGHWAY GUARDRAIL TRANSITION. 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:

THE EXISTING CONDITIONS SHOWN HEREON ARE THE RESULTS OF AN ON THE GROUND FIELD SURVEY PERFORMED BY C&C CONSULTING ENGINEERS, LLC BETWEEN JUNE 9, 2017 AND OCTOBER 12, 2017. REFERENCE FIELD BOOK #41300.

SCALES:

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

FOUNDATIONS:

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

UNSUITABLE MATERIAL:

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

ANCHOR BOLTS:

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

CAST-IN-PLACE CONCRETE:

THE FOLLOWING CONCRETE MIXES SHALL BE USED:

- 4000 PSI, 3/4 IN., 610 CEMENT CONCRETE: CONCRETE PEDESTALS, KEEPER BLOCK, CONCRETE SLAB, CURTAIN WALL IN FRONT OF ABUTMENTS AND COPING REPAIR (2" TO 6" DEPTH)
4000 PSI, 3/4 IN., 585 HP CEMENT CONCRETE: DECK, INTEGRAL ABUTMENT DIAPHRAGM AND WINGWALLS
5000 PSI, 3/4 IN., 685 HP CEMENT CONCRETE: SIDEWALK
4000 PSI, 1 1/2 IN., 565 CEMENT CONCRETE: PILE CAP, APPROACH SLAB, RECONSTRUCTED FLOOD WALL
4000 PSI, 3/8 IN., 660 CEMENT CONCRETE: COPING REPAIR (> 6" DEPTH)

PRECAST CONCRETE:

THE FOLLOWING CONCRETE MIX SHALL BE USED:

- 5000 PSI, 3/4 IN., 685 HP CEMENT CONCRETE: HIGHWAY GUARDRAIL TRANSITION

REINFORCEMENT:

REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M31 GRADE 60. UNLESS NOTED OTHERWISE ON THE CONSTRUCTION DRAWINGS, ALL BARS SHALL BE LAPPED AS FOLLOWS:

Table with 4 columns: MODIFICATION CONDITIONS, #4 BARS, #5 BARS, #6 BARS. Lists conditions for bar lapping (e.g., NONE, 12" OF CONCRETE BELOW BAR, EPOXY COATED BARS, COATED BARS).

ALL OTHER BARS SHALL BE LAPPED AS SHOWN ON THE CONSTRUCTION DRAWINGS. CONCRETE COVER OVER REBAR SHALL BE 2" UNLESS OTHERWISE NOTED, OR 3" FOR CONCRETE CAST AGAINST SOIL.

WELDED WIRE FABRIC SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M336 GRADE 65 AND SHALL BE EPOXY COATED IN CONFORMANCE WITH ASTM A884.

MEMBRANE WATERPROOFING:

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

STRUCTURAL STEEL:

ALL STRUCTURAL STEEL SHALL MEET REQUIREMENTS OF AASHTO M 270, GRADE 50. ALL GIRDERS ARE MAIN MEMBERS AND SHALL CONFORM TO THE APPLICABLE CHARPY V-NOTCH (CVN) IMPACT TEST REQUIREMENTS OF AASHTO M 270.

CASING FOR WATER MAIN SHALL BE STAINLESS STEEL CONFORMING TO ASTM A312. CASING FOR GAS MAIN SHALL CONFORM TO ASTM A500 GRADE C AND HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A123.

WELDING:

- 1. NO FIELD WELDING WILL BE ALLOWED EXCEPT AS NOTED.
2. WELDS SHALL BE E70XX MINIMUM.

UTILITIES:

- 1. THE CONTRACTOR SHALL LOCATE AND PROTECT FROM DAMAGE ALL EXISTING UTILITIES.
2. THE FOLLOWING IS THE SCOPE OF UTILITY WORK INCLUDED IN THIS PROJECT:

UTILITY ELECTRIC
CONTRACTOR SHALL PROVIDE AND INSTALL ELECTRIC CONDUITS AND CONDUIT SUPPORTS AT THE TEMPORARY UTILITY BRIDGE (PHASE 1A) AND IN THE FINAL CONDITION (PHASE 1B).

UTILITY GAS
CONTRACTOR SHALL PROVIDE AND INSTALL UTILITY BAY CROSS FRAMES. CONTRACTOR SHALL PROVIDE PIPE ROLLERS PER UTILITY GAS SPECIFICATIONS.

VERIZON TELECOM
CONTRACTOR SHALL PROVIDE AND INSTALL UTILITY BAY CROSS FRAMES. VERIZON SHALL PROVIDE AND INSTALL CONDUITS AND ASSOCIATED CONDUIT SUPPORTS.

CITY OF FITCHBURG WATER
CONTRACTOR SHALL PROVIDE AND INSTALL UTILITY BAY CROSS FRAMES, 10" WATER MAIN, RESTRAINED PIPE FITTINGS, POLYURETHANE INSULATION, ALUMINUM JACKETING, 22" CASING AT ABUTMENTS, END SEALS, GATE VALVES, CONNECTION SHUT-OFF AND TYING TO EXISTING WATER LINE.

CITY OF FITCHBURG STORMWATER AND WASTEWATER
CONTRACTOR SHALL PROVIDE AND INSTALL 60" HDPE PIPE AND 8' DIAMETER MANHOLE INCLUDING TYING IN TO CITY OF FITCHBURG DRAINAGE SYSTEM, AND RECONSTRUCTION OF EXISTING FLOOD WALL AT OUTFALL AND RESTORATION OF EMBANKMENT IN FRONT OF RECONSTRUCTED FLOOD WALL.

TRAFFIC:

- 1. THE BRIDGE SHALL BE CONSTRUCTED IN STAGES. A SINGLE LANE OF SOUTHBOUND TRAFFIC SHALL BE MAINTAINED IN ALL STAGES OF CONSTRUCTION.

ESTIMATED QUANTITIES (NOT GUARANTEED). Table with 3 columns: Description, Quantity, Unit. Lists items like GEOTECHNICAL MONITORING, STONE MASONRY REPAIRS, DEMOLITION OF SUPERSTRUCTURE, BRIDGE EXCAVATION, etc.

FITCHBURG
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER

Table with 4 columns: STATE, FED. AID PROJ. NO., SHEET NO., TOTAL SHEETS. Values: MA, N/A, 26, 67. PROJECT FILE NO. 607680.

GENERAL NOTES AND ESTIMATED QUANTITIES

TRAFFIC DATA table with columns: DESIGN YEAR, ROADWAY OVER, ROADWAY UNDER. Values include AVERAGE DAILY TRAFFIC (PRESENT 12,302, DESIGN YEAR 15,010), DESIGN HOURLY VOLUME (1,243), etc.

SEISMIC DESIGN CRITERIA table with columns: DESIGN RETURN PERIOD (2,500 YRS), DESIGN SPECTRA (As, SDs, SD1), SITE CLASS (D), SEISMIC DESIGN CATEGORY (SDC) (A).

HYDRAULIC DESIGN DATA table with columns: Drainage Area (62.4), Design Flood Discharge (4,046), Design Flood Frequency (2% (50)), Design Flood Velocity (6.9), Design Flood Elevation (462.0), Base Flood Discharge (4,562), Base Flood Elevation (462.66), Design Scour Flood Event (1% (100)), etc.

\* NONE DOCUMENTED IN NBIS DATABASE
\*\* MINOR SCOUR ALONG EAST ABUTMENT

Table with 2 columns: DATE, DESCRIPTION. Includes approval stamp for construction by MassDOT.

**FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	27	67
PROJECT FILE NO.		607680	

**BORING LOGS (1 OF 6)**

<b>massDOT</b>		Northern Drill Service, Inc. 130 East Main Street, Bldg. A Northborough, MA 01532		Phone: (508)393-6900 Fax: (508) 393-6901		Boring No. BB-2	
City/Town: Fitchburg, MA		Bridge No. F-04-010		Project File No: 607680		Contract No: 69762	
Project: Route 31 (River Street) over North Nashua River		Date & Time Started: 11-14-2018 1:05 pm		Total Hours: 14.8		Groundwater Depth: 13'	
Date & Time Completed: 11-19-2018 7:30 am		Date & Time Completed: 11-19-2018 5:00 pm		Date & Time Completed: 11-19-2018 5:00 pm		14.8	
Coordinates: N 3039018.35 E 572918.18		Driller's Name: Zac Nader		Helper's Name: Andy Miller		Ground Elevation: 470.09'	
Inspector's Name: L. Hopp/ S. Sullivan		Inspector's Company: TRC Companies Inc. for STV, Inc.		Inspector's Name: L. Hopp/ S. Sullivan		Inspector's Company: TRC Companies Inc. for STV, Inc.	
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot	Recovery Inches	Field Description	Strata Changes		
S1	0-1			-6 in. Bituminous pavement -6 in. Concrete	1'		
S2	1-2	13-15	7	Wet, medium dense, brown COARSE TO FINE SAND, some coarse to fine gravel, trace silt. (F#1).			
S3	2-4	1-4-16-18	15	Wet, medium dense, brown COARSE TO FINE SAND, some coarse to fine gravel, trace silt, organics. (F#1).			
S4	4-6	6-8-7-5	12	Wet, medium dense, brown, COARSE TO FINE SAND, some medium to fine gravel, trace silt. (F#1).			
S5	6-8	13-16-12-12	21	Wet, medium dense, brown, COARSE TO FINE SAND, trace medium to fine gravel, trace silt. (F#1).			
S6	8-10	4-6-4-7	5	Wet, medium dense, brown COARSE TO FINE SAND, trace medium to fine gravel, trace silt. (F#1).			
S7	10-12	3-3-3-1	4	Wet, loose, brown COARSE TO FINE SAND, some coarse to fine gravel, trace silt. (F#1).			
S8	12-14	3-5-12-25	8	Wet, loose, brown COARSE TO FINE SAND, some coarse to fine gravel, trace silt. (F#1).			
S9	14-16	20-18-25-28	15	Top 12 in: Wet, dense, brown COARSE TO FINE GRAVEL, trace coarse to fine sand, trace silt. Bottom 3 in: Wet, dense, brown FINE GRAVEL, trace coarse to fine sand, trace silt. (F#1).	14'		
S10	16-17	51-706*	12	Wet, very dense, brown, COARSE TO FINE SAND, some fine to medium gravel, trace silt. (F#1).	16'		
R1	17-19	4.6 min/ft. REC 8" RQD 0"	33% 0%	(Possible Boulder Abutment). (F#1).	19'		
S11	19-21	15-21-31-16	6	Wet, very dense, gray MEDIUM TO FINE GRAVEL, some fine to coarse sand, trace silt.			
S12	21-23	13-14-17-13	12	Wet, dense, brown, MEDIUM TO FINE GRAVEL, some fine to coarse sand, trace silt.			
S13	23-25	12-11-9-7	6	Wet, medium dense, brown COARSE TO FINE GRAVEL, trace coarse to fine sand, trace silt.			

GROUND  
EL. 470.09'

EL. 465'

BOT. OF PROP. S. ABUT. EL. 460.37'

EL. 460'

GROUNDWATER TABLE RECORDED ON 11/19/2018

EL. 455'

EL. 450'

EL. 445'

<b>massDOT</b>		Northern Drill Service, Inc. 130 East Main Street, Bldg. A Northborough, MA 01532		Phone: (508)393-6900 Fax: (508) 393-6901		Boring No. BB-2	
City/Town: Fitchburg, MA		Bridge No. F-04-010		Project File No: 607680		Contract No: 69762	
Project: Route 31 (River Street) over North Nashua River		Date & Time Started: 11-14-2018 1:05 pm		Total Hours: 14.8		Groundwater Depth: 13'	
Date & Time Completed: 11-19-2018 7:30 am		Date & Time Completed: 11-19-2018 5:00 pm		Date & Time Completed: 11-19-2018 5:00 pm		14.8	
Coordinates: N 3039018.35 E 572918.18		Driller's Name: Zac Nader		Helper's Name: Andy Miller		Ground Elevation: 470.09'	
Inspector's Name: L. Hopp/ S. Sullivan		Inspector's Company: TRC Companies Inc. for STV, Inc.		Inspector's Name: L. Hopp/ S. Sullivan		Inspector's Company: TRC Companies Inc. for STV, Inc.	
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot	Recovery Inches	Field Description	Strata Changes		
S13	25-27	6-5-5-6	4	Wet, medium dense, brown COARSE TO FINE GRAVEL, some coarse to fine sand, trace silt.			
S14	27-29	6-6-5-4	11	Wet, medium dense, brown COARSE TO FINE GRAVEL, some coarse to fine sand, trace silt.			
S15	34-36	8-10-12-13	9	Wet, medium dense, brown COARSE TO FINE SAND, some silt, trace medium to fine gravel.	34'		
S16	39-41	5-6-7-12	12	Wet, medium dense, COARSE TO FINE SAND, some silt, trace medium to fine gravel.			
S17	44-46	14-11-10-13	9	Wet, medium dense, COARSE TO FINE SAND, some silt, trace coarse to fine gravel.			
S18	49-51	35-47-1026*-25	15	Wet, very dense, brown COARSE TO FINE SAND, some silt, trace gravel. (F#1).			

EL. 445'

EL. 440'

EL. 435'

EL. 430'

EL. 425'

EL. 420'

<b>massDOT</b>		Northern Drill Service, Inc. 130 East Main Street, Bldg. A Northborough, MA 01532		Phone: (508)393-6900 Fax: (508) 393-6901		Boring No. BB-2	
City/Town: Fitchburg, MA		Bridge No. F-04-010		Project File No: 607680		Contract No: 69762	
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Inspector's Name: L. Hopp/ S. Sullivan		Inspector's Company: TRC Companies Inc. for STV, Inc.		Inspector's Name: L. Hopp/ S. Sullivan		Inspector's Company: TRC Companies Inc. for STV, Inc.	
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot	Recovery Inches	Field Description	Strata Changes		
S19	54-55.5	82-87-1205*	9	Moist, very dense, COARSE TO FINE SAND, some silt, trace fine gravel (color appears brown with oxidation present).	55.5'		
R1	55.5-60.5	1 min/ft. REC 6" RQD 0"	10% 0%	GRANITE, gray and black, highly fractured, highly weathered.			
R2	60.5-66	6.2 min/ft. REC 46" RQD 19"	73% 29%	60.5 ft to 63.5 ft: Grey, Very Dense CLAY, moderately weathered. 63.5 ft to 66 ft: Muscovite, biotite, GRANITE, white and gray, hard.	63.5'		
R3	66-71	3.6 min/ft. REC 60" RQD 52"	100% 87%	66 ft to 67 ft 7 in: Muscovite, biotite, GRANITE, white and gray, hard, moderately weathered. 67 ft 7 in to 71 ft: GRANITE, gray and black, hard, slightly weathered, joint at 67 ft 7 in includes clay seam.			
Bottom of Borehole = 71 ft.							

EL. 420'

EL. 415'

ESTIMATED PILE TIP ELEVATION AT S. ABUT. EL. 409±

EL. 410'

EL. 405'

EL. 400'

EL. 395'

CONTINUATION

CONTINUATION

**BORING BB-2 AT SOUTH ABUTMENT**

**NOTES:**

- LOCATION OF BORINGS SHOWN ON KEY PLAN, THUS .
- BORINGS ARE TAKEN FOR PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.
- WATER LEVELS SHOWN ON THE BORING LOGS WERE OBSERVED AT THE TIME OF TAKING BORINGS AND DO NOT NECESSARILY SHOW THE TRUE GROUND WATER LEVEL.
- FIGURES IN COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A 1 1/8" 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 AVE.) IN LAWRENCE, MA. THE CONTRACTOR MAY EXAMINE THE SOIL AND ROCK SAMPLES BY CONTACTING THE MASSDOT GEOTECHNICAL SECTION AT 10 PARK PLAZA, BOSTON, MA.
- BORINGS BB-1 THRU BB-3 WERE OBTAINED IN NOVEMBER 2018. BORINGS BB-4 THRU BB-6 WERE OBTAINED IN JANUARY 2022.
- BORINGS WERE OBTAINED BY NORTHERN DRILL SERVICE, INC., 130 EAST MAIN STREET, BLDG. A., NORTHBOROUGH, MA 01532.
- THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.

SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

11-AUG-2023 10:34 AM 607680\_BRR\_03 (BORING LOGS (1 OF 6))DWG Plotted on 14-Sep-2023 10:34 AM Final Structural Submittal (SF)

**FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	28	67
PROJECT FILE NO.		607680	

**BORING LOGS (2 OF 6)**

<b>massDOT</b>		Northern Drill Service, Inc. 130 East Main Street, Bldg. A Northborough, MA 01532		Phone: 508-393-6900 Fax: 508-393-6901		Boring No. BB-4 Scale	
City/Town: Fitchburg, MA		Bridge No. F-04-010		Project File No: 607680		Contract No: 69762	
Project: Route 31 (River Street) over North Nashua River		Date & Time Started: 01-26-2022		Total Hours:			
Groundwater Depth: N/A		Date & Time: N/A		Date & Time Completed: 01-31-2022			
Coordinates: N 3039036.87 E 572917.57		Driller's Name: Zac Nader		Helper's Name: Carl			
Ground Elevation: 470.0		Inspector's Name: L. Hopp/ H. Barnes		Inspector's Company: TRC Companies Inc. for STV, Inc.			
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot	Recovery Inches	Field Description		Strata Changes	
	0-1			8" Asphalt pavement 26" cobble stones, and concrete			
	1-2	1.31 min/ft	REC 4" RQD 0%	33% 0%			
	2-3			Rebar encountered at 2 feet			
	3-7			Top of Abutment encountered at 3' - 1' cobbles above 2.5 feet Masonry			
	7-8	21-5-1000"	3	Refusal at 8 feet - Masonry Fragments			
	9-9.5'	10-1000"		Refusal at 9.5 feet			
	10-14			Drilled through Abutment, abutment was found to end at 13.5 feet			
	14-16	62-42-45-63	14	Brown fine to medium SAND (wet)		13.5'	
	19-21	9-11-12-12	12	Brownlight brown fine to coarse SAND, trace Silt (wet)			
	24-26	12-9-10-10	0	* No Recovery *			

GROUND  
EL. 470'  
  
EL. 465'  
BOT. OF PROP.  
S. ABUT. EL. 460.37  
EL. 460'  
  
EL. 455'  
  
EL. 450'  
  
EL. 445'

<b>massDOT</b>		Northern Drill Service, Inc. 130 East Main Street, Bldg. A Northborough, MA 01532		Phone: 508-393-6900 Fax: 508-393-6901		Boring No. BB-4 Scale	
City/Town: Fitchburg, MA		Bridge No. F-04-010		Project File No: 607680		Contract No: 69762	
Project: Route 31 (River Street) over North Nashua River		Date & Time Started: 01-26-2022		Total Hours:			
Groundwater Depth: N/A		Date & Time: N/A		Date & Time Completed: 01-31-2022			
Coordinates: N 3039036.87 E 572917.57		Driller's Name: Zac Nader		Helper's Name: Carl			
Ground Elevation: 470.0		Inspector's Name: L. Hopp/ H. Barnes		Inspector's Company: TRC Companies Inc. for STV, Inc.			
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot	Recovery Inches	Field Description		Strata Changes	
S6	29-31	13-8-10-12	11	Tan fine to medium SAND, some Silt, trace Gravel (wet)			
S7	34-36	10-12-11-10	8	Tanlight brown fine to coarse SAND, some Silt (wet)			
S8	39-41	7-4-5-8	14	Light brown fine to medium SAND and SILT			
S9	44-45	31-1009"	10	Light brown fine to coarse SAND and SILT, little Gravel			
S10	49-50.6	23-24-25-1001"	13	Light brown fine to medium SAND, some Silt			

EL. 445'  
  
EL. 440'  
  
EL. 435'  
  
EL. 430'  
  
EL. 425'  
  
EL. 420'

<b>massDOT</b>		Northern Drill Service, Inc. 130 East Main Street, Bldg. A Northborough, MA 01532		Phone: 508-393-6900 Fax: 508-393-6901		Boring No. BB-4 Scale	
City/Town: Fitchburg, MA		Bridge No. F-04-010		Project File No: 607680		Contract No: 69762	
Project: Route 31 (River Street) over North Nashua River		Date & Time Started: 01-26-2022		Total Hours:			
Groundwater Depth: N/A		Date & Time: N/A		Date & Time Completed: 01-31-2022			
Coordinates: N 3039036.87 E 572917.57		Driller's Name: Zac Nader		Helper's Name: Carl			
Ground Elevation: 470.0		Inspector's Name: L. Hopp/ H. Barnes		Inspector's Company: TRC Companies Inc. for STV, Inc.			
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot	Recovery Inches	Field Description		Strata Changes	
	51-54			Drilled through Boulder to 54 feet			
S11	54-56	37-43-83-84	15	Gray fine to medium SILT, little Clay		54'	
S12	59-60	26-29-1000"	12	Gray fine to medium SILT, some Clay			
R1	61-66	2 min/ft. REC 55" RQD 55"	93%	Muscovite, biotite, GRANITE, white and gray, hard, slightly weathered.		61'	
R2	66-71	2 min/ft. REC 55" RQD 48.5"	91%	Muscovite, biotite GRANITE, white and gray, hard, slightly weathered.		61'	
Bottom of Borehole = 71 ft.							

EL. 420'  
  
EL. 415'  
ESTIMATED PILE  
TIP ELEVATION AT  
S. ABUT. EL. 409±  
EL. 410'  
  
EL. 405'  
  
EL. 400'  
  
EL. 395'

CONTINUATION

CONTINUATION

**BORING BB-4 AT SOUTH ABUTMENT**

**NOTES:**

- SEE SHEET 3 FOR BORING NOTES.

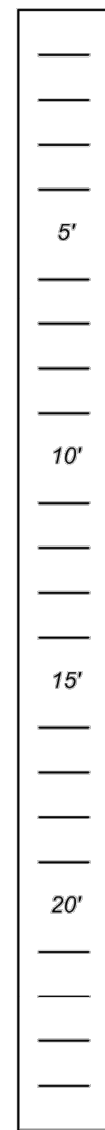
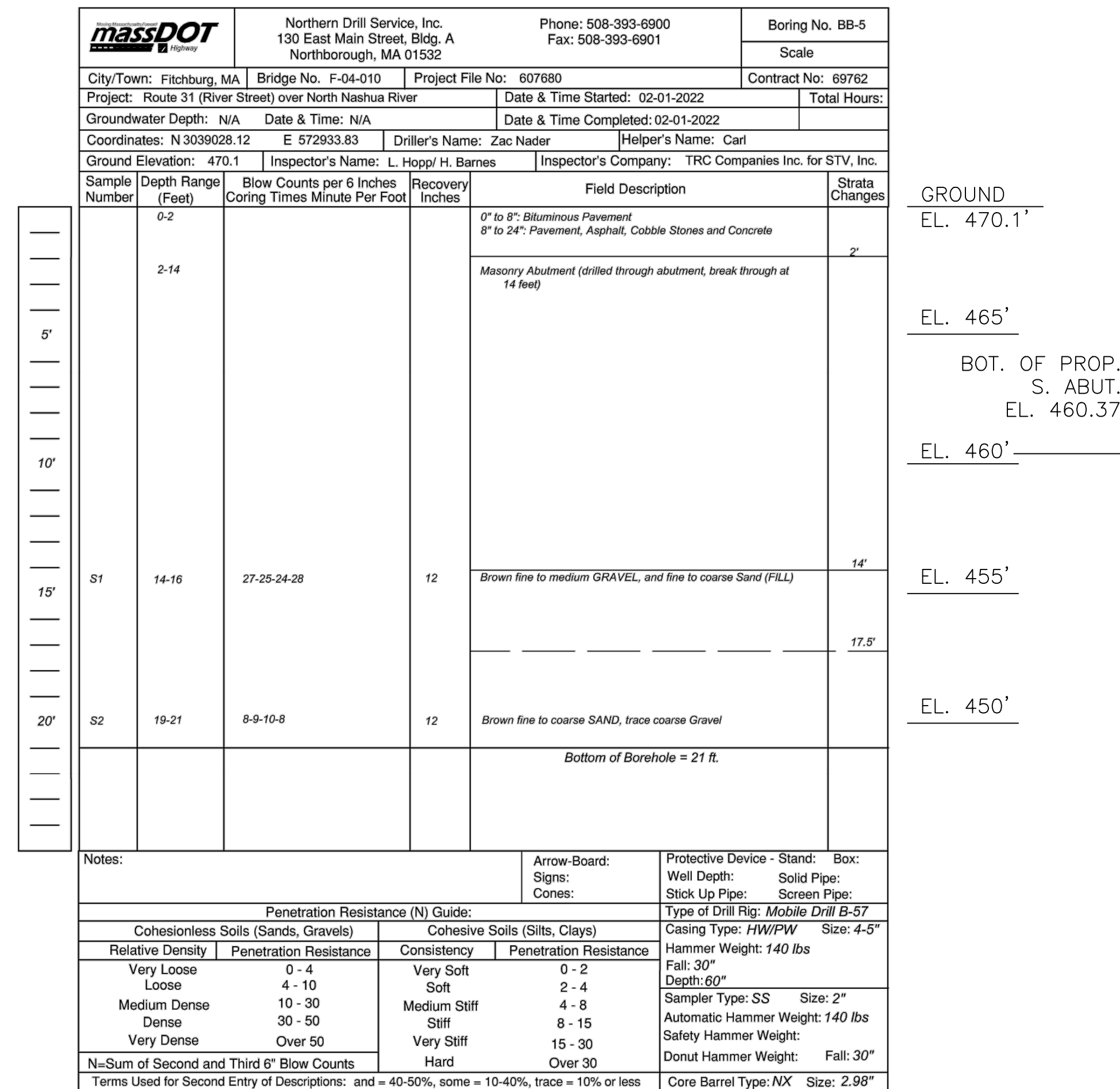
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

11-AUG-2023 10:34 AM 607680\_BOR\_04 (BORING LOGS (2 OF 6))DWG Plotted on 14-Sep-2023 10:34 AM

**FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	29	67
PROJECT FILE NO.		607680	

**BORING LOGS (3 OF 6)**



GROUND  
EL. 470.1'

EL. 465'

BOT. OF PROP.  
S. ABUT.  
EL. 460.37'

EL. 460'

EL. 455'

EL. 450'

**BORING BB-5 AT SOUTH ABUTMENT**

**NOTES:**

- SEE SHEET 3 FOR BORING NOTES.

SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

**FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	30	67
PROJECT FILE NO.		607680	

**BORING LOGS (4 OF 6)**

<b>massDOT</b>		Northern Drill Service, Inc. 130 East Main Street, Bldg. A Northborough, MA 01532		Phone: (508)393-6900 Fax: (508) 393-6901		Boring No. BB-3	
City/Town: Fitchburg, MA		Bridge No. F-04-010		Project File No: 607680		Contract No: 69762	
Project: Route 31 (River Street) over North Nashua River		Date & Time Started: 11-09-2018 10:00 am		Total Hours:			
Groundwater Depth: 13'		Date & Time: 11-14-2018 7:30 am		Date & Time Completed: 11-14-2018 12:30 pm		15.5	
Coordinates: N 3039059.78 E 572974.24		Driller's Name: Zac Nader		Helper's Name: Carl			
Ground Elevation: 470.45'		Inspector's Name: L. Hopp/ S. Sullivan		Inspector's Company: TRC Companies Inc. STV, Inc.			
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot	Recovery Inches	Field Description	Strata Changes		
	0-3.5			-4 in. Bituminous pavement -6 in. Concrete			
				Note: 3.5 ft below deck encountered top of pier Sealed 3' casing 2 ft. into pier.			
R	5.5-10.5	3.9 min/ft. REC 60*	100%	CONCRETE PIER			
R	10.5-15.5	3.3 min/ft. REC 60*	100%	CONCRETE PIER			
R	15.5-20.5	3.2 min/ft. REC 55*	92%	CONCRETE PIER			
R	20.5-22.5	2.2 min/ft. REC 23*	96%	CONCRETE PIER			
S1	22.5-24.5	4-17-9-9	7	Wet, medium dense, black COARSE TO FINE SAND, some medium to fine gravel, trace silt (F#).	22.5'		
S2	24.5-26.5	8-16-13-9	17	Top 9 in: Wet, medium dense, black COARSE SAND (F#).			

GROUND  
EL. 470.45'  
  
EL. 465'  
  
EL. 460'  
  
EL. 455'  
  
BOT. OF FOOTING AT  
PIER EL. 448.25±  
EL. 450'  
  
EL. 445'

GROUNDWATER  
TABLE  
RECORDED ON  
11/14/2018

<b>massDOT</b>		Northern Drill Service, Inc. 130 East Main Street, Bldg. A Northborough, MA 01532		Phone: (508)393-6900 Fax: (508) 393-6901		Boring No. BB-3	
City/Town: Fitchburg, MA		Bridge No. F-04-010		Project File No: 607680		Contract No: 69762	
Project: Route 31 (River Street) over North Nashua River		Date & Time Started: 11-09-2018 10:00 am		Total Hours:			
Groundwater Depth: 13'		Date & Time: 11-14-2018 7:30 am		Date & Time Completed: 11-14-2018 12:30 pm		15.5	
Coordinates: N 3039059.78 E 572974.24		Driller's Name: Zac Nader		Helper's Name: Carl			
Ground Elevation: 470.45'		Inspector's Name: L. Hopp/ S. Sullivan		Inspector's Company: TRC Companies Inc. STV, Inc.			
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot	Recovery Inches	Field Description	Strata Changes		
S3	27-29	4-6-6-9	11	Bottom 8 in: Wet, medium dense, brown COARSE TO FINE SAND, some coarse to fine gravel, trace silt. (F#).			
S4	30-32	6-5-6-9	7	Wet, medium dense, dark gray COARSE TO FINE SAND, trace medium to fine gravel, trace silt.			
S5	32-34	10-9-12-13	17	Top 10 in: Wet, medium dense, dark gray COARSE TO FINE SAND, trace medium to fine gravel, trace silt. Bottom 7 in: Wet, medium dense, gray, FINE SAND, some silt.			
S6	34-36	4-7-13-20	13	Wet, medium dense, brown, MEDIUM TO FINE SAND, trace silt, trace fine gravel.			
S7	36-38	11-13-16-15	14	Wet, medium dense, brown FINE SAND, and silt. Orange striations (oxidation) present.			
S8	38-40	5-6-8-17	12	Wet, medium dense, brown FINE SAND, and silt. Orange striations (oxidation) present.			
S9	40-42	11-9-14-16	13	Wet, medium dense, brown COARSE TO FINE SAND, some silt, trace medium gravel.			
S10	42-44	14-16-14-16	18	Wet, dense, brown COARSE TO FINE SAND, some silt, trace medium gravel.			
S11	44-46	10-16-12-19	14	Top 3 in: Wet, medium dense, brown COARSE TO FINE GRAVEL, some coarse to fine sand, some silt. Bottom 11 in: Wet, medium dense, brown, MEDIUM TO FINE SAND, some silt, trace medium to fine gravel.	44' <del>44.25'</del>		
S12	46-48	30-33-55-64	24	Wet, very dense, brown COARSE TO FINE SAND, and coarse to fine gravel, trace silt.			

EL. 445'  
  
EL. 440'  
  
EL. 435'  
  
EL. 430'  
  
EL. 425'  
  
EL. 420'

<b>massDOT</b>		Northern Drill Service, Inc. 130 East Main Street, Bldg. A Northborough, MA 01532		Phone: (508)393-6900 Fax: (508) 393-6401		Boring No. BB-3	
City/Town: Fitchburg, MA		Bridge No. F-04-010		Project File No: 607680		Contract No: 69762	
Project: Route 31 (River Street) over North Nashua River		Date & Time Started: 11-09-2018 10:00 am		Total Hours:			
Groundwater Depth: 13'		Date & Time: 11-14-2018 7:30 am		Date & Time Completed: 11-14-2018 12:30 pm		15.5	
Coordinates: N 3039059.78 E 572974.24		Driller's Name: Zac Nader		Helper's Name: Carl			
Ground Elevation: 470.45'		Inspector's Name: L. Hopp/ S. Sullivan		Inspector's Company: TRC Companies Inc. STV, Inc.			
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot	Recovery Inches	Field Description	Strata Changes		
S13	50-50.8	62-304*	10	Wet, very dense, gray, FINE SAND, some medium to fine gravel, some silt.			
R1	51-56	2.7 min/ft. REC 25* RQD 0*	42%	51 ft. to 53 ft. 11 in.: No Recovery. 53 ft. 11 in. to 54 ft. 10 in.: Muscovite, biotite GRANITE, white and gray, hard, moderately weathered. 54 ft. 10 in. to 56 ft. 1 in.: GRANITE, gray and black, hard, slightly weathered.	51'		
R2	56-61	4.1 min/ft. REC 58* RQD 54*	97%	56 ft. 1 in. to 57 ft. 11 in.: Muscovite, biotite GRANITE, white and gray, hard, moderately weathered. 57 ft. 11 in. to 61 ft.: GRANITE, gray and black, hard, slightly weathered.			
Bottom of Borehole = 61 ft.							

EL. 420'  
  
EL. 415'  
  
EL. 410'  
  
EL. 405'  
  
EL. 400'  
  
EL. 395'

Notes:				Arrow-Board: Signs: Cones:		Protective Device - Stand: Box: Well Depth: Solid Pipe: Stick Up Pipe: Screen Pipe: Type of Drill Rig: Mobile Drill B-57	
Penetration Resistance (N) Guide:				Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Sills, Clays)	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance	Relative Density	Penetration Resistance	Consistency	Penetration Resistance
Very Loose	0 - 4	Very Soft	0 - 2	Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4	Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Medium Stiff	4 - 8	Medium Dense	10 - 30	Medium Stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15	Dense	30 - 50	Stiff	8 - 15
Very Dense	Over 50	Very Stiff	15 - 30	Very Dense	Over 50	Very Stiff	15 - 30
N=Sum of Second and Third 6" Blow Counts				Hard		Over 30	
Terms Used for Second Entry of Descriptions: and = 40-50%, some = 10-40%, trace = 10% or less				Core Barrel Type: NX		Size: 2.98"	

CONTINUATION

CONTINUATION

**BORING BB-3 AT PIER**

**NOTES:**

- SEE SHEET 3 FOR BORING NOTES.

SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

**FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	31	67
PROJECT FILE NO.		607680	

**BORING LOGS (5 OF 6)**

11-AUG-2023 10:36 AM  
607680\_BOR\_07 (BORING LOGS (5 OF 6)).DWG  
Plotted on 14-Sep-2023 10:36 AM

<b>massDOT</b>		Northern Drill Service, Inc. 130 East Main Street, Bldg. A Northborough, MA 01532		Phone: 508-393-6900 Fax: 508-393-6901		Boring No. BB-1	
City/Town: Fitchburg, MA		Bridge No. F-04-010		Project File No: 607680		Contract No: 69762	
Project: Route 31 (River Street) over North Nashua River		Date & Time Started: 11-06-2018 8:30 am		Total Hours: 15.8			
Groundwater Depth: 13'		Date & Time: 11-08-2018 8:00 am		Date & Time Completed: 11-08-2018 12:20 pm			
Coordinates: N 3039094.12 E 573013.85		Driller's Name: Zac Nader		Helper's Name: Carl			
Ground Elevation: 471.16		Inspector's Name: L. Hopp/ S. Sullivan		Inspector's Company: TRC Companies Inc. for STV, Inc.			
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot	Recovery Inches	Field Description	Strata Changes		
	0-4			HAND AUGERING ~5 in. Bituminous pavement	0.4'		
S1	4-6	5-4-2-3	9	Wet, loose, gray/brown, MEDIUM TO FINE GRAVEL, some coarse to fine sand, trace silt. (Fill).			
S2	6-7.25	6-9-50*	10	Wet, very dense, gray/brown, MEDIUM TO FINE GRAVEL, and coarse to fine sand, trace silt, boulder present (Fill).			
S3	8-10	5-3-2-2	9	Wet, loose, gray/brown, MEDIUM TO FINE GRAVEL, and coarse to fine sand, trace silt. (Fill).			
S4	10-12	3-1-1-1	9	Wet, loose, gray/brown, COARSE TO FINE SAND, and medium to fine gravel, some silt (Fill).	10'		
S5	12-14	3-2-1-4	5	Wet, loose, gray/brown, COARSE TO FINE GRAVEL, some coarse to fine sand, some silt. (Fill).	12'		
S6	14-16	4-6-5-4	5	Wet, medium dense, brown, COARSE TO FINE GRAVEL, some coarse to fine sand, some silt. (Fill).			
S7	16-18	4-16-46-36	18	Wet, very dense, gray/brown, COARSE TO FINE GRAVEL, some coarse to fine sand, trace silt, wood. (Fill).			
S8	18-20	18-16-22-20	8	Wet, dense, brown, MEDIUM TO FINE GRAVEL, some medium to fine sand, trace silt.			
S9	20-22	4-10-7-11	5	Wet, medium dense, brown, MEDIUM TO FINE GRAVEL, trace coarse to fine sand, trace silt (rock stuck in tip).			
S10	22-24	8-11-7-6	8	Wet, medium dense, gray/brown, COARSE TO FINE GRAVEL, and coarse to fine sand, trace silt.			
S11	24-26	5-6-10-13	6	Top 3 in: Wet, medium dense, gray/brown, COARSE TO FINE GRAVEL, and coarse to fine sand, trace silt.	24.25'		

GROUND  
EL. 471.16'  
  
BOT. OF PROP.  
N. ABUT. EL. 461.39'  
  
EL. 465'  
  
EL. 460'  
  
GROUNDWATER  
TABLE RECORDED  
ON 11/08/2018  
EL. 455'  
  
EL. 450'  
  
EL. 445'

<b>massDOT</b>		Northern Drill Service, Inc. 130 East Main Street, Bldg. A Northborough, MA 01532		Phone: 508-393-6900 Fax: 508-393-6901		Boring No. BB-1	
City/Town: Fitchburg, MA		Bridge No. F-04-010		Project File No: 607680		Contract No: 69762	
Project: Route 31 (River Street) over North Nashua River		Date & Time Started: 11-06-2018 8:30 am		Total Hours: 15.8			
Groundwater Depth: 13'		Date & Time: 11-08-2018 8:00 am		Date & Time Completed: 11-08-2018 12:20 pm			
Coordinates: N 3039094.12 E 573013.85		Driller's Name: Zac Nader		Helper's Name: Carl			
Ground Elevation: 471.16		Inspector's Name: L. Hopp/ S. Sullivan		Inspector's Company: TRC Companies Inc. for STV, Inc.			
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot	Recovery Inches	Field Description	Strata Changes		
S12	26-28	11-13-14-14	18	Bottom 3 in: Wet, medium dense, red, MEDIUM TO FINE SAND, some silt (oxidation present). Top 3 in: Wet, medium dense, gray, COARSE TO FINE SAND, some coarse to fine gravel, trace silt. Bottom 15 in: Wet, medium dense, COARSE TO FINE SAND, some silt, trace medium gravel (Oxidation Present). Wet, medium dense, gray/brown, COARSE TO FINE SAND, some medium to fine gravel, trace silt. (Rock stuck in split Spoon).			
S13	28-30	8-13-13-12	9				
S14	34-36	3-4-5-9	11	Wet, loose, gray, COARSE TO FINE SAND, some silt.			
S15	39-41	6-8-16-20	15	Wet, medium dense, brown, COARSE TO FINE SAND, some silt, trace medium gravel.			
S16	44-46	13-13-9-6	15	Top 7 in: Wet, medium dense, gray to brown, COARSE TO FINE SAND, some medium to fine gravel, trace clay. Bottom 8 in: Wet, medium dense, brown, CLAY, some silt.	44.6'		

EL. 445'  
  
EL. 440'  
  
EL. 435'  
  
EL. 430'  
  
EL. 425'  
  
EL. 420'

<b>massDOT</b>		Northern Drill Service, Inc. 130 East Main Street, Bldg. A Northborough, MA 01532		Phone: 508-393-6900 Fax: 508-393-6901		Boring No. BB-1	
City/Town: Fitchburg, MA		Bridge No. F-04-010		Project File No: 607680		Contract No: 69762	
Project: Route 31 (River Street) over North Nashua River		Date & Time Started: 11-06-2018 8:30 am		Total Hours: 15.8			
Groundwater Depth: 13'		Date & Time: 11-08-2018 8:00 am		Date & Time Completed: 11-08-2018 12:20 pm			
Coordinates: N 3039094.12 E 573013.85		Driller's Name: Zac Nader		Helper's Name: Carl			
Ground Elevation: 471.16		Inspector's Name: L. Hopp/ S. Sullivan		Inspector's Company: TRC Companies Inc. for STV, Inc.			
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot	Recovery Inches	Field Description	Strata Changes		
R1	51-55.5	12.75 min/ft. REC 46" RQD 25"	85% 46%	GRANITE, gray and black, hard, slightly weathered.  52 ft. 8 in. changes to Muscovite, biotite GRANITE, white and gray, hard, moderately weathered.	51'		
R2	55.5-57	39.85 min/ft. REC 15" RQD 25"	83% 78%	Muscovite, biotite GRANITE, white and gray, hard, moderately weathered.			
				Bottom of Borehole = 57 ft.			

ESTIMATED PILE  
TIP ELEVATION AT  
N. ABUT. EL. 420±  
  
EL. 420'  
  
EL. 415'  
  
EL. 410'

CONTINUATION

CONTINUATION

**BORING BB-1 AT NORTH ABUTMENT**

**NOTES:**

- SEE SHEET 3 FOR BORING NOTES.

SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

**FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	32	67
PROJECT FILE NO.		607680	

**BORINGS LOGS (6 OF 6)**

<b>massDOT</b>		Northern Drill Service, Inc. 130 East Main Street, Bldg. A Northborough, MA 01532		Phone: 508-393-6900 Fax: 508-393-6901		Boring No. BB-6 Scale	
City/Town: Fitchburg, MA		Bridge No. F-04-010		Project File No: 607680		Contract No: 69762	
Project: Route 31 (River Street) over North Nashua River		Date & Time Started: 01-25-2022		Total Hours:			
Groundwater Depth: N/A		Date & Time: N/A		Date & Time Completed: 01-26-2022			
Coordinates: N 3039100.71 E 572997.10		Driller's Name: Zac Nader		Helper's Name: Carl			
Ground Elevation: 471.0		Inspector's Name: L. Hopp/ H. Barnes		Inspector's Company: TRC Companies Inc. for STV, Inc.			
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot	Recovery Inches	Field Description		Strata Changes	
	0-6			23" Pavement / asphalt			
				Cobble stones, and soil			
S1	6-8	5-9-3-10	12	Brown fine to coarse SAND, trace Silt, trace Asphalt (wet) Top of Abutment at 8 feet below the ground surface		8'	
R1	8-9	2.57 min/ft REC 0" RQD 0%	0%	Masonry Abutment			
S2	9-11	9-5-33-31	5	2" Tan fine to coarse SAND (wet) 3" Masonry Abutment Fragments			
S3	13-14.3	6-12-100/4"		Masonry Abutment fragments refusal @ 14 feet			
R2	14.5-15.5	1.57 min/ft REC=8.5" RQD=0	71%			14'	
			0%				
S4	19-20	10-31-28-29	11	Tan/brown medium to coarse SAND			
S5	23-25	10-12-21-18	7	Tan/brown coarse SAND			
Notes:		Arrow-Board: Signs: Cones:		Protective Device - Stand: Well Depth: Stick Up Pipe: Screen Pipe:		Box: Solid Pipe: Screen Pipe:	
Penetration Resistance (N) Guide:		Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Sils, Clays)		Casing Type: HW/PW Size: 4-5"	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance	Consistency	Penetration Resistance	Hammer Weight: 140 lbs	Fall: 30"
Very Loose	0 - 4	Very Soft	0 - 2	Soft	2 - 4	Depth: 60"	
Loose	4 - 10	Medium Stiff	4 - 8	Stiff	8 - 15	Sampler Type: SS Size: 2"	
Medium Dense	10 - 30	Dense	30 - 50	Very Dense	Over 50	Automatic Hammer Weight: 140 lbs	
						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: NX		Size: 2.98"			

GROUND  
EL. 471.0'  
  
EL. 465'  
  
BOT. OF PROP.  
N. ABUT. EL. 461.39  
  
EL. 460'  
  
EL. 455'  
  
EL. 450'  
  
EL. 445'

<b>massDOT</b>		Northern Drill Service, Inc. 130 East Main Street, Bldg. A Northborough, MA 01532		Phone: 508-393-6900 Fax: 508-393-6901		Boring No. BB-6 Scale	
City/Town: Fitchburg, MA		Bridge No. F-04-010		Project File No: 607680		Contract No: 69762	
Project: Route 31 (River Street) over North Nashua River		Date & Time Started: 01-25-2022		Total Hours:			
Groundwater Depth: N/A		Date & Time: N/A		Date & Time Completed: 01-26-2022			
Coordinates: N 3039100.71 E 572997.10		Driller's Name: Zac Nader		Helper's Name: Carl			
Ground Elevation: 471.0		Inspector's Name: L. Hopp/ H. Barnes		Inspector's Company: TRC Companies Inc. for STV, Inc.			
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot	Recovery Inches	Field Description		Strata Changes	
S6	26-28	9-10-11-11	11	Light brown/gray fine to medium SAND, little Silt			
S7	31-33	12-16-26-15	3	Light brown fine to coarse SAND, little Silt			
S8	38-40	9-10-11-10	12	Light brown/gray fine to medium SAND, some Silt, trace Clay			
S9	43-45	23-24-22-15	12	Tan/gray fine SAND and SILT, trace Clay top of rock at 48.5 feet		48.5'	
Notes:		Arrow-Board: Signs: Cones:		Protective Device - Stand: Well Depth: Stick Up Pipe: Screen Pipe:		Box: Solid Pipe: Screen Pipe:	
Penetration Resistance (N) Guide:		Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Sils, Clays)		Casing Type: HW/PW Size: 4-5"	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance	Consistency	Penetration Resistance	Hammer Weight: 140 lbs	Fall: 30"
Very Loose	0 - 4	Very Soft	0 - 2	Soft	2 - 4	Depth: 60"	
Loose	4 - 10	Medium Stiff	4 - 8	Stiff	8 - 15	Sampler Type: SS Size: 2"	
Medium Dense	10 - 30	Dense	30 - 50	Very Dense	Over 50	Automatic Hammer Weight: 140 lbs	
						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: NX		Size: 2.98"			

EL. 445'  
  
EL. 440'  
  
EL. 435'  
  
EL. 430'  
  
EL. 425'  
  
ESTIMATED PILE  
TIP ELEVATION AT  
N. ABUT. EL. 420±  
  
EL. 420'

<b>massDOT</b>		Northern Drill Service, Inc. 130 East Main Street, Bldg. A Northborough, MA 01532		Phone: 508-393-6900 Fax: 508-393-6901		Boring No. BB-6 Scale	
City/Town: Fitchburg, MA		Bridge No. F-04-010		Project File No: 607680		Contract No: 69762	
Project: Route 31 (River Street) over North Nashua River		Date & Time Started: 01-25-2022		Total Hours:			
Groundwater Depth: N/A		Date & Time: N/A		Date & Time Completed: 01-26-2022			
Coordinates: N 3039100.71 E 572997.10		Driller's Name: Zac Nader		Helper's Name: Carl			
Ground Elevation: 471.0		Inspector's Name: L. Hopp/ H. Barnes		Inspector's Company: TRC Companies Inc. for STV, Inc.			
Sample Number	Depth Range (Feet)	Blow Counts per 6 Inches Coring Times Minute Per Foot	Recovery Inches	Field Description		Strata Changes	
R3	49-54	2.5 min/ft REC 26" RQD 25%	43%	Muscovite, biotite, GRANITE, white and gray, hard, highly weathered.			
R4	54-59	4 min/ft REC 56" RQD 50%	96%	Muscovite, biotite GRANITE, white and gray, hard, slightly weathered.			
				Bottom of Borehole = 59 ft.			
Notes:		Arrow-Board: Signs: Cones:		Protective Device - Stand: Well Depth: Stick Up Pipe: Screen Pipe:		Box: Solid Pipe: Screen Pipe:	
Penetration Resistance (N) Guide:		Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Sils, Clays)		Casing Type: HW/PW Size: 4-5"	
Relative Density	Penetration Resistance	Consistency	Penetration Resistance	Consistency	Penetration Resistance	Hammer Weight: 140 lbs	Fall: 30"
Very Loose	0 - 4	Very Soft	0 - 2	Soft	2 - 4	Depth: 60"	
Loose	4 - 10	Medium Stiff	4 - 8	Stiff	8 - 15	Sampler Type: SS Size: 2"	
Medium Dense	10 - 30	Dense	30 - 50	Very Dense	Over 50	Automatic Hammer Weight: 140 lbs	
						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: NX		Size: 2.98"			

EL. 420'  
  
EL. 415'  
  
EL. 410'

CONTINUATION

CONTINUATION

**BORING BB-6 AT NORTH ABUTMENT**

**NOTES:**

- SEE SHEET 3 FOR BORING NOTES.

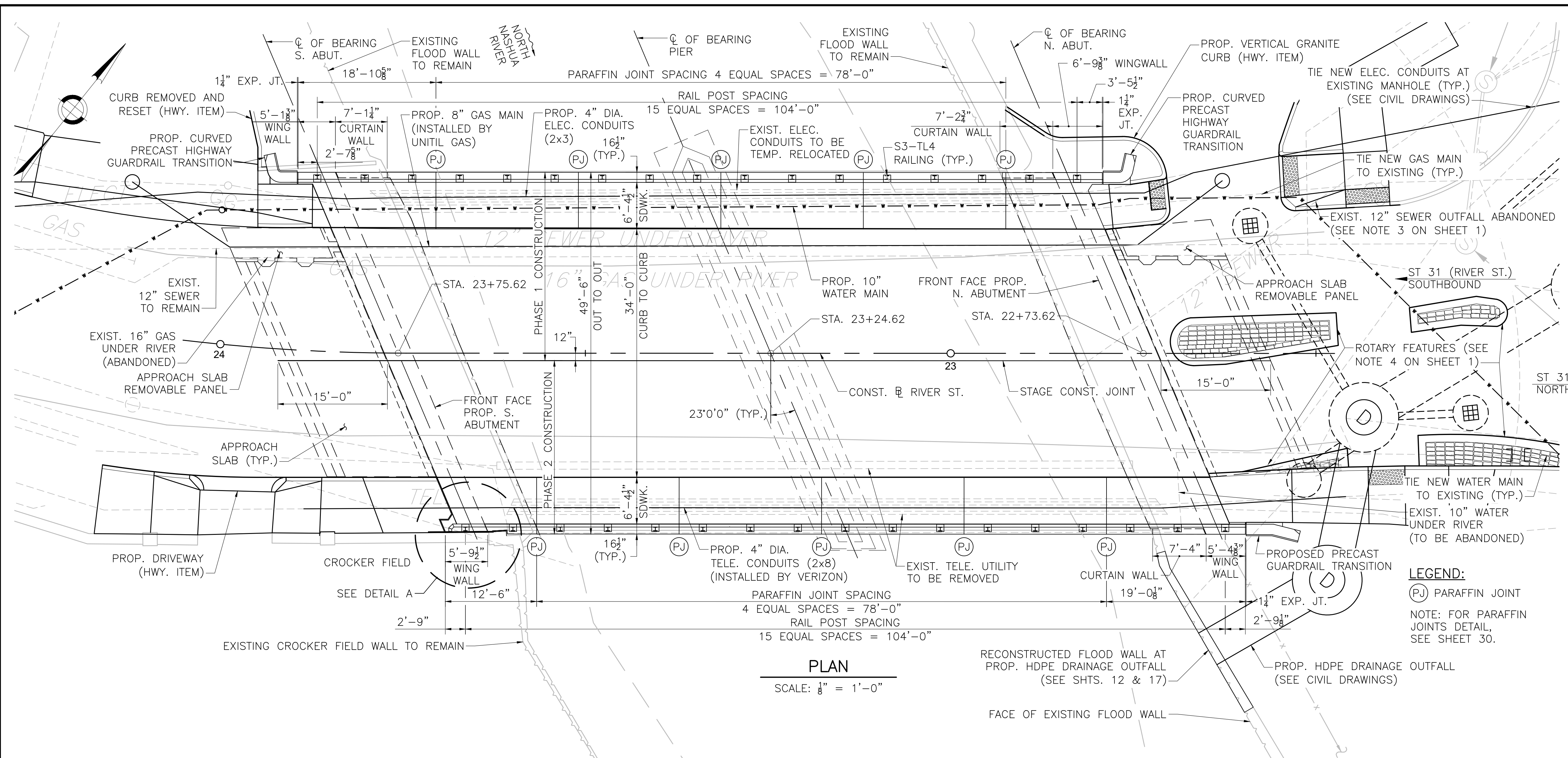
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	



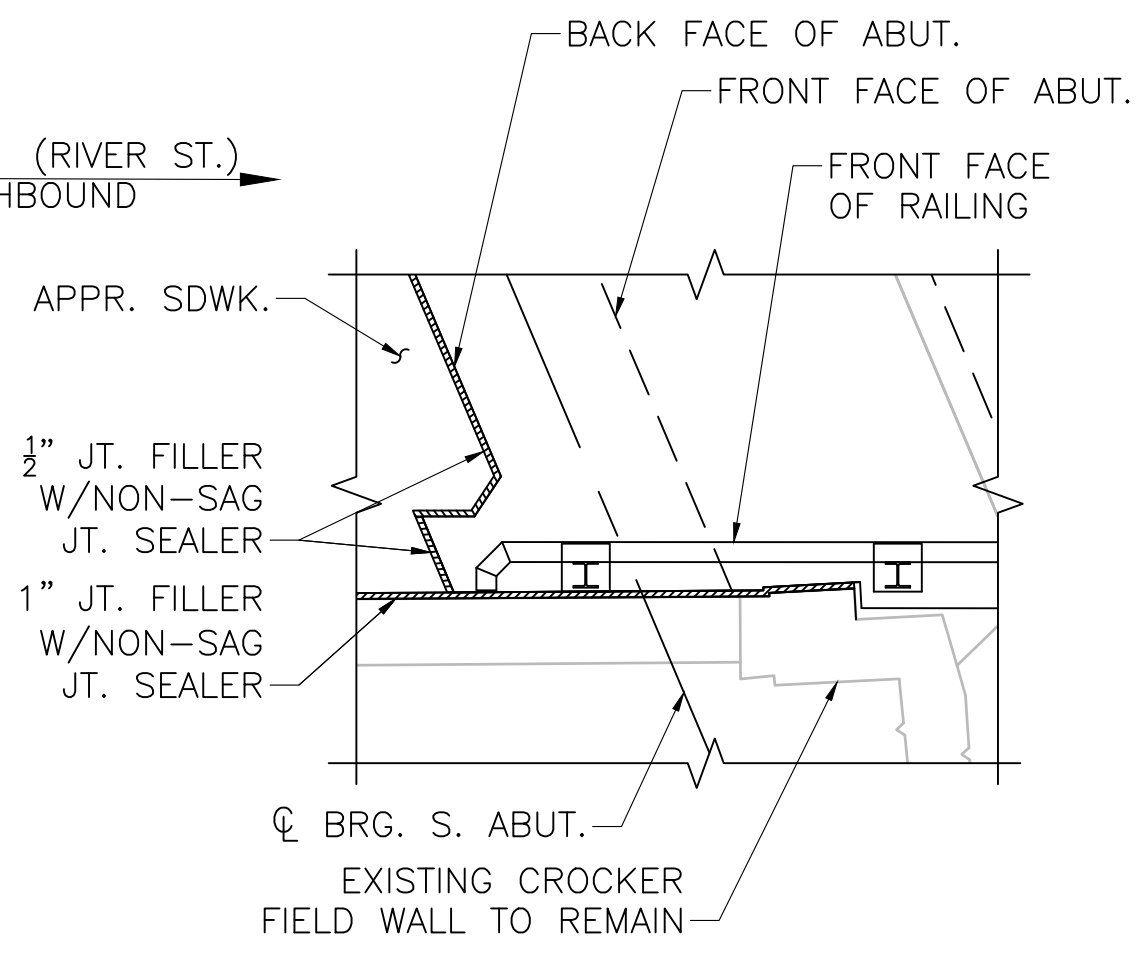
**FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	33	67
PROJECT FILE NO.		607680	

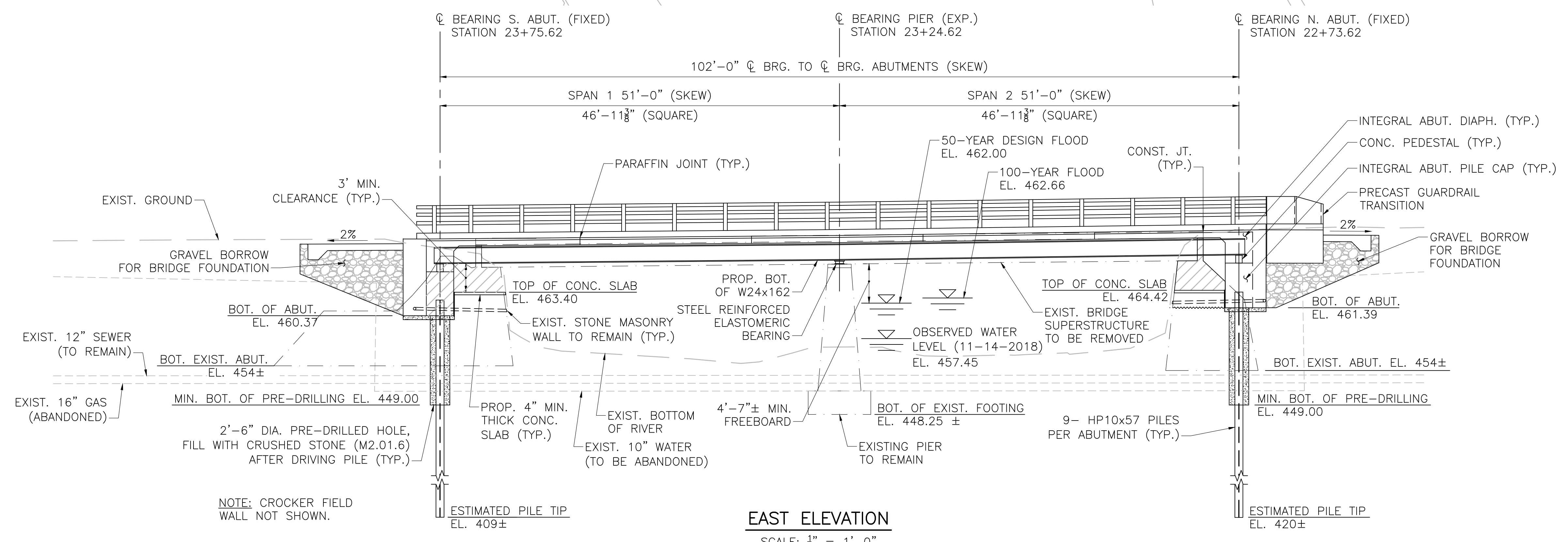
**PLAN AND ELEVATION**



**PLAN**  
SCALE: 1/8" = 1'-0"



**DETAIL A**  
SCALE: 1/4" = 1'-0"



**EAST ELEVATION**  
SCALE: 1/8" = 1'-0"

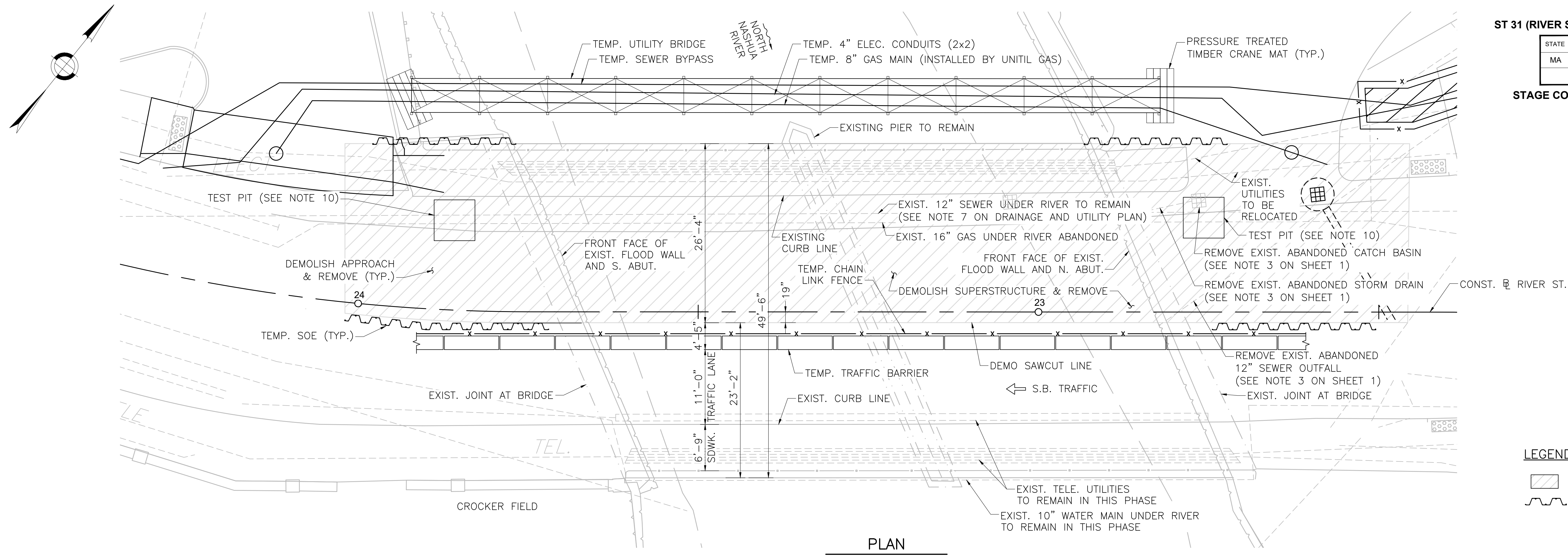
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

11-AUG-2023 10:37 AM 607680\_BR\_09 (PLAN AND ELEVATION).DWG Plotted on 14-Sep-2023 10:37 AM Final Structural Submittal (SF)

FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	34	67
PROJECT FILE NO.		607680	

STAGE CONSTRUCTION DETAILS - PHASE 1A



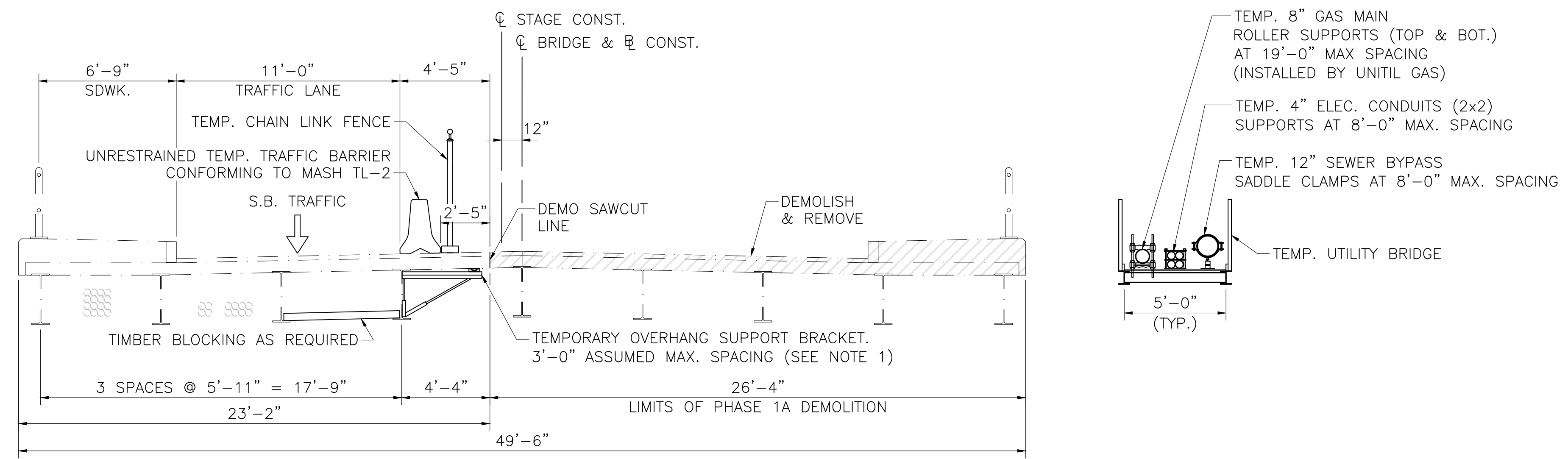
PLAN  
SCALE: 1/8" = 1'-0"

LEGEND:

	DEMOLISH AND REMOVE
	SCHEMATIC TEMPORARY SUPPORT OF EXCAVATION

CONSTRUCTION STAGING NOTES (PHASE 1A):

1. PLACE TEMPORARY TRAFFIC BARRIER ON EXISTING BRIDGE AND APPROACHES. INSTALL TIMBER BLOCKING AND CANTILEVER BRACKETS (DESIGNED BY CONTRACTOR) AT WEST CANTILEVER OF EXISTING BRIDGE.
2. ALLOW SOUTHBOUND TRAFFIC ON BRIDGE.
3. INSTALL TEMPORARY SUPPORT OF EXCAVATION (DESIGNED BY CONTRACTOR) AT APPROACHES.
4. INSTALL TEMPORARY UTILITY BRIDGE. SEE SHEET 14 FOR DETAILS.
5. COORDINATE WITH UNITIL GAS AND UNITIL ELECTRIC AND TEMPORARILY RELOCATE 8" GAS MAIN AND ELECTRICAL CONDUITS TO UTILITY BRIDGE.
6. COORDINATE WITH CITY OF FITCHBURG AND INSTALL TEMPORARY SEWER BYPASS ON UTILITY BRIDGE.
7. EXISTING TELEPHONE UTILITIES AND WATER MAIN TO REMAIN IN THIS PHASE.
8. DEMOLISH AND REMOVE EXISTING BRIDGE SUPERSTRUCTURE AND APPROACHES TO LIMITS SHOWN.
9. EXCAVATE EXISTING ABUTMENTS TO THE LIMITS SHOWN ON SHEETS 15 AND 16.
10. LOCATE EXISTING SEWER LINE USING TEST PITS (ONE AT EACH APPROACH) PRIOR TO PILE DRIVING OPERATIONS. EXCAVATION FOR TEST PITS IS ANTICIPATED TO OCCUR AFTER EXCAVATION FOR PROPOSED ABUTMENTS IS COMPLETE. PLAN AREA OF TEST PITS TO BE ADJUSTED IN THE FIELD AS NECESSARY TO LOCATE EXISTING SEWER LINE.



PHASE 1A (LOOKING SOUTH)  
SCALE: 1/4" = 1'-0"

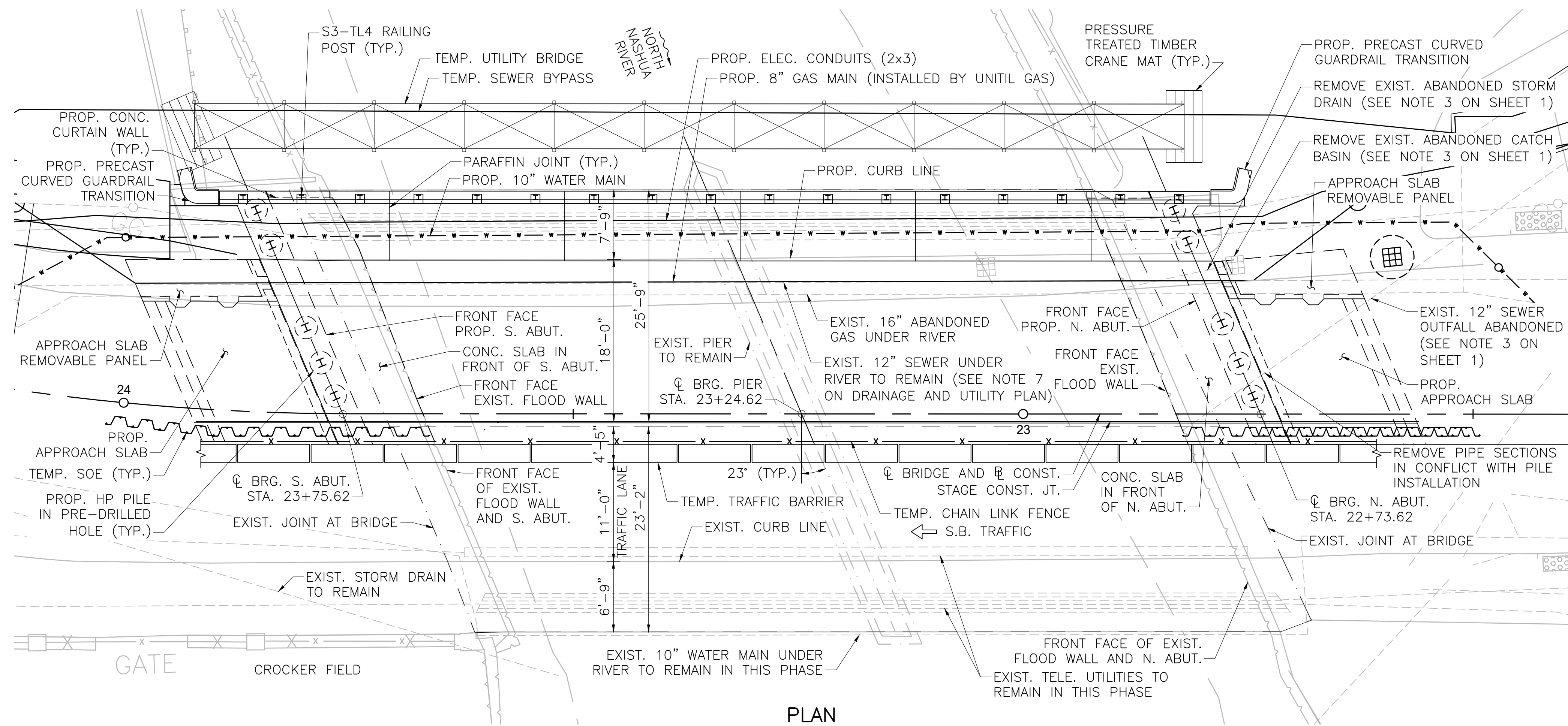
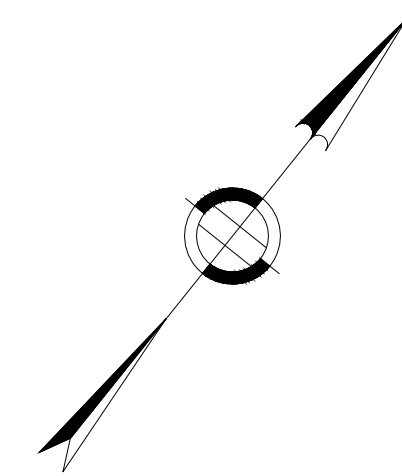
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

607680\_BR 10 (STAGE CONSTRUCTION DETAILS - PHASE 1A).DWG Plotted on 14-Sep-2023 10:37 AM 11-AUG-2023 Final Structural Submittal (SF)

**FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	35	67
PROJECT FILE NO.		607680	

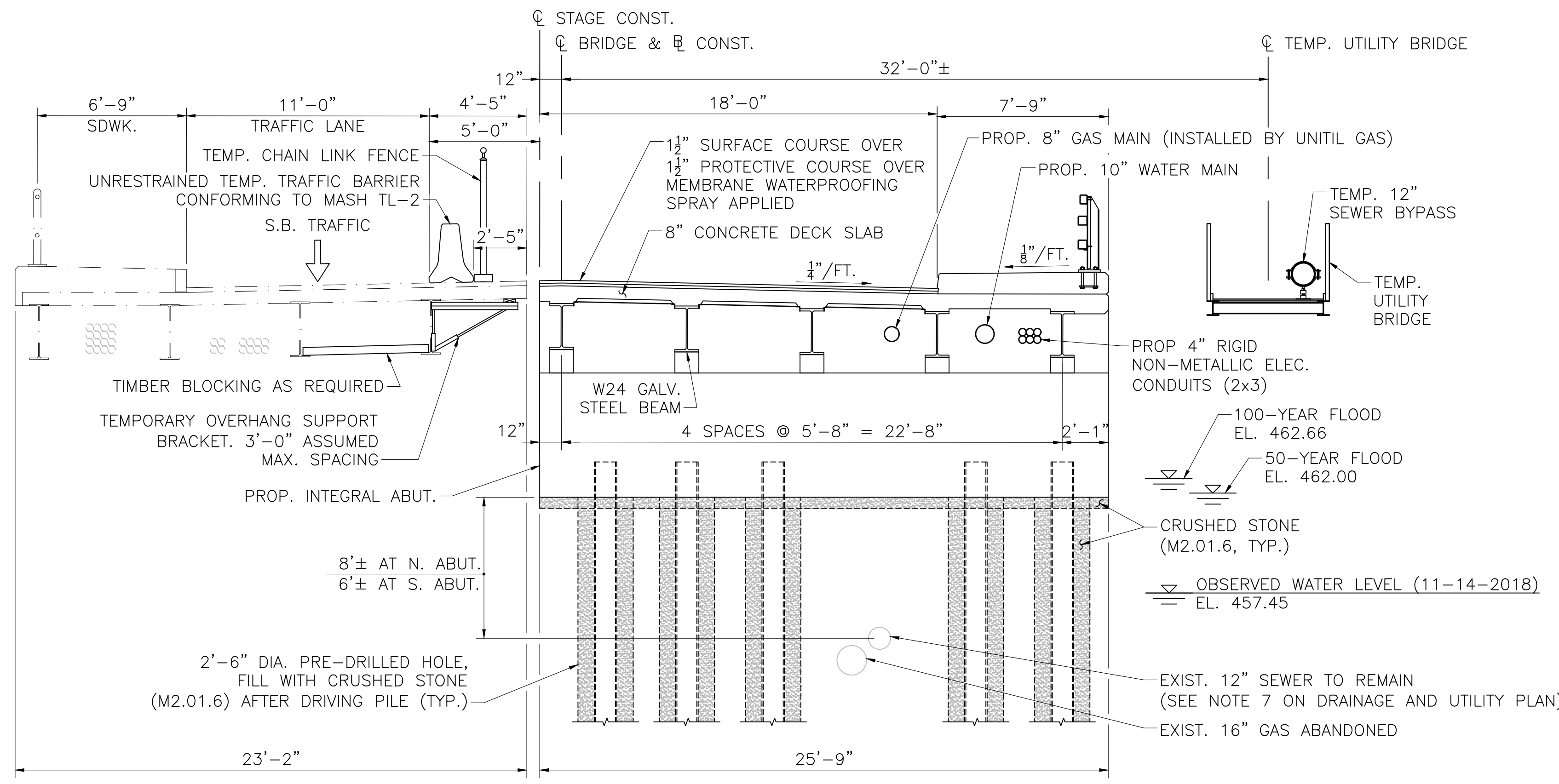
**STAGE CONSTRUCTION DETAILS - PHASE 1B**



**PLAN**  
SCALE: 1/8" = 1'-0"

**LEGEND:**

	DEMOLISH AND REMOVE
	SCHEMATIC TEMPORARY SUPPORT OF EXCAVATION



**PHASE 1B (LOOKING SOUTH)**  
SCALE: 1/4" = 1'-0"

**CONSTRUCTION STAGING NOTES (PHASE 1B):**

1. PROTECT AND MONITOR EXISTING SEWER LINE DURING PILE DRIVING OPERATIONS.
2. ALL EXCAVATED VOLUME BELOW THE BOTTOM OF ABUTMENTS SHALL BE FILLED WITH CRUSHED STONE (M2.01.6).
3. CONSTRUCT SOUTHBOUND PORTION OF PROPOSED BRIDGE TO THE EXTENT SHOWN.
4. INSTALL PROPOSED 4" ELECTRICAL CONDUITS AND PROPOSED 8" GAS MAIN IN SOUTHBOUND PORTION OF PROPOSED BRIDGE.
5. REMOVE TEMPORARY 12" SEWER BYPASS, AND TEMPORARY UTILITY BRIDGE AFTER PILE INSTALLATION.

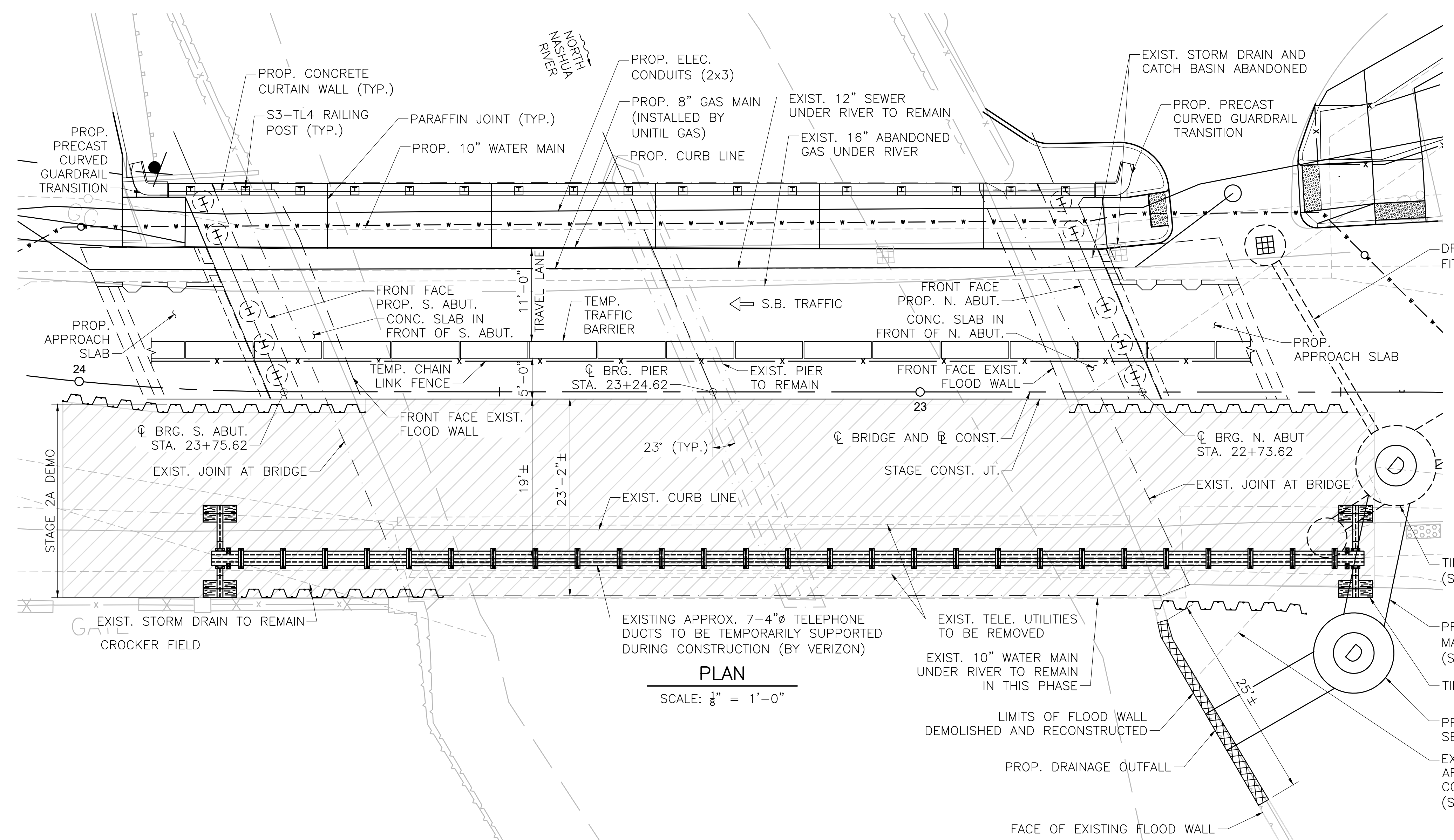
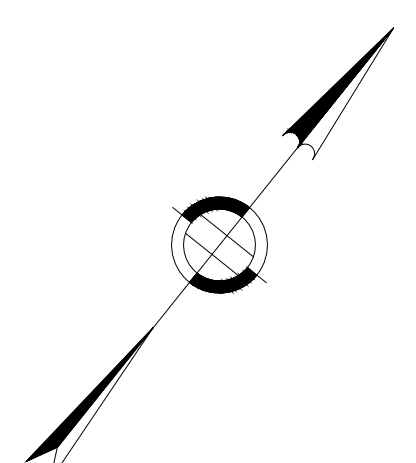
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

607680\_BR 11 (STAGE CONSTRUCTION DETAILS - PHASE 1B).DWG Plotted on 14-Sep-2023 10:38 AM 11-AUG-2023 Final Structural Submittal (SF)

**FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	36	67
PROJECT FILE NO.		607680	

**STAGE CONSTRUCTION DETAILS PHASE 2A**

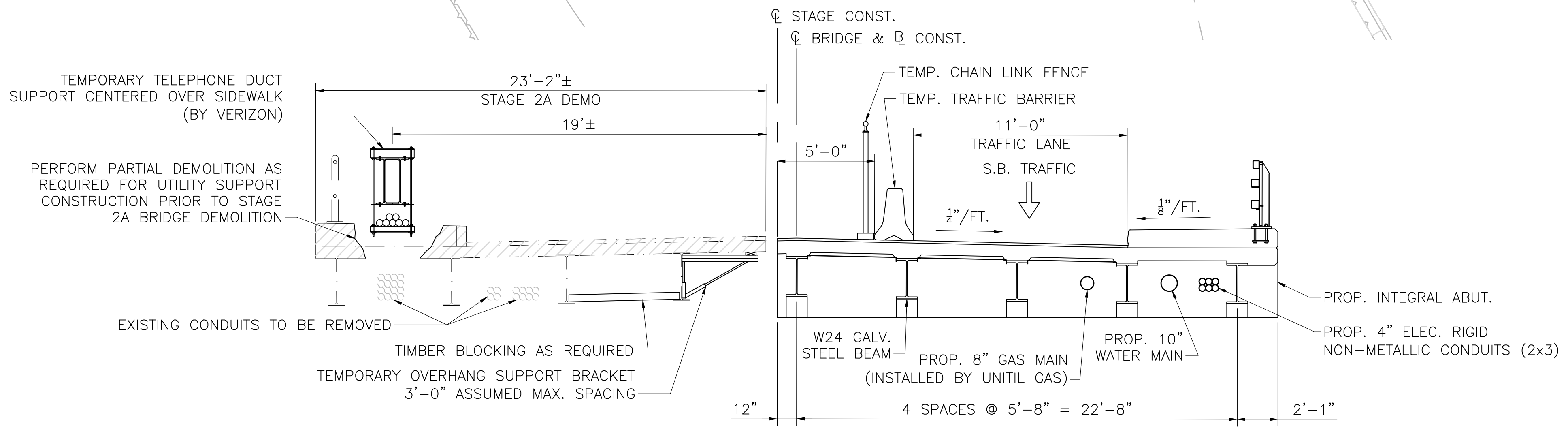


**LEGEND:**  
 DEMOLISH AND REMOVE  
 SCHEMATIC TEMPORARY SUPPORT OF EXCAVATION

**PLAN**  
SCALE:  $\frac{1}{8}'' = 1'-0''$

**CONSTRUCTION STAGING NOTES (PHASE 2A):**

1. INSTALL TRAFFIC CONTROL TO DIRECT SOUTHBOUND TRAFFIC ON BRIDGE. NORTHBOUND TRAFFIC TO BE DETOURED AS SHOWN ON TEMPORARY TRAFFIC CONTROL PLANS.
2. CONSTRUCT PROPOSED DRAINAGE OUTFALL AS INDICATED IN THE CIVIL DRAWINGS. EXCAVATION FOR THE 60" HDPE PIPE, MANHOLE AND OUTFALL WILL REQUIRE TEMPORARY SUPPORT OF EXISTING TELEPHONE UTILITIES ACROSS THE TRENCH WIDTH. THIS TEMPORARY SUPPORT IS THE RESPONSIBILITY OF THE CONTRACTOR AND IS DIFFERENT FROM THE TEMPORARY SUPPORT USED TO SUPPORT THE EXISTING TELEPHONE UTILITIES ACROSS THE BRIDGE. REMOVE EXISTING STONE MASONRY AND CONSTRUCT NEW WALL AT OUTFALL TO THE LIMITS SHOWN ON SHEET 17. RESTORE EMBANKMENT IN FRONT OF THE WALL TO ITS ORIGINAL CONDITION OR BETTER.
3. PERFORM PARTIAL DEMOLITION OF SIDEWALK AND DECK TO FACILITATE INSTALLATION OF TEMPORARY SUPPORT STRUCTURE OF TELEPHONE UTILITIES (BY VERIZON).
4. VERIZON'S CONTRACTOR TO CONSTRUCT TEMPORARY TELEPHONE DUCT SUPPORT AND MOVE WIRES FROM EXISTING DUCTS TO THE CONDUITS IN THE TEMPORARY SUPPORT. THE TEMPORARY SUPPORT SHOWN FOR THE TELEPHONE UTILITIES IS CONCEPTUAL AND IS INTENDED TO ALERT THE CONTRACTOR TO THE POTENTIAL LIMITS OF THE SUPPORTS. CONTRACTOR SHALL COORDINATE WITH THE UTILITY OWNER REGARDING PLACEMENT OF THE TEMPORARY SUPPORT TO FACILITATE BRIDGE CONSTRUCTION ACTIVITIES. CAUTION SHALL BE EXERCISED SO AS NOT TO DAMAGE THE INSTALLED SEWER HDPE PIPE OR MANHOLE.
5. CONTRACTOR TO REMOVE EXISTING TELEPHONE UTILITY DUCTS AS PART OF THE SUPERSTRUCTURE DEMOLITION OPERATIONS.
6. EXCAVATE EXISTING ABUTMENTS TO THE LIMITS SHOWN ON SHEETS 15 AND 16.



**PHASE 2A (LOOKING SOUTH)**  
SCALE:  $\frac{1}{4}'' = 1'-0''$

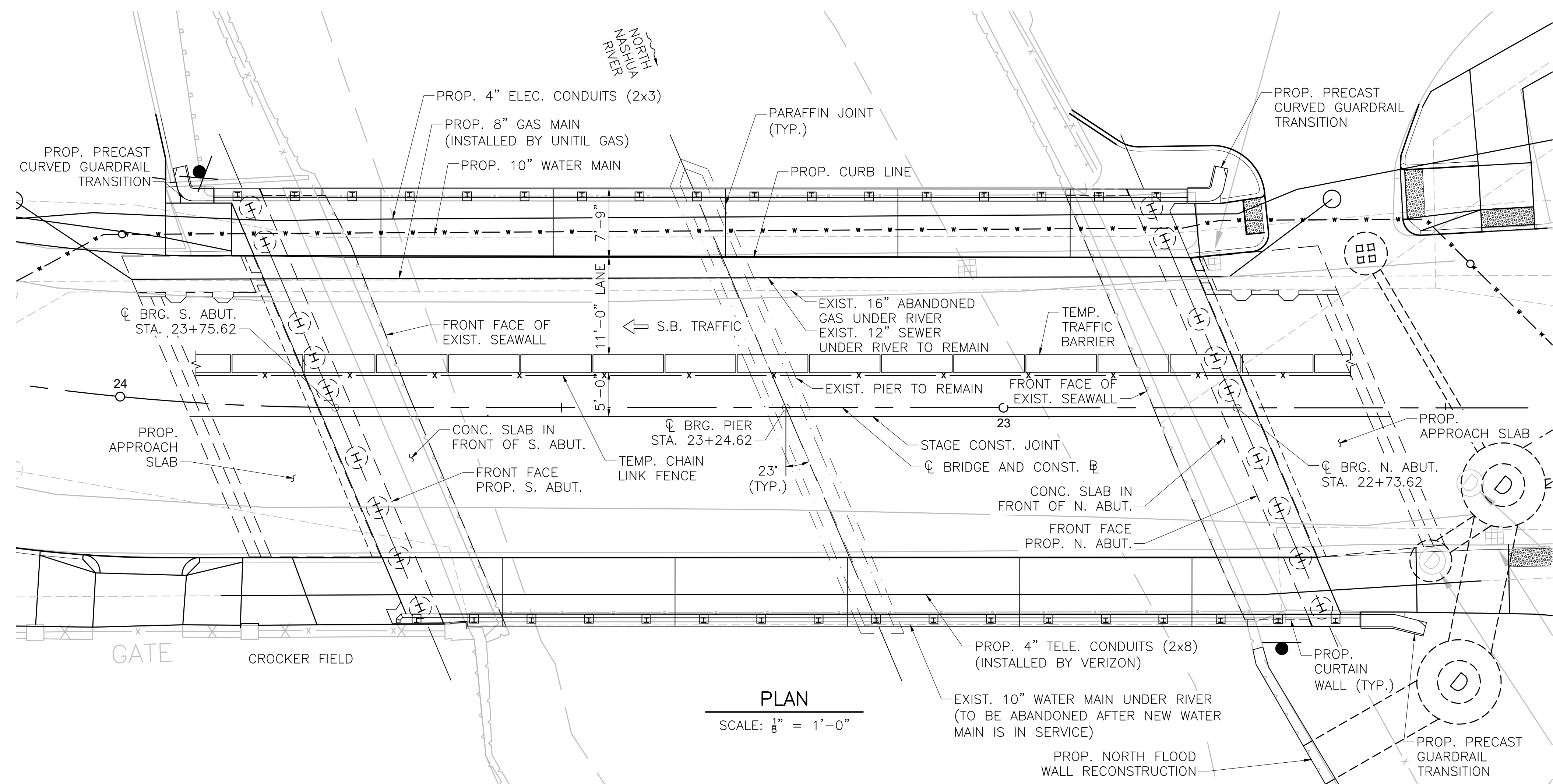
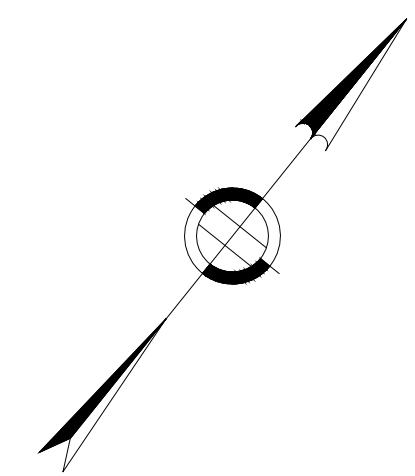
DATE	DESCRIPTION
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

607680\_BR 12 (STAGE CONSTRUCTION DETAILS PHASE 2A).DWG 11-AUG-2023 10:38 AM Final Structural Submission (SF)

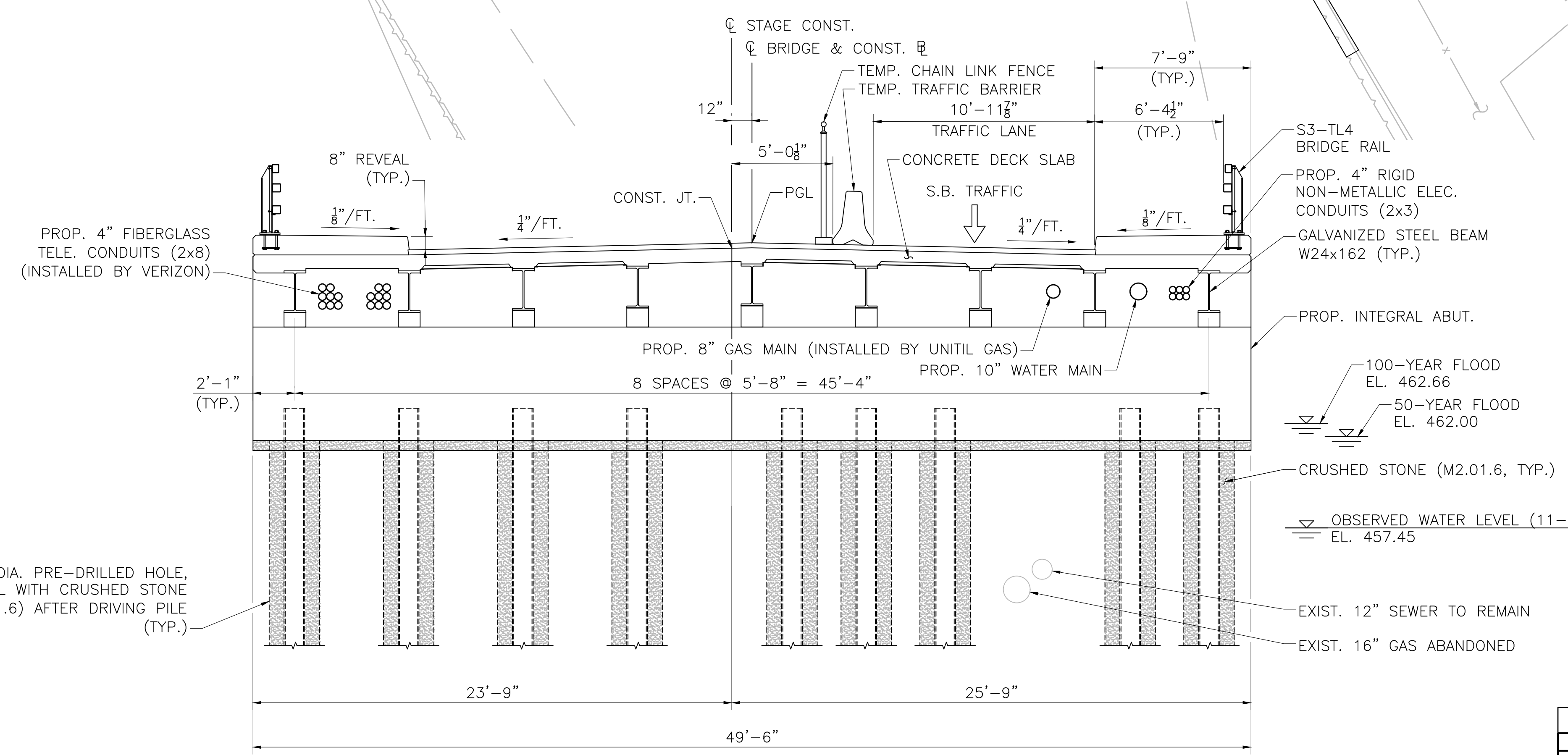
**FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	37	67
PROJECT FILE NO.		607680	

**STAGE CONSTRUCTION DETAILS - PHASE 2B**



**PLAN**  
SCALE: 1/8" = 1'-0"



**PHASE 2B (LOOKING SOUTH)**  
SCALE: 1/4" = 1'-0"

**CONSTRUCTION STAGING NOTES (PHASE 2B):**

1. CONSTRUCT ABUTMENT CAPS AND PEDESTALS. CLEAN AND PREP TOP FACE OF PIER AND INSTALL BEARINGS.
2. ERECT REMAINING BEAMS, DIAPHRAGMS AND UTILITY CROSS FRAMES.
3. COORDINATE AND ASSIST VERIZON'S CONTRACTOR IN RELOCATING PROPOSED TELEPHONE CONDUITS INTO BAY 8 AND REMOVING TEMPORARY TELEPHONE DUCT SUPPORT FROM THE SITE.
4. CONSTRUCT REMAINING PORTION OF PROPOSED BRIDGE.
5. REMOVE TEMPORARY TRAFFIC CONTROLS. RESTORE ALL APPROACH AREAS AND EMBANKMENTS TO ORIGINAL CONDITION OR BETTER.
6. OPEN BRIDGE TO TRAFFIC ON BOTH BOUNDS.

2'-6" DIA. PRE-DRILLED HOLE, FILL WITH CRUSHED STONE (M2.01.6) AFTER DRIVING PILE (TYP.)

DATE	DESCRIPTION
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

607680\_BR 13 (STAGE CONSTRUCTION DETAILS - PHASE 2B).DWG Plotted on 14-Sep-2023 10:38 AM 11-AUG-2023 Final Structural Submittal (SF)

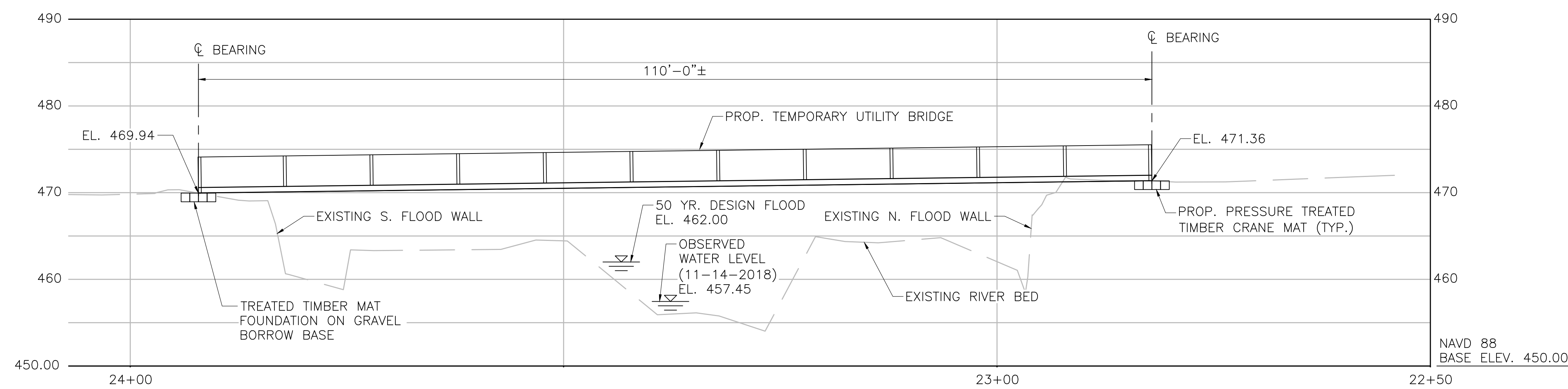
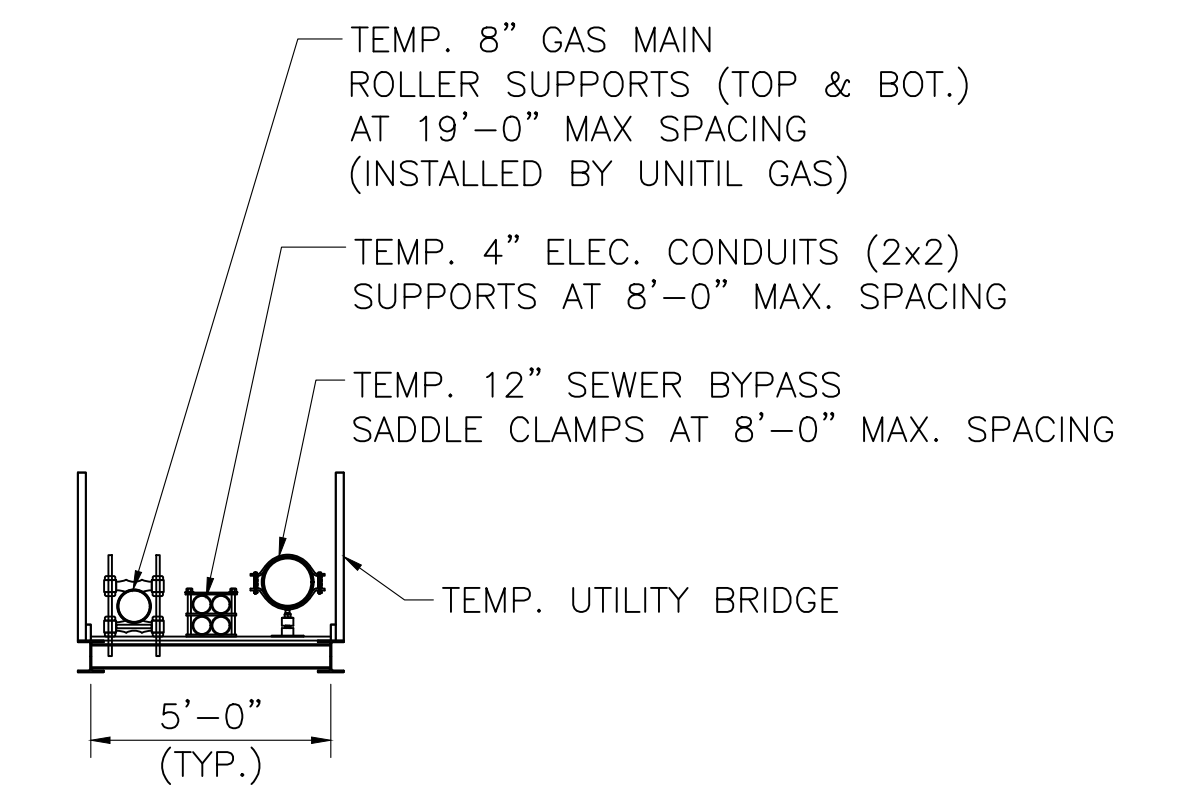
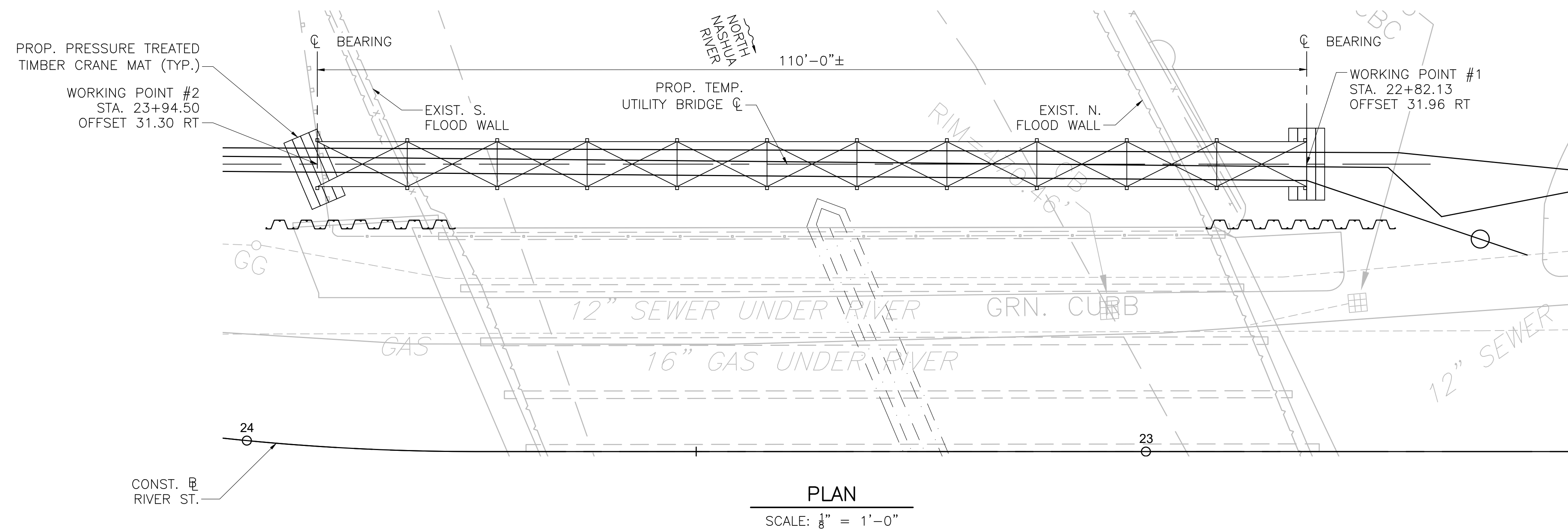
**FITCHBURG**  
**ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	38	67
PROJECT FILE NO.		607680	

**TEMPORARY UTILITY BRIDGE DETAILS**

**NOTES:**

1. THE PLAN AND ELEVATION SHOWN FOR THE TEMPORARY UTILITY BRIDGE IS CONCEPTUAL. THE DEPTH, LENGTH, AND  $\phi$  OF BEARING LOCATION MAY BE ADJUSTED AND SHALL BE SUBMITTED FOR REVIEW BY THE ENGINEER.
2. CONTRACTOR SHALL RESTORE AREAS IMPACTED BY THE TEMPORARY UTILITY BRIDGE AS SHOWN IN THE CIVIL PANS.
3. SEE SHEET 28 FOR SUPPORT DETAILS IN FINAL CONDITION FOR GAS MAIN AND ELEC. CONDUITS. CONNECTION DETAILS BETWEEN UTILITY SUPPORTS AND TEMP. UTILITY BRIDGE SHALL BE PROVIDED BY CONTRACTOR FOR REVIEW BY ENGINEER.



**DESIGN CRITERIA FOR UTILITY BRIDGE**

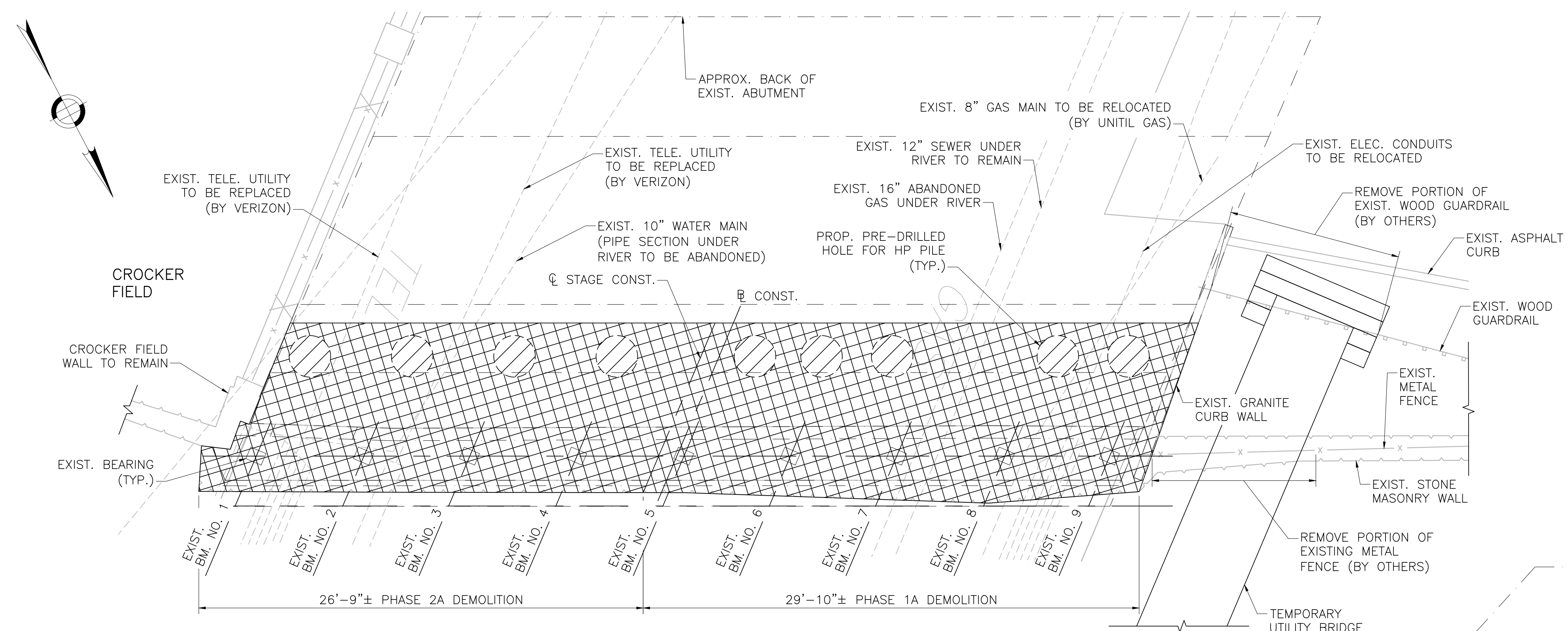
1. TEMPORARY UTILITY BRIDGE APPROX. DIMENSIONS: 110' LONG x 5' WIDE (CLEAR WIDTH).
2. TEMPORARY UTILITY BRIDGE SHALL REST ON CRANE MATS OR EQUIVALENT.
3. CRANE MATS SHALL BE LOCATED NO CLOSER THAN 1.5\*B OR 6' FROM THE BACK FACE OF THE EXISTING SEA WALL, WHERE 'B' IS THE CRANE MAT DIMENSION TAKEN PERPENDICULAR TO THE EXISTING SEA WALL.
4. DEAD LOAD SURCHARGE FROM THE TEMPORARY UTILITY BRIDGE SHALL NOT EXCEED 1 KSF.
5. CONTRACTOR TO COORDINATE DESIGN OF CRANE MATS WITH ESTIMATED LOADS AND DETAILS FROM TEMPORARY UTILITY BRIDGE FABRICATOR.

DATE	DESCRIPTION
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

**FITCHBURG**  
**ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

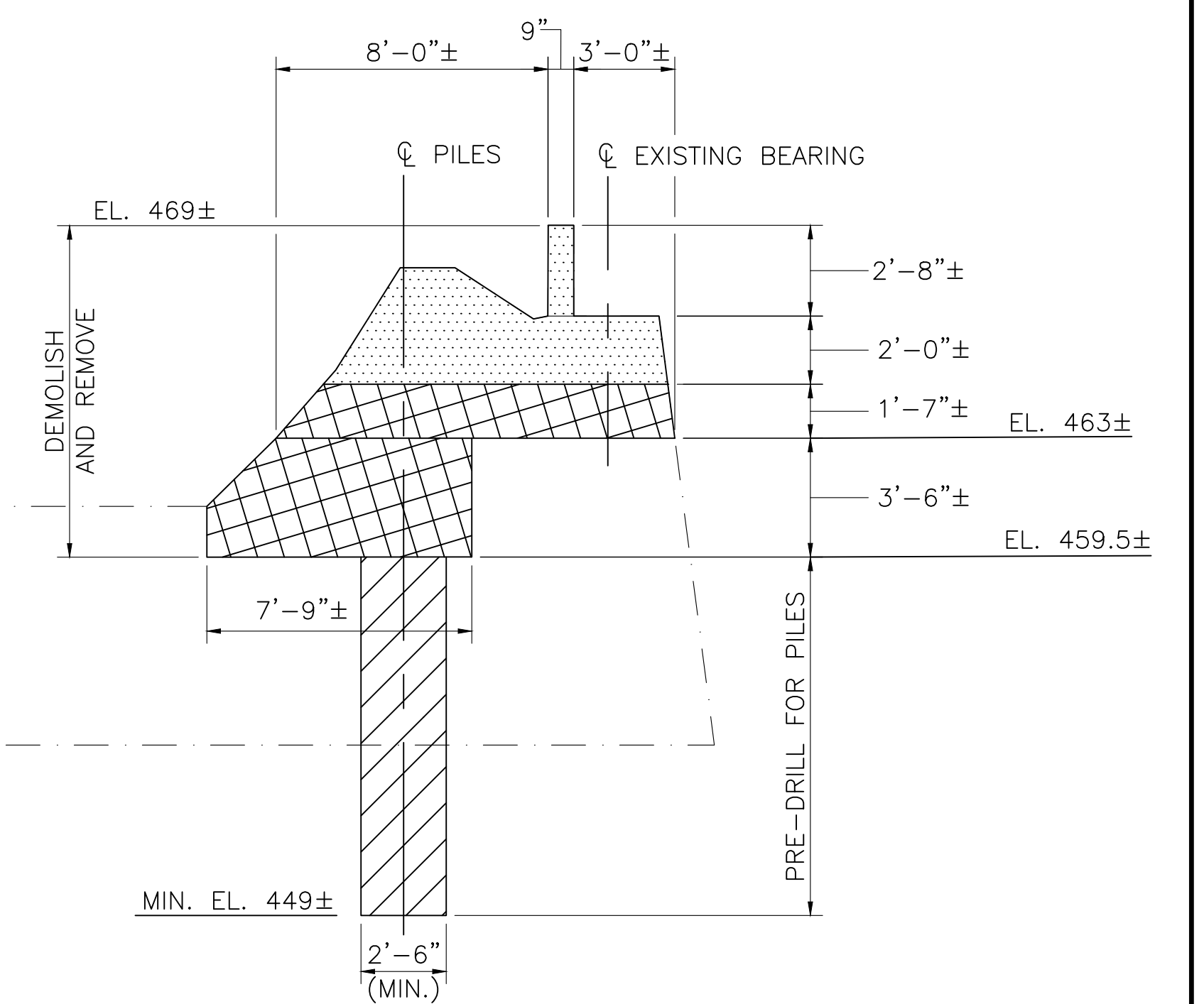
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	39	67
PROJECT FILE NO.		607680	

**EXISTING SOUTH ABUTMENT DEMOLITION LIMITS**



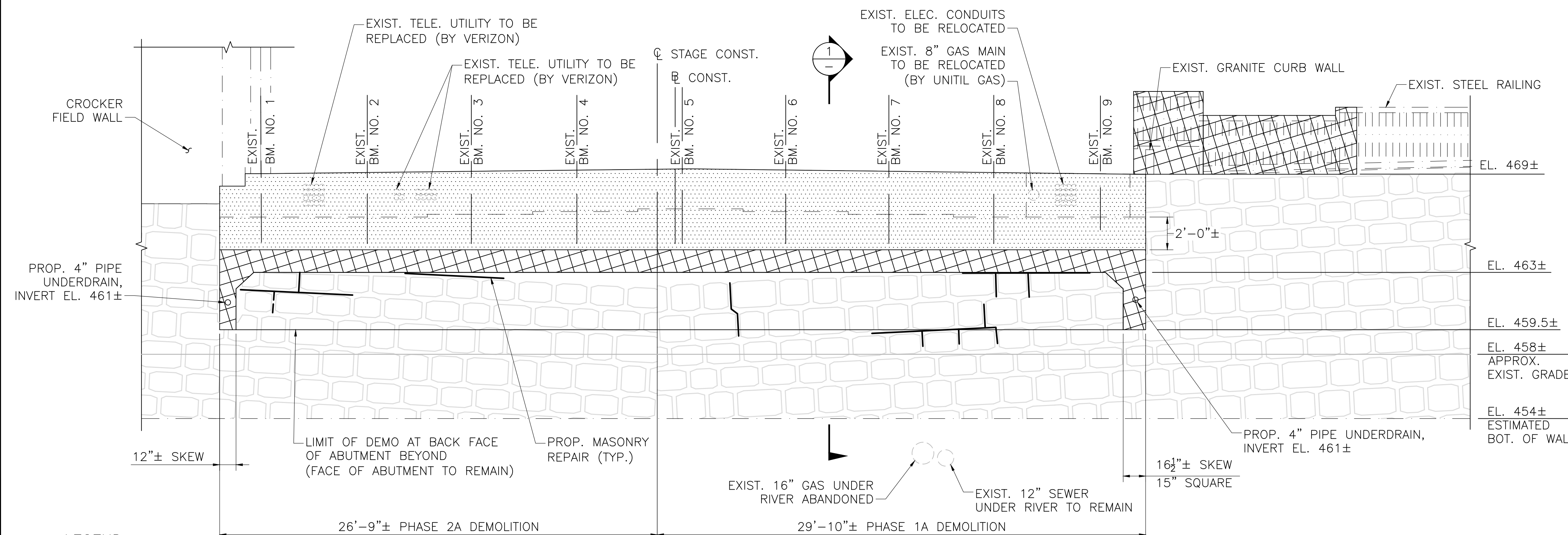
**EXISTING SOUTH ABUTMENT PLAN**

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



**TYPICAL EXISTING ABUTMENT SECTION 1**

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



**EXISTING SOUTH ABUTMENT ELEVATION**

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

**NOTES:**

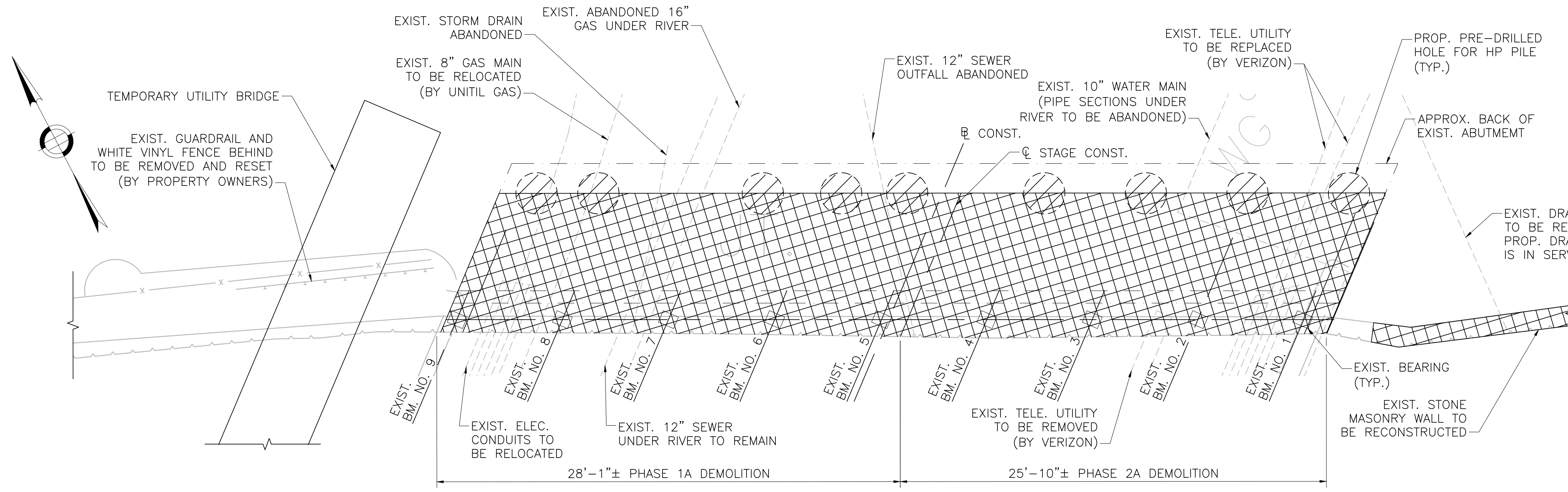
- EXISTING ABUTMENT ELEVATIONS AND DIMENSIONS ARE BASED ON RECORD PLANS. CONTRACTOR SHALL VERIFY LIMITS PRIOR TO DEMOLITION WORK.
- CONTRACTOR SHALL EXERCISE EXTREME CAUTION DURING DEMOLITION AND PRE-DRILLING TO AVOID NEGATIVE IMPACT TO EXISTING ABUTMENT, CROCKER FIELD WALL, AND SEWER (UNDER RIVER).
- CONTRACTOR TO COORDINATE WITH PROPERTY OWNERS REGARDING REMOVAL OF EXISTING WOOD GUARDRAIL AND METAL FENCE IN THE VICINITY OF THE TEMPORARY UTILITY BRIDGE. THESE ITEMS ARE TO BE REMOVED AND RESET BY THE PROPERTY OWNERS.
- REMOVE UPPER COURSES OF EXISTING STONE MASONRY TO THE ELEVATION SHOWN. DEMOLITION LIMITS SHALL BE AT STONE MASONRY JOINTS AS PRACTICALLY AS POSSIBLE. AFTER DEMOLITION, SURFACES OF STONE ADJACENT TO PROPOSED CONCRETE ABUTMENT CONSTRUCTION SHALL BE CLEANED AND DRESSED TO REMOVE SHARP EDGES AND MAINTAIN A RELATIVELY SMOOTH AND STRAIGHT PROFILE.
- SEE SHEET 20 FOR PILE LAYOUT.

DATE	DESCRIPTION
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

**FITCHBURG**  
**ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

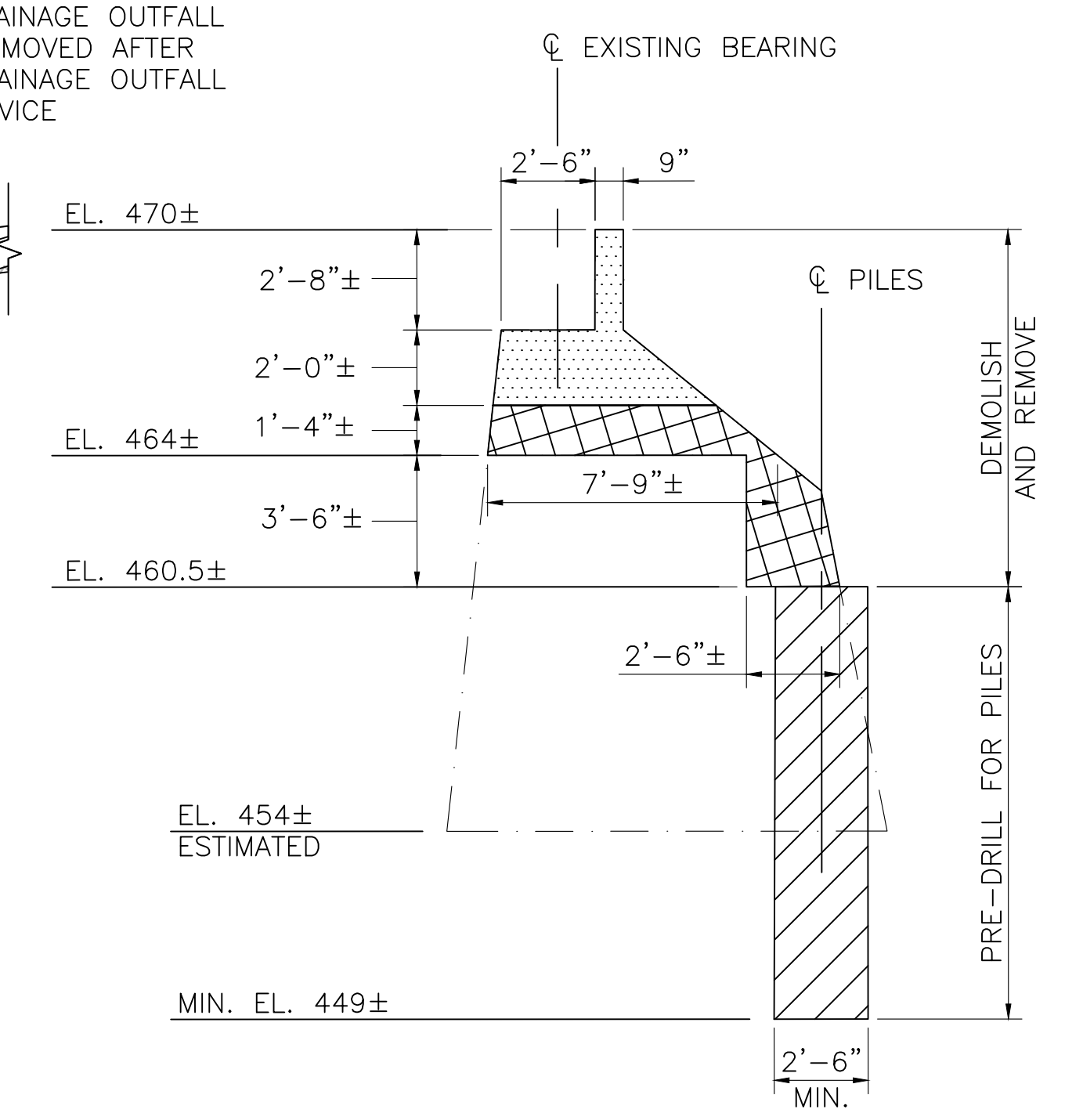
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	40	67
PROJECT FILE NO.		607680	

**EXISTING NORTH ABUTMENT DEMOLITION LIMITS**



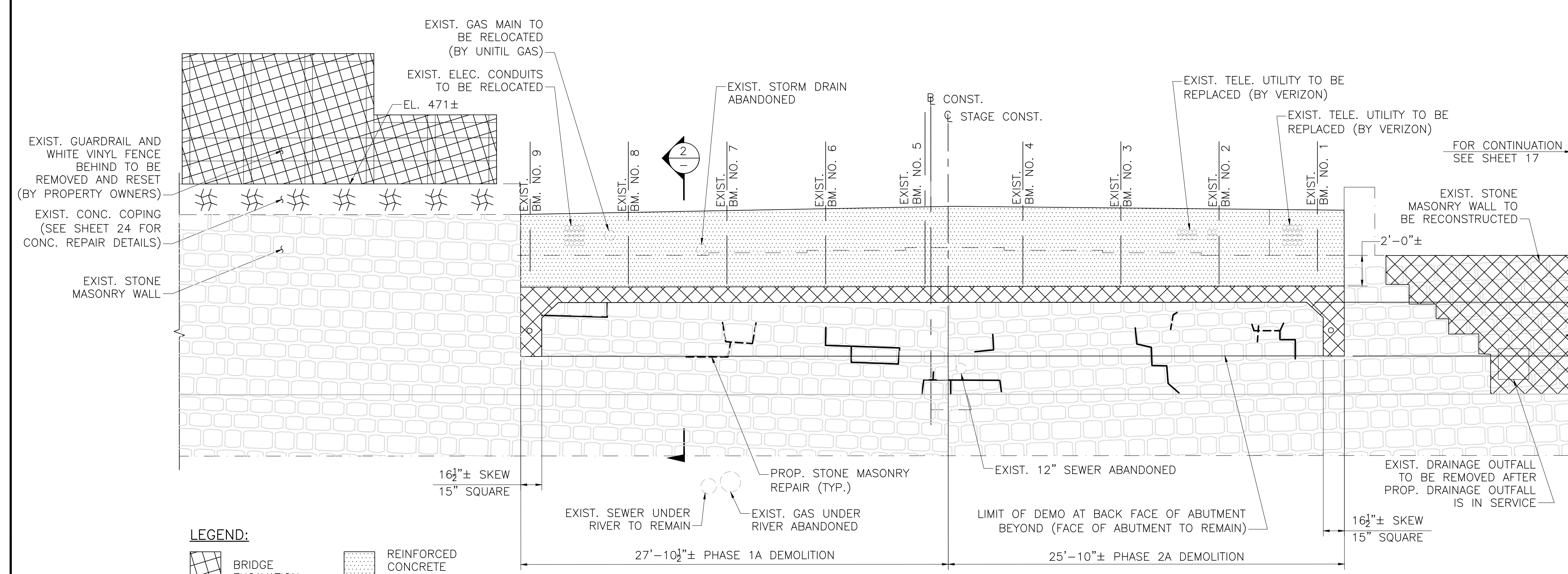
**EXISTING NORTH ABUTMENT PLAN**

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



**EXISTING TYPICAL ABUTMENT SECTION 2**

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



**EXISTING NORTH ABUTMENT ELEVATION**

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

**LEGEND:**

- BRIDGE EXCAVATION
- REINFORCED CONCRETE EXCAVATION
- PRE-DRILL FOR PILES
- TYPE 1 STONE MASONRY REPAIR (SEE SHEET 24)
- TYPE 2 STONE MASONRY REPAIR (SEE SHEET 24)
- MAP CRACKING WITH EFFLORESCENCE AND ADJACENT SPALLS

**NOTES:**

1. EXISTING ABUTMENT ELEVATIONS AND DIMENSIONS ARE BASED ON RECORD PLANS. CONTRACTOR SHALL VERIFY LIMITS PRIOR TO DEMOLITION WORK.
2. CONTRACTOR SHALL EXERCISE EXTREME CAUTION DURING DEMOLITION AND PRE-DRILLING TO AVOID NEGATIVE IMPACT TO EXISTING ABUTMENT, CROCKER FIELD WALL, AND SEWER (UNDER RIVER).
3. CONTRACTOR TO COORDINATE WITH PROPERTY OWNERS REGARDING REMOVAL OF EXISTING GUARDRAIL AND VINYL FENCE IN THE VICINITY OF THE TEMPORARY UTILITY BRIDGE. THESE ITEMS ARE TO BE REMOVED AND RESET BY THE PROPERTY OWNERS.
4. REMOVE UPPER COURSES OF EXISTING STONE MASONRY TO THE ELEVATION SHOWN. DEMOLITION LIMITS SHALL BE AT STONE MASONRY JOINTS AS PRACTICALLY POSSIBLE. AFTER DEMOLITION, SURFACES OF STONE ADJACENT TO PROPOSED CONCRETE ABUTMENT CONSTRUCTION SHALL BE CLEANED AND DRESSED TO REMOVE SHARP EDGES AND MAINTAIN A RELATIVELY SMOOTH AND STRAIGHT PROFILE.
5. SEE SHEET 20 FOR PILE LAYOUT.

SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

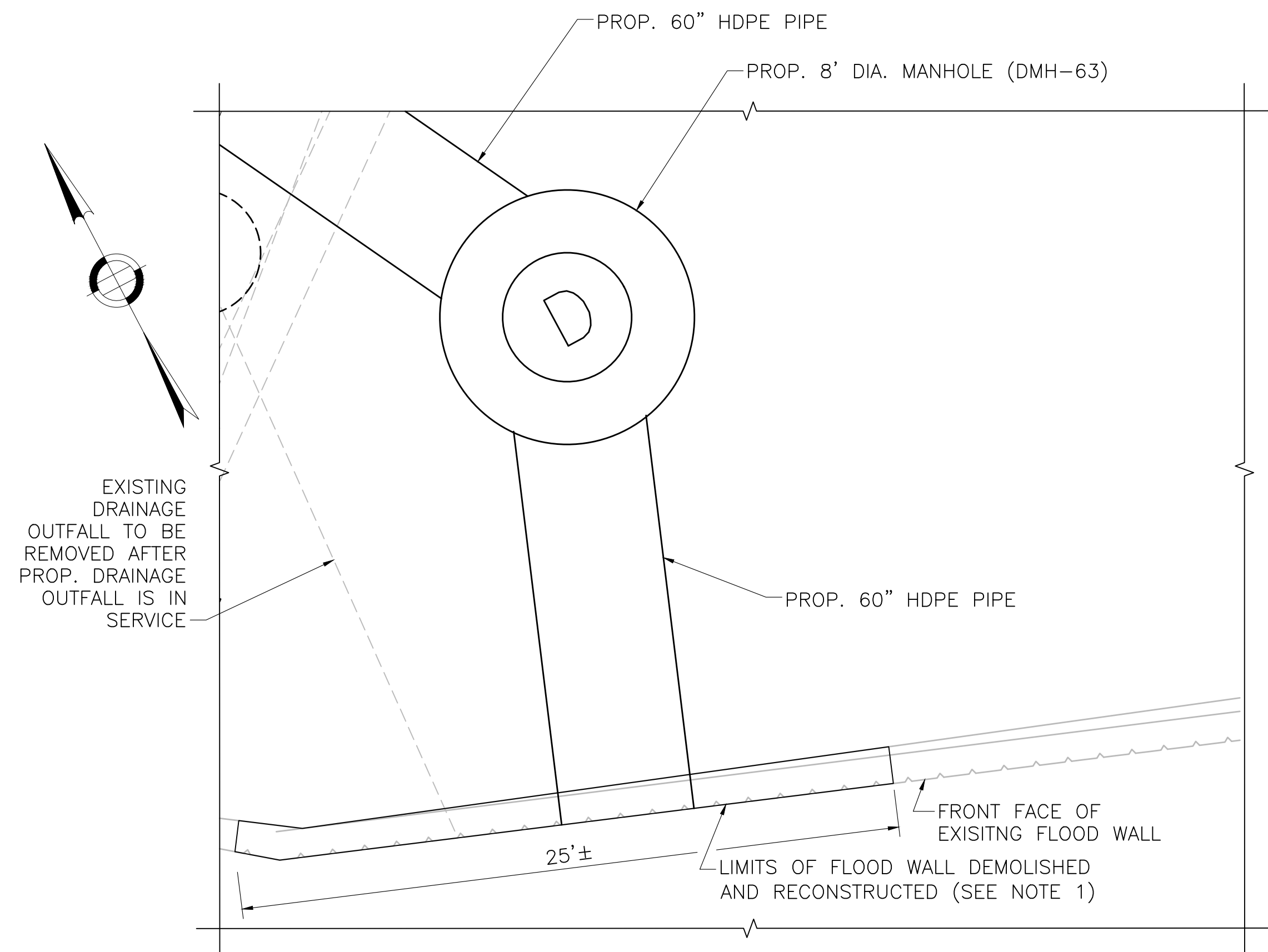
607680\_BR 16 (EXISTING NORTH ABUTMENT DEMO LIMITS)DWG Plotted on 14-Sep-2023 10:40 AM 11-AUG-2023 Final Structural Submission (SF)



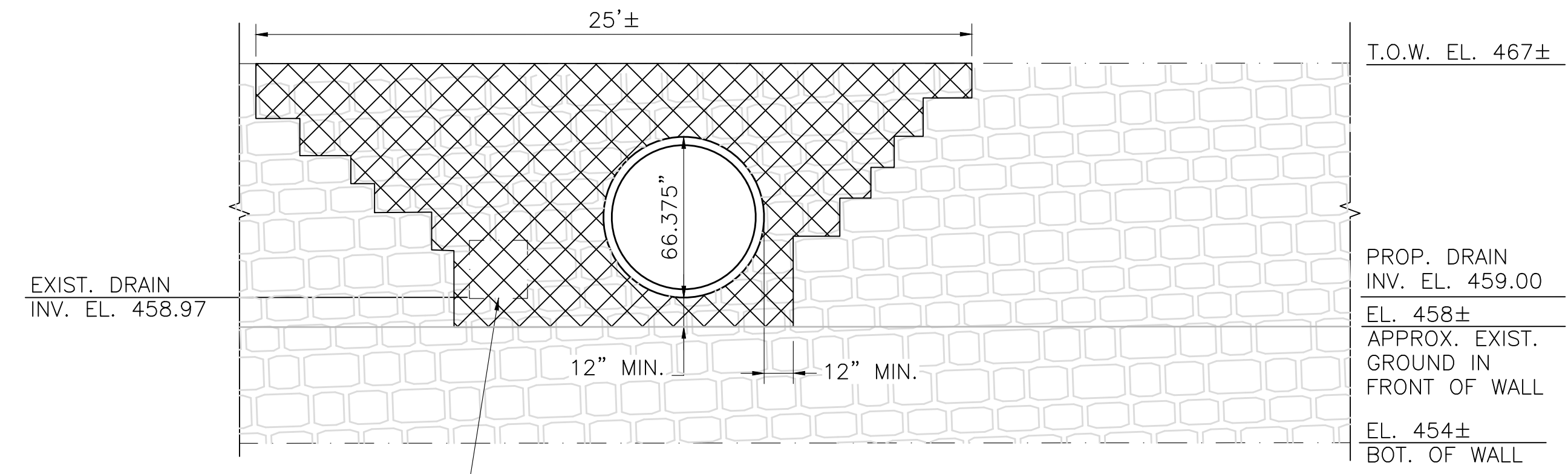
**FITCHBURG**  
**ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	41	67
PROJECT FILE NO.		607680	

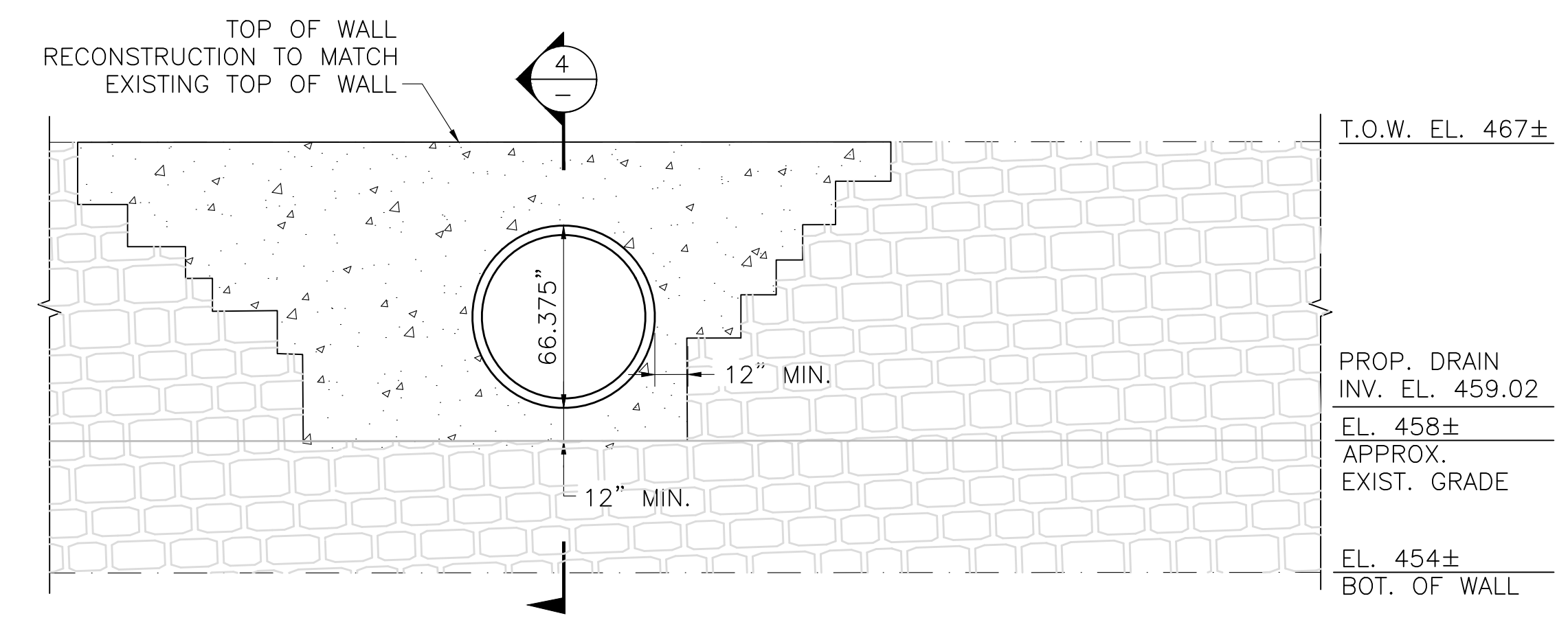
**NORTH FLOOD WALL DEMOLITION AND RECONSTRUCTION FOR OUTFALL PIPE**



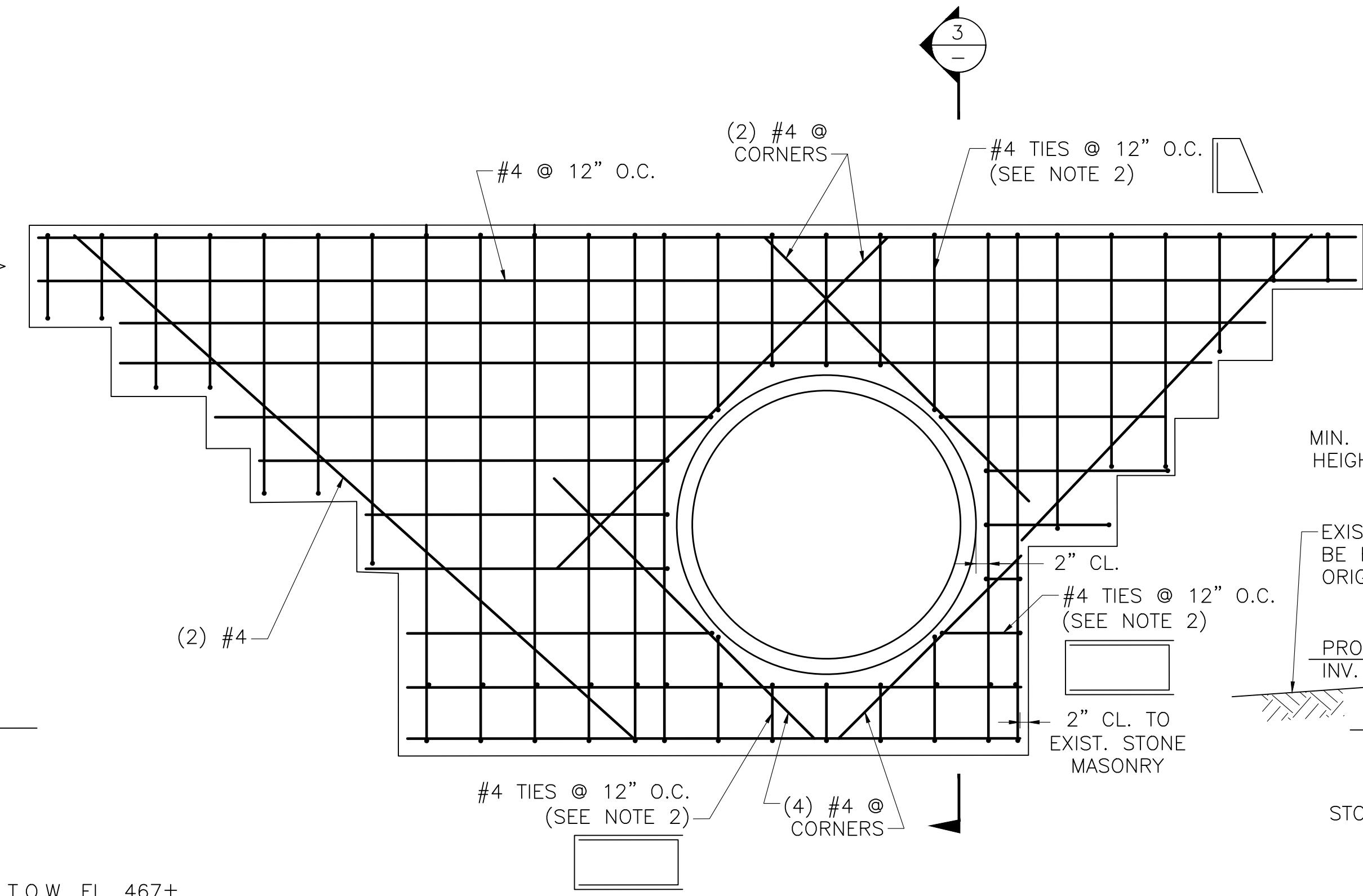
**PLAN**  
 SCALE: 1/4" = 1'-0"



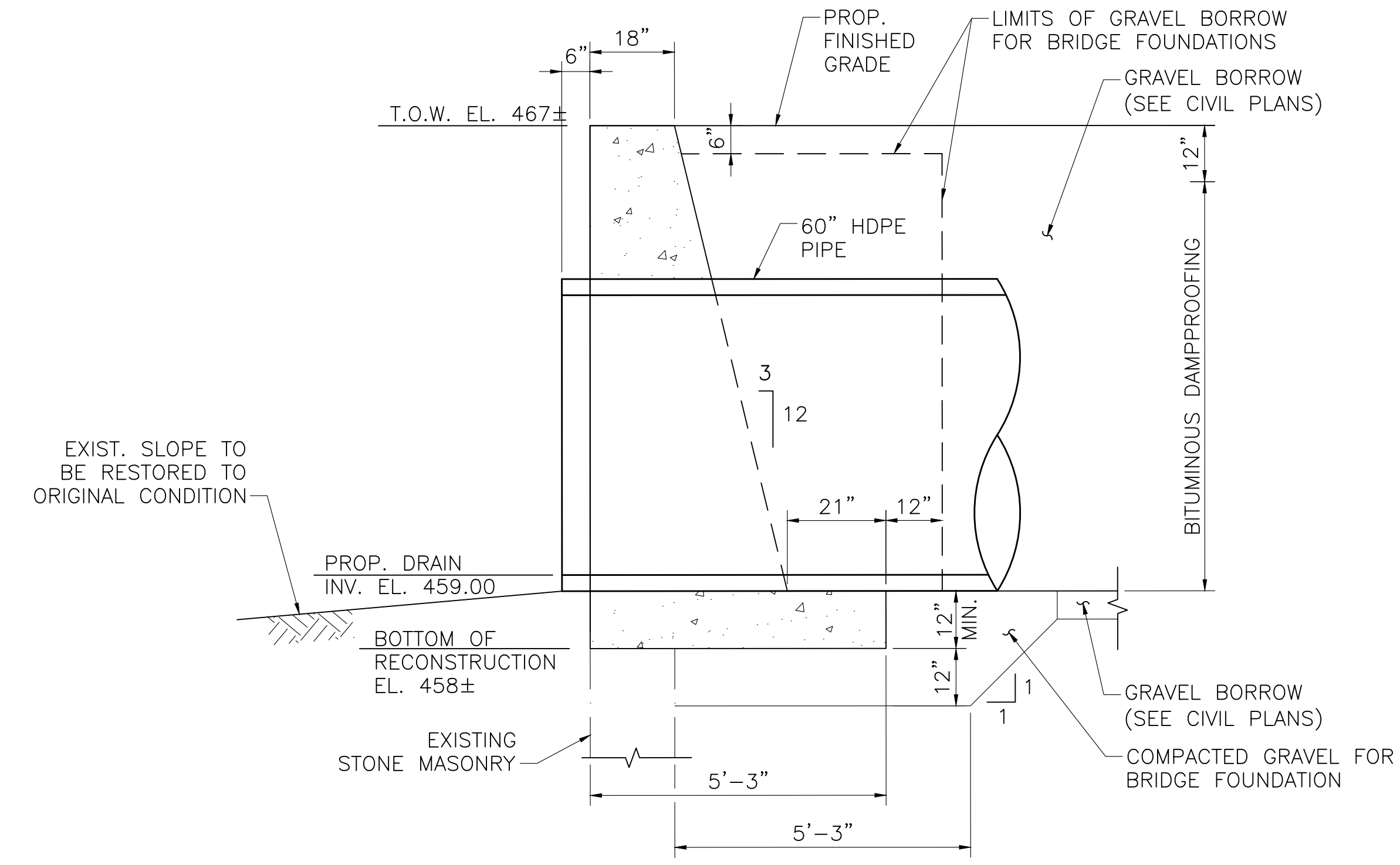
**ELEVATION - EXCAVATION LIMITS**  
 SCALE: 1/4" = 1'-0"



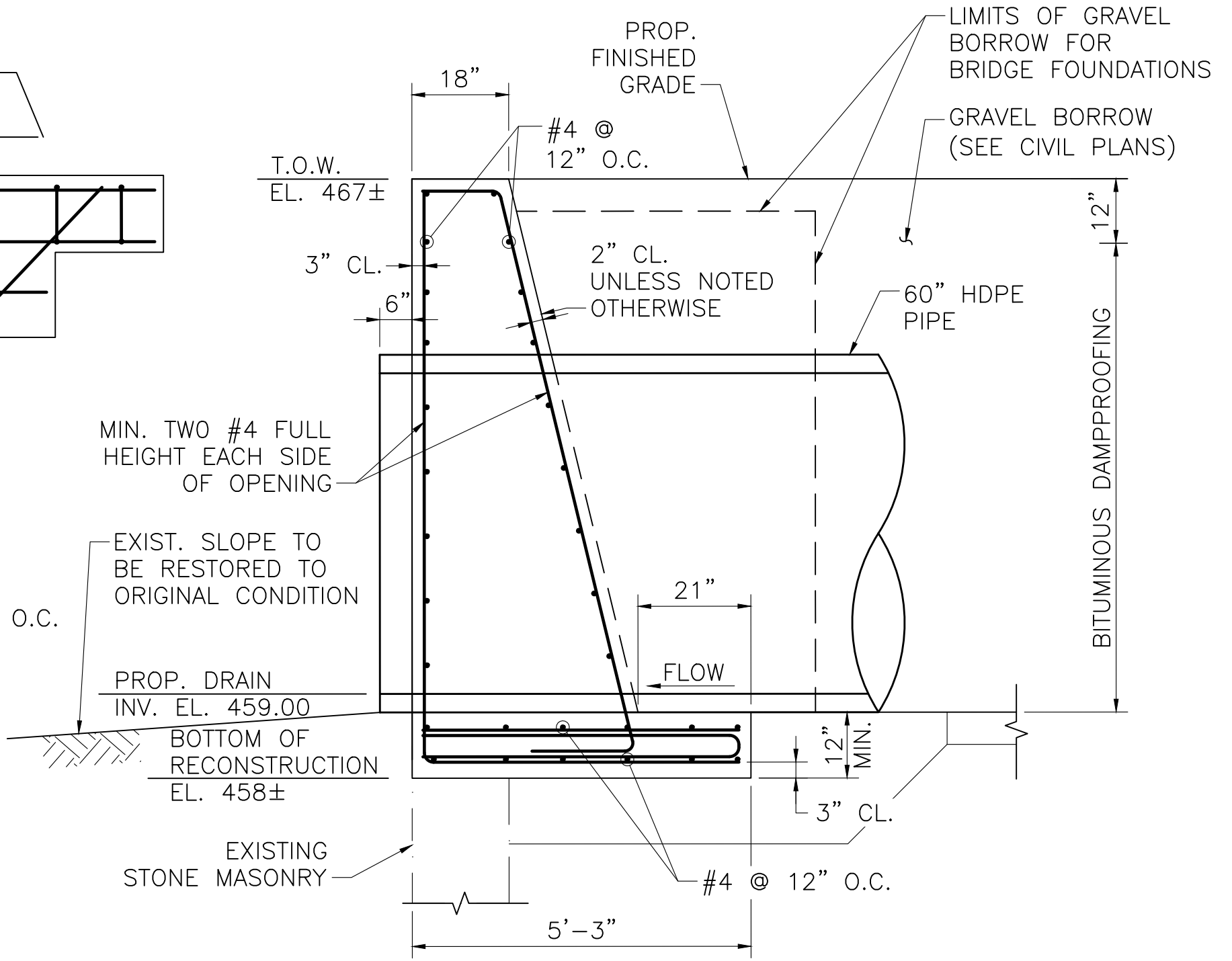
**PROPOSED RECONSTRUCTION ELEVATION**  
 SCALE: 1/4" = 1'-0"



**ELEVATION - REINFORCING**  
 SCALE: 1/2" = 1'-0"



**SECTION 4**  
 SCALE: 1/2" = 1'-0"



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

- NOTES:**
- LIMITS SHOWN ARE APPROXIMATE. LIMITS TO BE CONFIRMED IN FIELD BASED ON PRECONSTRUCTION SURVEY.
  - WHERE DIMENSIONS ARE TOO SMALL TO ALLOW FOR CLEAR COVER PLUS DEVELOPMENT OF STRAIGHT BARS, TIES SHALL BE USED.

**LEGEND:**

	BRIDGE EXCAVATION
	PROPOSED CONCRETE

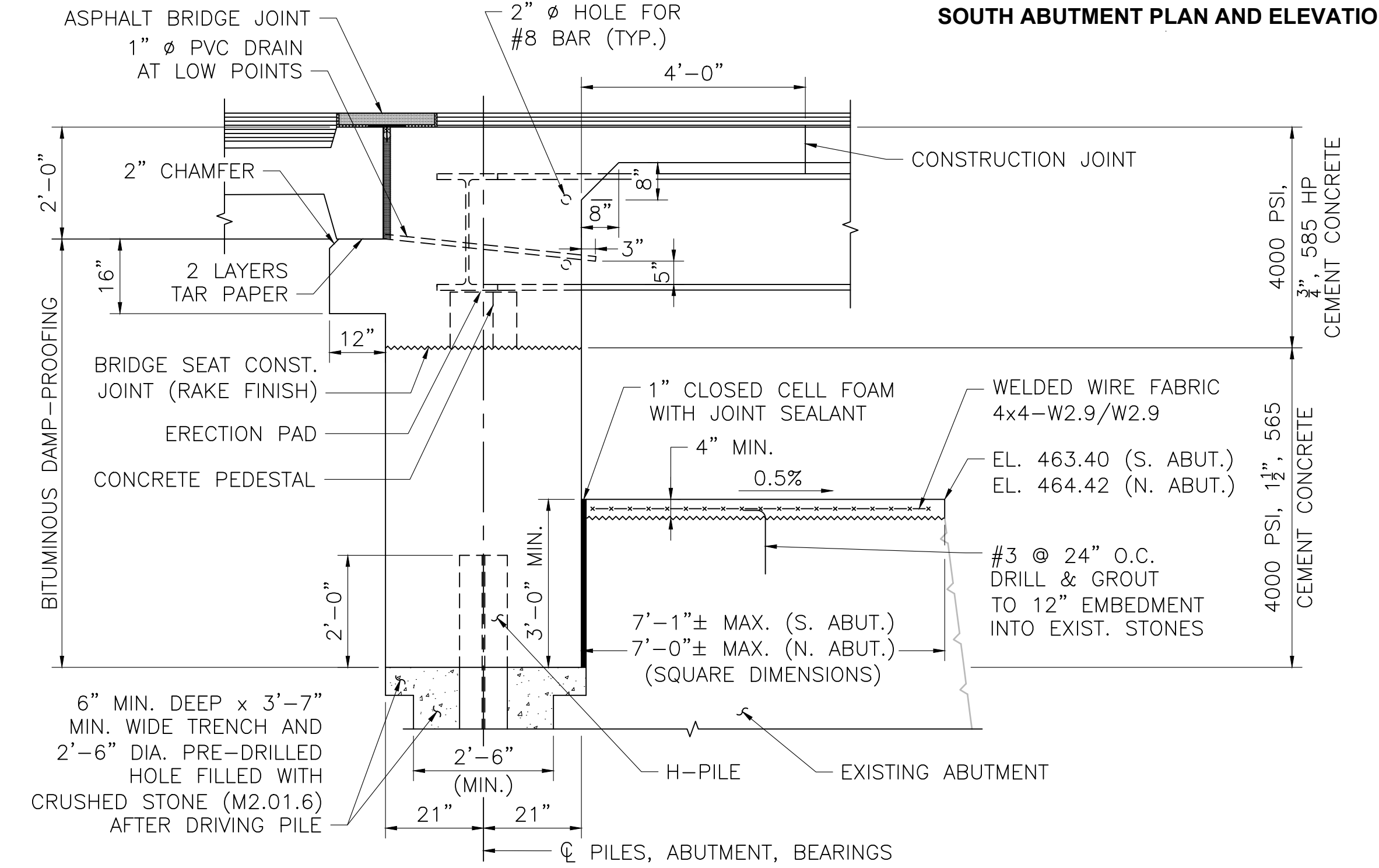
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

607680\_BR 17 (NORTH FLOOD WALL DEMOLITION).DWG Plotted on 14-Sep-2023 10:40 AM 11-AUG-2023 Final Structural Submittal (SF)

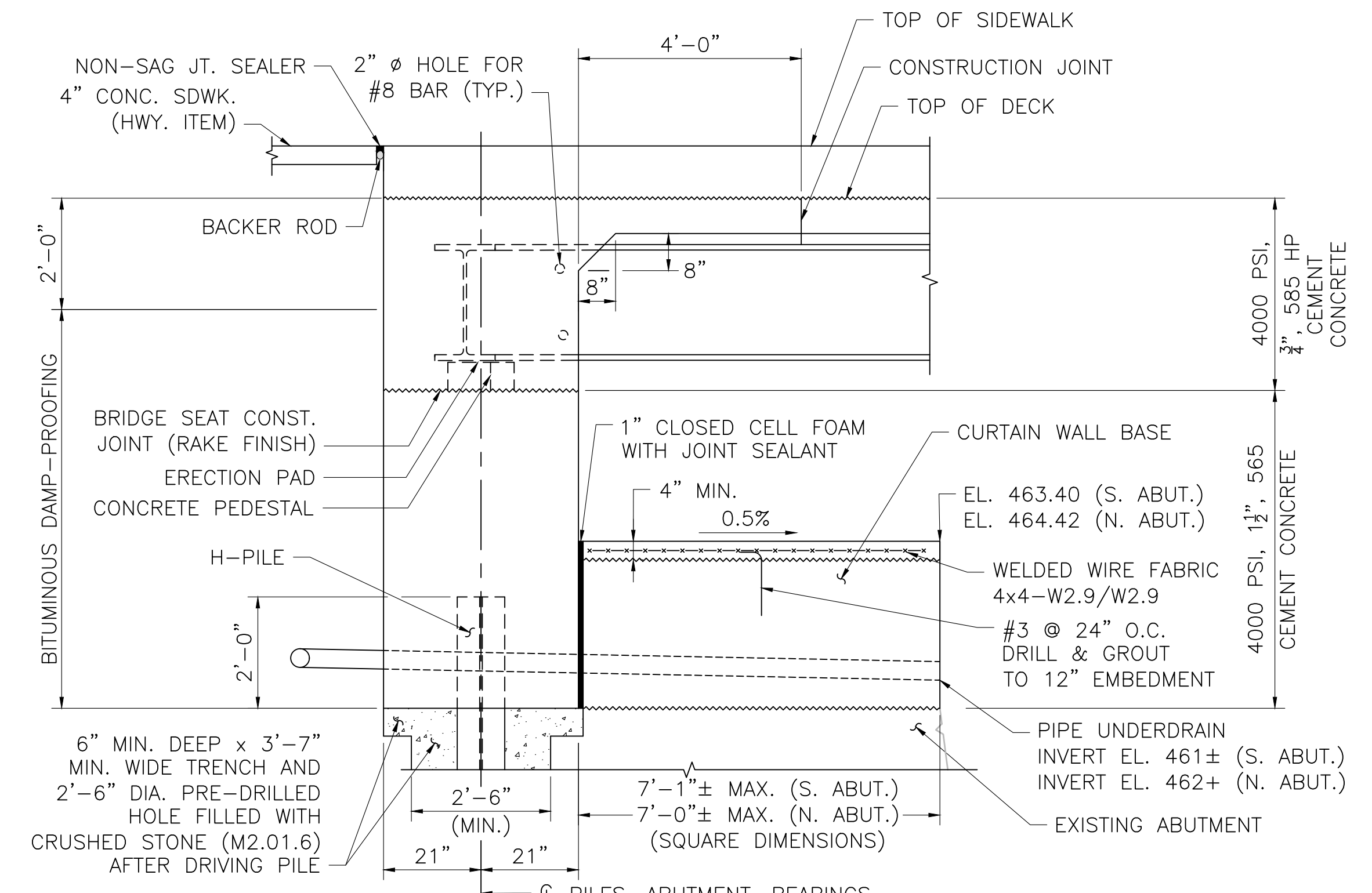
**FITCHBURG**  
**ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	42	67
PROJECT FILE NO.		607680	

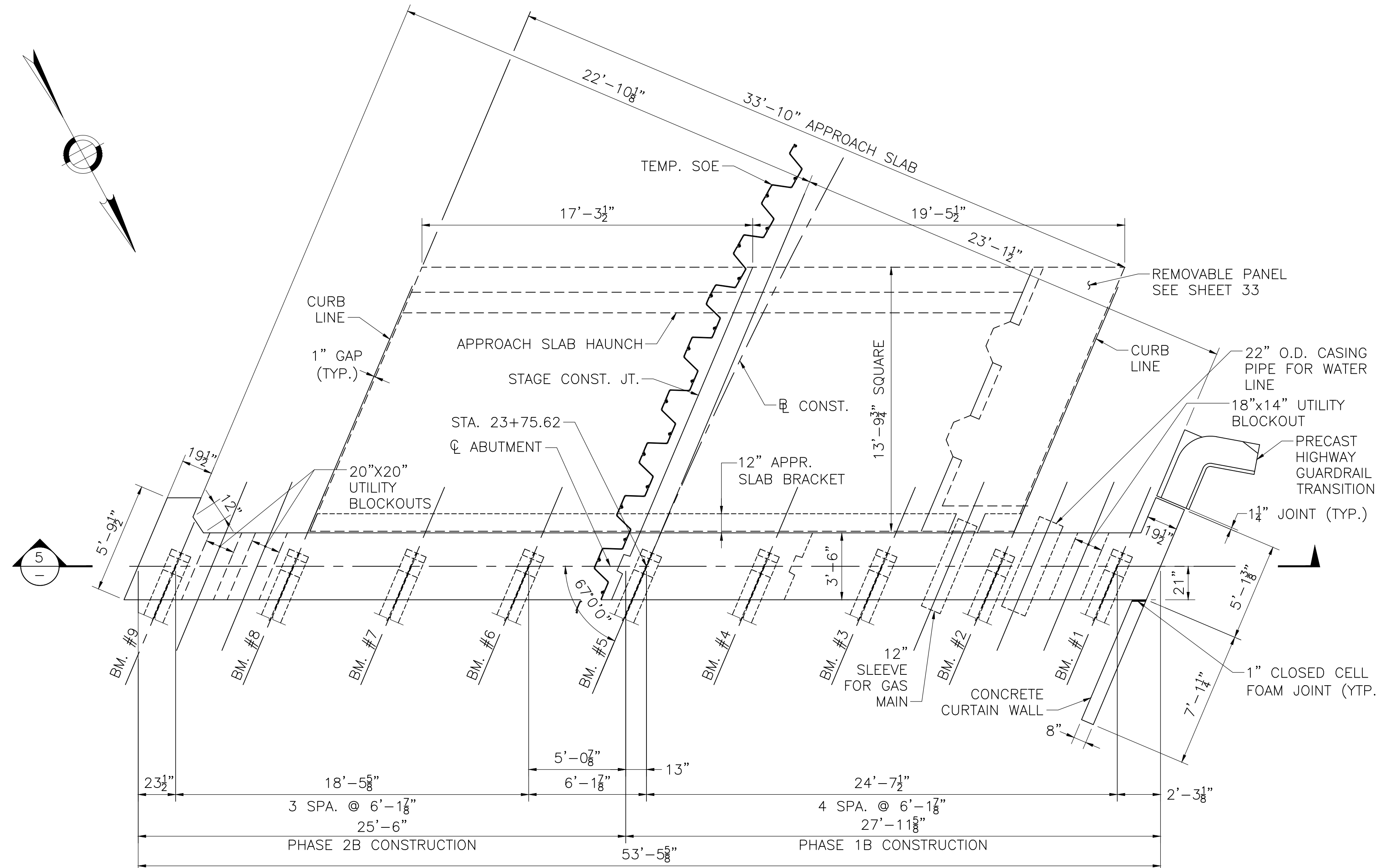
**SOUTH ABUTMENT PLAN AND ELEVATION**



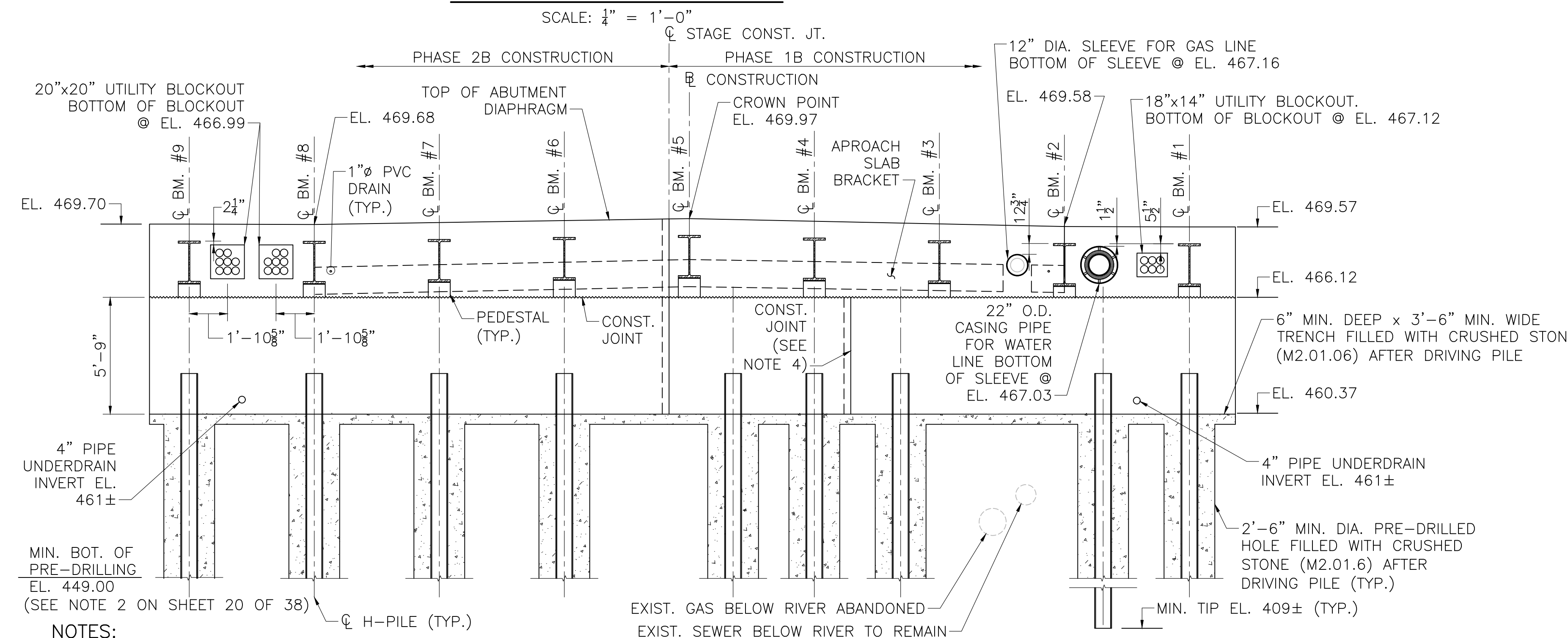
**TYPICAL ABUTMENT SECTION AT ROADWAY**  
 SCALE: 1/2" = 1'-0"



**TYPICAL ABUTMENT SECTION AT SIDEWALK**  
 SCALE: 1/2" = 1'-0"



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



**SECTION 5**  
 SCALE: 1/4" = 1'-0"

TOP OF PEDESTAL ELEVATIONS					
BM. #1	466.62	BM. #4	466.89	BM. #7	466.83
BM. #2	466.63	BM. #5	467.02	BM. #8	466.73
BM. #3	466.76	BM. #6	466.92	BM. #9	466.75

NOTE: ELEVATIONS DO NOT INCLUDE ERECTION PAD THICKNESS.

- NOTES:**
1. ALL ELEVATIONS ARE SHOWN AT ABUTMENT CENTERLINE.
  2. DETAILS ABOVE DECK LEVEL OMITTED FOR CLARITY.
  3. REFER TO SHEET 20 FOR PILE LAYOUT.

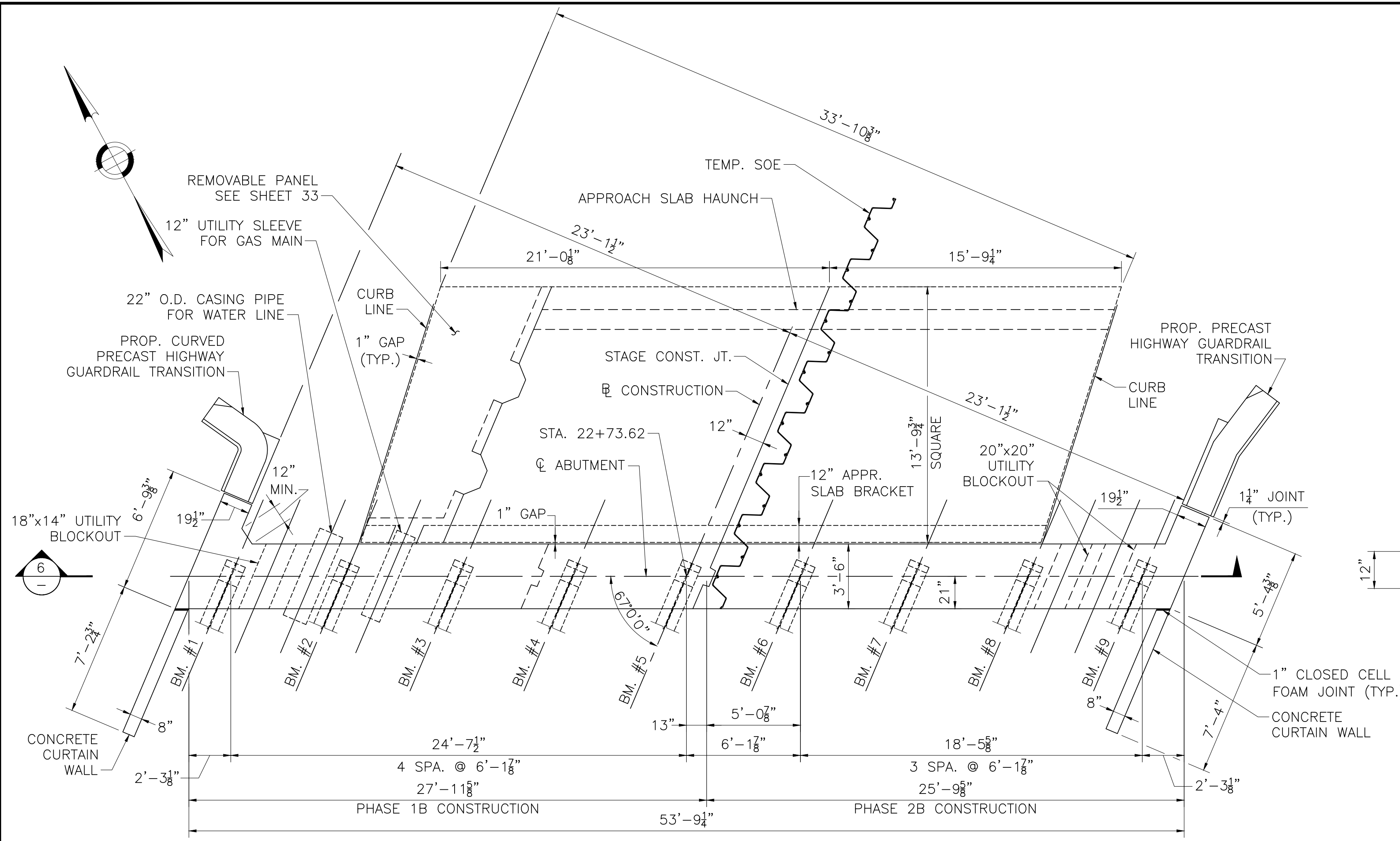
4. CONTRACTOR MAY ELIMINATE CONSTRUCTION JOINT WITH APPROVAL OF THE ENGINEER PROVIDED THAT INITIAL SET ( $F_c=500\text{PSI}$ ) OF ALL CONCRETE DOES NOT OCCUR UNTIL AFTER COMPLETION OF PLACEMENT. AN APPROVED RETARDER SHALL BE USED WHEN NECESSARY TO RETAIN THE WORKABILITY OF THE CONCRETE.

DATE	DESCRIPTION
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
	CONSTRUCTION BY MASSDOT
	AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
	USE ONLY PRINTS OF LATEST DATE

**FITCHBURG**  
**ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

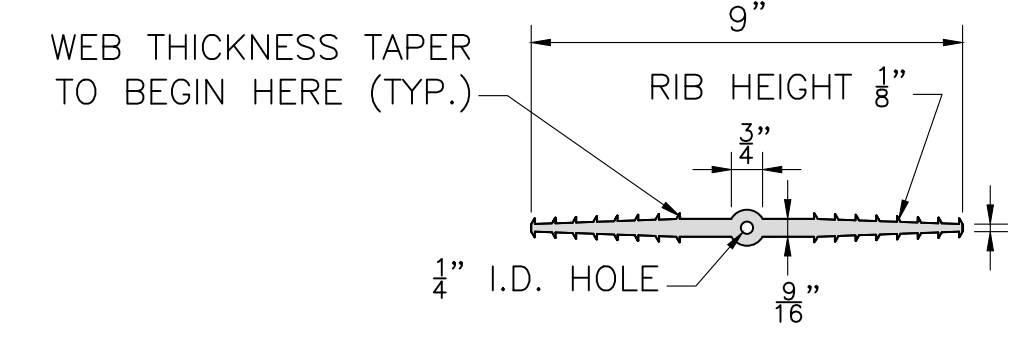
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	43	67
PROJECT FILE NO.		607680	

**NORTH ABUTMENT PLAN AND ELEVATION**

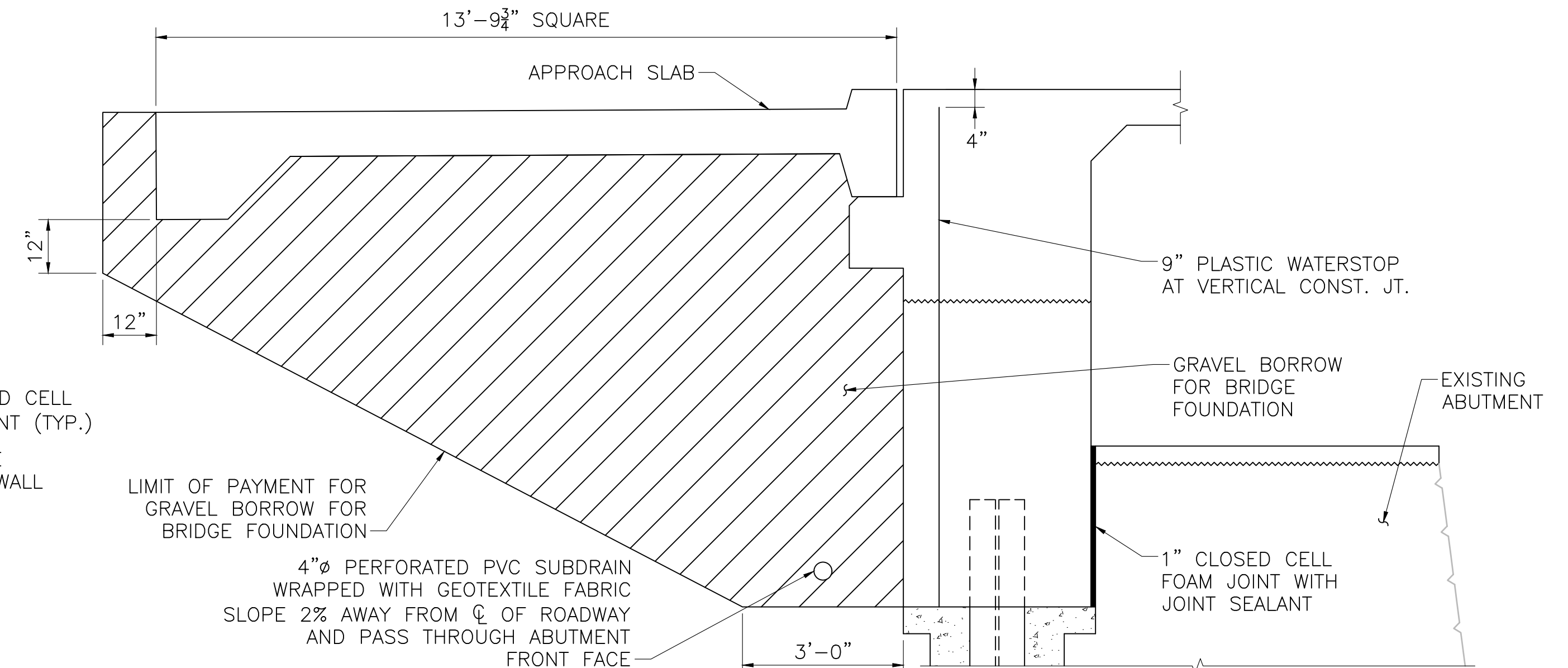


**NORTH ABUTMENT PLAN**

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

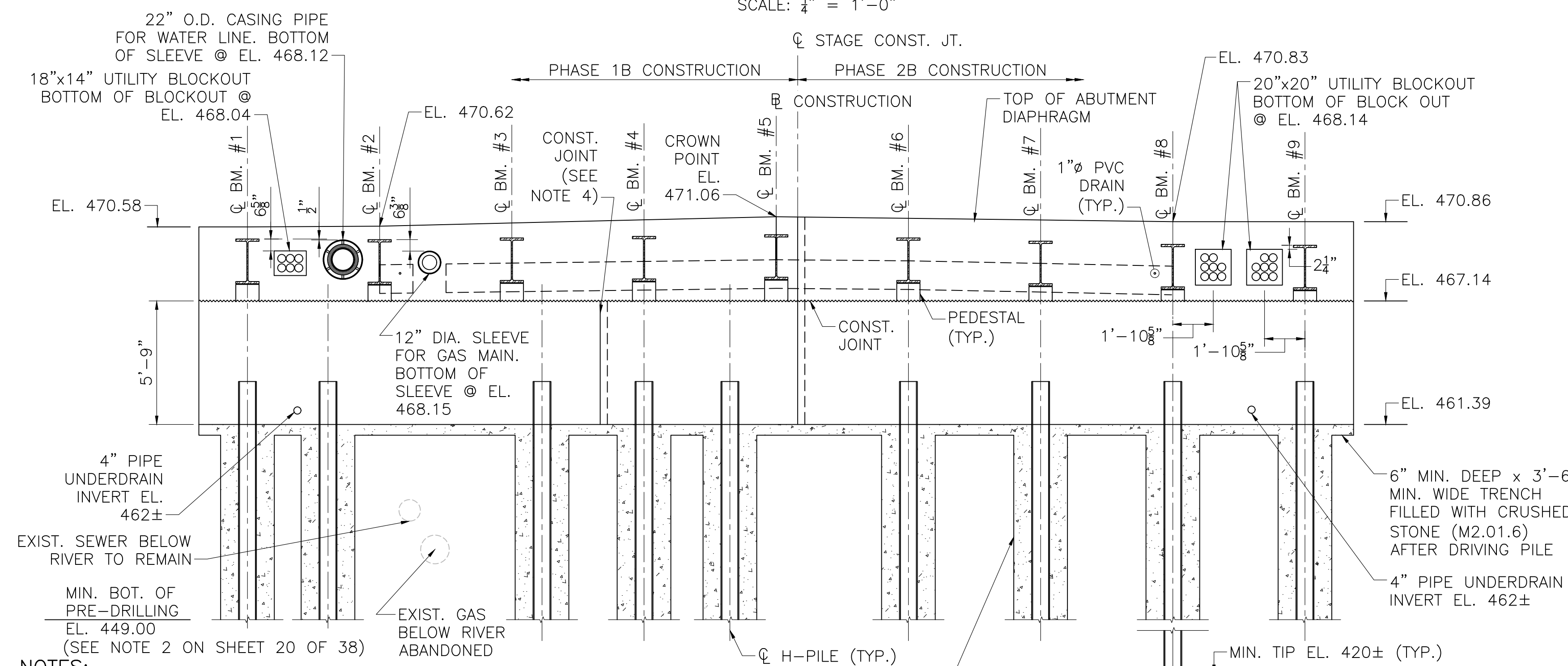


**9" WATERSTOP**  
NOT TO SCALE



**INTEGRAL ABUTMENT BACKFILL**

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

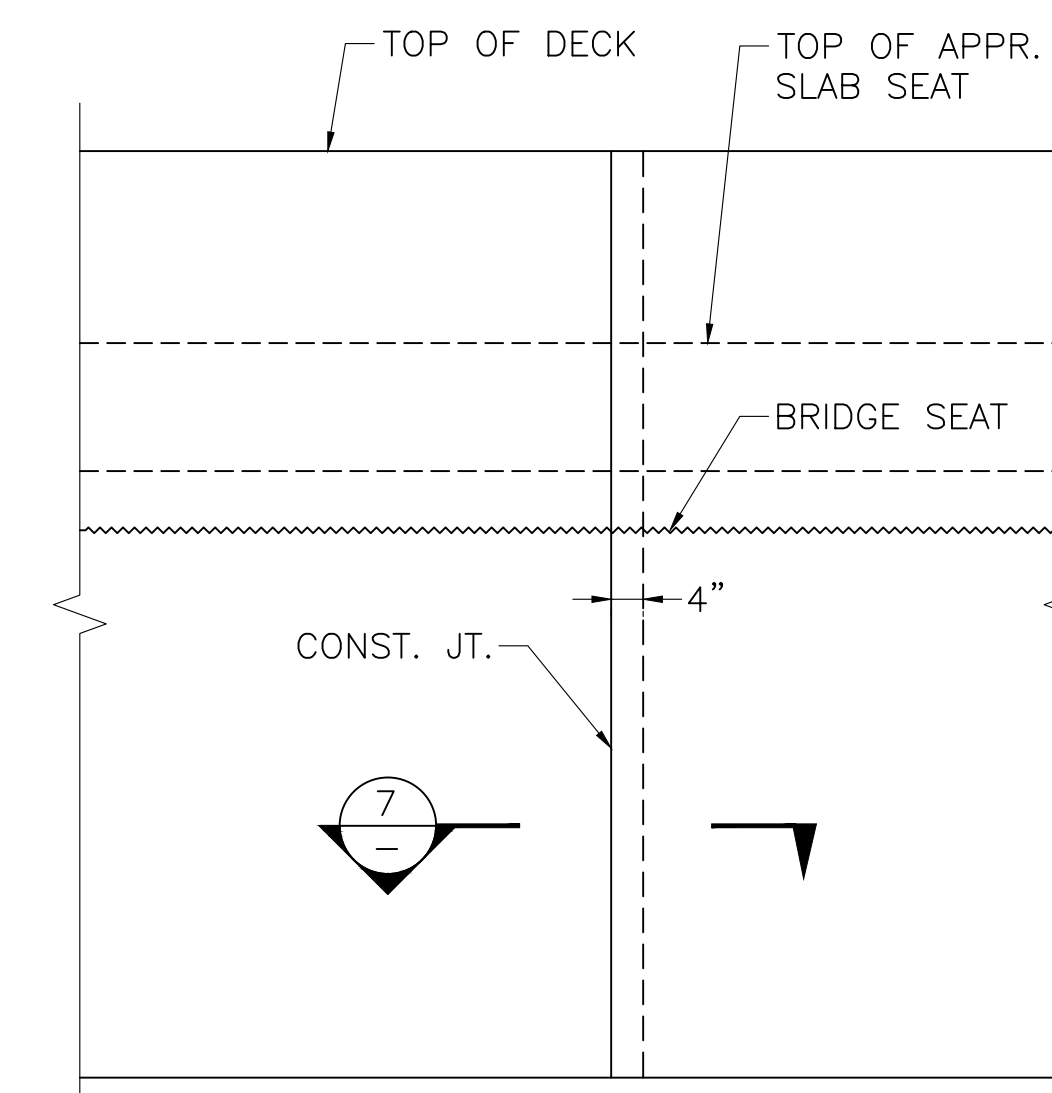


**SECTION 6**

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

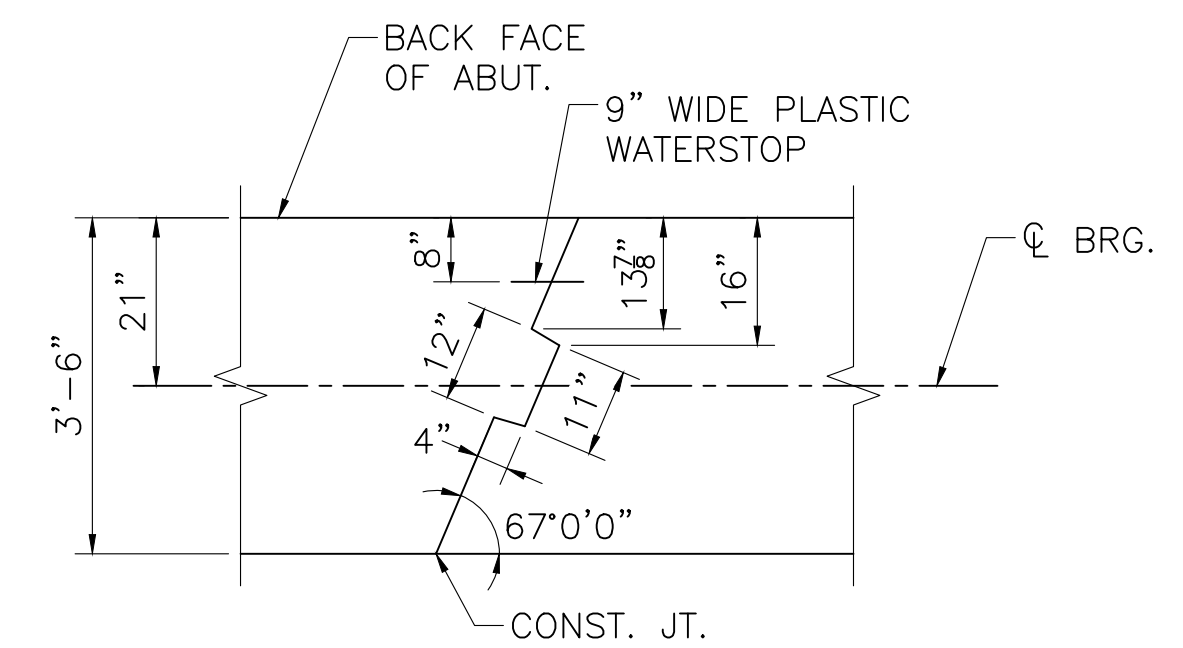
TOP OF PEDESTAL ELEVATIONS					
BM. #1	467.64	BM. #4	467.97	BM. #7	467.96
BM. #2	467.67	BM. #5	468.11	BM. #8	467.88
BM. #3	467.82	BM. #6	468.04	BM. #9	467.92

NOTE: ELEVATIONS DO NOT INCLUDE ERECTION PAD THICKNESS.



**CONSTRUCTION JOINT AT ABUTMENT**

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



**SECTION 7**

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

NOTE: REINFORCEMENT SHALL BE CONTINUOUS THROUGH CONSTRUCTION JOINT.

- NOTES:**
1. ALL ELEVATIONS ARE SHOWN AT ABUTMENT CENTERLINE.
  2. DETAILS ABOVE DECK LEVEL OMITTED FOR CLARITY.
  3. REFER TO SHEET 20 FOR PILE LAYOUT.
  4. CONTRACTOR MAY ELIMINATE CONSTRUCTION JOINT WITH APPROVAL OF THE ENGINEER PROVIDED THAT INITIAL SET ( $F'_c=500$ PSI) OF ALL CONCRETE DOES NOT OCCUR UNTIL AFTER COMPLETION OF PLACEMENT. AN APPROVED RETARDER SHALL BE USED WHEN NECESSARY TO RETAIN THE WORKABILITY OF THE CONCRETE.

SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	44	67
PROJECT FILE NO.		607680	

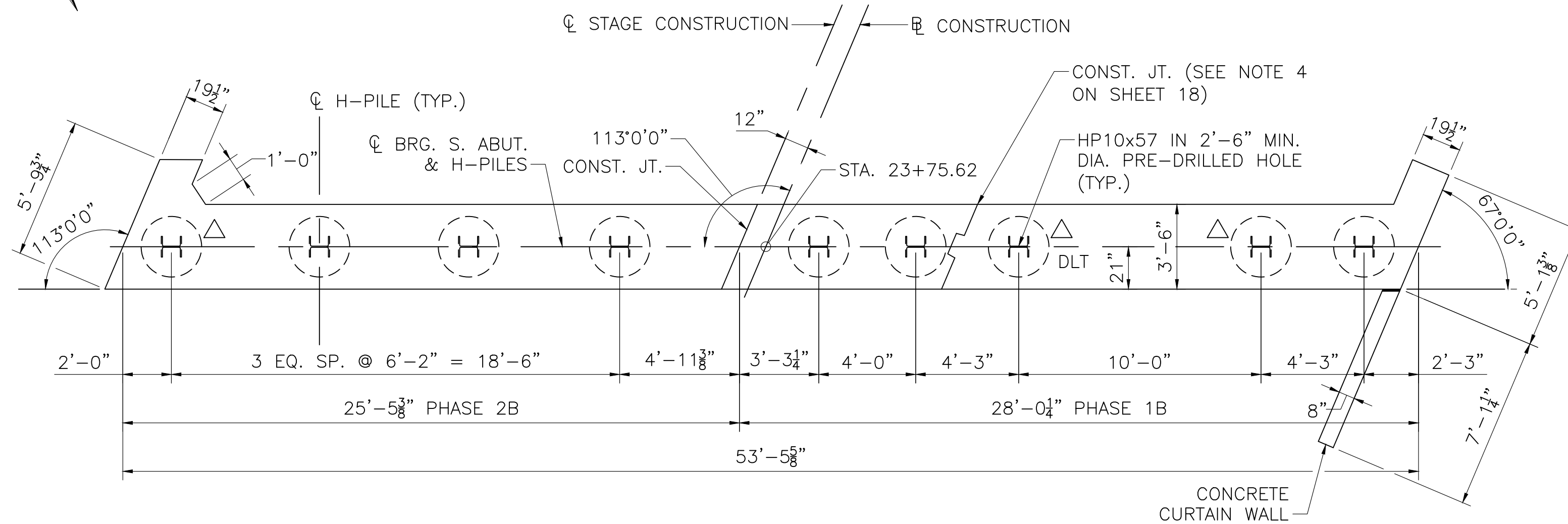
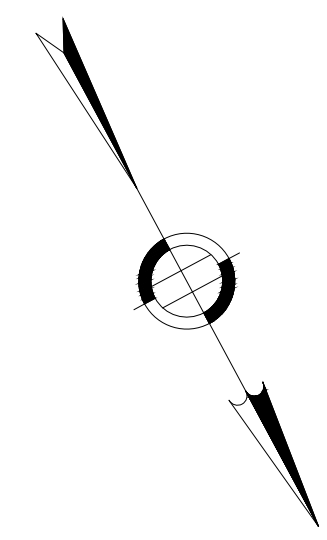
PILE LAYOUT AND NOTES

INTEGRAL ABUTMENT PILE NOTES:

- DRILL A TEST HOLE AT EACH PILE LOCATION AS DESCRIBED IN THE SPECIFICATIONS. THE CONTRACTOR IS ADVISED OF THE POTENTIAL EXISTENCE OF OBSTRUCTIONS AT THIS SITE. THE TEST HOLES WILL HELP IDENTIFY AND DRILL THROUGH OBSTRUCTIONS SO THAT THE PILES CAN BE DRIVEN WITHOUT DAMAGE AND WITHIN ALIGNMENT TOLERANCES.
- PRE-DRILL 2'-6" MINIMUM  $\phi$  HOLE TO EL. 449.00 MINIMUM AT THE SOUTH ABUTMENT AND EL. 449.00 MINIMUM AT THE NORTH ABUTMENT. PRE-DRILLED HOLES SHALL BE WITHIN 2% OF PLUMB. CONTRACTOR SHALL MAINTAIN A 3'-7" WIDE x 6" MINIMUM DEEP TRENCH BELOW THE BOTTOM OF EACH PROPOSED ABUTMENT. AFTER THE PILES ARE DRIVEN, THE HOLES AND THE TRENCHES SHALL BE FILLED WITH CRUSHED STONE (M2.01.6).
- PILES MARKED  $\Delta$  SHALL BE PRE-DRILLED WITH 2'-6" HOLES TO EL. 429.00 MIN. AT THE SOUTH ABUTMENT AND AT THE NORTH ABUTMENT. PRE-DRILLED HOLES SHALL BE WITHIN 2% OF PLUMB. AFTER THE PILES ARE DRIVEN, THE HOLES SHALL BE FILLED WITH CRUSHED STONE (M2.01.6)
- ALL SPLICES SHALL HAVE COMPLETE PENETRATION BUTT WELDS. THERE SHALL BE NO SPLICES WITHIN THE TOP 20 FEET OF PILE. SPlice WELDS SHALL BE 100% UT.
- THE FACTORED AXIAL DESIGN LOAD PER PILE IS 140 KIPS AS PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS STRENGTH I LOAD COMBINATION.
- THE FACTORED STRUCTURAL RESISTANCE PER PILE IS 420 KIPS AND IS THE PRODUCT OF THE NOMINAL STRUCTURAL RESISTANCE OF 840 KIPS AND A RESISTANCE FACTOR OF 0.50.
- PILES SHALL BE DRIVEN TO BEDROCK WITH AN ESTIMATED TIP ELEVATION OF 420 FEET AT THE NORTH ABUTMENT AND 409 FEET AT THE SOUTH ABUTMENT. HEAVY DUTY PILE SHOES SHALL BE INSTALLED ON THE TIPS OF ALL PILES. PREFABRICATED PILE SHOES MAY BE USED IF APPROVED BY THE ENGINEER.
- DETERMINATION OF THE DRIVEN PILE RESISTANCE, PILE DRIVING CRITERIA, AND PILE INTEGRITY SHALL BE PERFORMED USING THE DYNAMIC DRIVING/TESTING METHOD WITH A RESISTANCE FACTOR OF 0.65. PILES SHALL BE INSTALLED TO ACHIEVE A FACTORED DRIVEN RESISTANCE EQUAL TO OR GREATER THAN THE FACTORED AXIAL DESIGN LOAD.
- THE CONTRACTOR SHALL SUBMIT A PILE SCHEDULE, PILE INSTALLATION, AND PILE DRIVING/TESTING PLAN FOR REVIEW AND APPROVAL OF THE ENGINEER.
- PILES SHALL CONFORM TO AASHTO M270 GRADE 50.

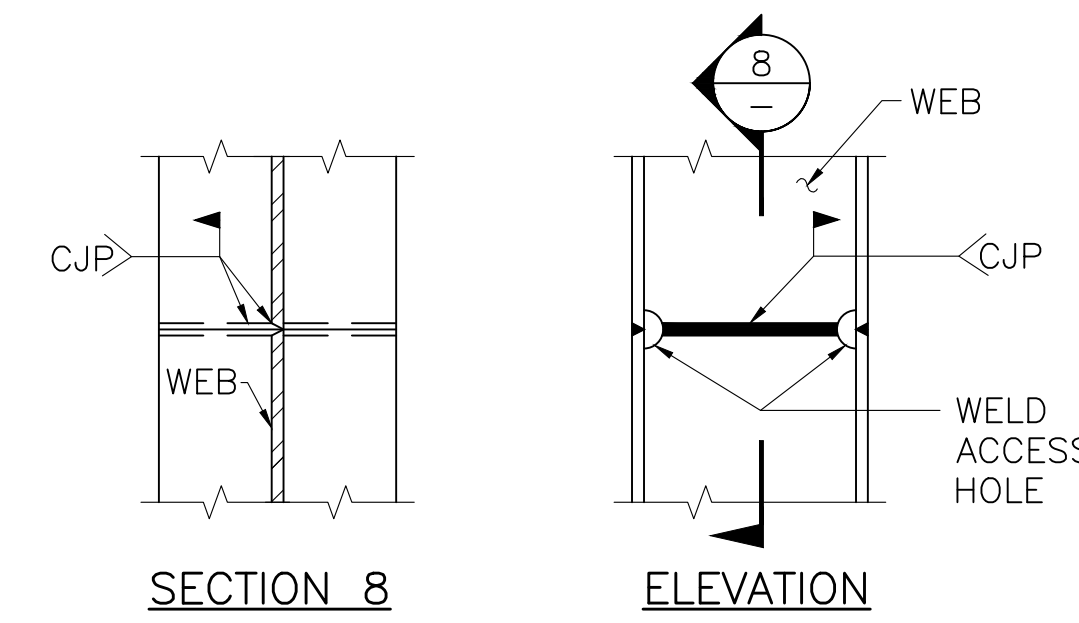
REQUIRED PILE LOCATION TOLERANCES:

- CONFORMANCE TO THE FOLLOWING TOLERANCES IS OF EXTREME IMPORTANCE TO FOUNDATIONS OF THIS TYPE.  
DLT - DYNAMIC LOAD TEST PILE  
THE DYNAMIC LOAD TEST (DLT) LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR TO SELECT THE EXACT LOCATION(S) FOR THE DLT'S WITH APPROVAL BY THE ENGINEER.



SOUTH ABUTMENT PILE LAYOUT PLAN

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

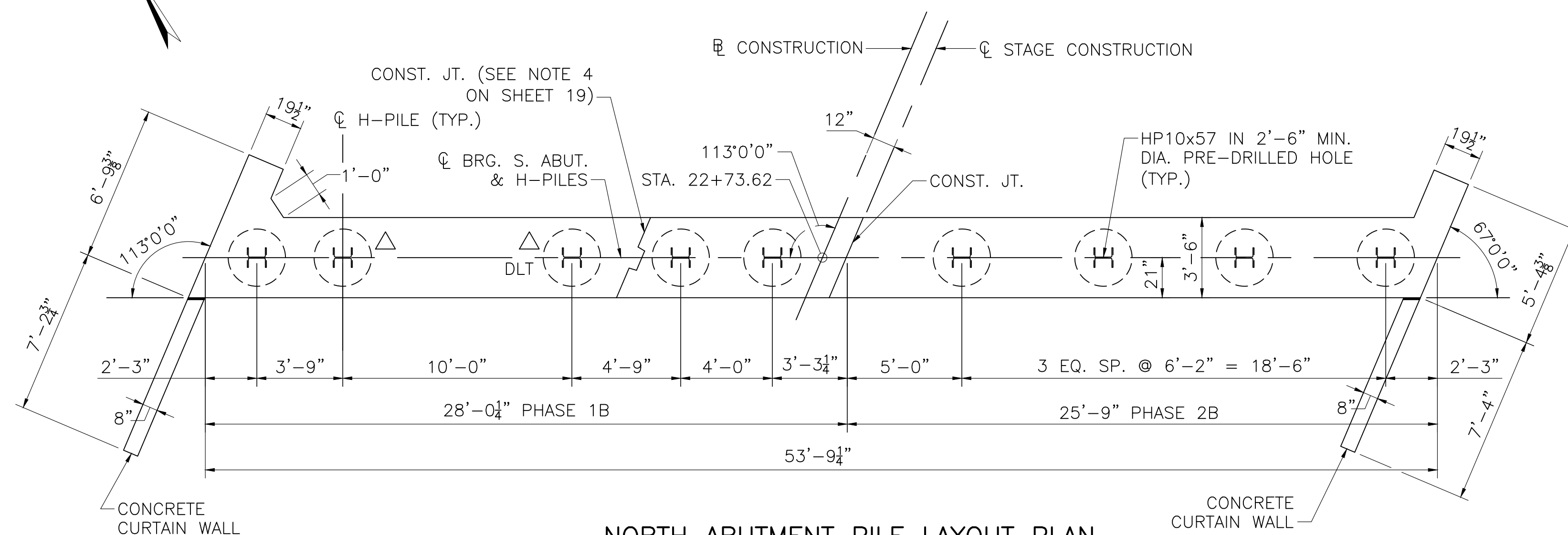
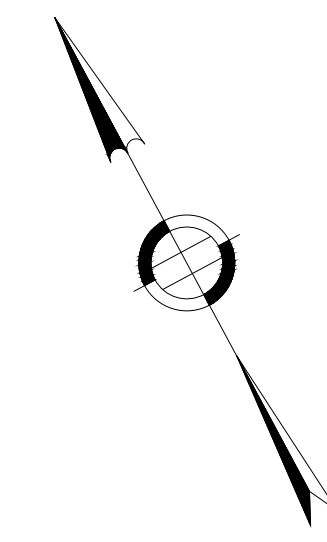


NOTES:

- ALL WELDS SHALL BE COMPLETE PENETRATION AND SHALL CONFORM TO THE ANSI/AASHTO/AWS BRIDGE WELDING CODE, D1.5.
- WELDING PROCEDURE SPECIFICATIONS MUST BE APPROVED BY THE ENGINEER PRIOR TO WELDING.
- WHENEVER POSSIBLE ALL PILES SHALL BE SPLICED ON THE GROUND IN THE FLAT POSITION.
- WEB SHALL BE COPE TO ALLOW FOR COMPLETE PENETRATION WELDING OF FLANGES.
- WELDED MECHANICAL PILE SPLICERS MAY BE USED PROVIDED THAT COMPLETE DETAILS AND WELDING PROCEDURES HAVE BEEN REVIEWED AND APPROVED BY THE ENGINEER.

H-PILE SPlice DETAILS

NOT TO SCALE

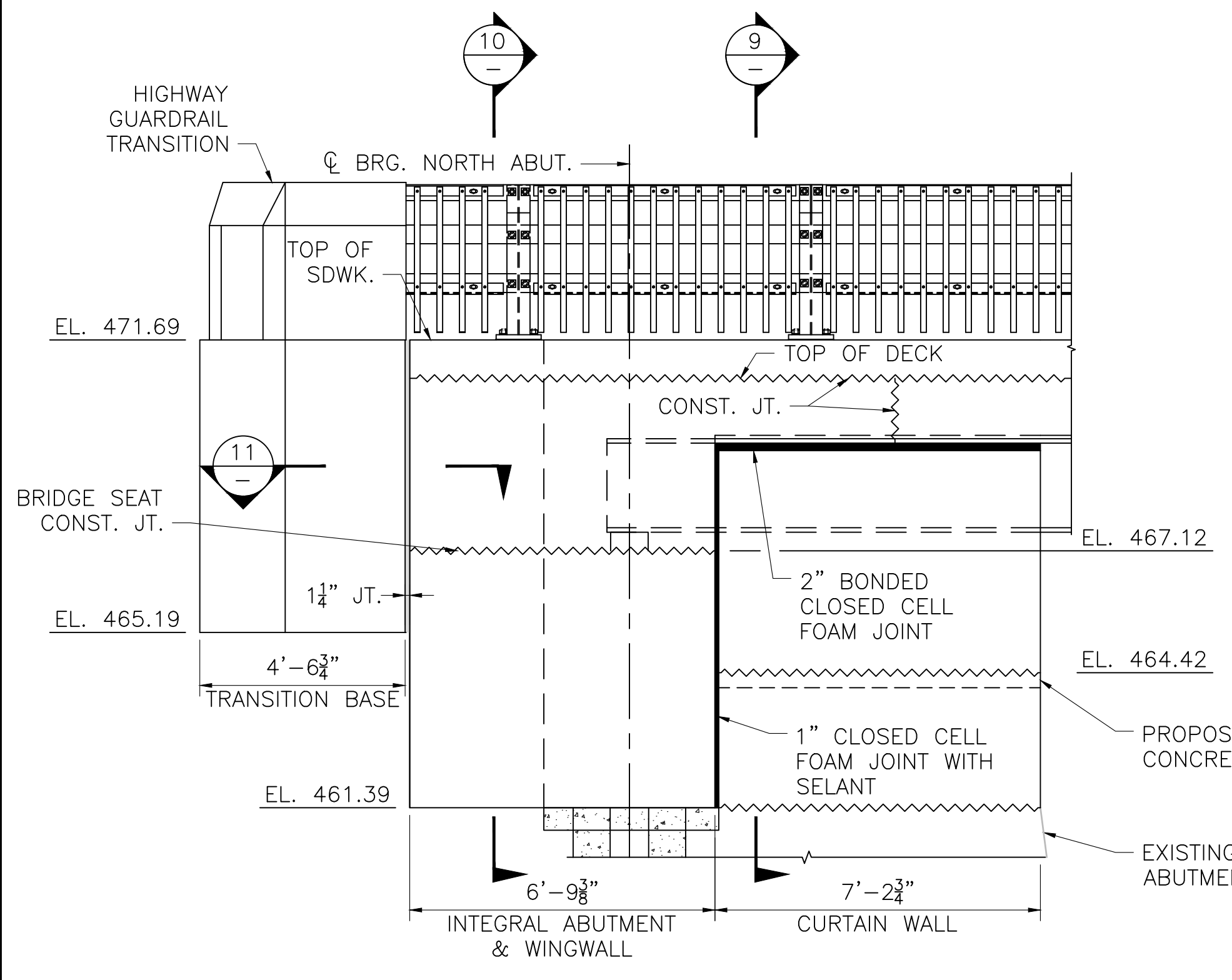


NORTH ABUTMENT PILE LAYOUT PLAN

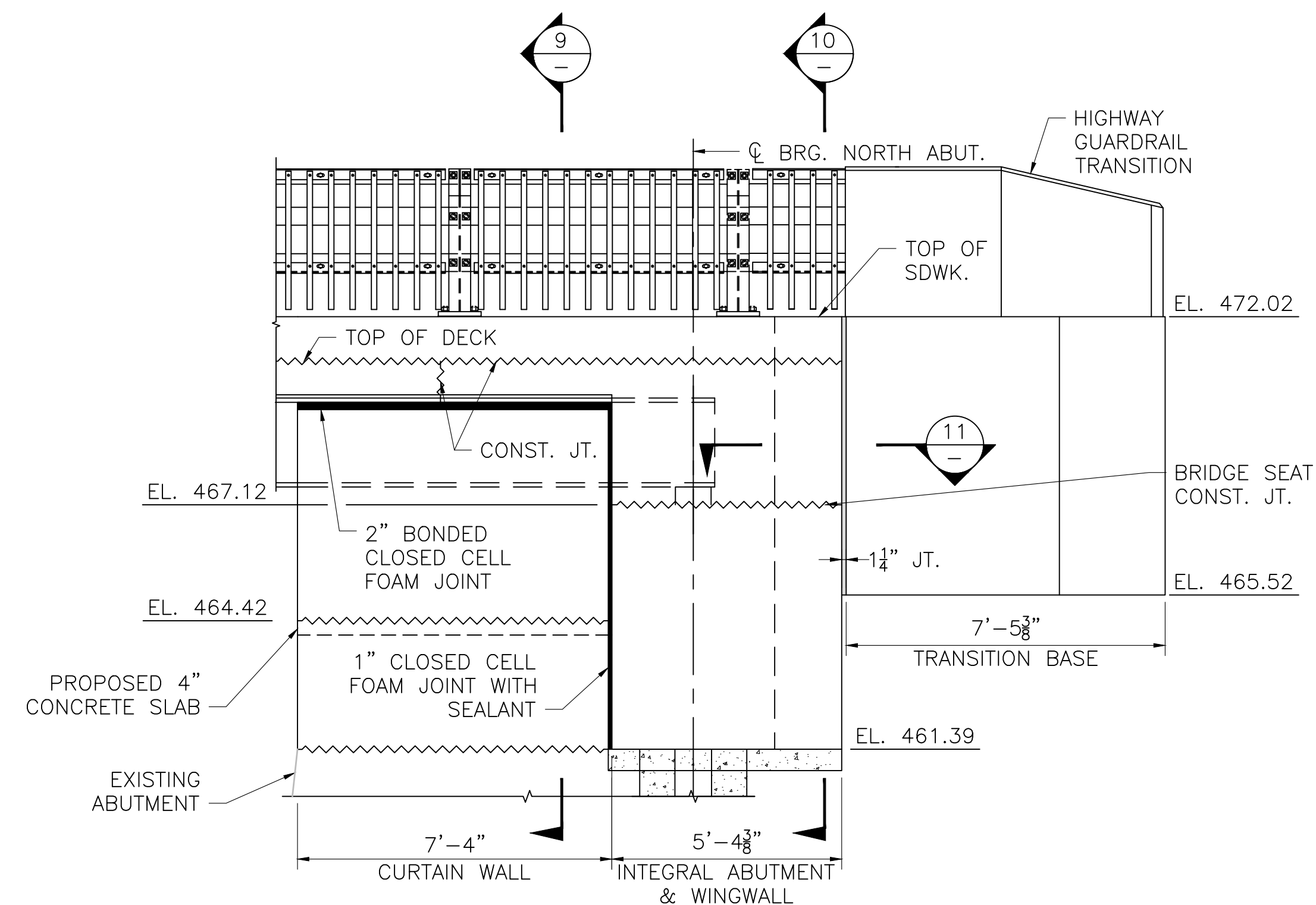
SCALE: 1/4" = 1'-0"

DATE	DESCRIPTION
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

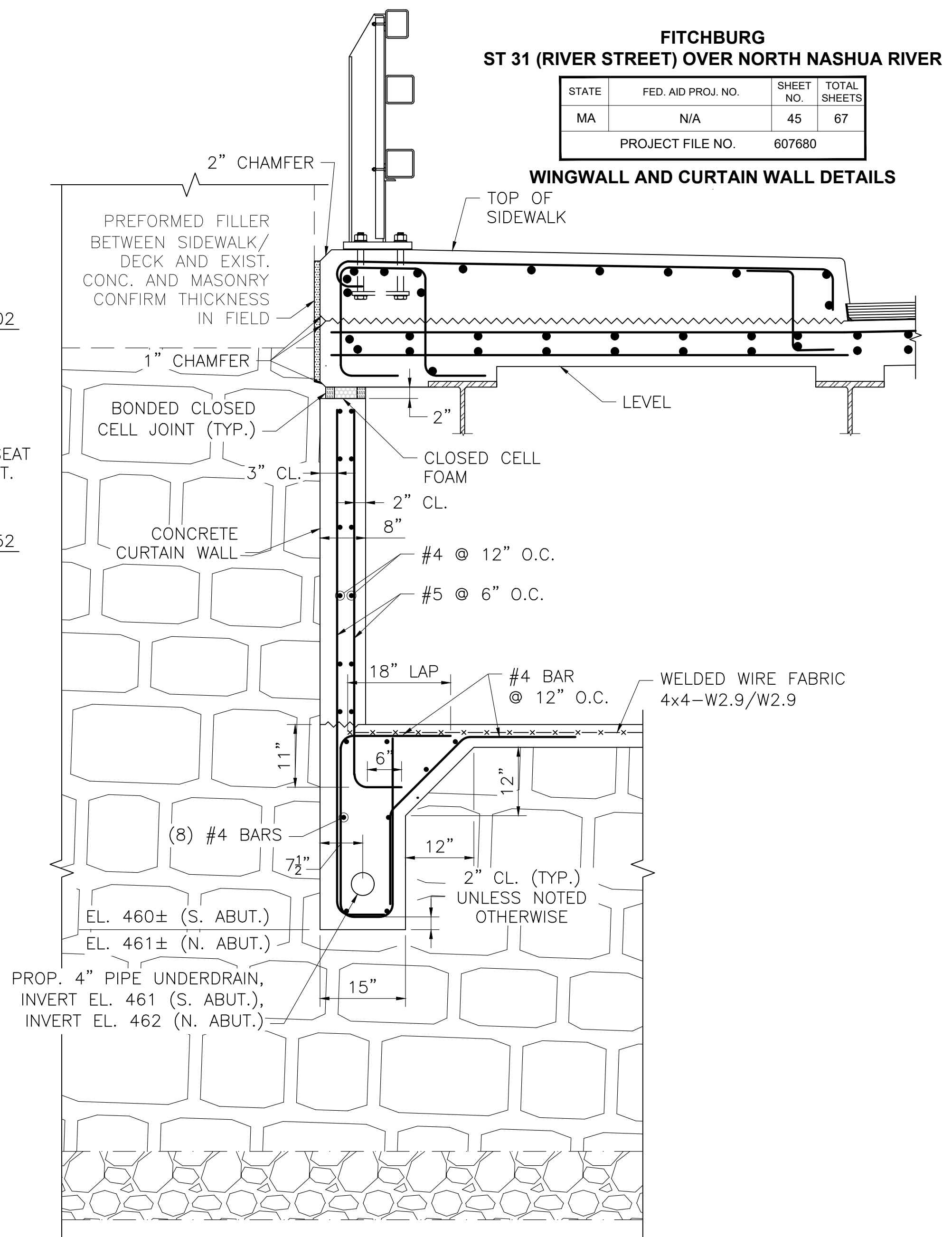
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	45	67
PROJECT FILE NO.		607680	



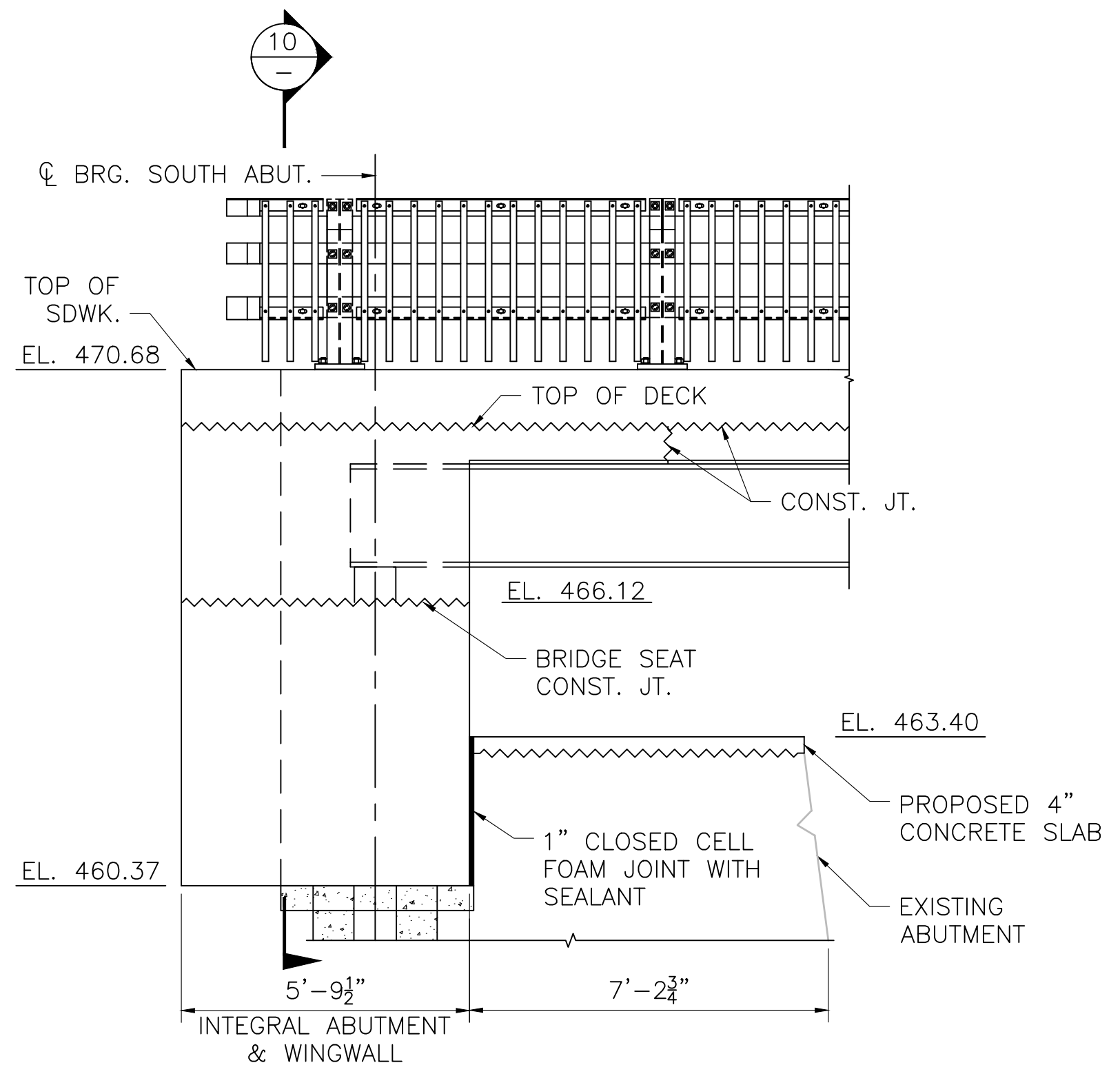
**NORTHWEST CURTAIN WALL ELEVATION**  
SCALE: 3/8" = 1'-0"



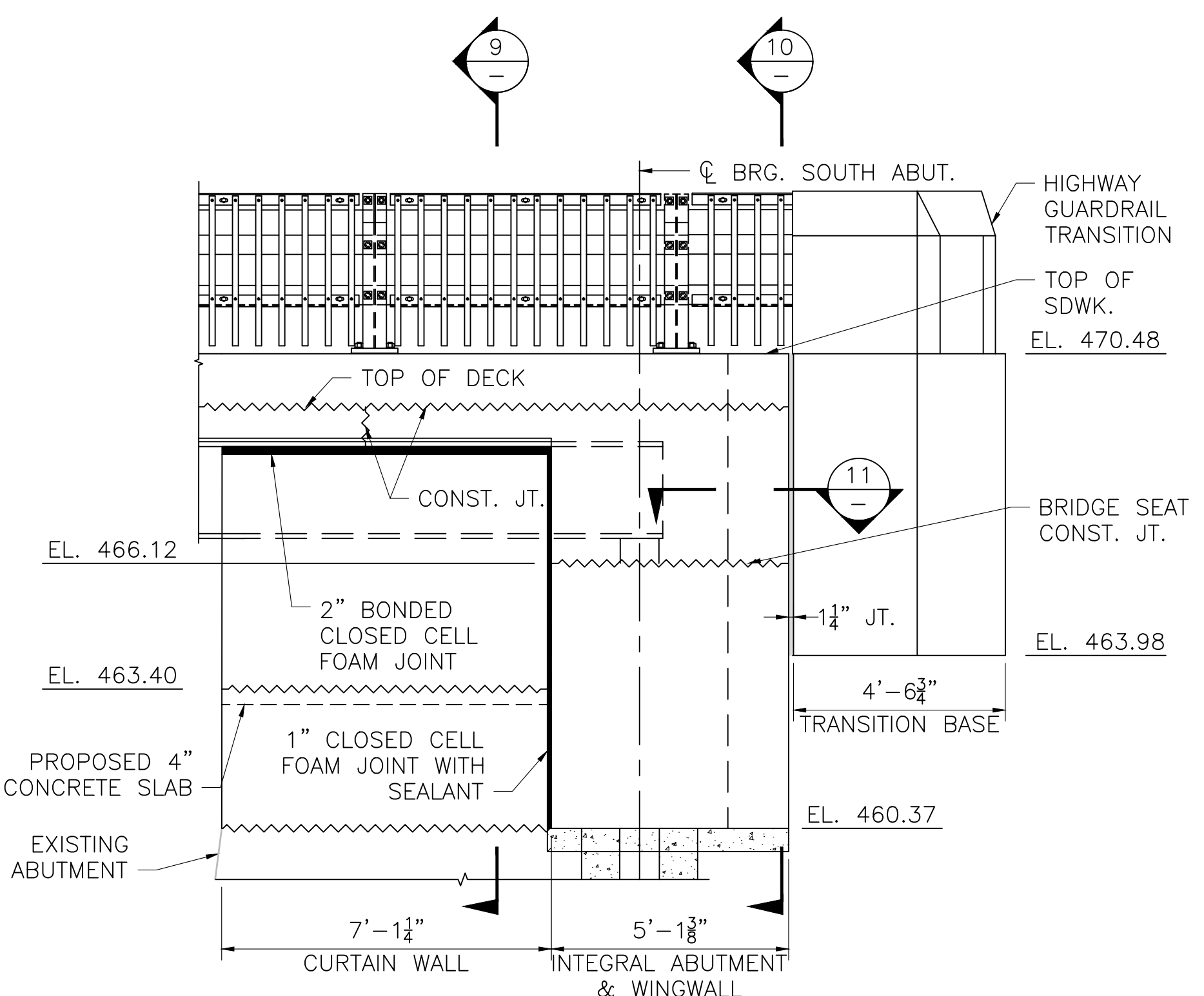
**NORTHEAST CURTAIN WALL ELEVATION**  
SCALE: 3/8" = 1'-0"



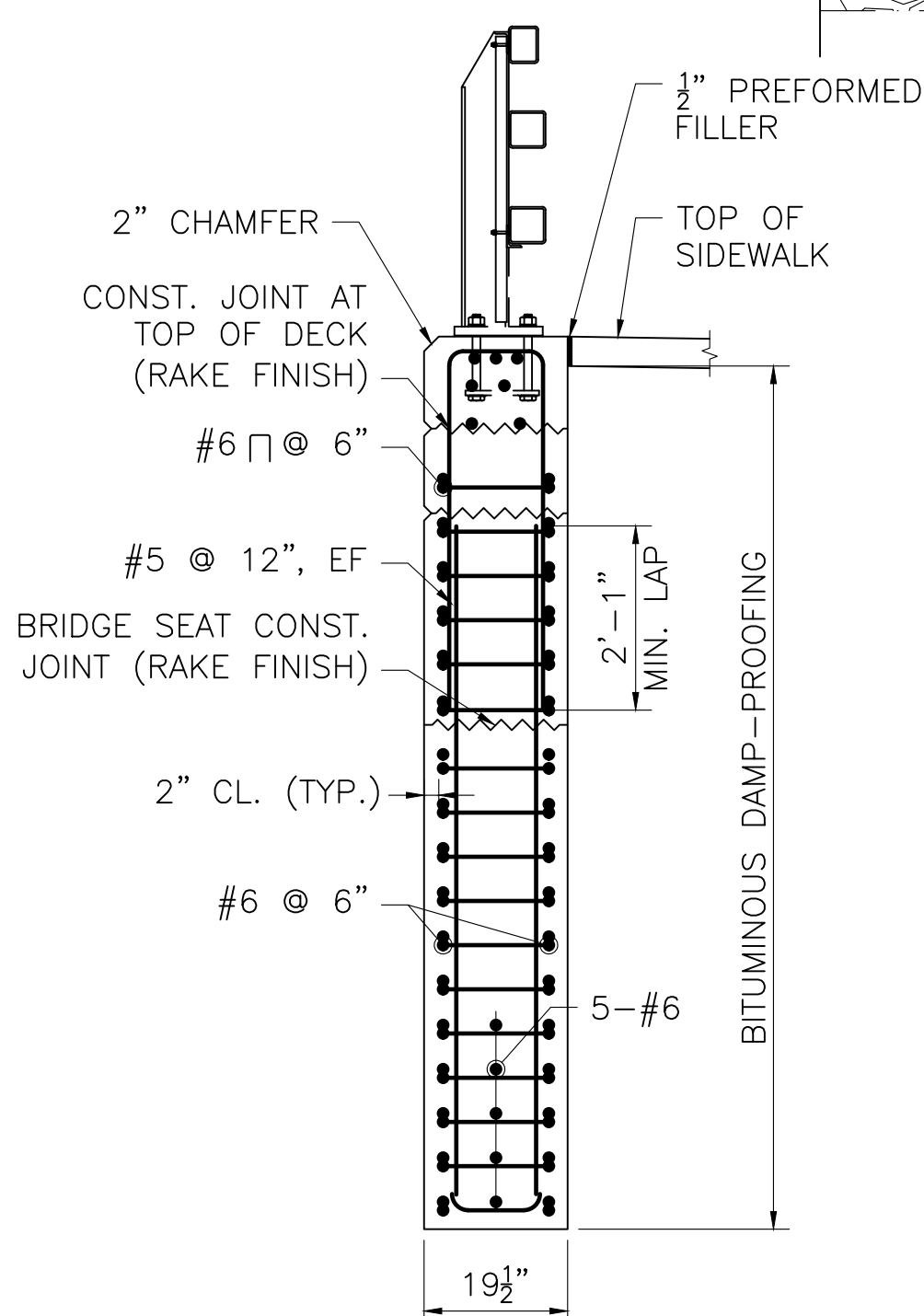
**SECTION 9**  
SCALE: 3/4" = 1'-0"



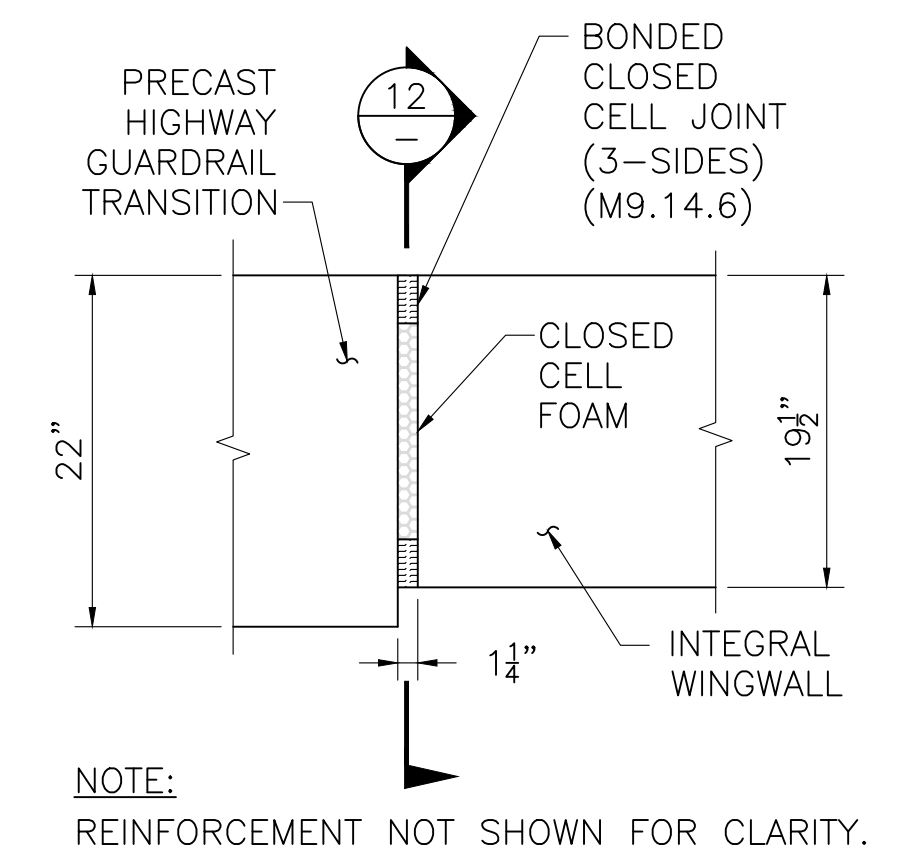
**SOUTHEAST ELEVATION**  
SCALE: 3/8" = 1'-0"



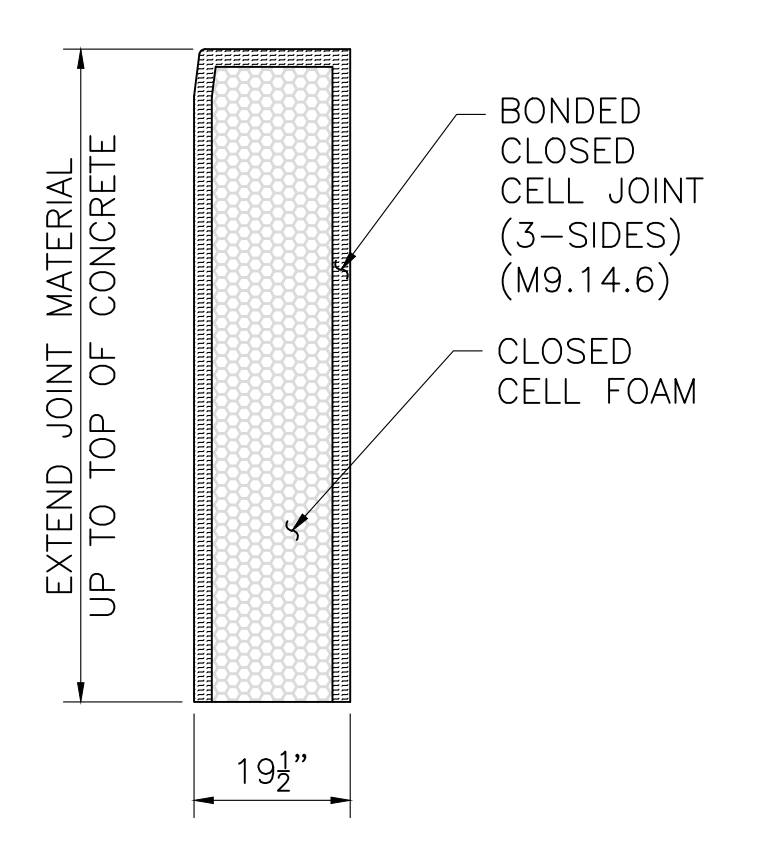
**SOUTHWEST CURTAIN WALL ELEVATION**  
SCALE: 3/8" = 1'-0"



**SECTION 10**  
SCALE: 1/2" = 1'-0"



**SECTION 11**  
SCALE: 1" = 1'-0"



**SECTION 12**  
SCALE: 1/2" = 1'-0"

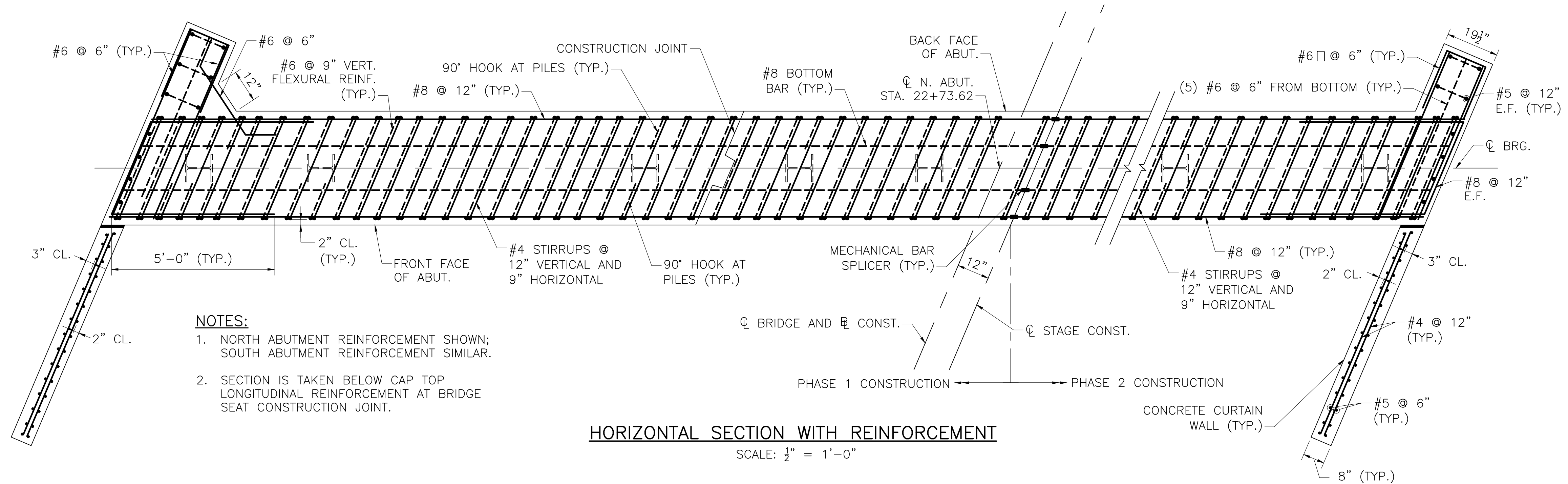
NOTE:  
REINFORCEMENT NOT SHOWN FOR CLARITY.

DATE	DESCRIPTION
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

607680\_BR 21 (RETAINING WALL DETAILS)DWG Plotted on 14-Sep-2023 10:41 AM 11-AUG-2023 Final Structural Submittal (SF)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	46	67
PROJECT FILE NO.		607680	

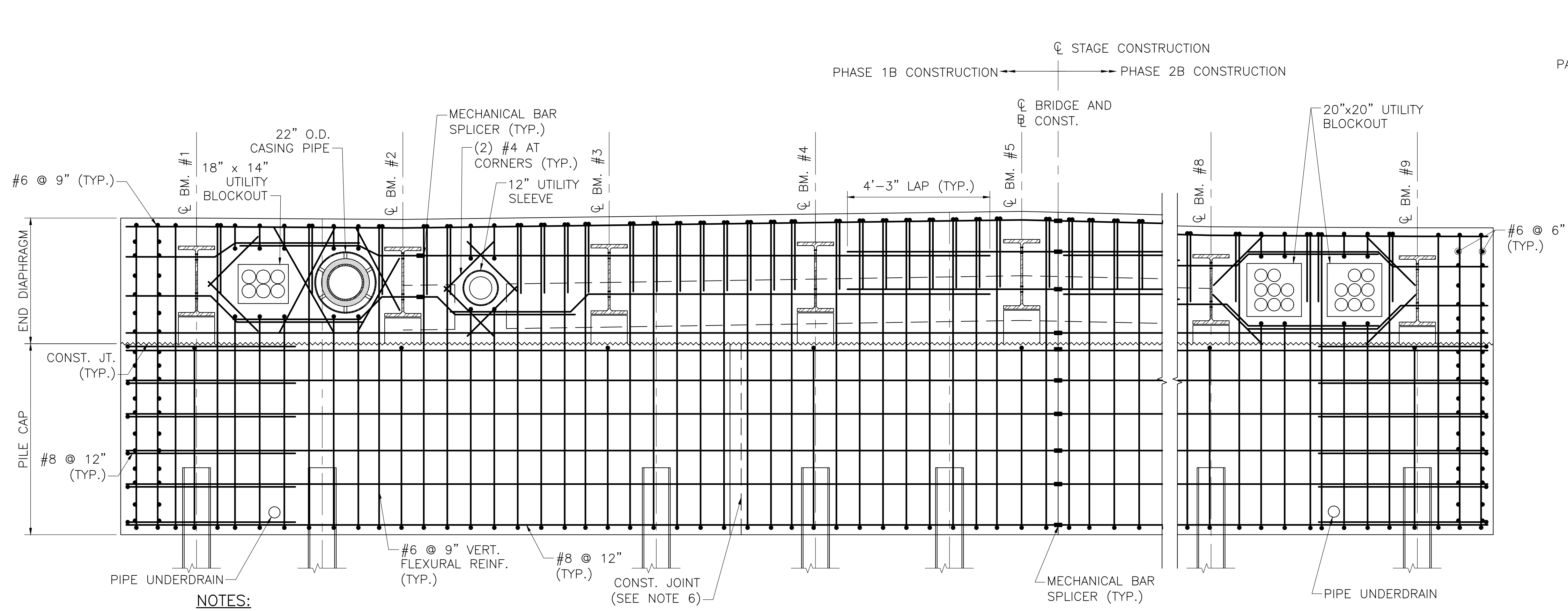
ABUTMENT DETAILS (1 OF 2)



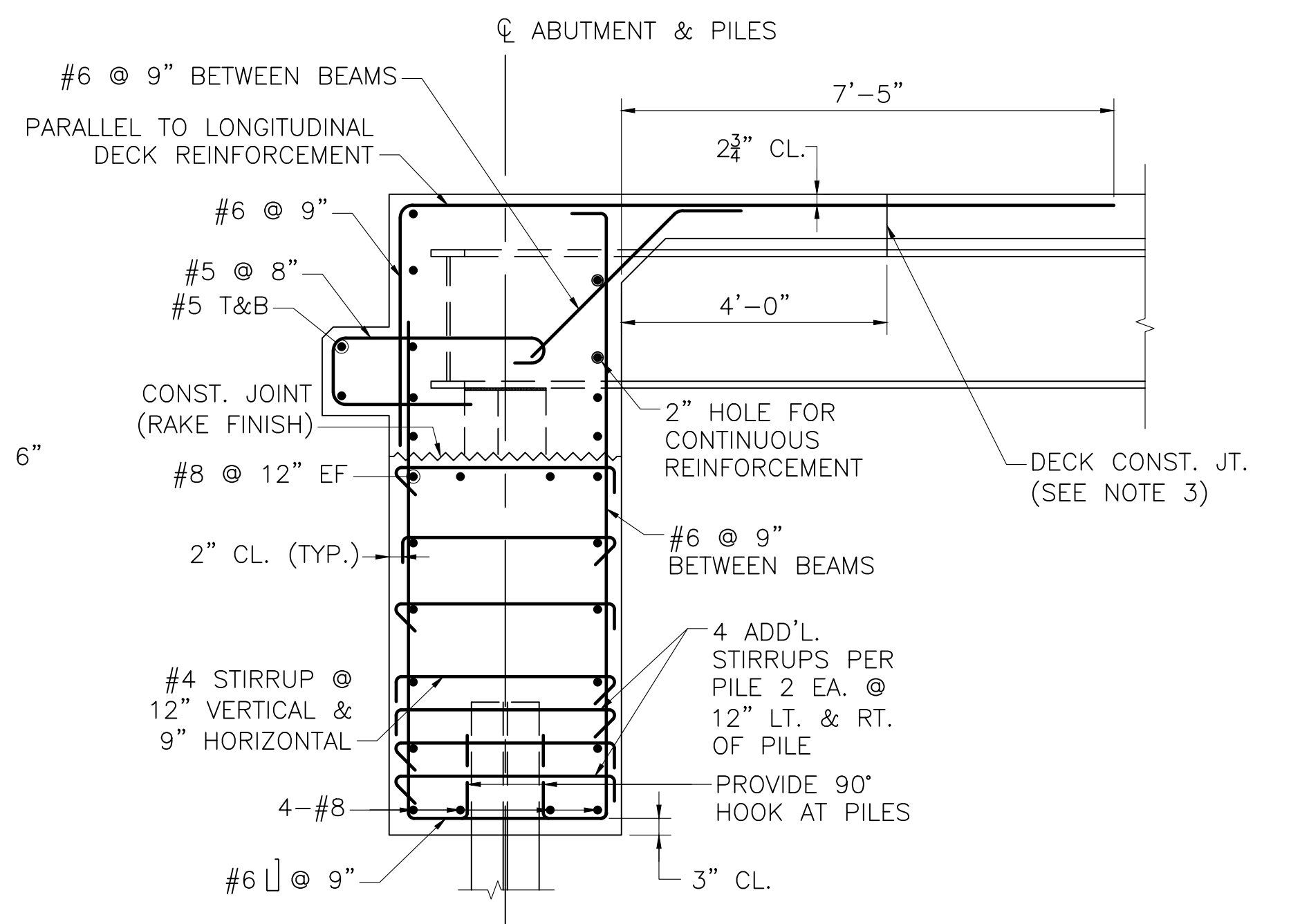
- NOTES:**
1. NORTH ABUTMENT REINFORCEMENT SHOWN; SOUTH ABUTMENT REINFORCEMENT SIMILAR.
  2. SECTION IS TAKEN BELOW CAP TOP LONGITUDINAL REINFORCEMENT AT BRIDGE SEAT CONSTRUCTION JOINT.

**CONSTRUCTION NOTES:**

1. ALL REINFORCEMENT SHALL BE COATED.
2. DECK SLAB REINFORCEMENT NOT SHOWN FOR CLARITY. CONTINUE DECK SLAB REINFORCEMENT TO BACK OF ABUTMENT.
3. THE CONTRACTOR SHALL FOLLOW THE DECK PLACEMENT SEQUENCE AS SHOWN ON SHEET 31.
4. ALL CONCRETE SHALL CONTAIN SUPERPLASTICIZER TO ENSURE ADEQUATE CONSOLIDATION.
5. BOTH ABUTMENTS SHALL BE BACKFILLED SIMULTANEOUSLY. NO MORE THAN TWO (2) FEET OF DIFFERENTIAL BACKFILL HEIGHT SHALL BE PERMITTED. BACKFILLING SHALL NOT BEGIN UNTIL THE ABUTMENT AND DECK CONSTRUCTION IS COMPLETE.
6. THE CONTRACTOR MAY USE MECHANICAL REINFORCING BAR SPLICERS IN LIEU OF TENSION LAP SPLICES TO FACILITATE CONSTRUCTION. HOWEVER, NO ADDITIONAL COMPENSATION WILL BE PROVIDED FOR THE USE OF MECHANICAL REINFORCING BAR SPLICERS. MECHANICAL REINFORCING BAR SPLICERS SHALL BE INSTALLED TO MAKE THIS REINFORCEMENT CONTINUOUS.
7. MECHANICAL REINFORCING BAR SPLICERS SHALL BE INSTALLED AT STAGE CONSTRUCTION JOINTS FOR ALL TRANSVERSE REINFORCEMENT.
8. THE TOP OF THE APPROACH SLAB SHALL MATCH THE TOP OF THE ABUTMENT DIAPHRAGM.



- NOTES:**
1. NORTH ABUTMENT REINFORCEMENT SHOWN; SOUTH ABUTMENT REINFORCEMENT SIMILAR.
  2. #4 STIRRUPS NOT SHOWN FOR CLARITY.

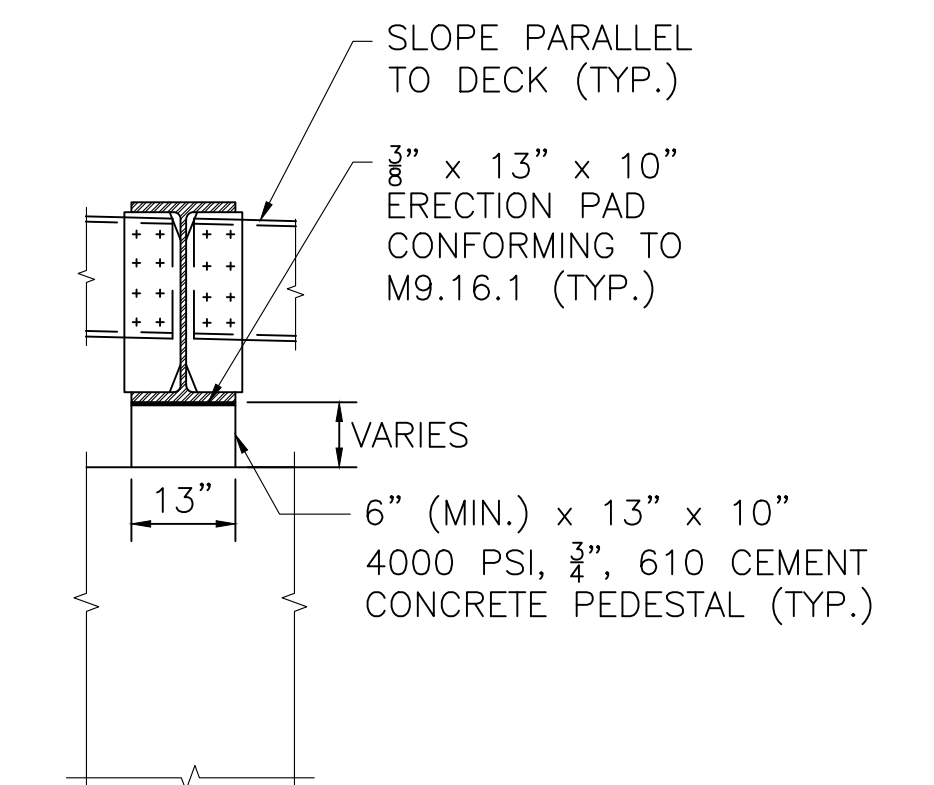


DATE	DESCRIPTION
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
	CONSTRUCTION BY MASSDOT
	AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
	USE ONLY PRINTS OF LATEST DATE

**FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

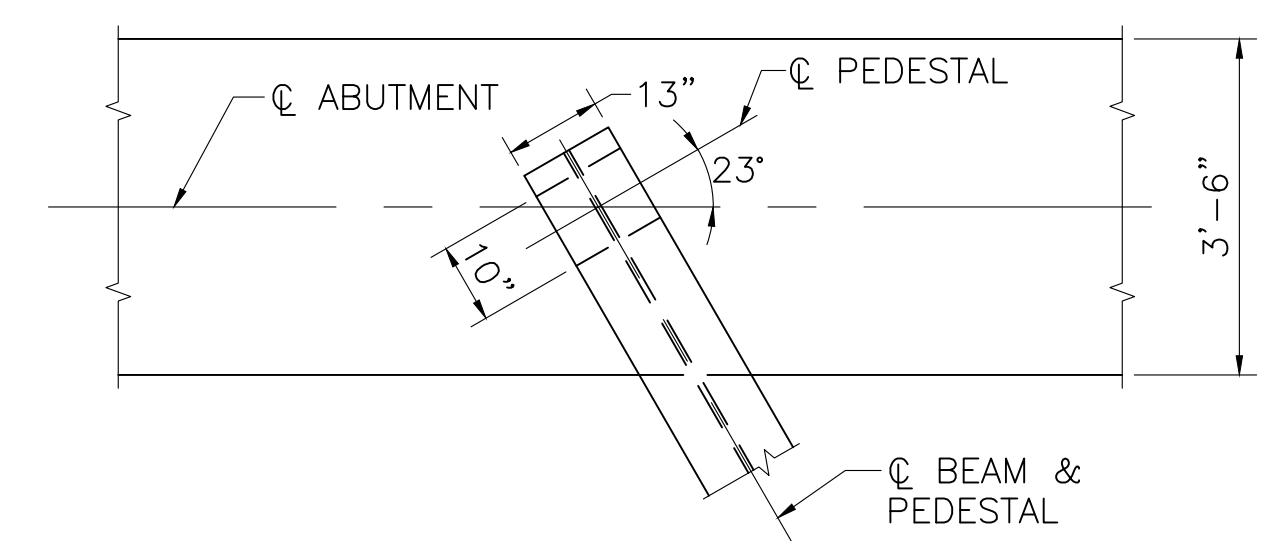
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	47	67
PROJECT FILE NO.		607680	

**ABUTMENT DETAILS (2 OF 2)**



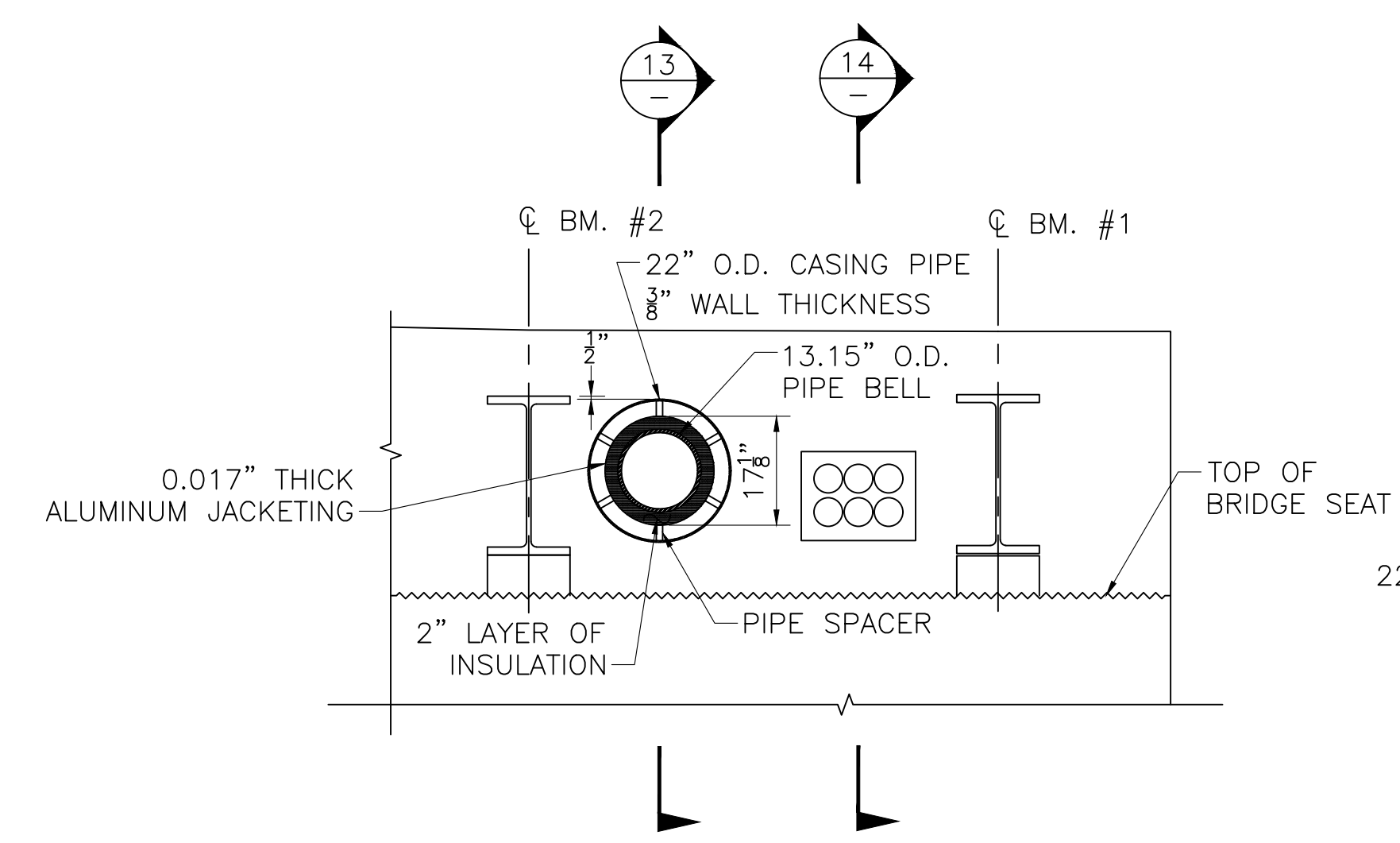
**BEAM END DETAILS**

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



**PEDESTAL PLAN**

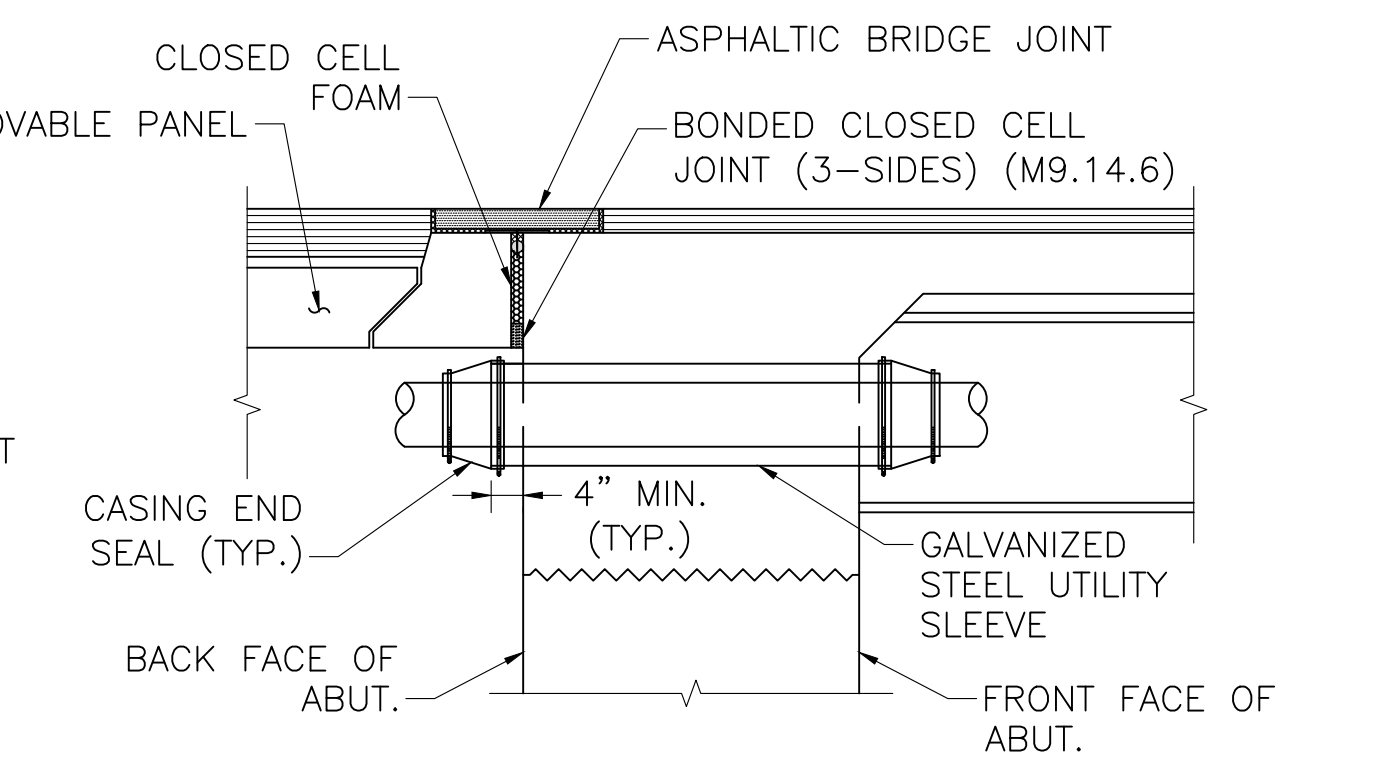
SCALE: 1/2" = 1'-0"



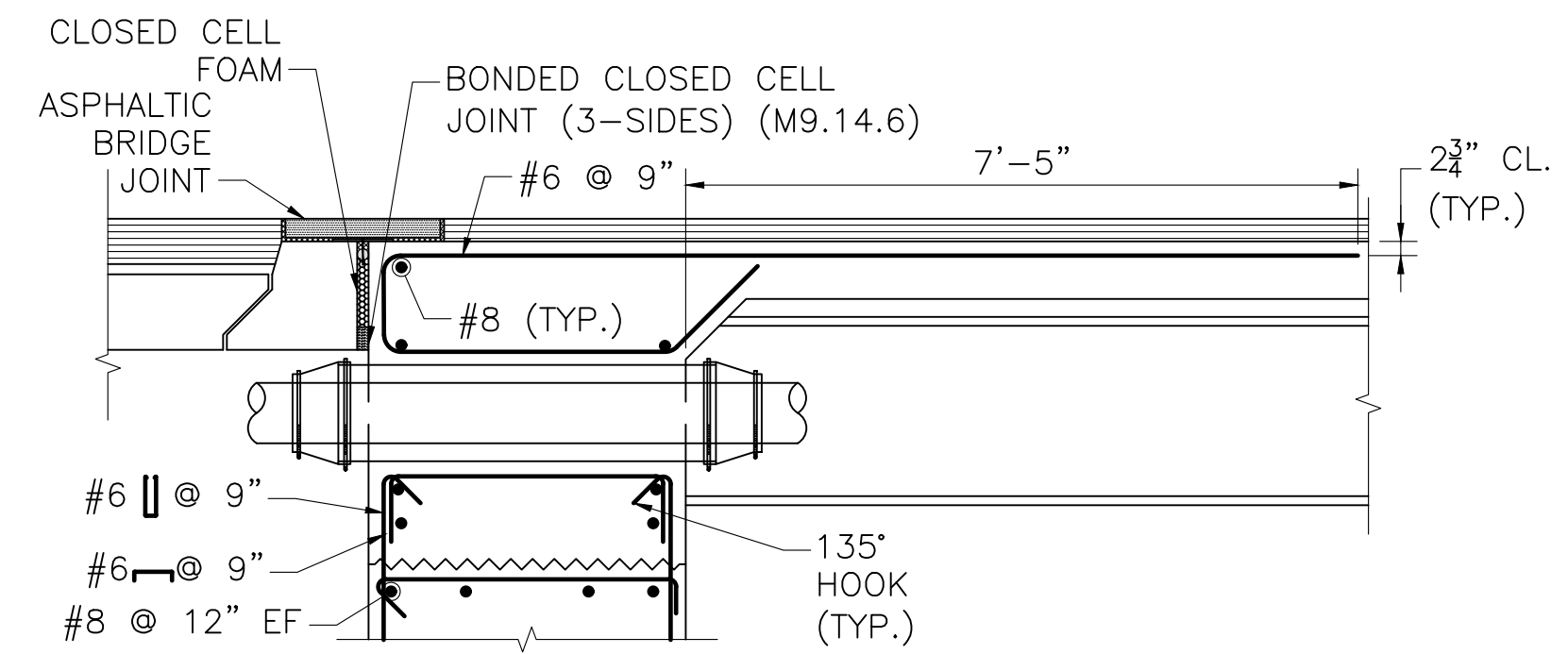
**LONGITUDINAL SECTION 13**

**BAY 1 UTILITY DETAILS AT ABUTMENT**

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

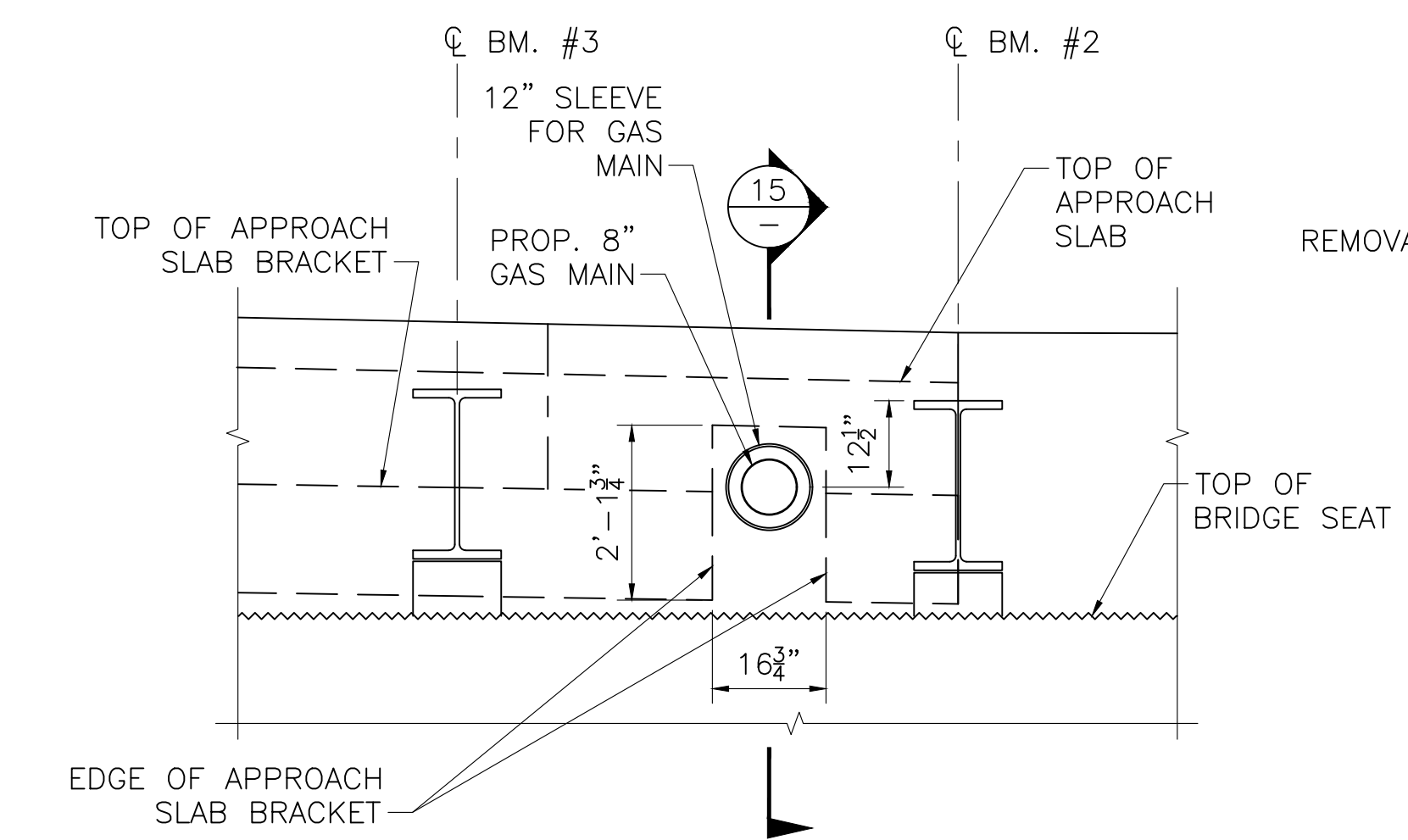


**LONGITUDINAL SECTION 15**



**TYPICAL REINFORCING AT ABUTMENT OPENINGS**

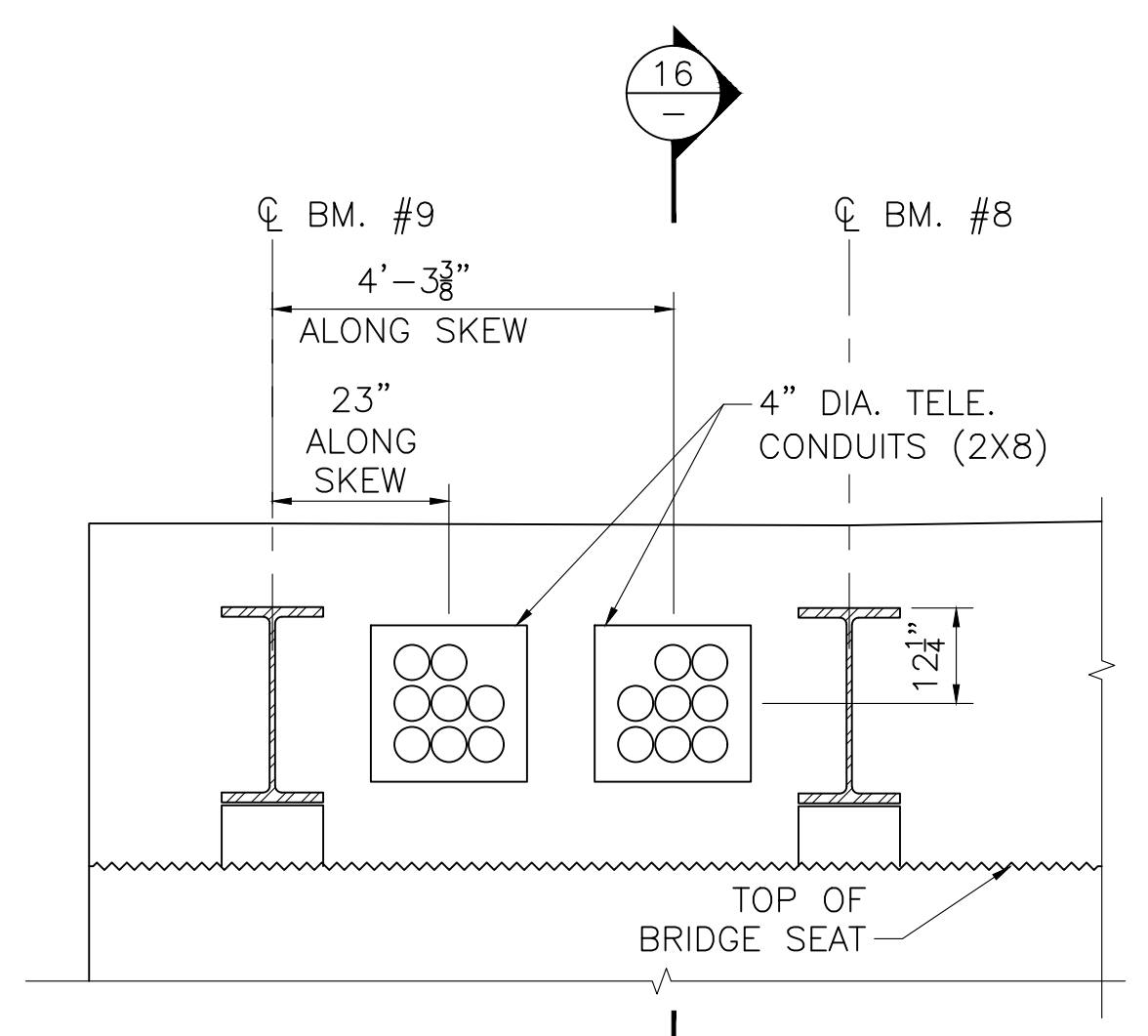
SCALE: 1/2" = 1'-0"



**TRANSVERSE SECTION**

**BAY 2 UTILITY DETAILS AT ABUTMENT**

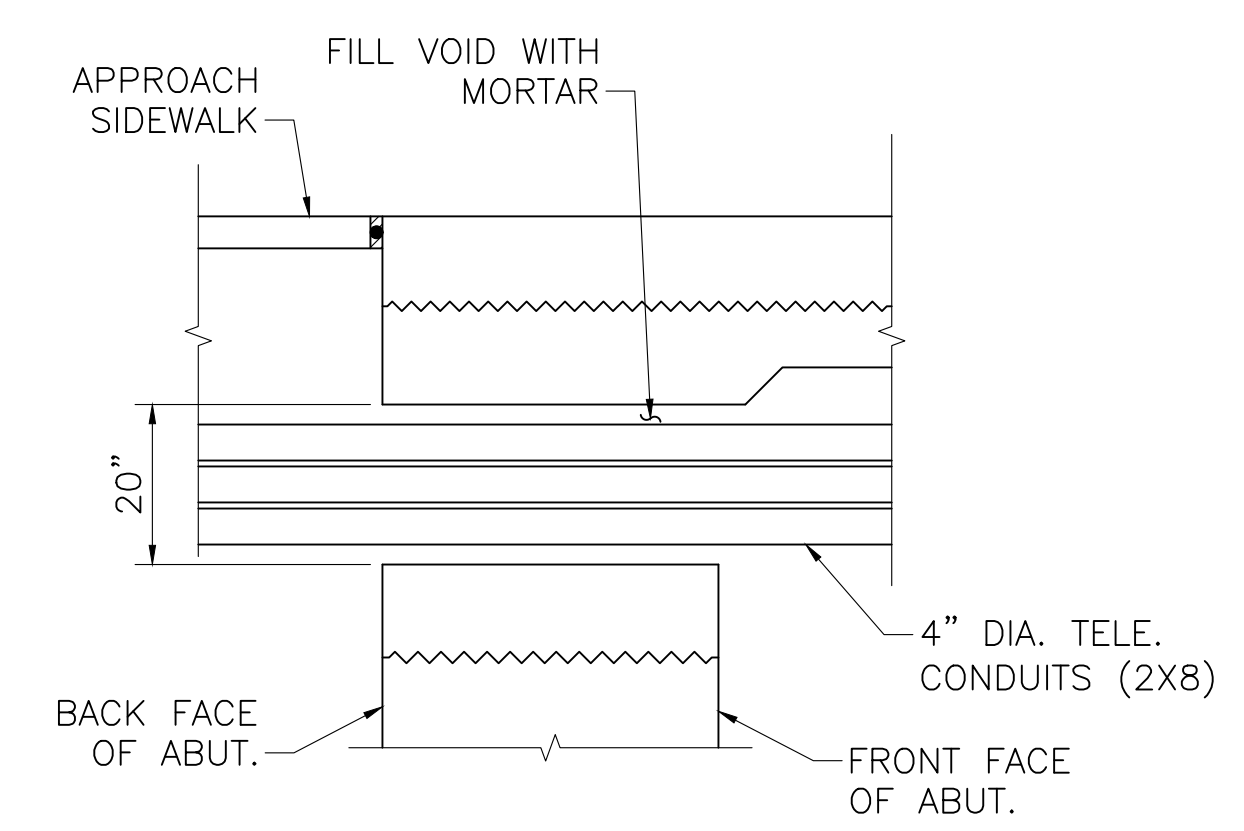
SCALE: 1/2" = 1'-0"



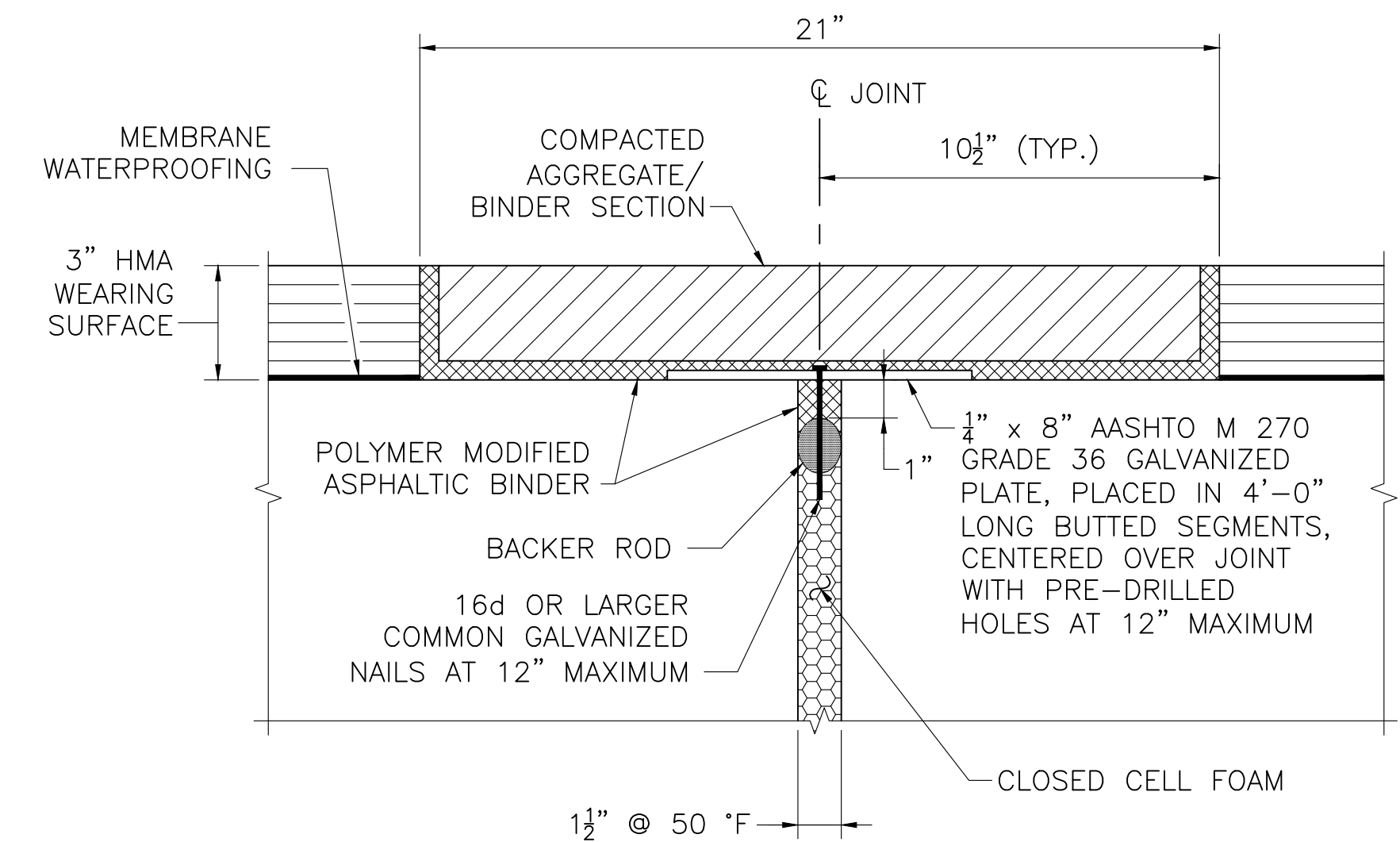
**TRANSVERSE SECTION**

**BAY 8 UTILITY DETAILS AT ABUTMENT**

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



**LONGITUDINAL SECTION 16**



**ASPHALTIC BRIDGE JOINT DETAIL**

SCALE: 3" = 1'-0"

**ASPHALTIC BRIDGE JOINT  
CONSTRUCTION SEQUENCE NOTES:**

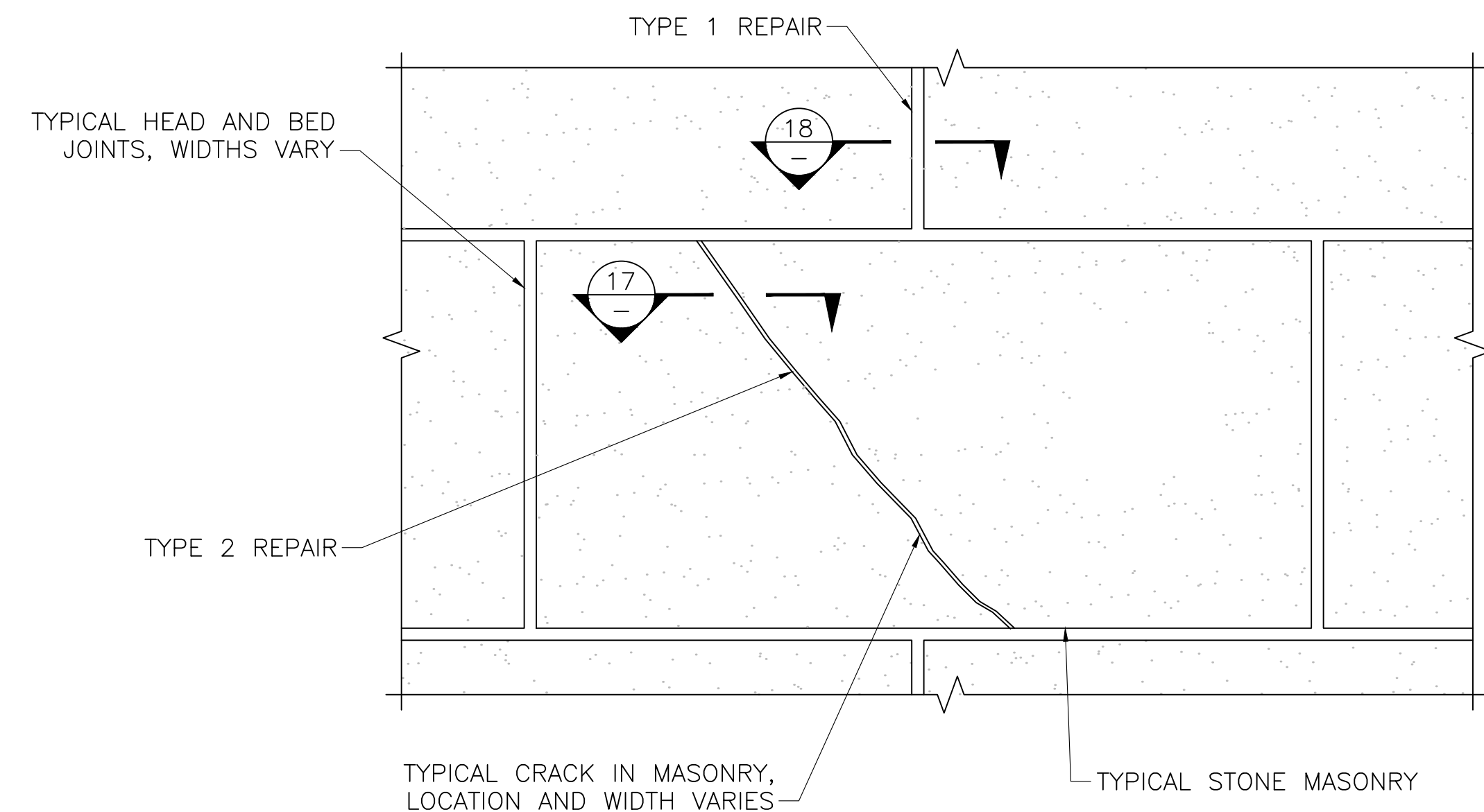
- CENTER 19" WIDE STRIP OF ROOFING FELT OVER THE JOINT LOCATION.
- PLACE WATERPROOFING MEMBRANE AND HMA WEARING SURFACE UNIFORMLY ACROSS THE DECK AND JOINT LOCATIONS.
- SAW CUT AND REMOVE THE HMA WEARING SURFACE AND MEMBRANE WATERPROOFING TO THE LIMITS REQUIRED.
- PLACE CLOSED CELL FOAM, BACKER ROD, POLYMER MODIFIED BINDER AND STEEL PLATE SECURED IN PLACE WITH GALVANIZED NAILS.  
\*NOTE: BONDED CLOSED CELL JOINT (3 SIDES) TO BE PLACED OVER GAS MAIN AT BEGINNING OF THIS STEP (SEE LONGITUDINAL SECTION 15).
- COAT THE SURFACES OF THE BLOCK-OUT WITH THE POLYMER MODIFIED ASPHALTIC BINDER.
- PLACE COMPACTED AGGREGATE/BINDER TO FILL ALL VOIDS AND OBTAIN A FINAL AND EVEN SURFACE WITH THE ADJACENT WEARING SURFACE.
- IT IS NOT NECESSARY TO CONSTRUCT THE JOINT AT MEAN TEMPERATURE, HOWEVER, THE MANUFACTURER SHOULD BE CONSULTED FOR INSTALLATION GUIDELINES FOR EXTREME CLIMATE CONDITIONS.

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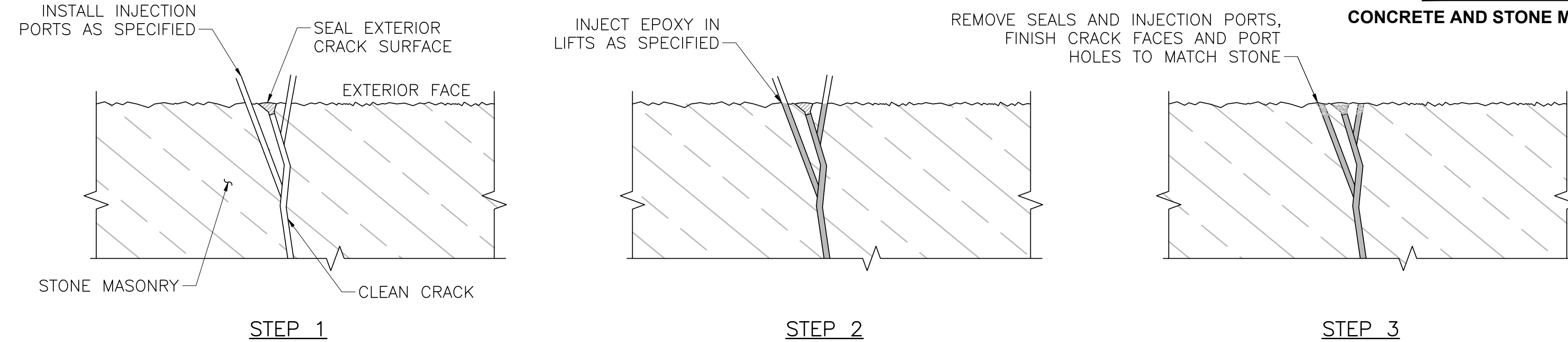
607680\_BR 23 (ABUTMENT DETAILS (2 OF 2))DWG Plotted on 14-Sep-2023 10:42 AM 11-AUG-2023 Final Structural Submittal (SF)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	48	67
PROJECT FILE NO.		607680	

CONCRETE AND STONE MASONRY REPAIR DETAILS



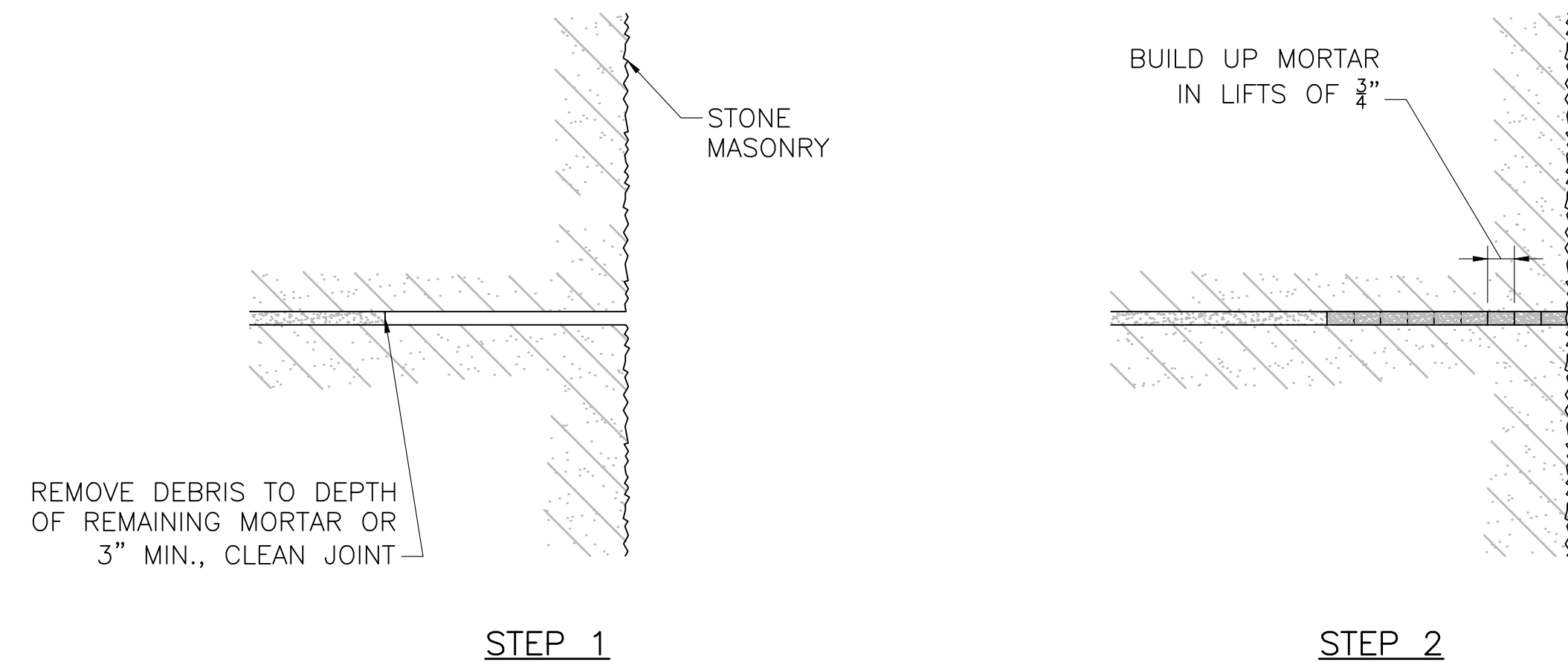
PARTIAL ELEVATION - TYPICAL STONE MASONRY REPAIRS  
NOT TO SCALE



NOTE:  
PERFORM TYPE 2 STONE MASONRY REPAIR - CRACK REPAIR BY EPOXY INJECTION ON CRACKS NO MORE THAN 1/4" WIDE. CONTRACTOR TO NOTIFY ENGINEER IF CRACKS ARE FOUND MORE THAN 1/4" WIDE.

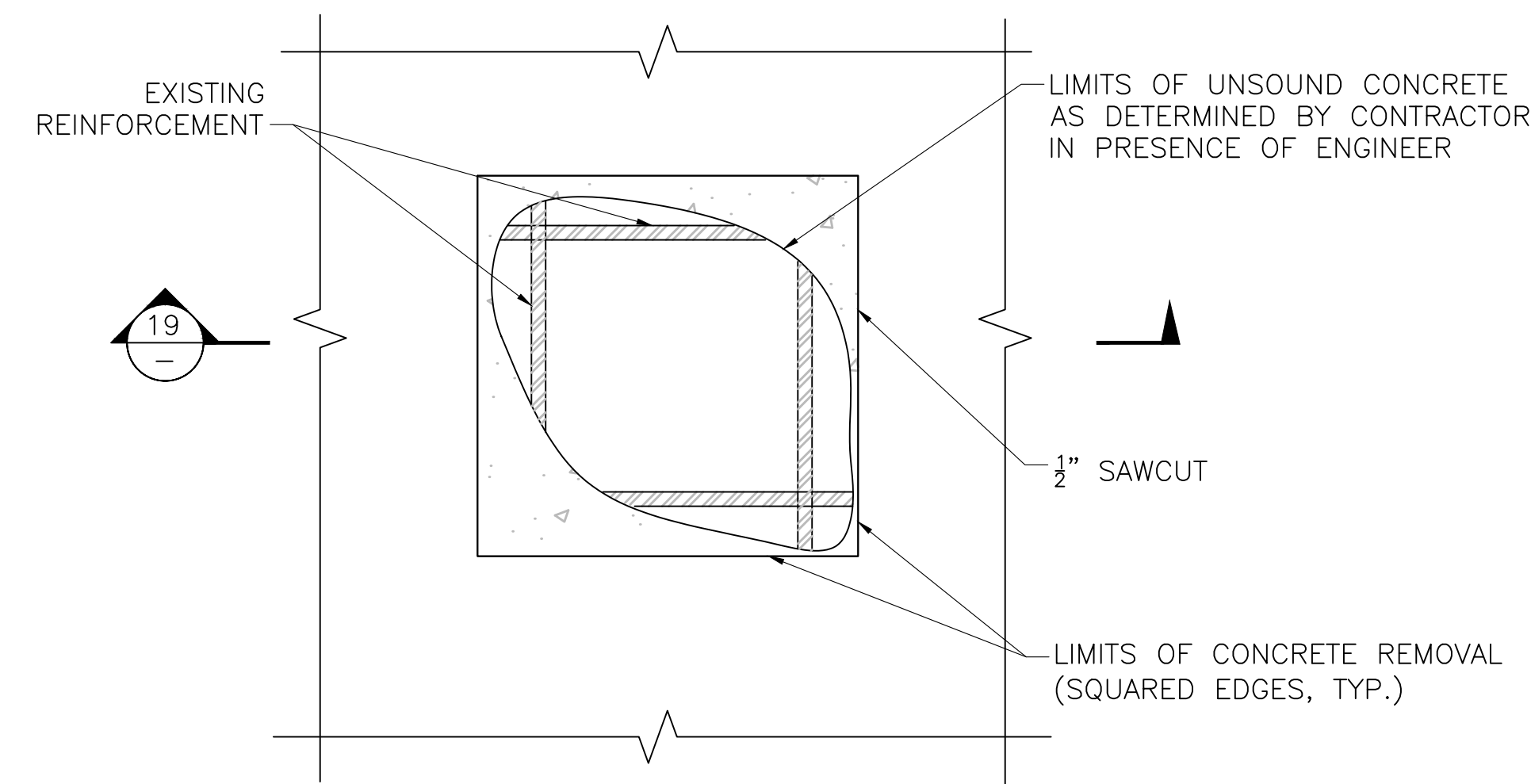
TYPE 2 STONE MASONRY REPAIR - CRACK REPAIR BY EPOXY INJECTION

SECTION 17  
NOT TO SCALE



TYPE 1 STONE MASONRY REPAIR - TYPICAL JOINT FILLING/POINTING AT GRANITE STONE JOINTS

SECTION 18  
NOT TO SCALE

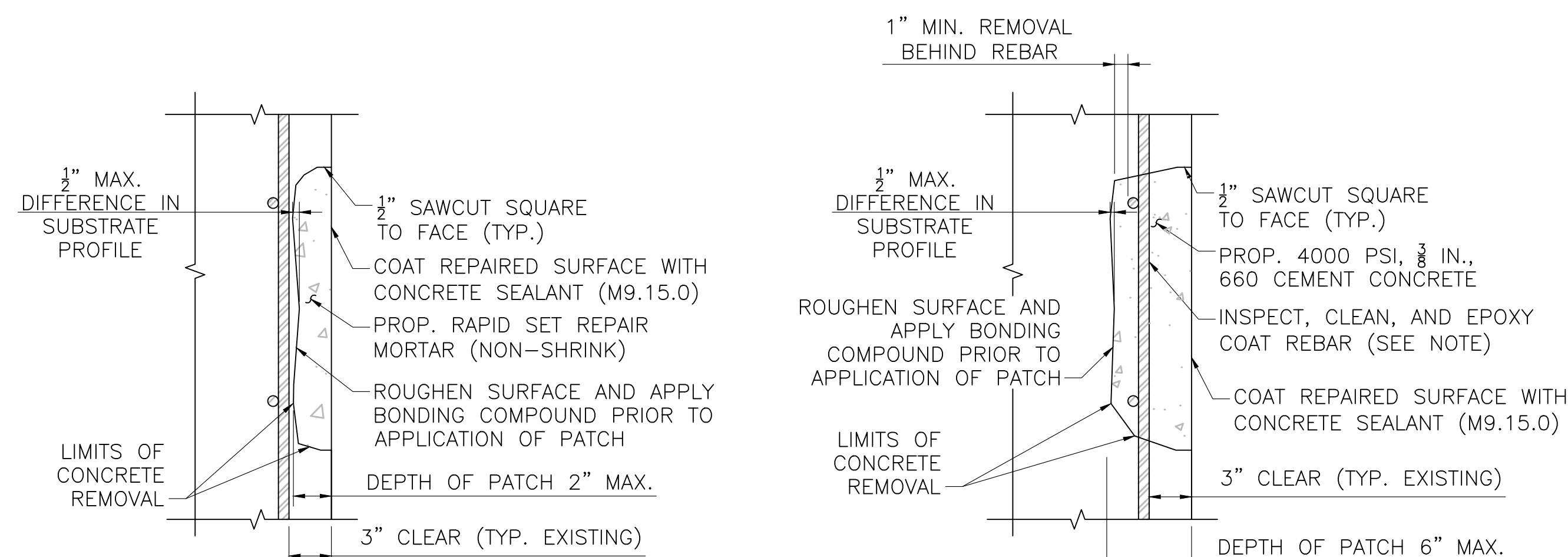


CONCRETE SPALL AND DELAMINATION REPAIR ELEVATION

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

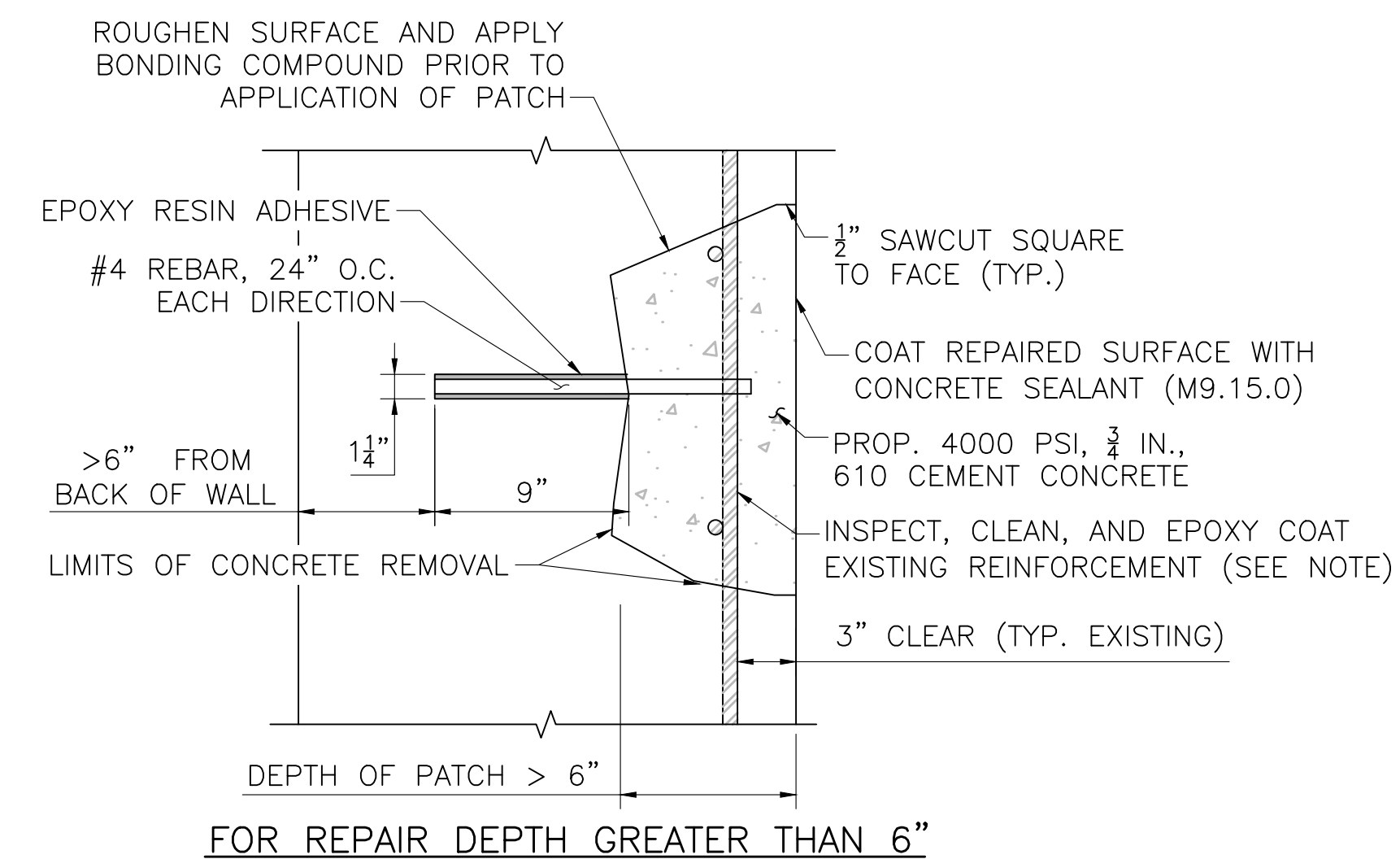
CONCRETE SPALL REPAIR NOTES:

1. THE CONTRACTOR SHALL EXERCISE CARE WHEN REMOVING CONCRETE AROUND REINFORCEMENT TO ONLY REMOVE DETERIORATED CONCRETE AND TO LIMIT THE SOUND CONCRETE REMOVED TO THE MINIMUM NECESSARY TO EFFECT A GOOD REPAIR.
2. THE CONTRACTOR SHALL ESTABLISH REPAIR LIMITS AS SHOWN ON THE PLANS AND AT THE DIRECTION OF THE ENGINEER. THE LOCATION SHOWN ON THE PLANS ARE BASED UPON OBSERVATIONS FROM THE RIVER ST. BRIDGE AND ARE NOT GUARANTEED. THE LOCATION AND EXTENT OF THE REPAIR SHALL BE FIELD VERIFIED AND APPROVED BY THE ENGINEER AFTER THE CONTRACTOR HAS SOUNDED AND MARKED OUT THE REPAIR AREAS. REPAIR CONFIGURATIONS SHOULD BE KEPT AS SIMPLE AS POSSIBLE, PREFERABLY WITH SQUARE CORNERS.
3. THE LIMITS OF THE REPAIRS SHALL BE SAWCUT ALONG NEAT LINES TO A DEPTH OF 1/2" TO PRODUCE A CLEAN EDGE.
4. REMOVE DETERIORATED AND UNSOUND CONCRETE AS WELL AS SOUND CONCRETE WHERE NECESSARY TO A MINIMUM OF 1" BEYOND SURFACE REINFORCEMENT.
5. EXPOSED REINFORCEMENT IS TO BE CLEANED BY MECHANICAL CLEANING AND HIGH PRESSURE WASHING WITH WATER THAT CONTAINS NO DETERGENTS OR BOND INHIBITING CHEMICALS. WHERE ACTIVE CORROSION HAS OCCURRED (THAT WHICH WOULD INHIBIT BONDING), SANDBLAST STEEL TO WHITE METAL FINISH.
6. MISSING OR DETERIORATED REINFORCING STEEL SHALL BE REPLACED AS DIRECTED BY THE ENGINEER. AFTER REMOVAL AND EDGE PREPARATION ARE COMPLETE, REMOVE BOND INHIBITING MATERIALS (DIRT, GREASE, LOOSELY BONDED AGGREGATE) BY ABRASION BLASTING OR HIGH PRESSURE WATER BLASTING WITH WATER THAT CONTAINS NO DETERGENTS OR BOND INHIBITING CHEMICALS. CHECK THE CONCRETE SURFACES AFTER CLEANING TO INSURE THAT THE SURFACE IS FREE FROM ADDITIONAL LOOSE AGGREGATE OR THAT ADDITIONAL DELAMINATIONS ARE NOT PRESENT.
7. FOR REPAIR DEPTHS 2" OR LESS, RAPID SET CONCRETE PATCH MATERIALS SHALL BE USED TO PERFORM THE REPAIRS, FROM MASSDOT'S QUALIFIED CONSTRUCTION MATERIALS LIST.
8. FOR REPAIR DEPTHS 6" OR LESS AND/OR WITH EXPOSED REBAR, 4000 PSI, 3/8", 660 CEMENT CONCRETE SHALL BE USED TO PERFORM THE REPAIRS.
9. FOR REPAIR DEPTHS GREATER THAN 6", 4000 PSI, 3/4", 610 CEMENT CONCRETE SHALL BE USED TO PERFORM THE REPAIRS.
10. PRESOAK CONCRETE SUBSTRATE WITH A WATER HOSE FOR 24 HOURS OR AS LONG AS SITE CONSTRAINTS PERMIT. AT TIME OF REPAIR CONCRETE PLACEMENT, SUBSTRATE SHALL BE SATURATED SURFACE DRY WITH NO STANDING WATER.
11. ALL REPAIRED SURFACES SHALL BE COATED WITH A CONCRETE SEALANT (M9.15.0).



FOR REPAIR DEPTH 6" OR LESS, AND/OR WITH EXPOSED REBAR

SECTION 19  
SCALE: 1 1/2" = 1'-0"



FOR REPAIR DEPTH GREATER THAN 6"

NOTE:  
EXPOSED REBAR WHERE BAR SECTION LOSS BY AREA IS GREATER THAN 20%, NEW SECTION OF REBAR, MATCHING THE ORIGINAL SIZE OF THE DETERIORATED REBAR, SHALL BE SPICED ONTO THE EXISTING BAR.

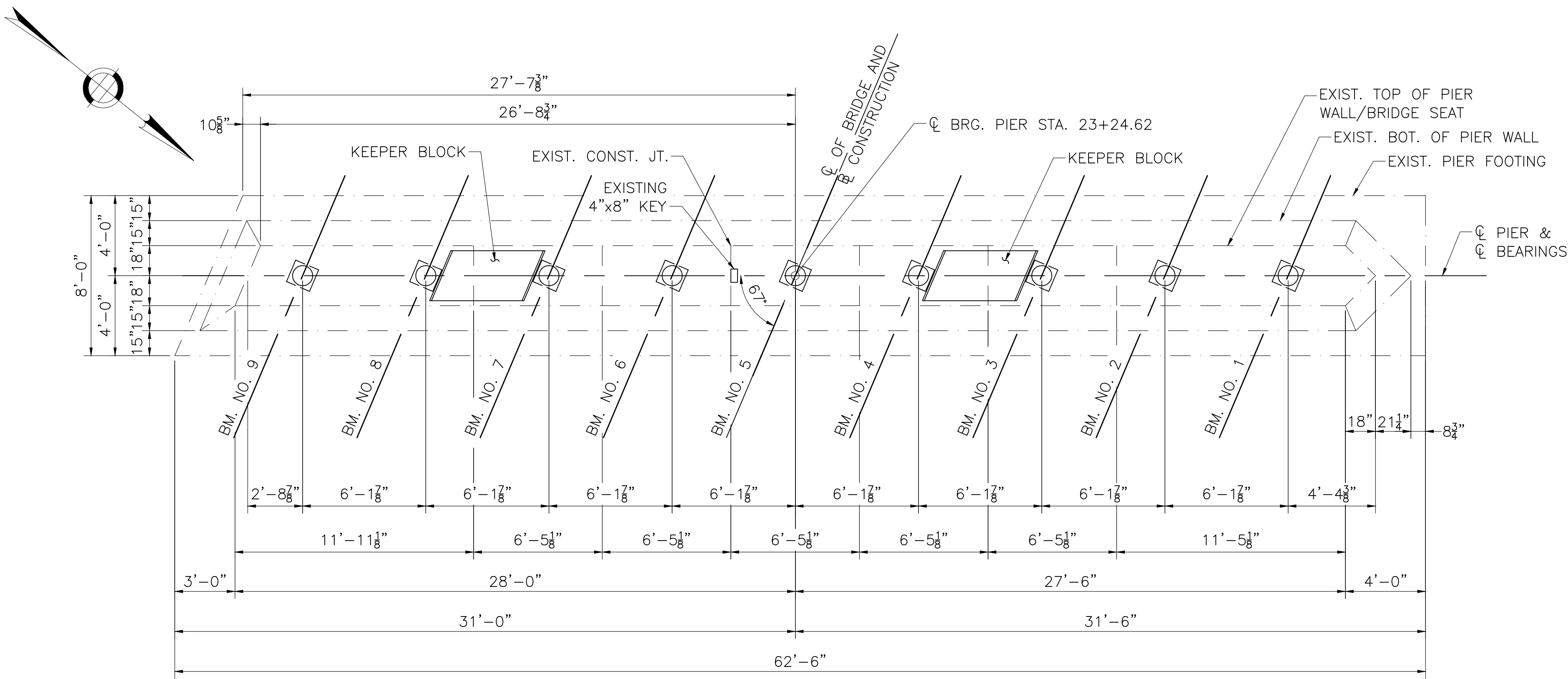
DATE	DESCRIPTION
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
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AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	



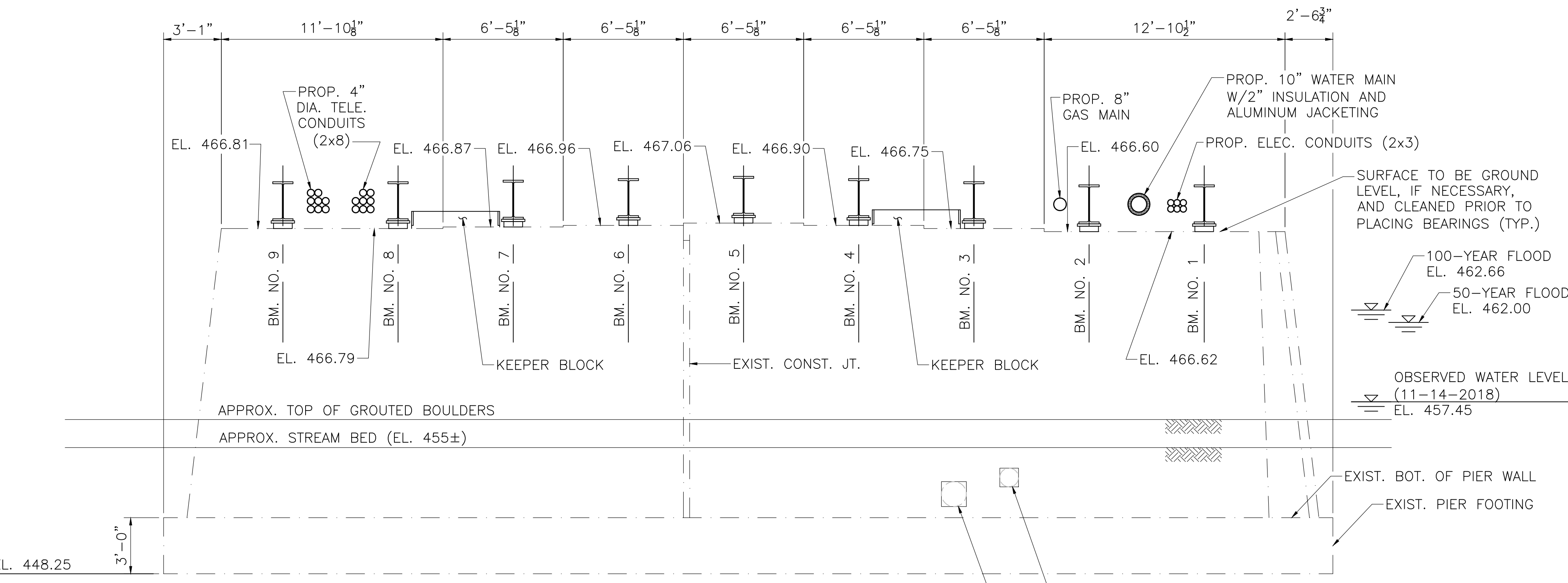
FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	49	67
PROJECT FILE NO.		607680	

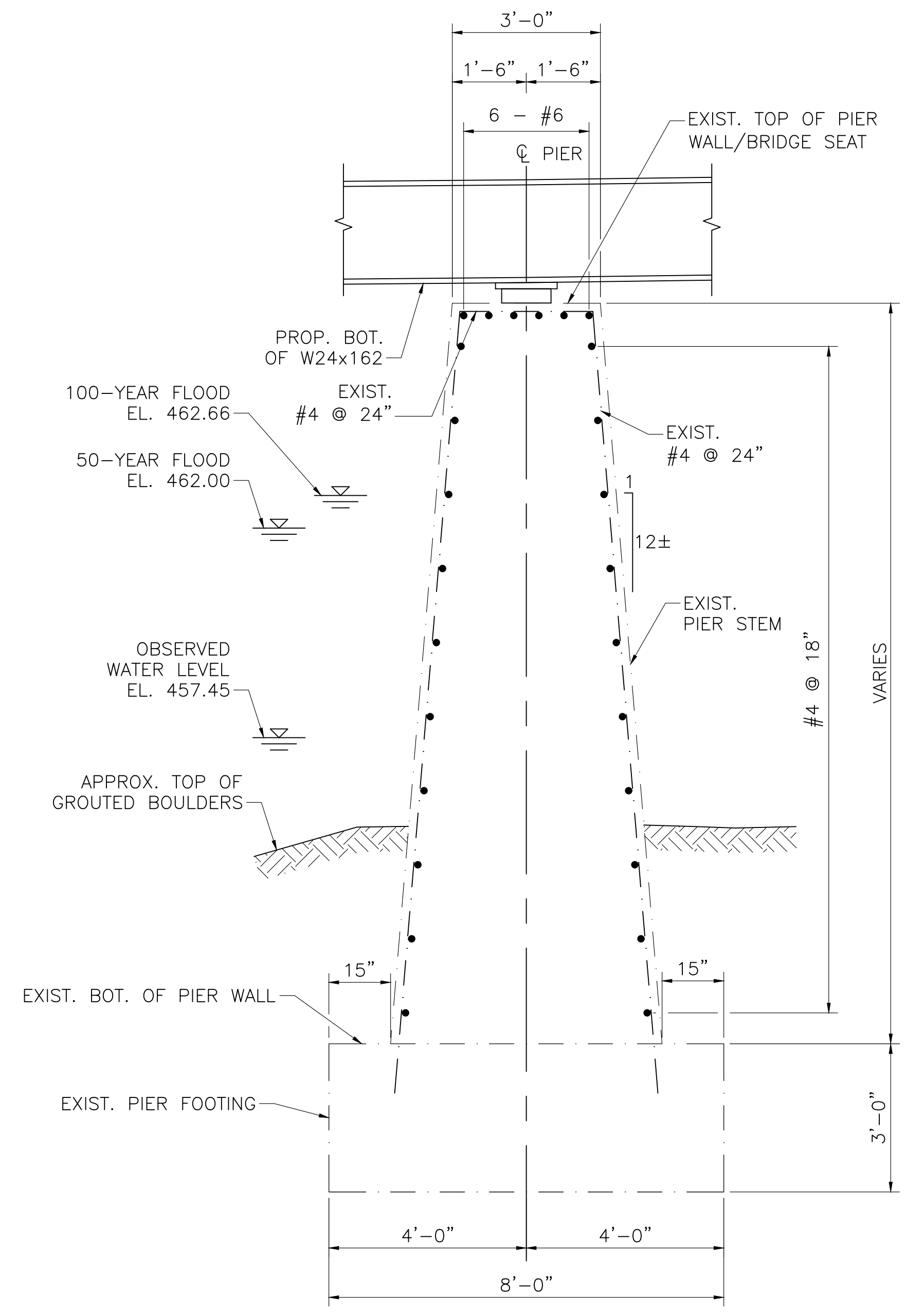
EXISTING PIER DETAILS



PLAN OF PIER  
SCALE: 1/4" = 1'-0"



ELEVATION OF PIER (LOOKING SOUTH)  
SCALE: 1/4" = 1'-0"



TYPICAL PIER SECTION  
SCALE: 1/2" = 1'-0"

**NOTES:**  
1. EXISTING PIER INFORMATION FROM SURVEY DATED JANUARY 21, 2019 PERFORMED BY C&C CONSULTING ENGINEERS, LLC.

**EXISTING PIER FOOTING NOTES:**

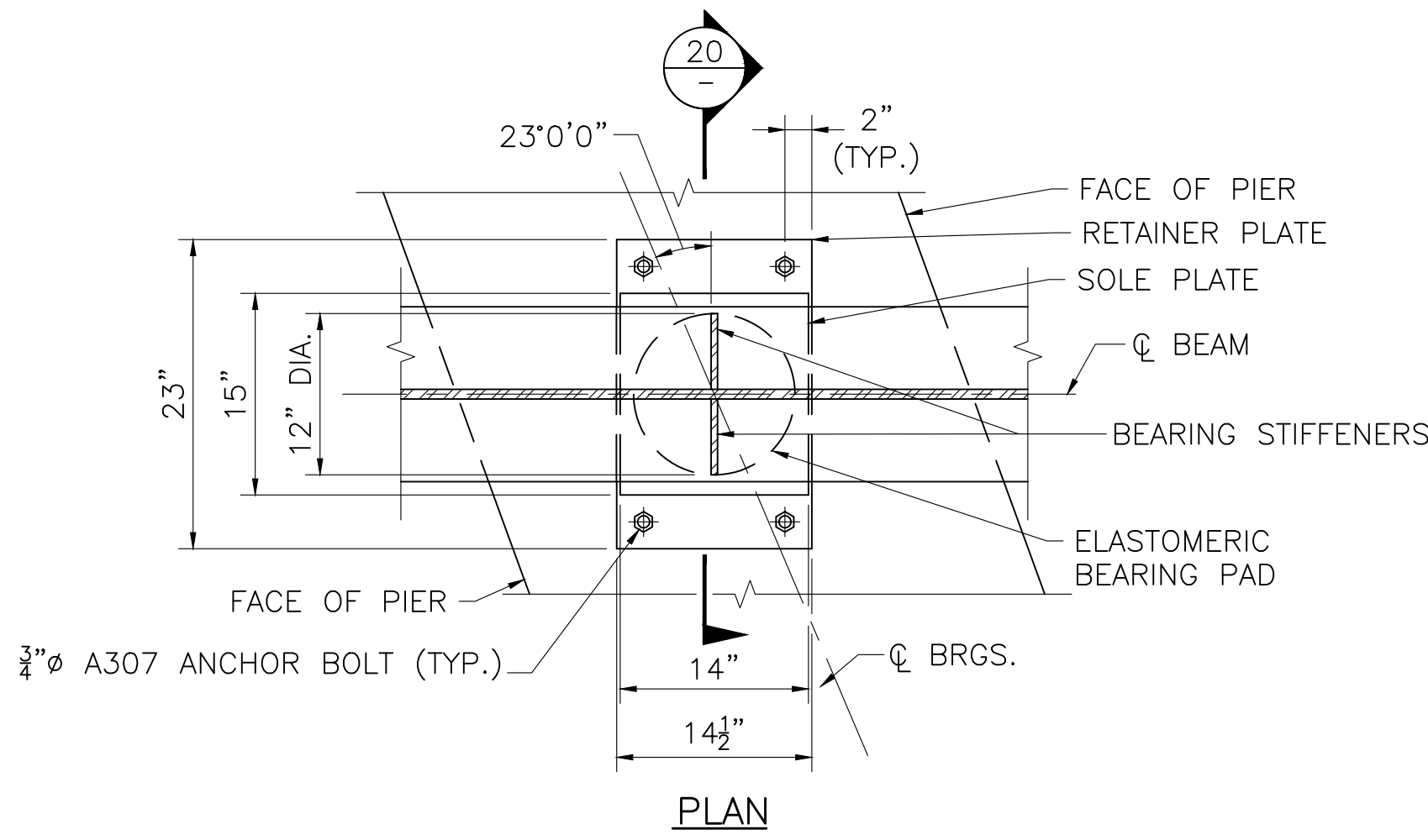
LIMIT STATE	FACTORED BEARING PRESSURE	FACTORED BEARING RESISTANCE
STRENGTH 1	5.64 KSF	6.5 KSF (RESISTANCE FACTOR $\phi_b=0.45$ )

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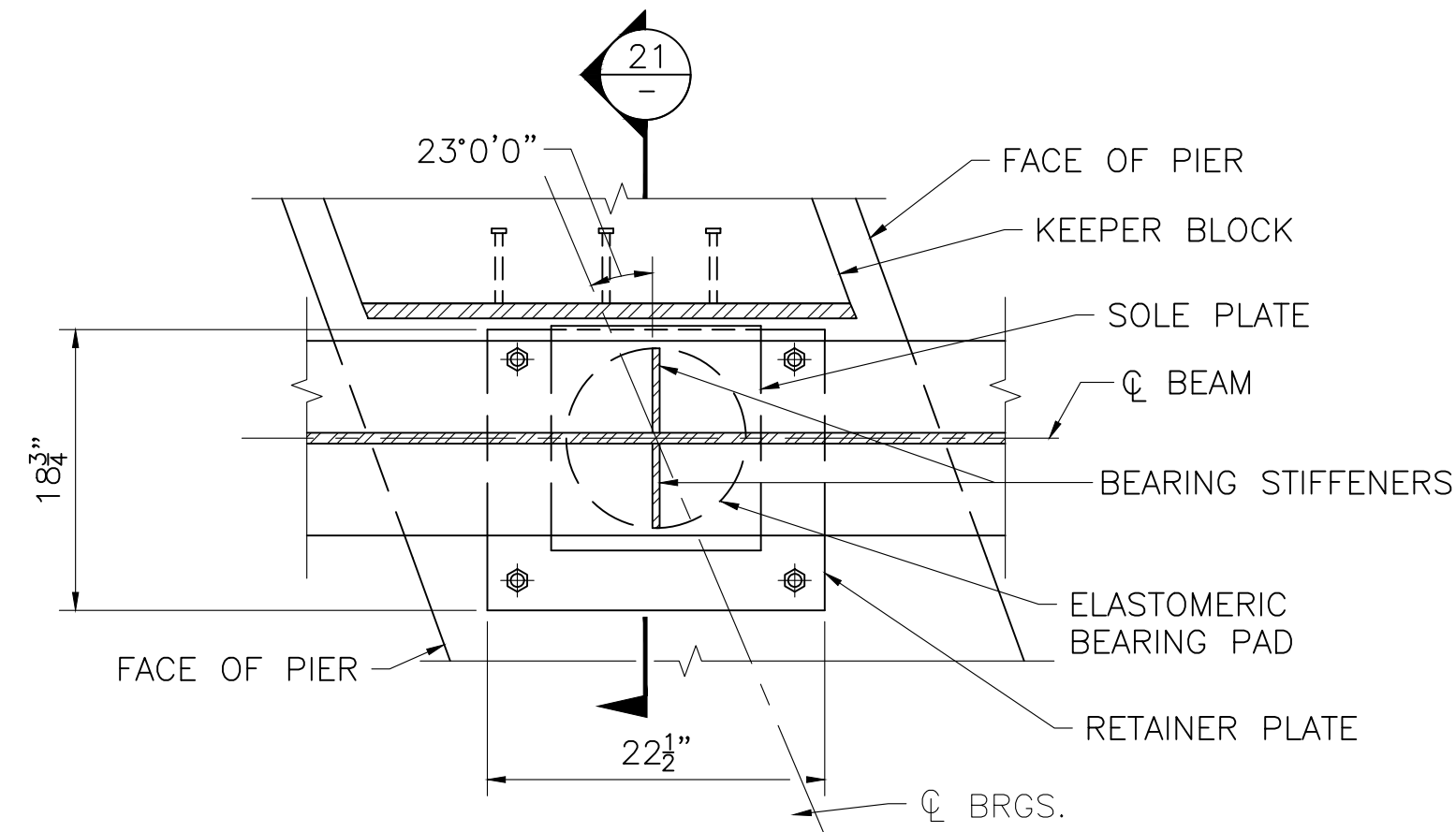
11-AUG-2023 607680\_BR\_25 (EXIST PIER MODIFICATIONS).DWG Plotted on 14-Sep-2023 10:42 AM Final Structural Submittal (SF)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	50	67
PROJECT FILE NO.		607680	

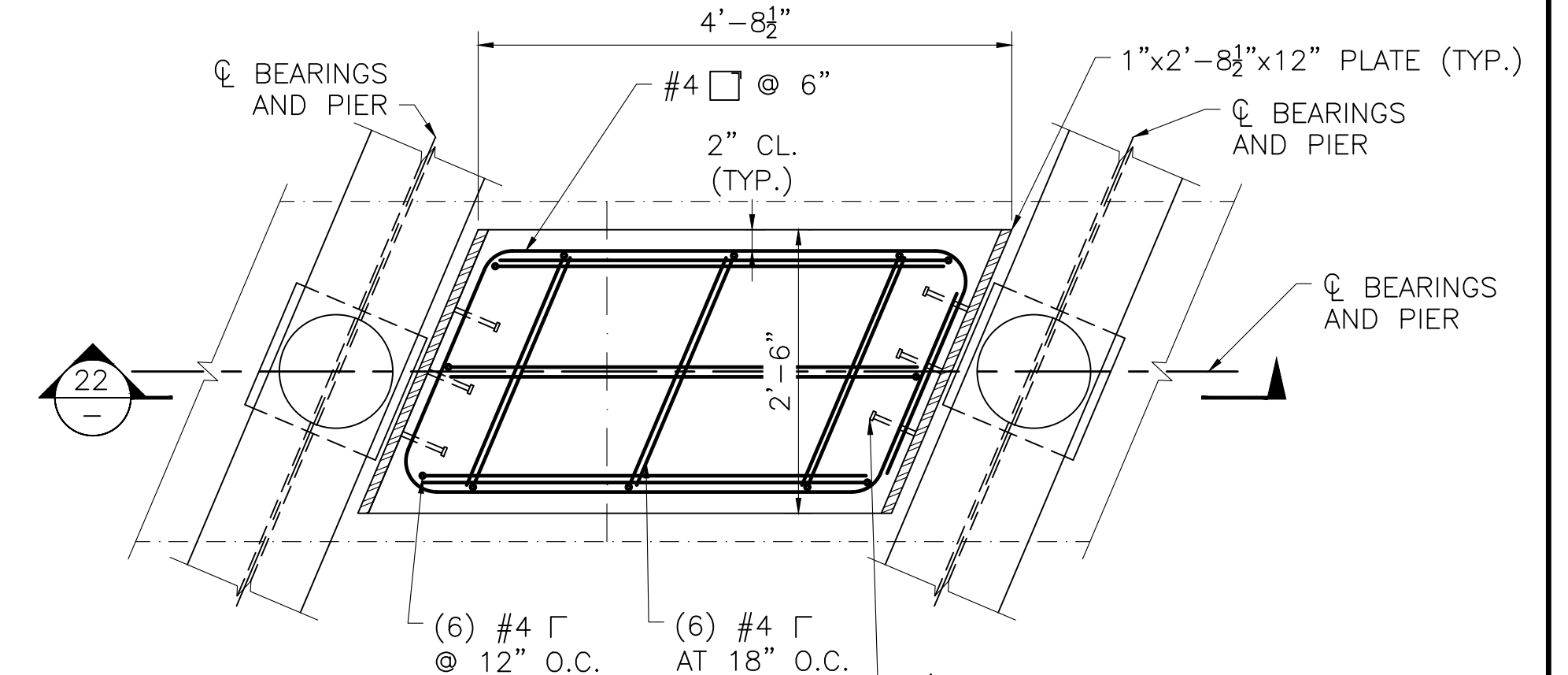
BEARING DETAILS AT PIER



PLAN



PLAN AT KEEPER BLOCK

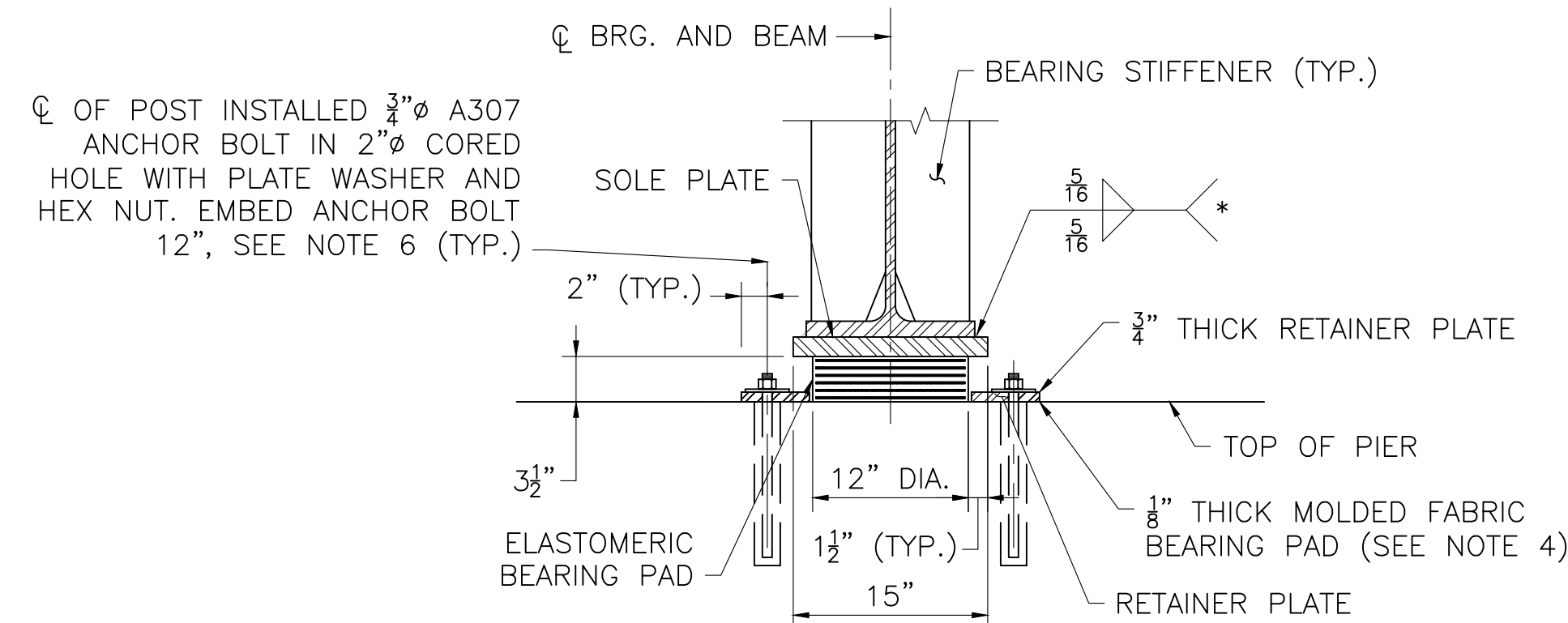


NOTES:

- KEEPER BLOCKS SHALL BE CAST BEFORE BEAMS ARE SET.
- STEEL PLATES EMBEDDED IN KEEPER BLOCK SHALL BE HOT-DIP GALVANIZED.

PLAN OF KEEPER BLOCK

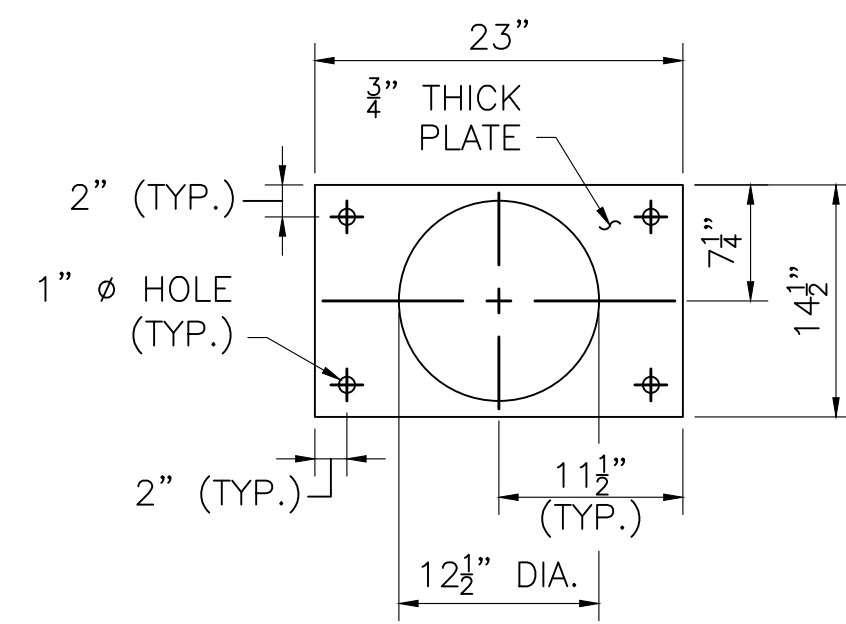
SCALE: 3/4" = 1'-0"



SECTION 20

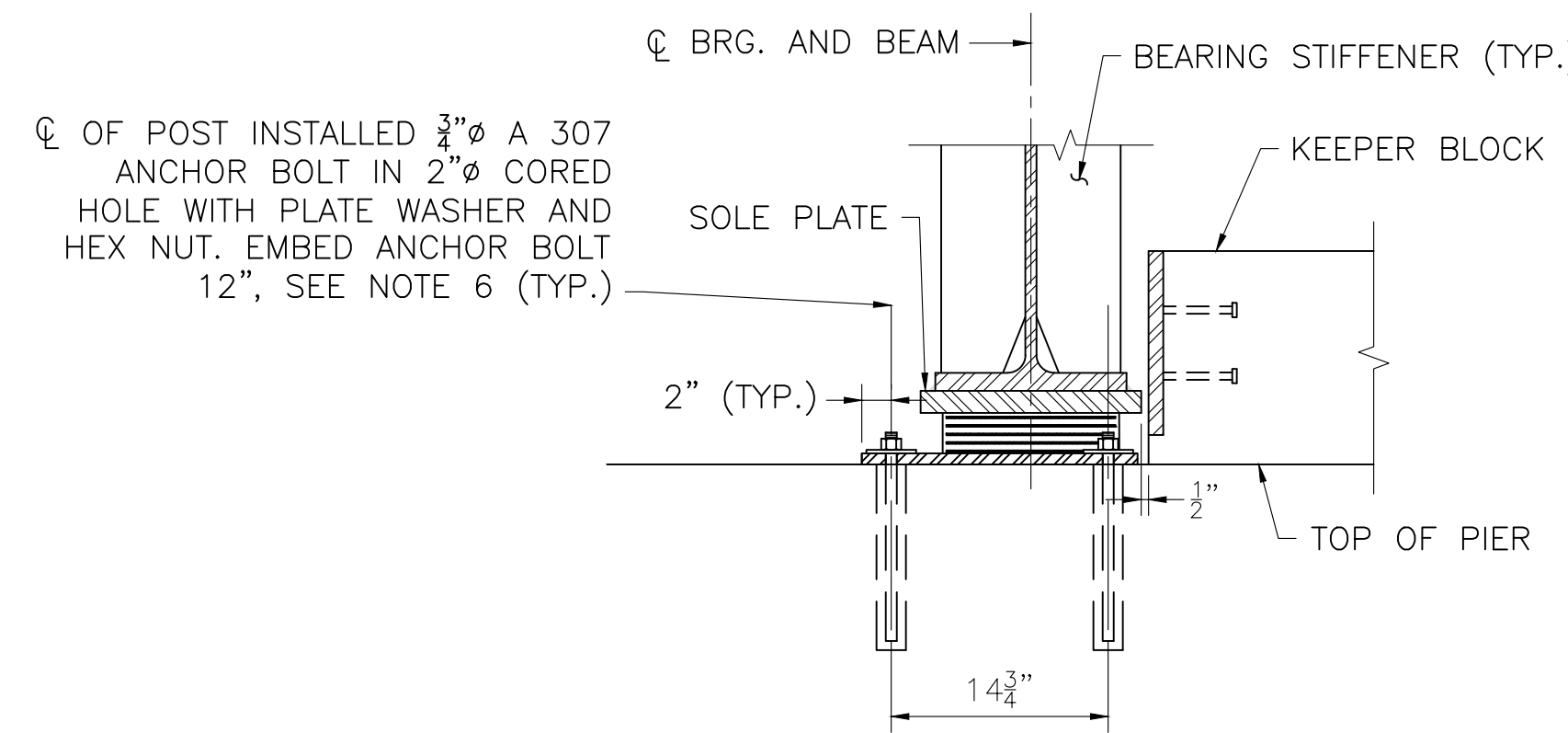
BEARING WITHOUT ANCHOR BOLTS

SCALE: 1" = 1'-0"



RETAINER PLATE DETAIL

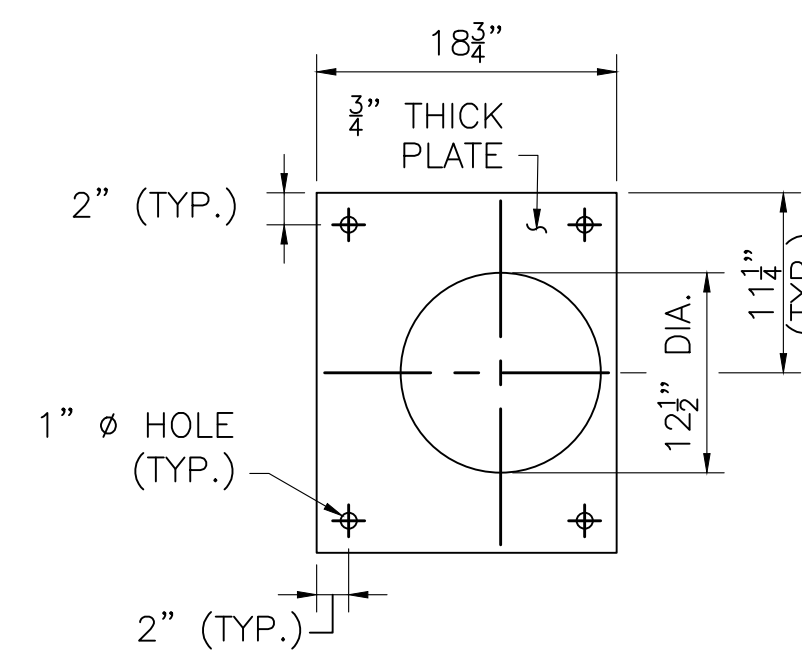
SCALE: 1" = 1'-0"



SECTION 21

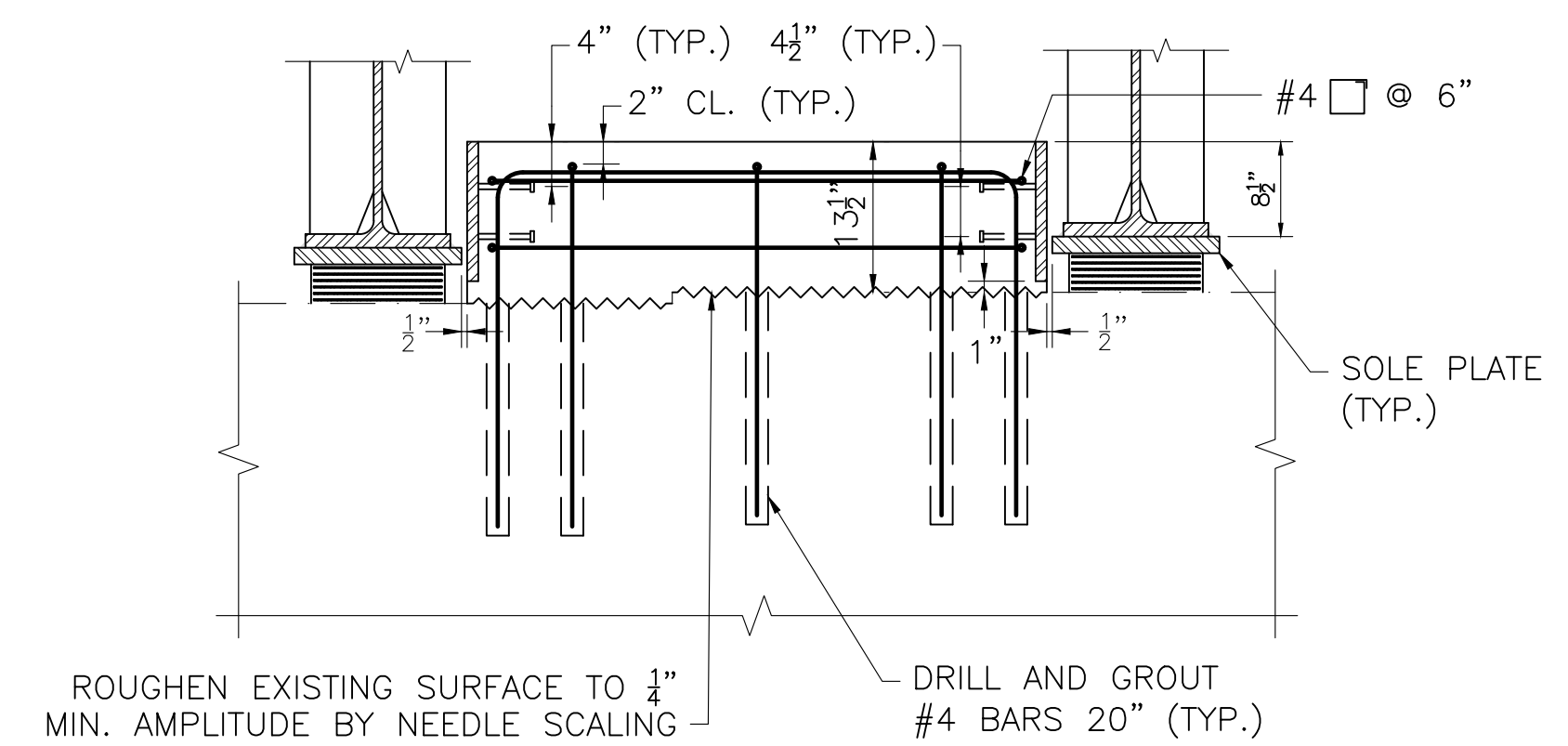
BEARING WITHOUT ANCHOR BOLTS

SCALE: 1" = 1'-0"



RETAINER PLATE DETAIL

SCALE: 1" = 1'-0"

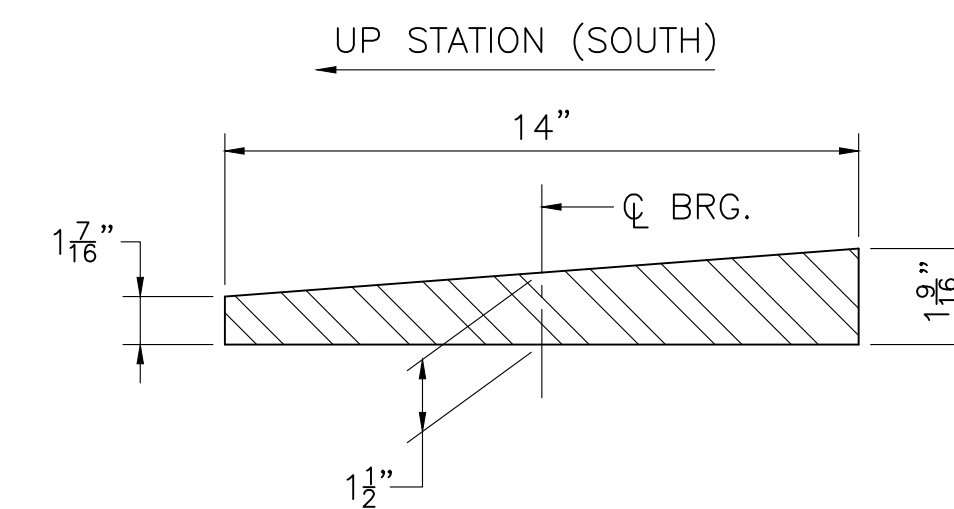


NOTE:

TOP OF INTERMEDIATE KEEPER BLOCK SHALL BE TROWELED SMOOTH.

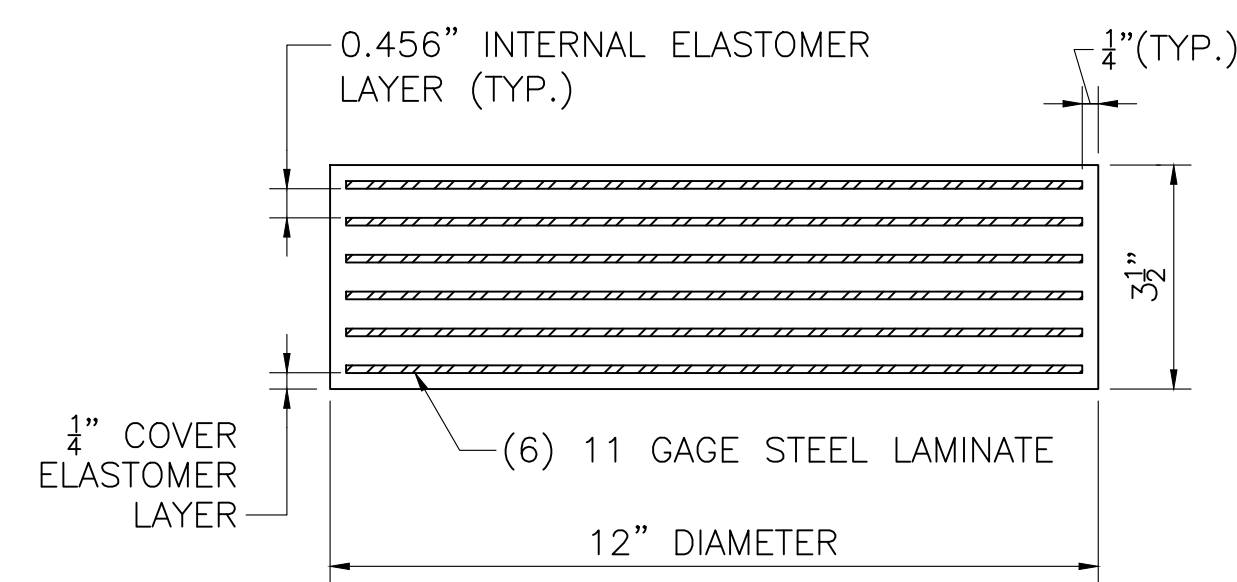
SECTION 22

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



SOLE PLATE DETAIL

SCALE: 3" = 1'-0"



ELASTOMERIC BEARING PAD

NOT TO SCALE

NOTES:

- ELASTOMER SHALL HAVE A SHEAR MODULUS OF 0.160 KSI.
- STEEL LAMINATES SHALL CONFORM TO ASTM A 1011 GRADE 36.
- THE COMPRESSIVE DESIGN LOAD ON THE BEARING PAD IS 168 KIPS. THE COMPRESSIVE DESIGN STRESS IS THE RESULT OF DIVIDING THE COMPRESSIVE DESIGN LOAD BY THE AREA OF THE PAD AND IS EQUAL TO 1.49 KSI.
- ELASTOMERIC BEARING PAD SHALL NOT BE VULCANIZED TO THE SOLE PLATE.

BEARING NOTES:

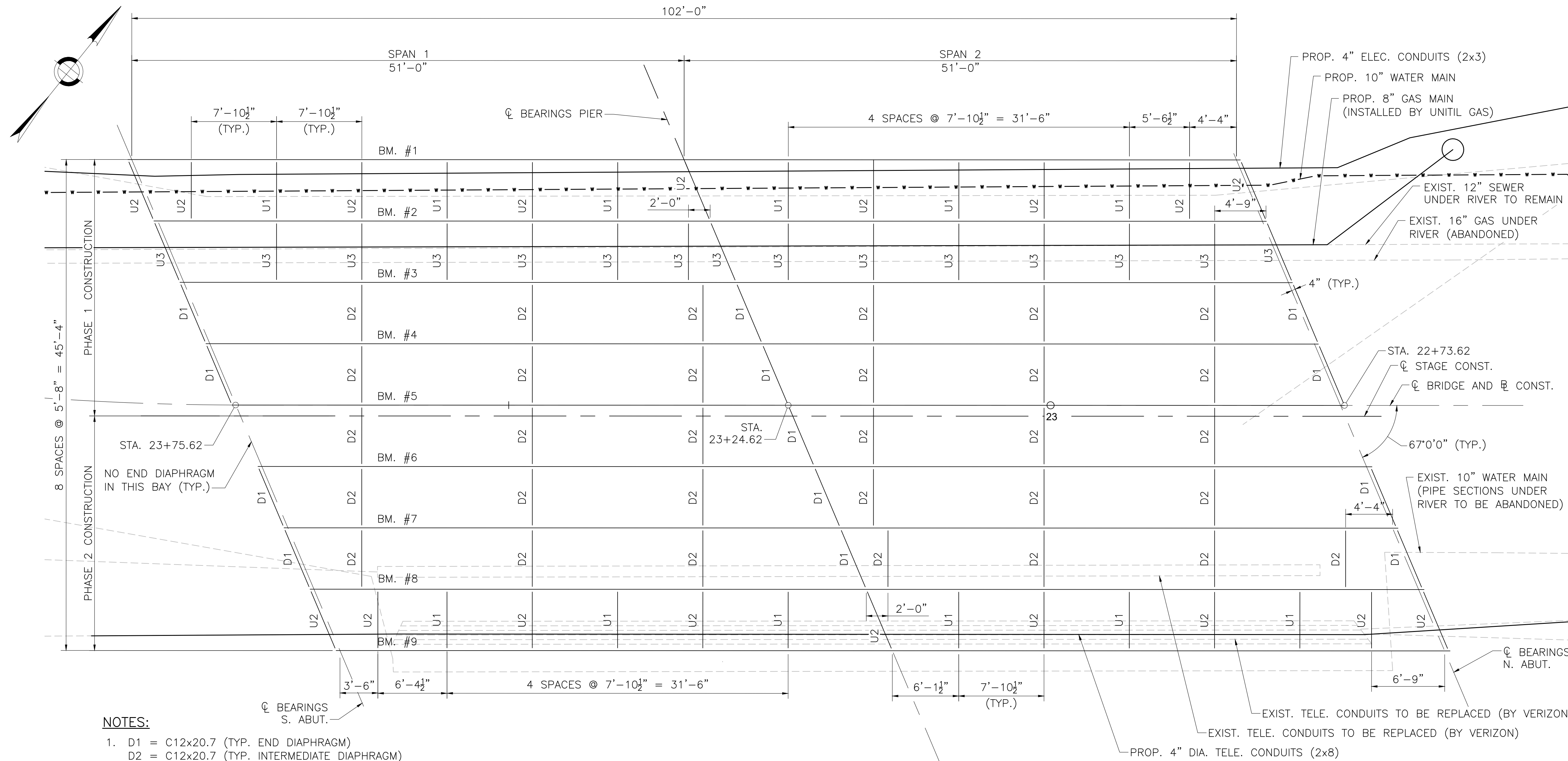
- STEEL SOLE PLATE AND RETAINER PLATE SHALL CONFORM TO AASHTO M 270 GRADE 36 AND SHALL BE HOT-DIP GALVANIZED.
- CENTER THE ELASTOMERIC PAD AND RETAINER PLATE UNDER THE SOLE PLATE DURING BEAM ERECTION.
- BEAMS SHALL BE ERECTED WHEN THE AMBIENT TEMPERATURE IS BETWEEN 50 °F AND 77 °F. IF BEAMS ARE ERECTED AT OTHER AMBIENT TEMPERATURES, THEY WILL HAVE TO BE JACKED AND THE ELASTOMERIC BEARINGS RECENTERED WHEN THE TEMPERATURE RETURNS TO THAT RANGE.
- MOLDED FABRIC BEARING PAD SHALL CONFORM TO M9.16.2 AND SHALL BE CUT TO THE SAME SHAPE AS THE RETAINER PLATE. ELASTOMERIC BEARING PAD MUST SIT ON CONCRETE AND NOT ON FABRIC PAD.
- ANCHOR BOLTS, NUTS, AND WASHERS SHALL CONFORM TO ASTM F 1554 GRADE 36 AND SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M 232.
- DRILL AND GROUT ANCHOR BOLTS IN ACCORDANCE WITH GROUT MANUFACTURER RECOMMENDATIONS. GROUT TO BE 4000 PSI MINIMUM AND SHALL BE LISTED ON THE MASSDOT QUALIFIED CONSTRUCTION MATERIALS LIST.

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**FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	51	67
PROJECT FILE NO.		607680	

**FRAMING PLAN AND BEAM ELEVATION**

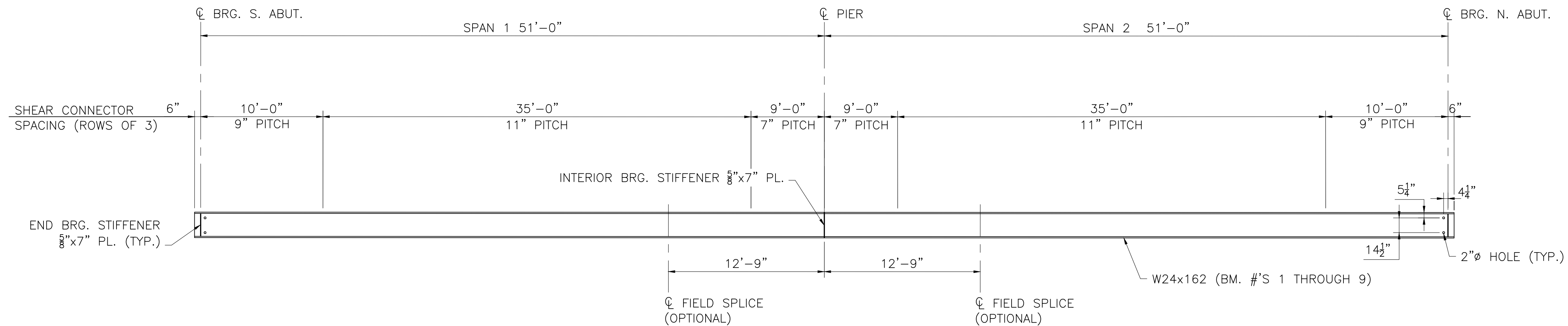


**NOTES:**

1. D1 = C12x20.7 (TYP. END DIAPHRAGM)  
D2 = C12x20.7 (TYP. INTERMEDIATE DIAPHRAGM)  
U1 = TYPICAL UTILITY SUPPORT BETWEEN DIAPHRAGMS  
U2 = TYPICAL UTILITY SUPPORT AT DIAPHRAGMS  
U3 = GAS MAIN SUPPORT AT DIAPHRAGMS
2. SEE SHEET 27 FOR DIAPHRAGM AND UTILITY SUPPORT DETAILS.
3. THE MAIN LOAD CARRYING MEMBERS ARE BM. #'S 1 THROUGH 9.
4. ALL STEEL SHALL CONFORM TO AASHTO M 270 GRADE 50.

**FRAMING PLAN**

SCALE:  $\frac{3}{16}'' = 1'-0''$



**NOTE:**

ALL BEARING STIFFENERS SHALL BE PLUMB.

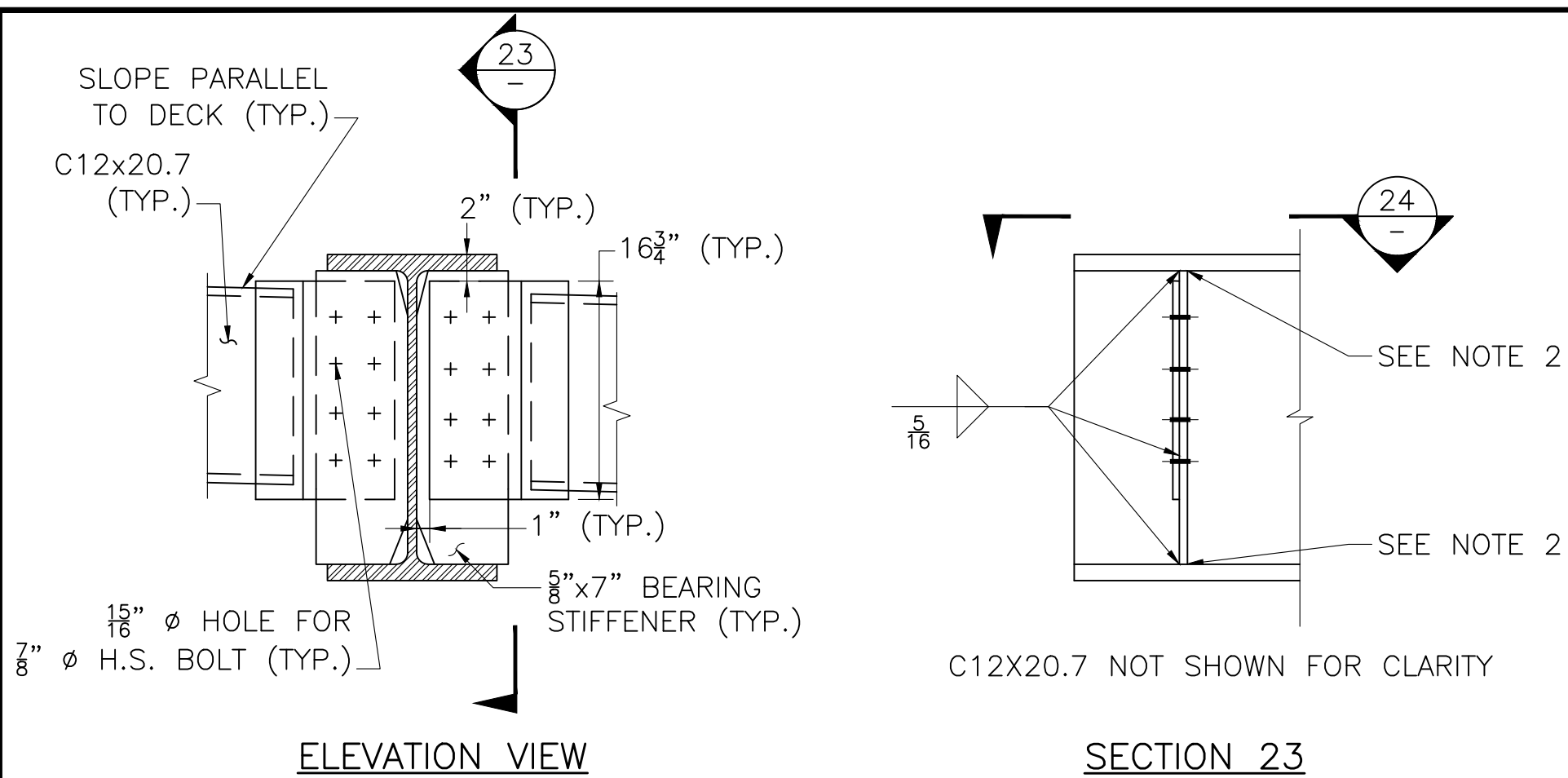
**BEAM ELEVATION**

SCALE:  $\frac{3}{16}'' = 1'-0''$

SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
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STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	52	67
PROJECT FILE NO.		607680	

STEEL DETAILS



ELEVATION VIEW

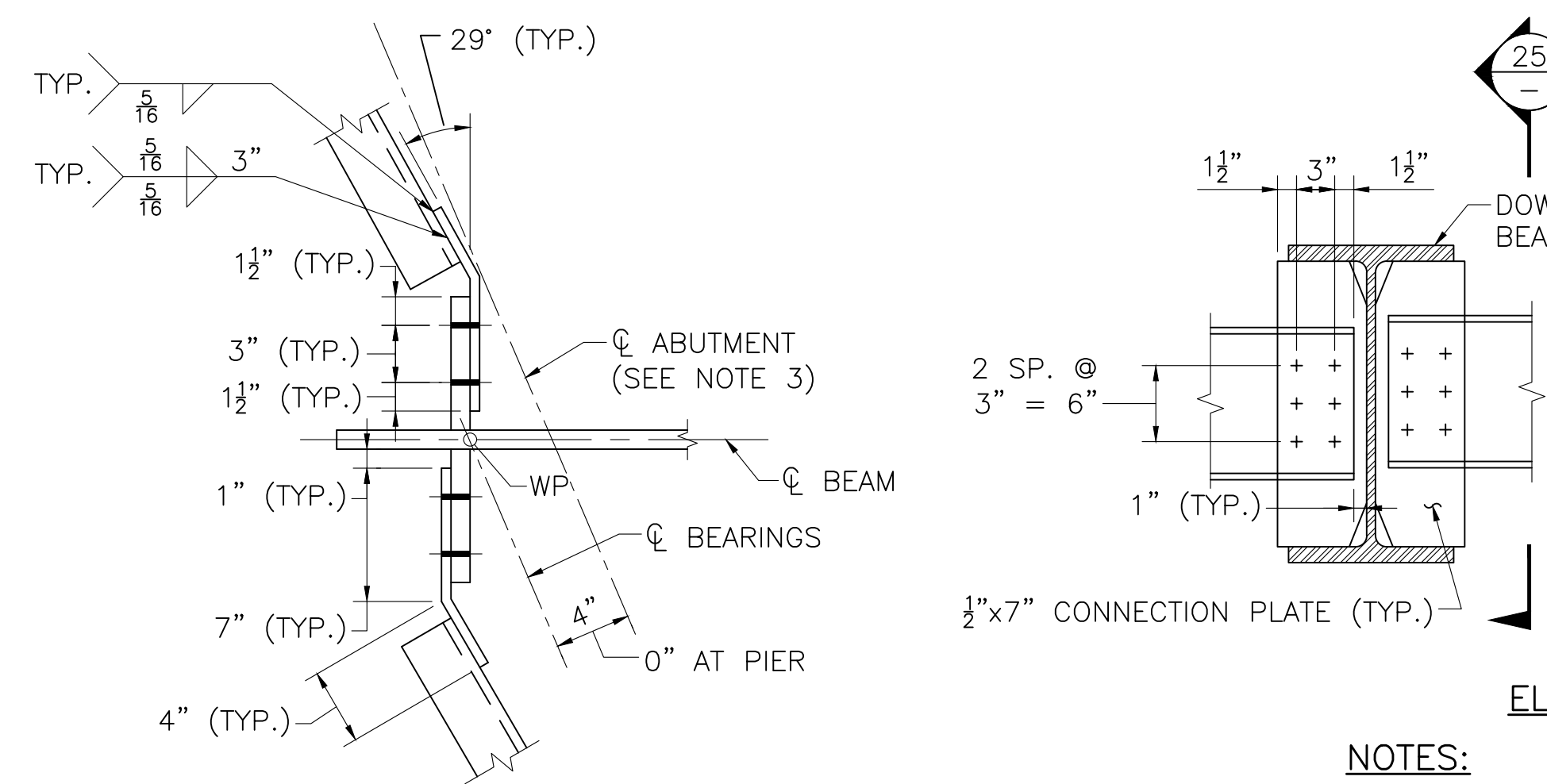
SECTION 23

NOTES:

- SEE CLIP DETAIL ON THIS SHEET.
- BEARING STIFFENER AT BOTH FLANGES SHALL BE MILLED FOR TIGHT FIT AND WELDED WITH 1/8" FILLET WELDS, BOTH SIDES OF PLATE.
- DETAIL SIMILAR AT PIERS.

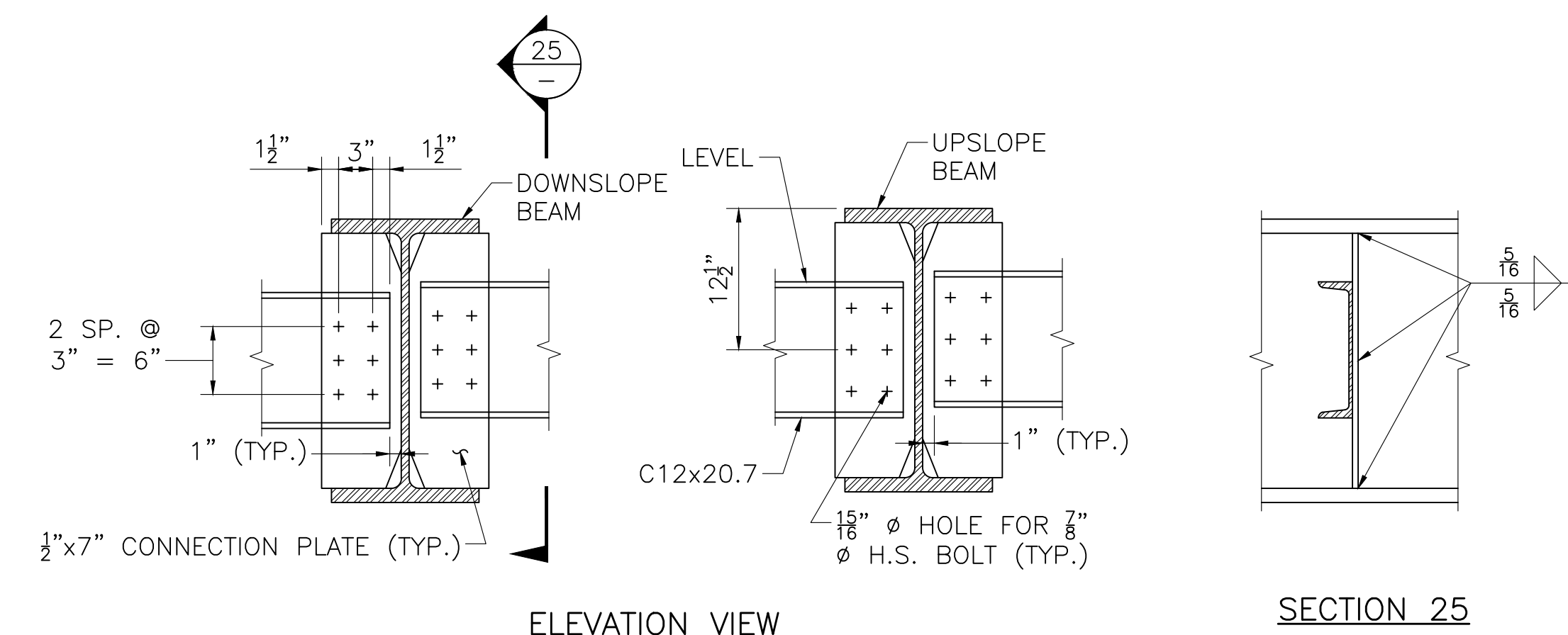
TYPICAL END DIAPHRAGM DETAILS (D1)

SCALE: 1" = 1'-0"



SECTION 24

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



ELEVATION VIEW

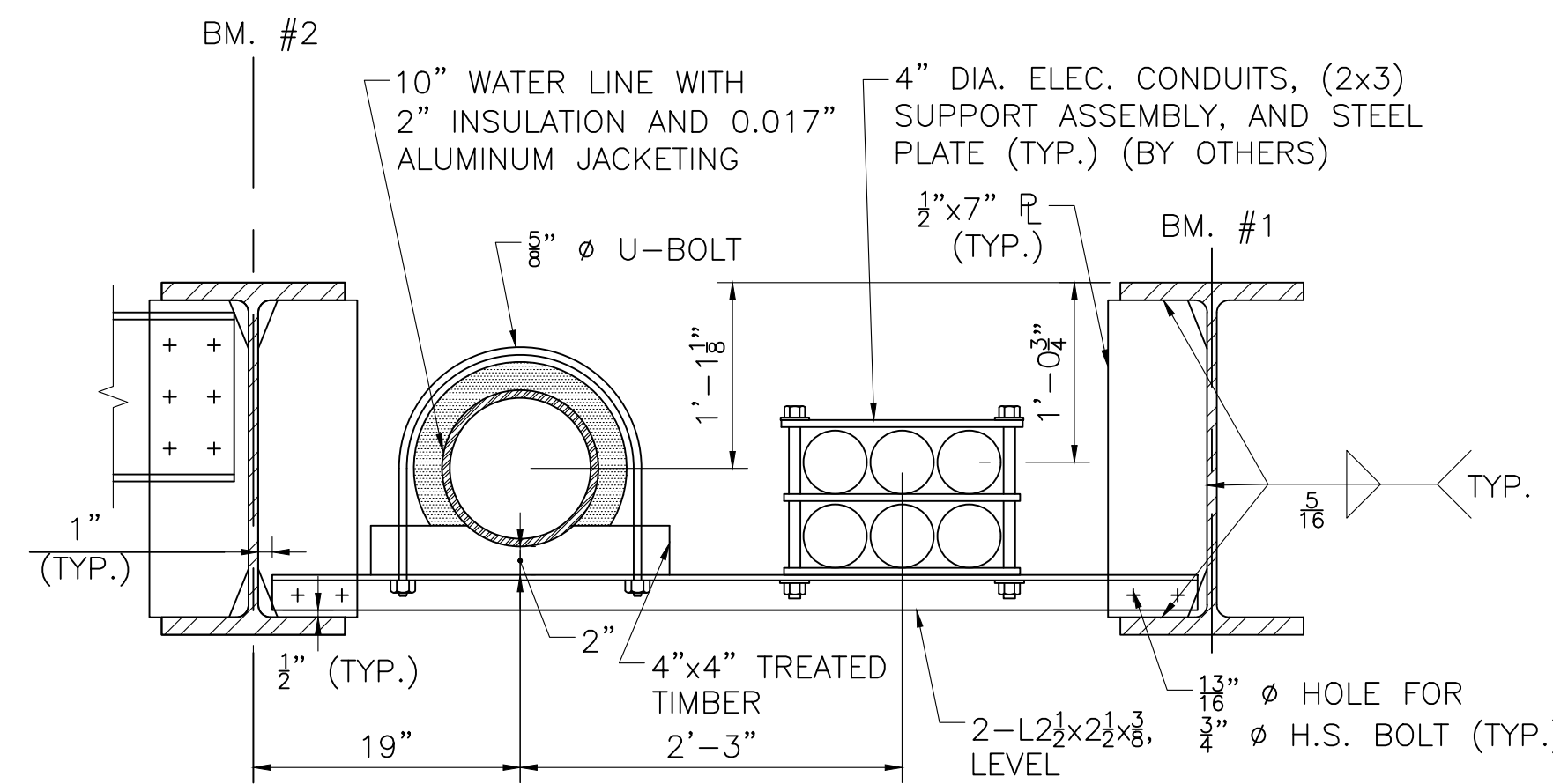
SECTION 25

NOTES:

- SEE CLIP DETAILS ON THIS SHEET.
- INTERMEDIATE DIAPHRAGMS SHALL BE CENTERED MID-DEPTH ON THE UPSLOPE BEAM.

TYPICAL INTERMEDIATE DIAPHRAGM DETAILS (D2)

SCALE: 1" = 1'-0"

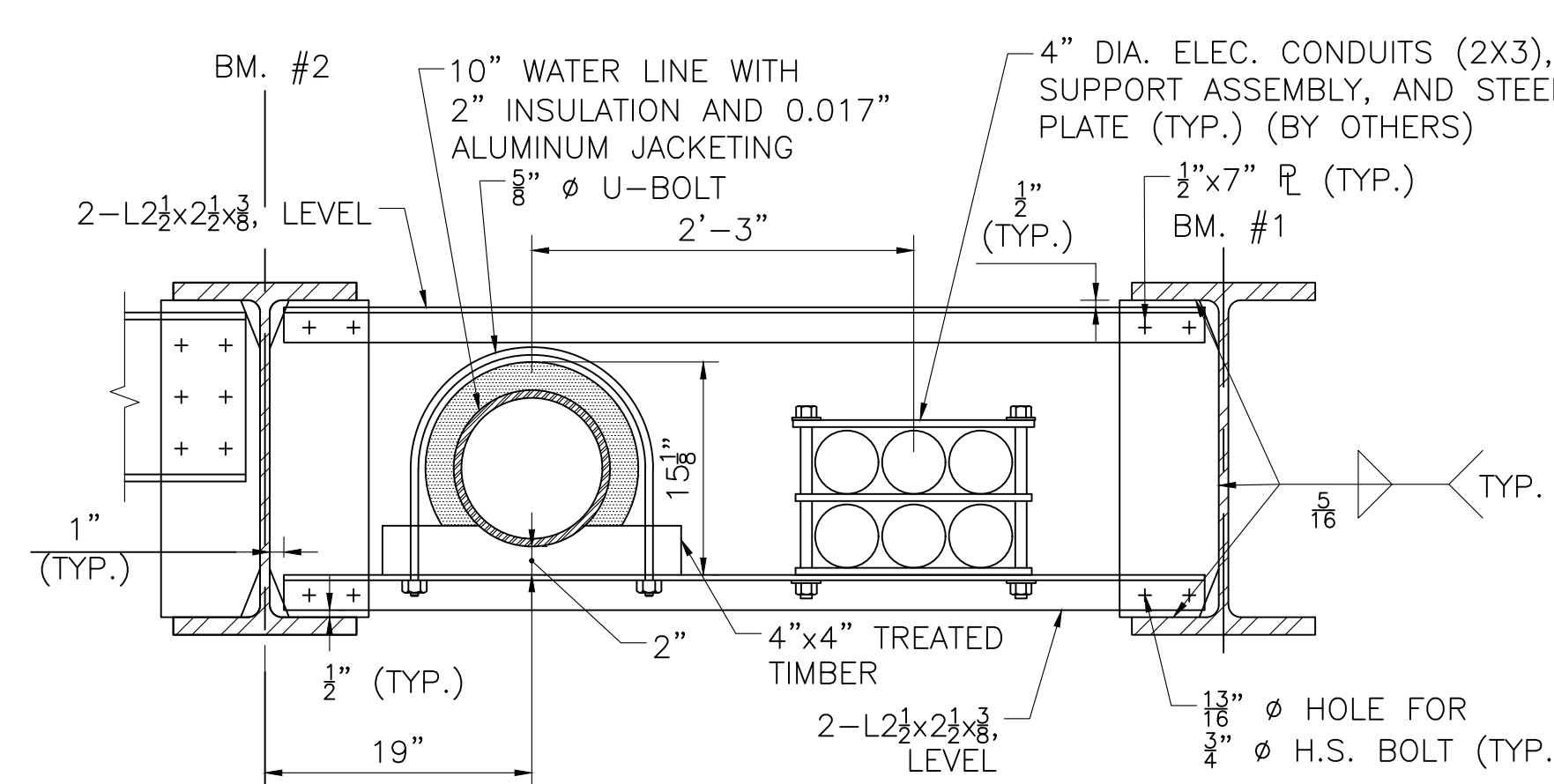


NOTE:

SEE DIAPHRAGM CONNECTION PLATE CLIP DETAILS ON THIS SHEET.

BAY 1 UTILITY SUPPORT DETAILS  
BETWEEN DIAPHRAGMS (U1)

SCALE: 1" = 1'-0"

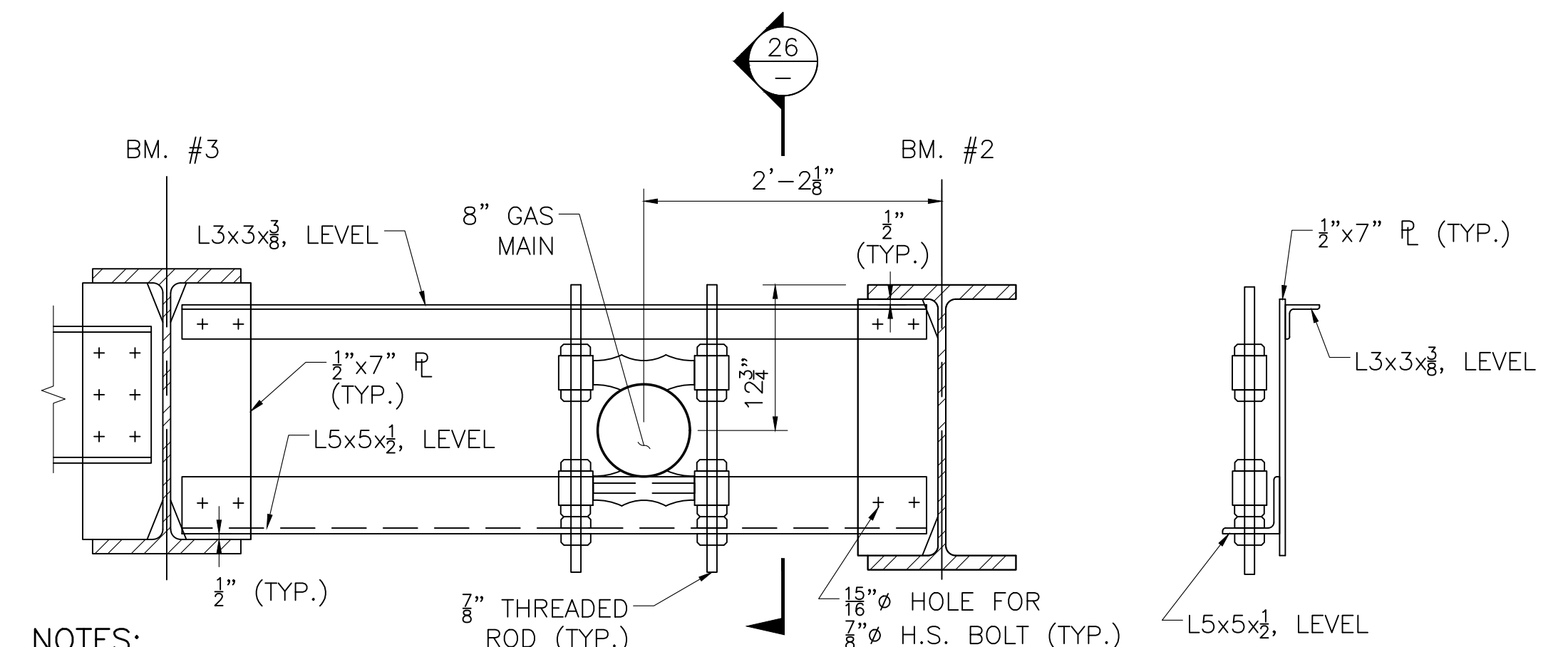


NOTE:

SEE DIAPHRAGM CONNECTION PLATE CLIP DETAILS ON THIS SHEET.

BAY 1 UTILITY SUPPORT DETAILS  
AT DIAPHRAGMS (U2)

SCALE: 1" = 1'-0"

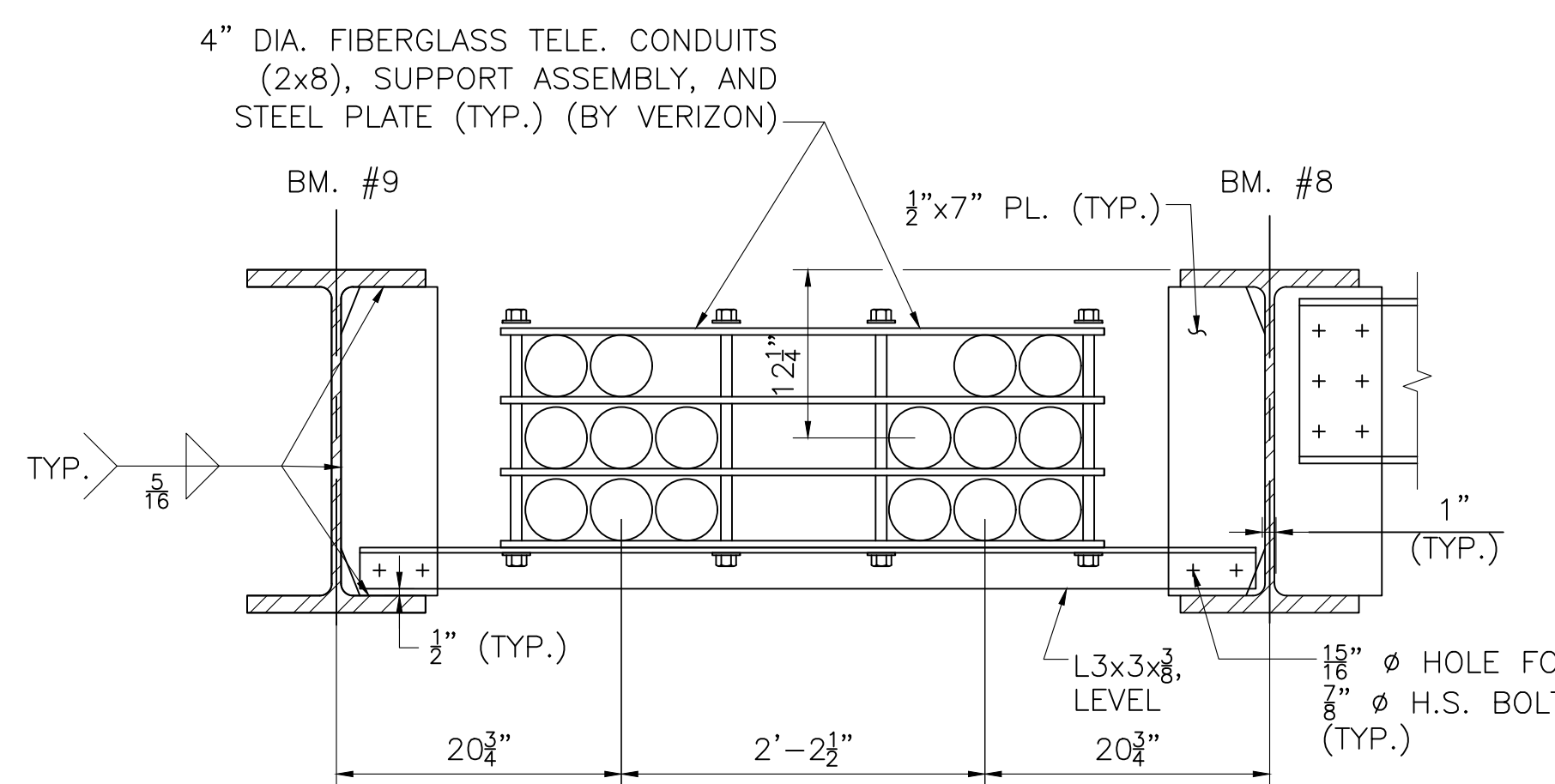


NOTES:

1. SEE DIAPHRAGM CONNECTION PLATE CLIP DETAILS ON THIS SHEET.

BAY 2 SUPPORT DETAILS  
AT DIAPHRAGMS (U3)

SCALE: 1" = 1'-0"

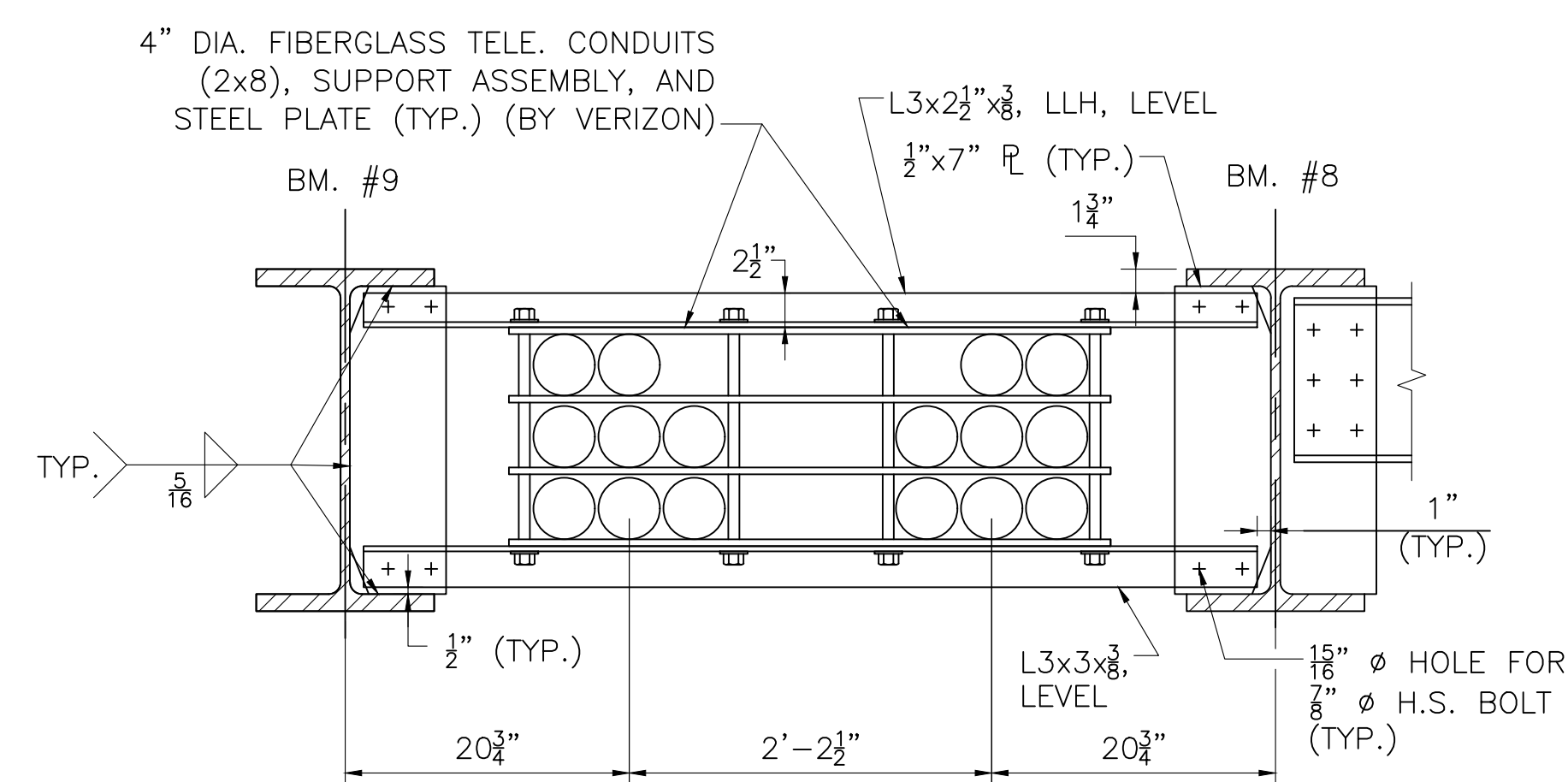


NOTE:

SEE DIAPHRAGM CONNECTION PLATE CLIP DETAILS ON THIS SHEET.

BAY 8 UTILITY SUPPORT DETAILS  
BETWEEN DIAPHRAGMS (U1)

SCALE: 1" = 1'-0"

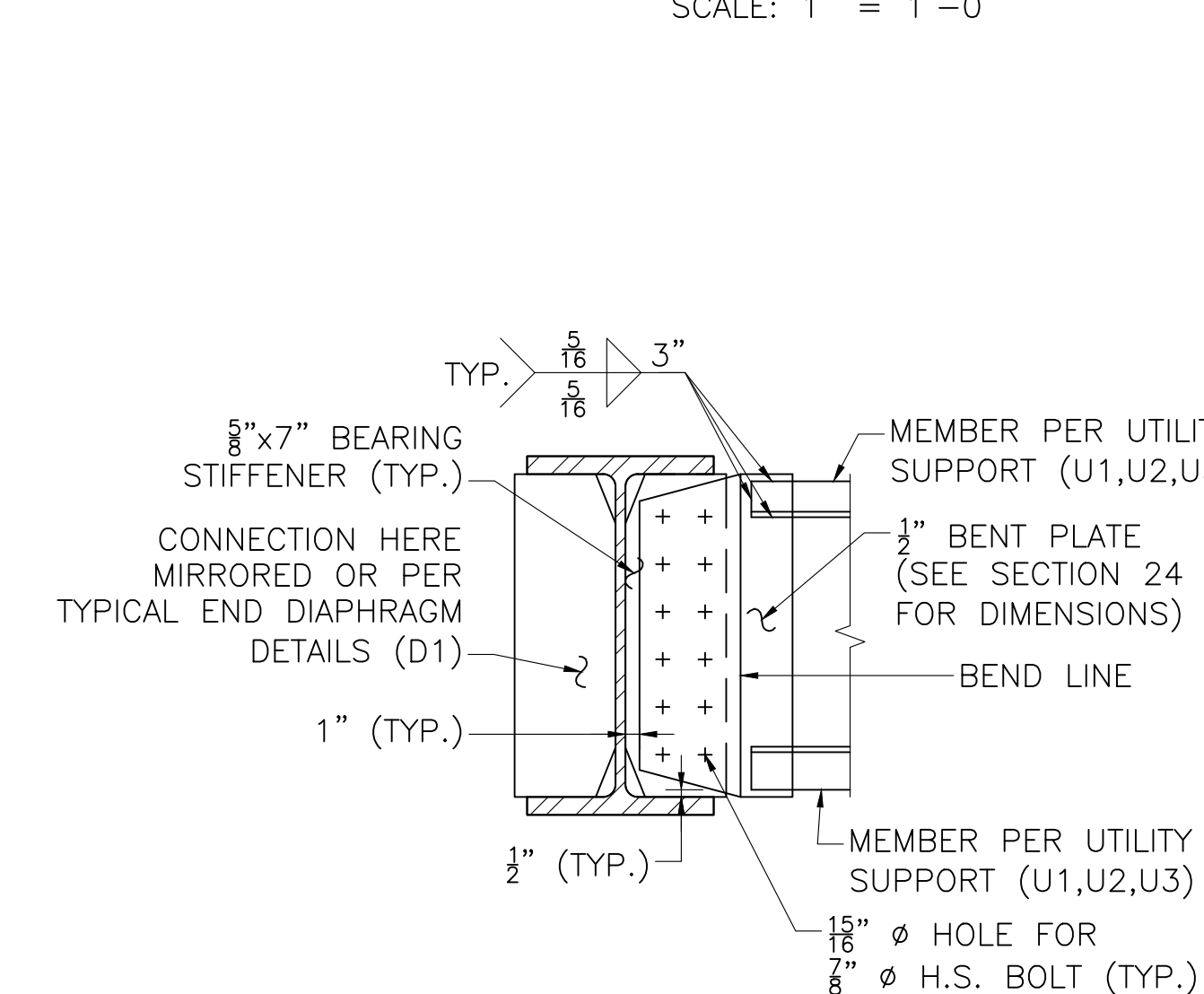


NOTES:

1. SEE DIAPHRAGM CONNECTION PLATE CLIP DETAILS ON THIS SHEET.

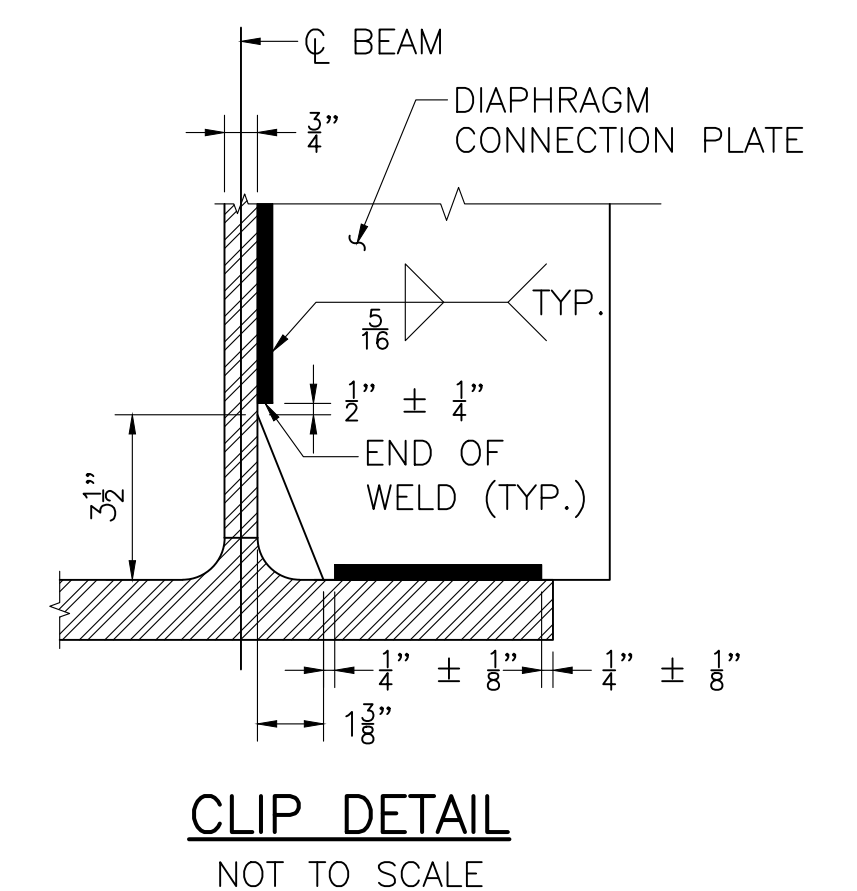
BAY 8 UTILITY SUPPORT DETAILS  
AT DIAPHRAGMS (U2)

SCALE: 1" = 1'-0"



UTILITY SUPPORT CONNECTION DETAIL  
AT PIER AND ABUTMENT

SCALE: 1" = 1'-0"



CLIP DETAIL  
NOT TO SCALE

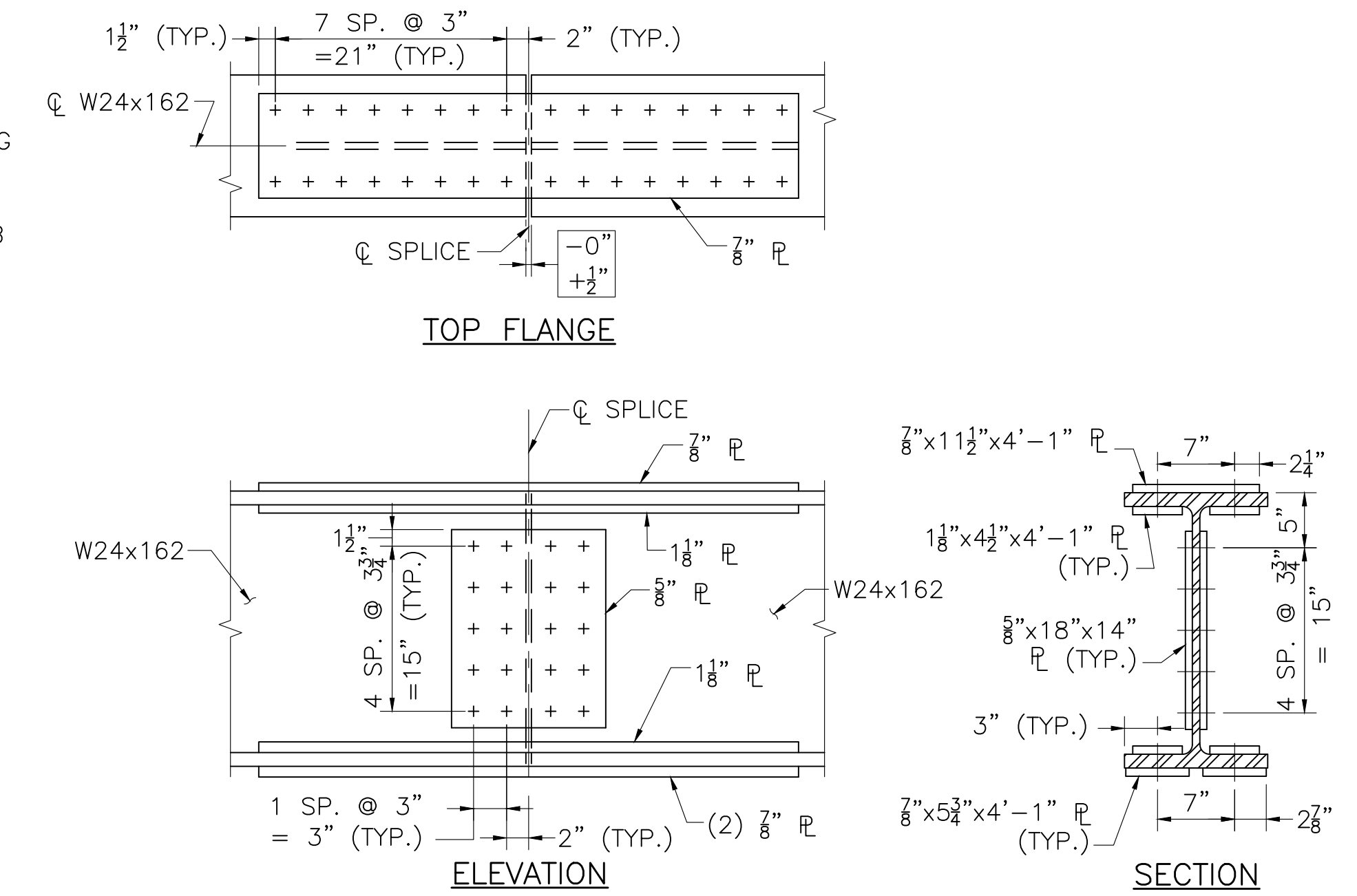
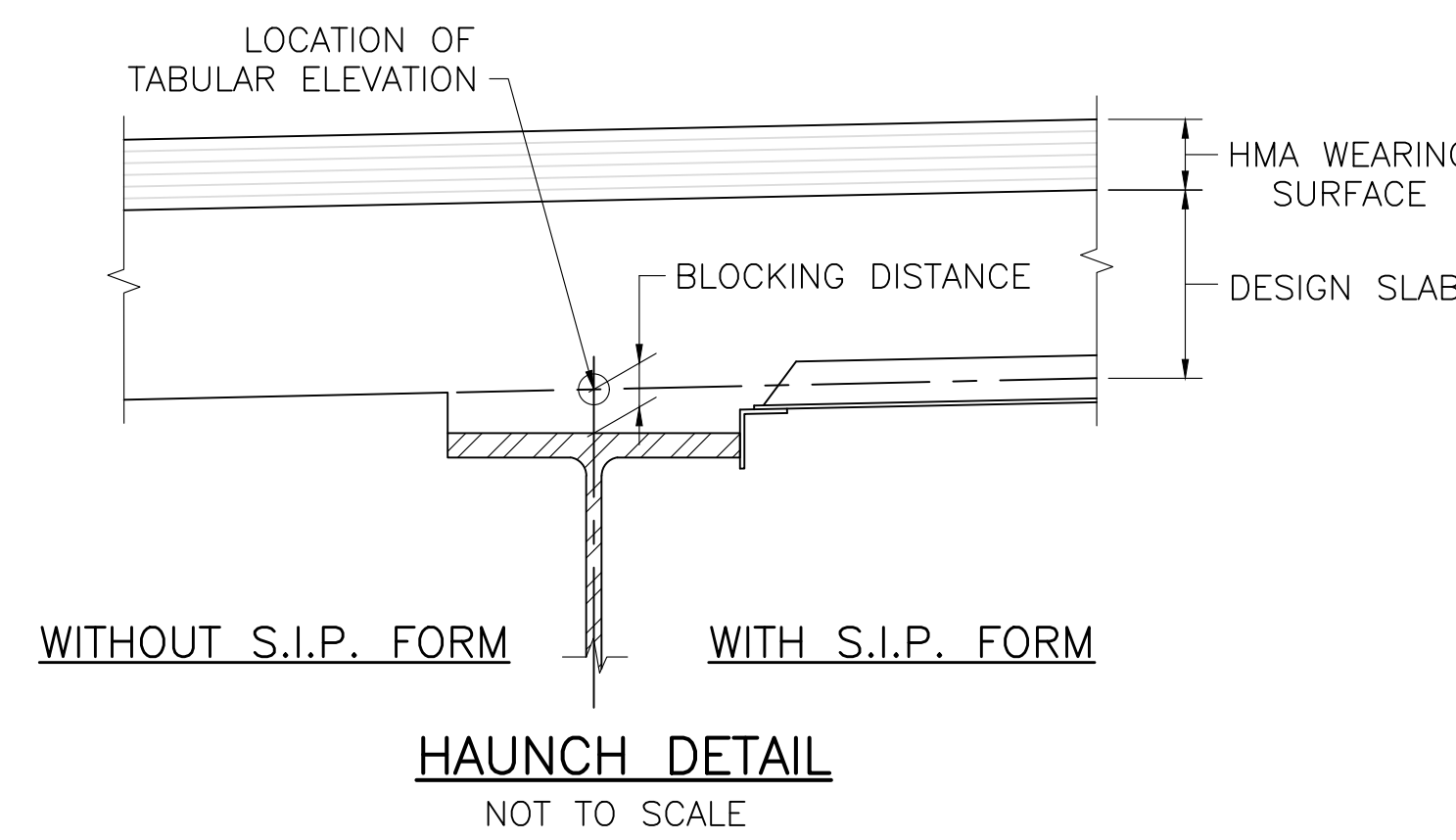
DATE	DESCRIPTION
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
	CONSTRUCTION BY MASSDOT
	AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
	USE ONLY PRINTS OF LATEST DATE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	53	67
PROJECT FILE NO.		607680	

BEAM DETAILS

CAMBER TABLE												
BM. NO.		CL. BRG. NORTH ABUT.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	CL. BRG. PIER.
1, 9	STEEL DL DEFL.	0	1/16	1/16	1/8	1/8	1/8	1/8	1/16	1/16	0	0
	CONC. DL DEFL.	0	1/8	3/16	1/4	1/4	1/4	1/4	3/16	1/16	0	0
	S.D.L DEFL.	0	1/16	3/16	1/4	1/4	1/4	3/16	1/8	1/16	0	0
	VERT. CURVE CAMBER	0	0	0	0	0	0	0	0	0	0	0
	ADDITIONAL CAMBER	0	0	0	0	0	0	0	0	0	0	0
	TOTAL CAMBER	0	1/4	7/16	9/16	5/8	5/8	9/16	3/8	1/4	1/16	0
2, 3, 7, 8	STEEL DL DEFL.	0	1/16	2/16	3/16	3/16	3/16	1/8	1/8	1/16	0	0
	CONC. DL DEFL.	0	1/8	3/16	1/4	1/4	1/4	1/4	3/16	1/16	0	0
	S.D.L DEFL.	0	1/16	1/16	1/8	1/8	1/8	1/8	1/16	1/16	0	0
	VERT. CURVE CAMBER	0	0	0	0	0	0	0	0	0	0	0
	ADDITIONAL CAMBER	0	0	0	0	0	0	0	0	0	0	0
	TOTAL CAMBER	0	3/16	3/8	1/2	9/16	9/16	1/2	3/8	3/16	1/16	0
4-6	STEEL DL DEFL.	0	0	1/16	1/16	1/16	1/16	1/16	1/16	0	0	0
	CONC. DL DEFL.	0	1/8	3/16	1/4	1/4	1/4	1/4	3/16	1/16	0	0
	S.D.L DEFL.	0	0	0	0	1/16	0	0	0	0	0	0
	VERT. CURVE CAMBER	0	0	0	0	0	0	0	0	0	0	0
	ADDITIONAL CAMBER	0	0	0	0	0	0	0	0	0	0	0
	TOTAL CAMBER	0	1/8	1/4	5/16	3/8	3/8	5/16	1/4	1/8	1/16	0

NOTE:  
CAMBER IS SYMMETRIC ABOUT CL. BRG. PIER.

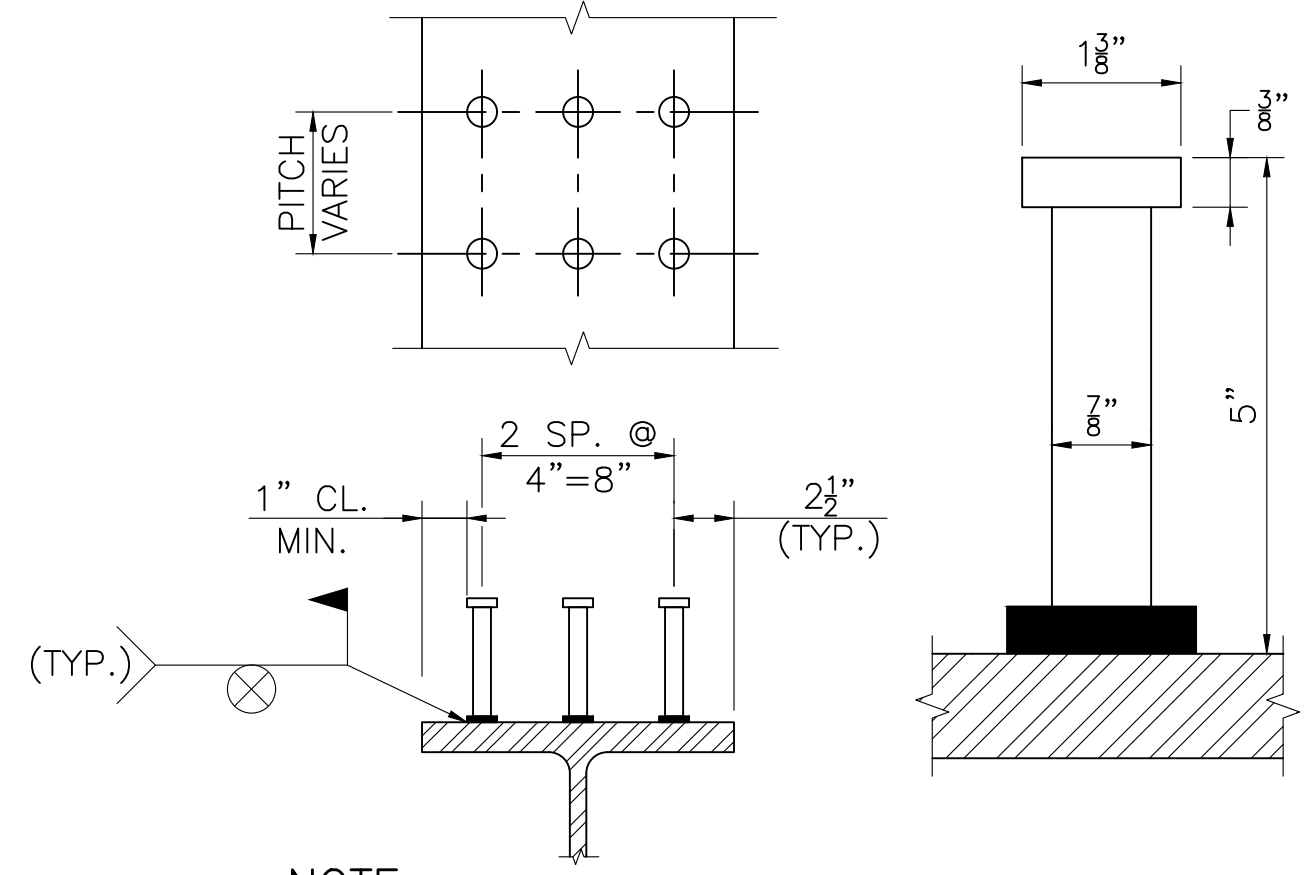


- NOTES:
- BOLTED FIELD SPLICES SHALL BE CONSIDERED SLIP-CRITICAL CONNECTIONS WITH CLASS C FAYING SURFACES.
  - + DENOTES 7/8" Ø ASTM F3125 GRADE A325 HIGH STRENGTH BOLT IN 1 1/8" Ø HOLE.
  - ONE ROW OF STUD SHEAR CONNECTORS SHALL BE PLACED ALONG THE CENTERLINE OF THE TOP FLANGE SPLICE PLATE. DECREASE SPACING OF SHEAR STUDS ON BOTH SIDES OF TOP FLANGE PLATE TO MAINTAIN TOTAL REQUIRED NUMBER OF SHEAR STUDS.

BEAM NO.	TOP OF FORM ELEVATIONS FOR DECK SLAB PRIOR TO PLACEMENT OF CONCRETE INCREASING STATIONS								
	CL. BRG. NORTH ABUT.	1/8 PT.	1/4 PT.	3/8 PT.	1/2 PT.	5/8 PT.	3/4 PT.	7/8 PT.	CL. BRG. PIER.
1	469.92	469.85	469.79	469.71	469.63	469.55	469.46	469.38	469.30
2	469.95	469.88	469.81	469.74	469.66	469.57	469.48	469.40	469.33
3	470.10	470.03	469.95	469.88	469.80	469.71	469.62	469.54	469.46
4	470.25	470.17	470.09	470.01	469.93	469.84	469.76	469.68	469.60
5	470.40	470.32	470.24	470.16	470.07	469.99	469.90	469.82	469.74
6	470.32	470.24	470.16	470.08	469.99	469.90	469.81	469.73	469.65
7	470.24	470.17	470.09	470.01	469.92	469.83	469.74	469.65	469.57
8	470.16	470.09	470.01	469.93	469.84	469.75	469.65	469.56	469.48
9	470.20	470.13	470.05	469.97	469.88	469.79	469.69	469.59	469.51

BEAM NO.	TOP OF FORM ELEVATIONS FOR DECK SLAB PRIOR TO PLACEMENT OF CONCRETE INCREASING STATIONS								
	CL. BRG. PIER	1/8 PT.	1/4 PT.	3/8 PT.	1/2 PT.	5/8 PT.	3/4 PT.	7/8 PT.	CL. BRG. SOUTH ABUT.
1	469.30	469.25	469.21	469.17	469.13	469.08	469.03	468.97	468.90
2	469.33	469.27	469.23	469.18	469.14	469.09	469.04	468.98	468.91
3	469.46	469.41	469.36	469.31	469.27	469.22	469.16	469.11	469.05
4	469.60	469.54	469.49	469.44	469.39	469.34	469.29	469.23	469.17
5	469.74	469.68	469.63	469.58	469.52	469.47	469.42	469.36	469.30
6	469.65	469.59	469.54	469.48	469.43	469.38	469.32	469.26	469.20
7	469.57	469.50	469.45	469.40	469.35	469.30	469.24	469.17	469.11
8	469.48	469.42	469.37	469.32	469.27	469.21	469.15	469.08	469.01
9	469.51	469.45	469.39	469.34	469.29	469.24	469.17	469.10	469.03

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



NOTE:  
3/4" Ø STUDS MAY BE SUBSTITUTED FOR 1 1/2" Ø STUDS BY ADJUSTING THE PITCH TO PROVIDE AN EQUIVALENT CROSS-SECTIONAL AREA PER FOOT.

STUD SHEAR CONNECTORS  
NOT TO SCALE

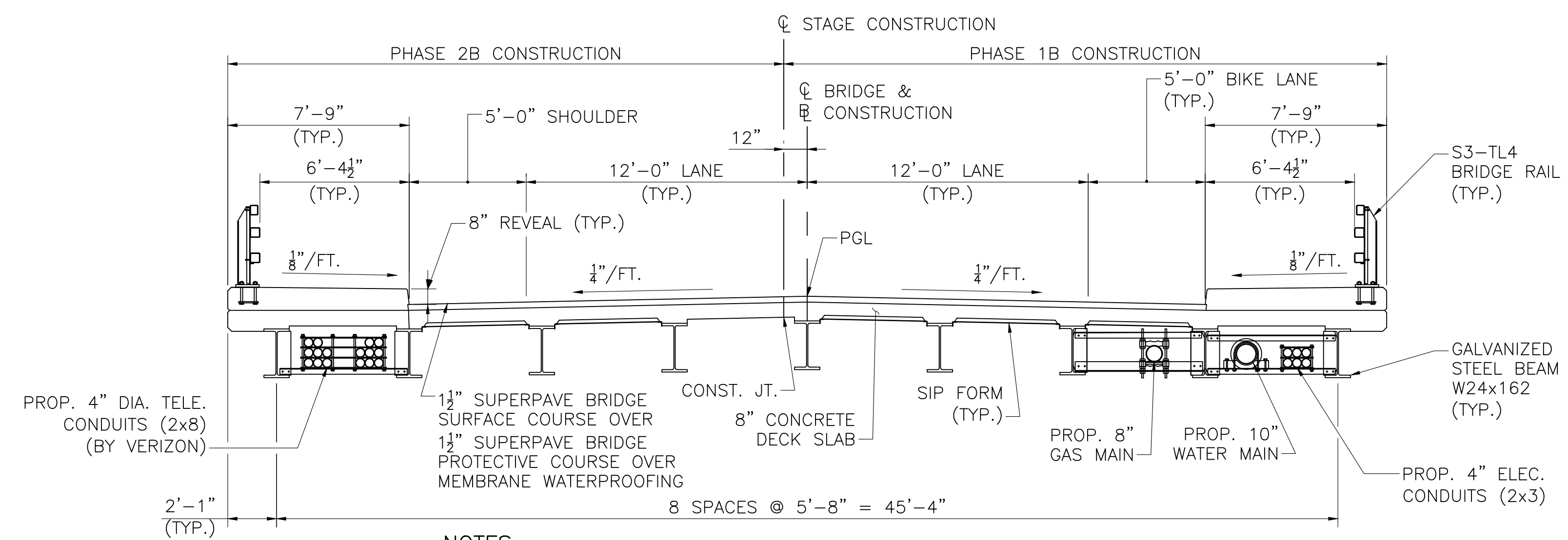
BOLTED FIELD SPLICE DETAILS  
SCALE: 1" = 1'-0"

SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

607680\_BR 29 (BEAM DETAILS).DWG Plotted on 14-Sep-2023 10:43 AM 11-AUG-2023 Final Structural Submittal (SF)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	54	67
PROJECT FILE NO.		607680	

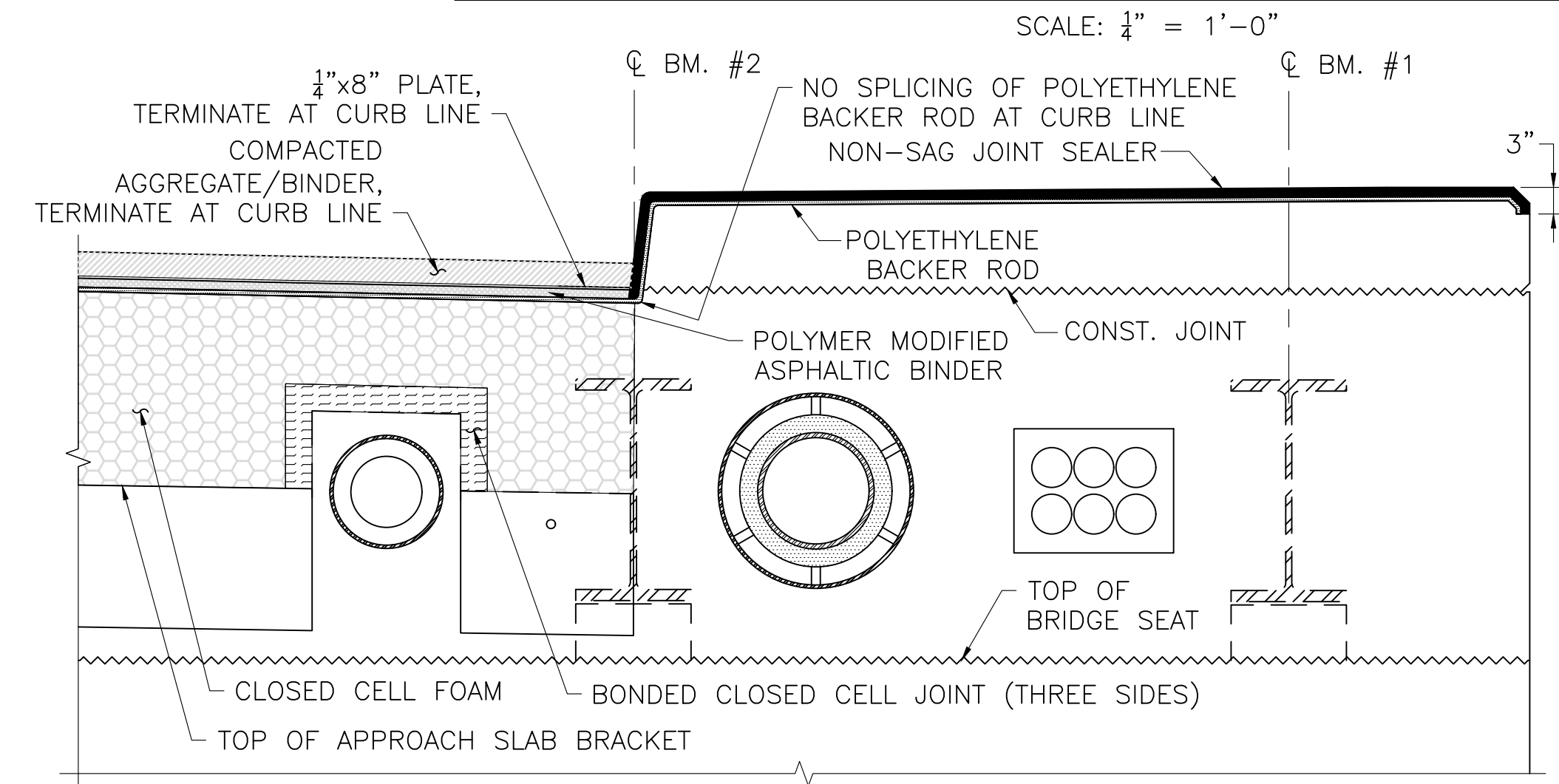
DECK DETAILS (1 OF 3)



NOTES:

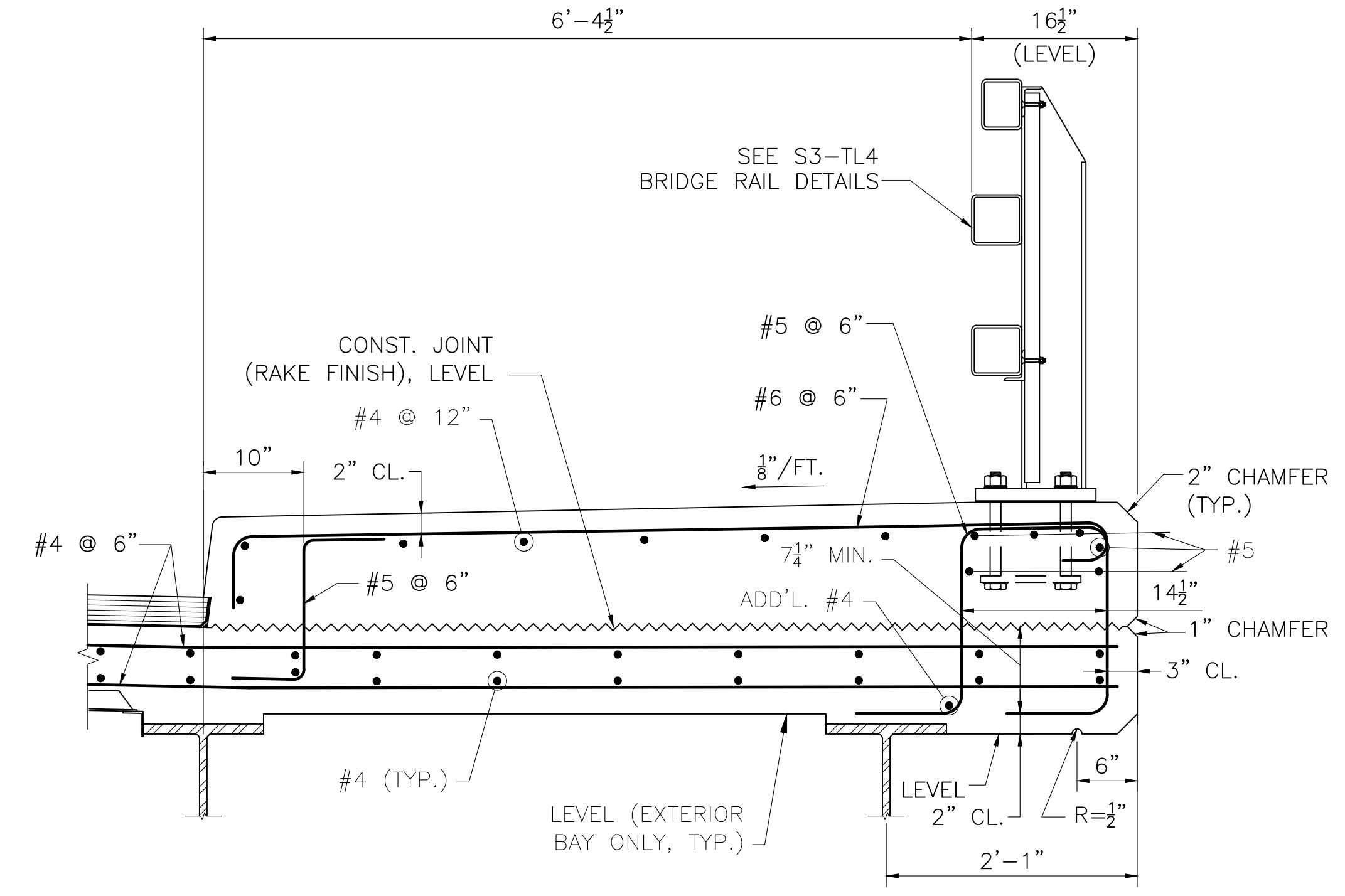
1. STAY IN PLACE FORMS SHALL ONLY BE USED IN THE BAYS AS SHOWN.
2. STAY IN PLACE FORMS ARE PROHIBITED WITHIN A DISTANCE OF 4' ON BOTH SIDES OF THE DECK TRANSVERSE CONSTRUCTION JOINTS.

TRANSVERSE SECTION OF SUPERSTRUCTURE (LOOKING UPSTATION)



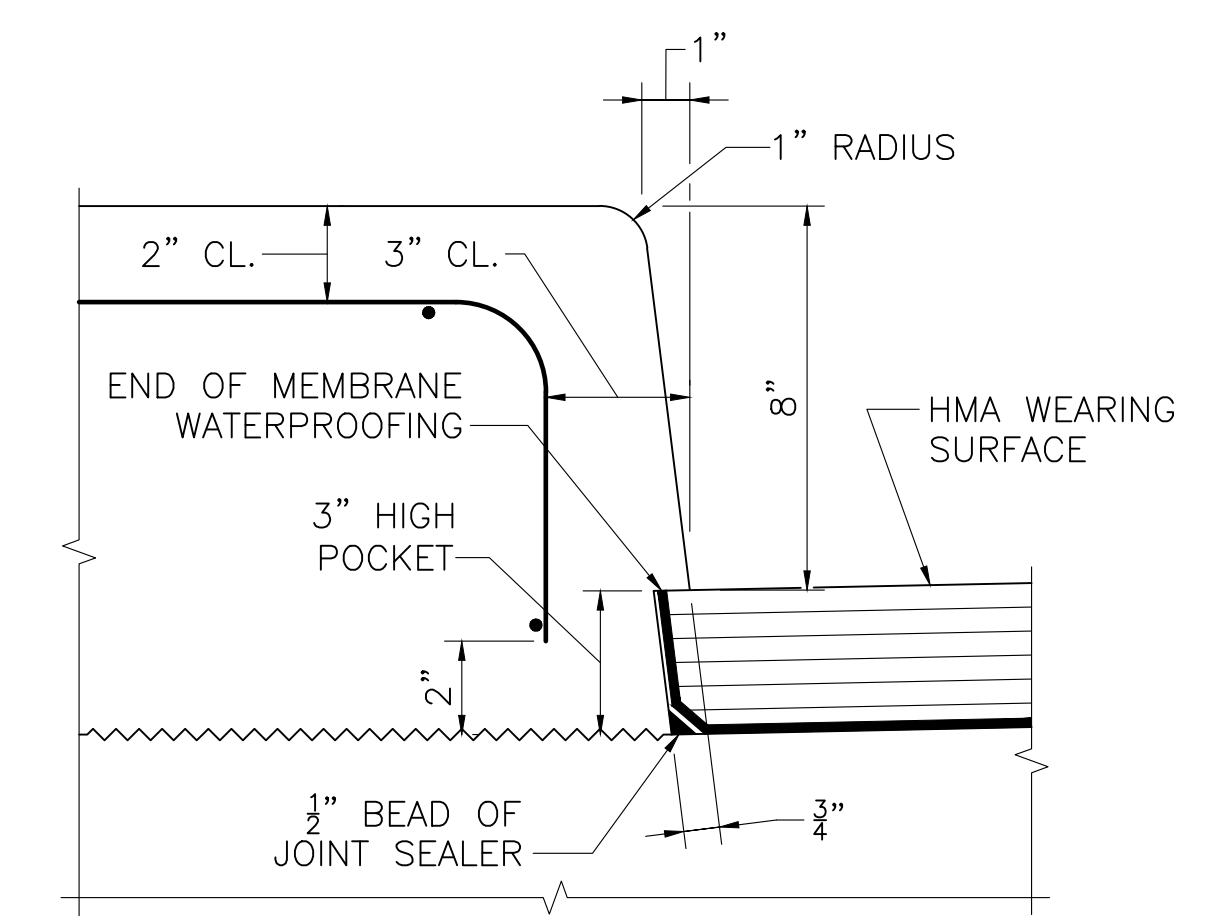
TYPICAL JOINT DETAIL AT ABUTMENT

SCALE: 3/4\"/>



SECTION THRU SIDEWALK

SCALE: 1\"/>

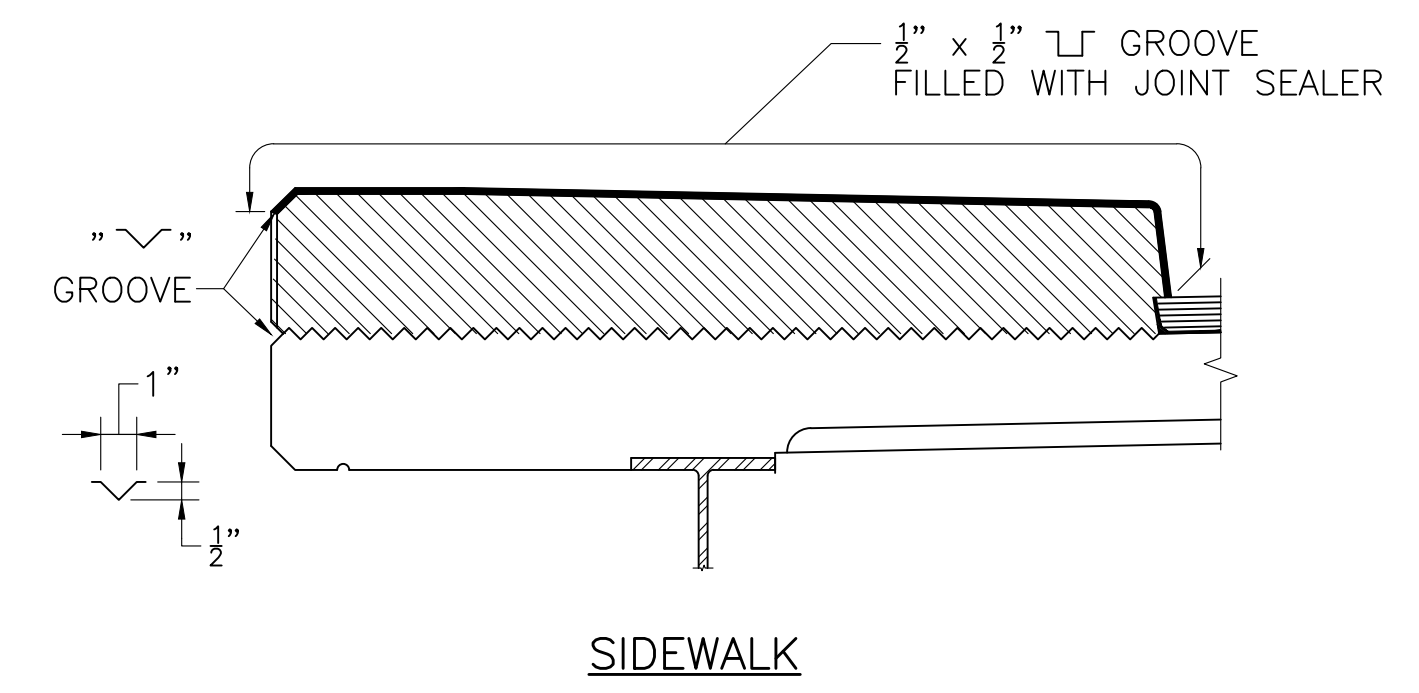


NOTE:

TURN MEMBRANE UP INTO 3\"/>

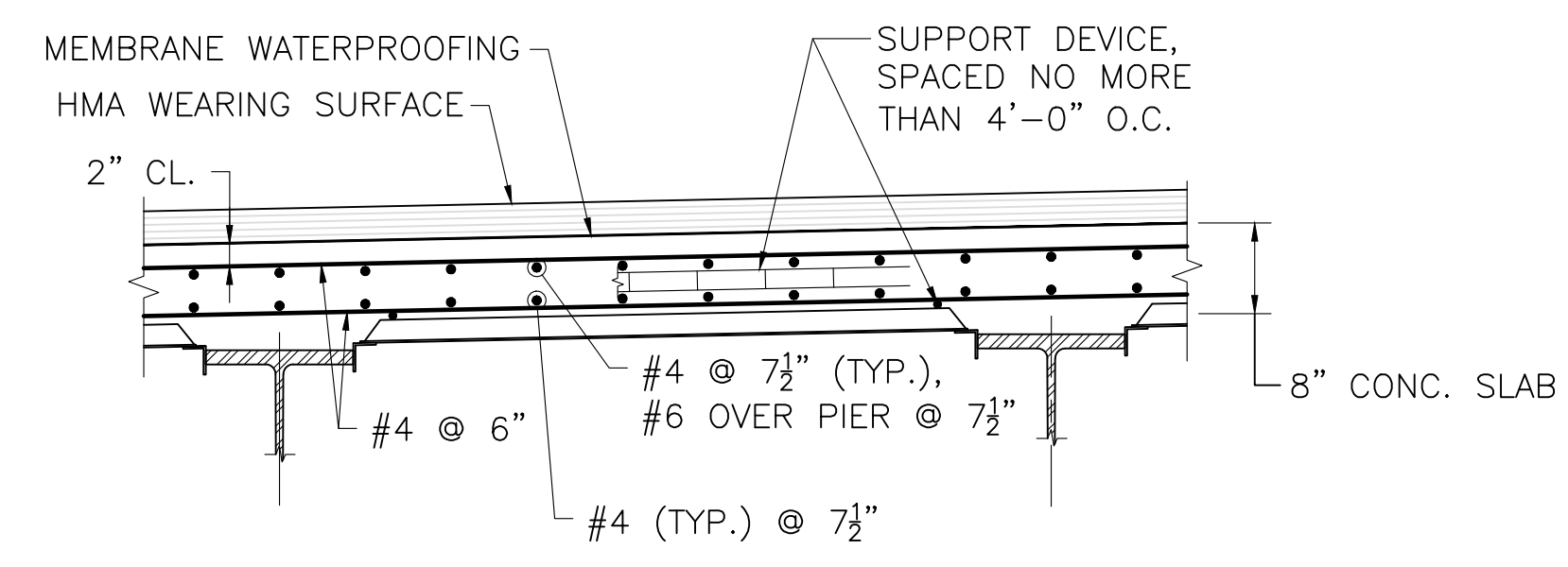
FACE OF SIDEWALK CURB DETAILS

SCALE: 3\"/>



PARAFFIN JOINT DETAILS

SCALE: 3/4\"/>

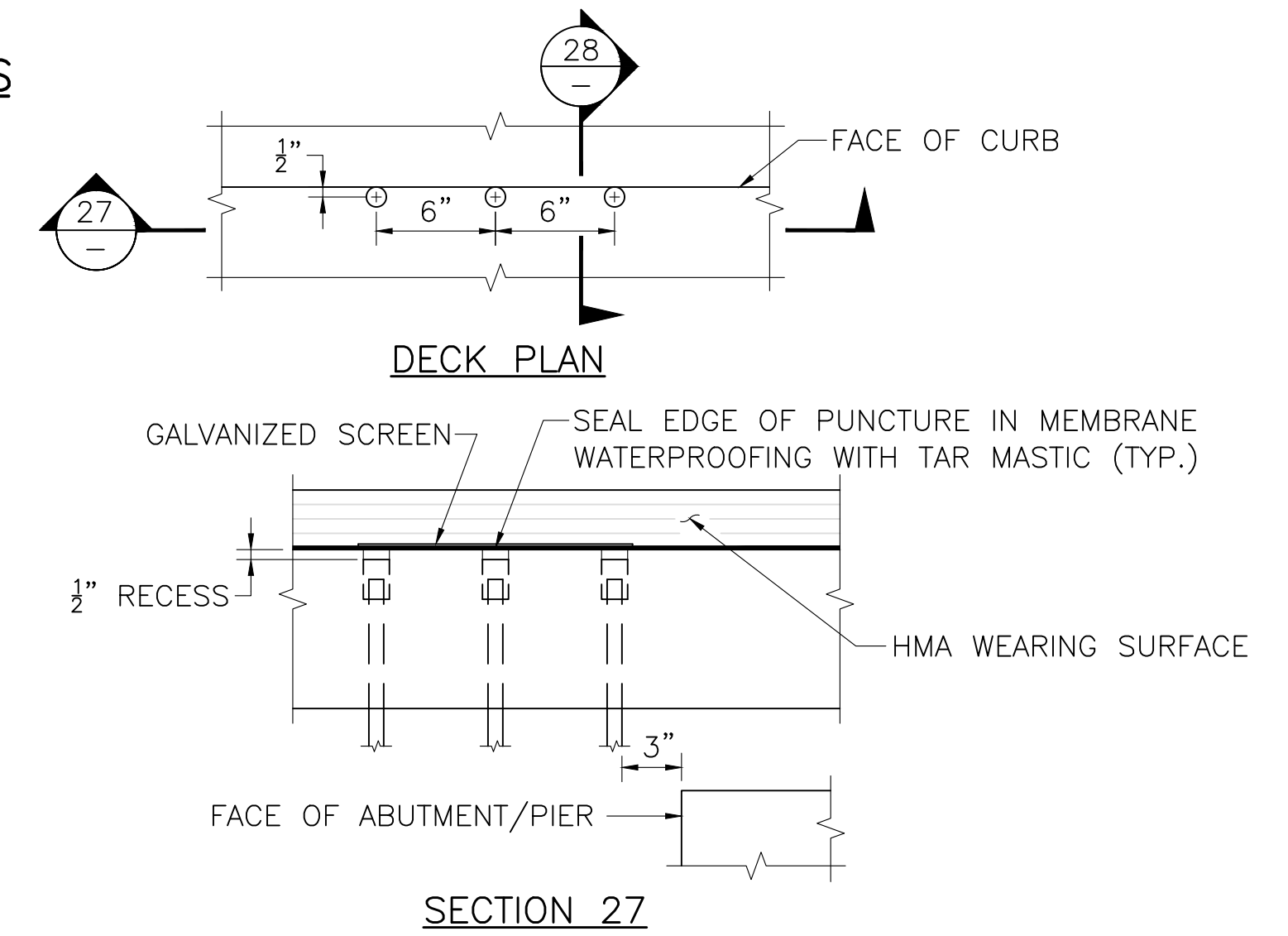


TYPICAL DECK REINFORCEMENT

SCALE: 3/4\"/>

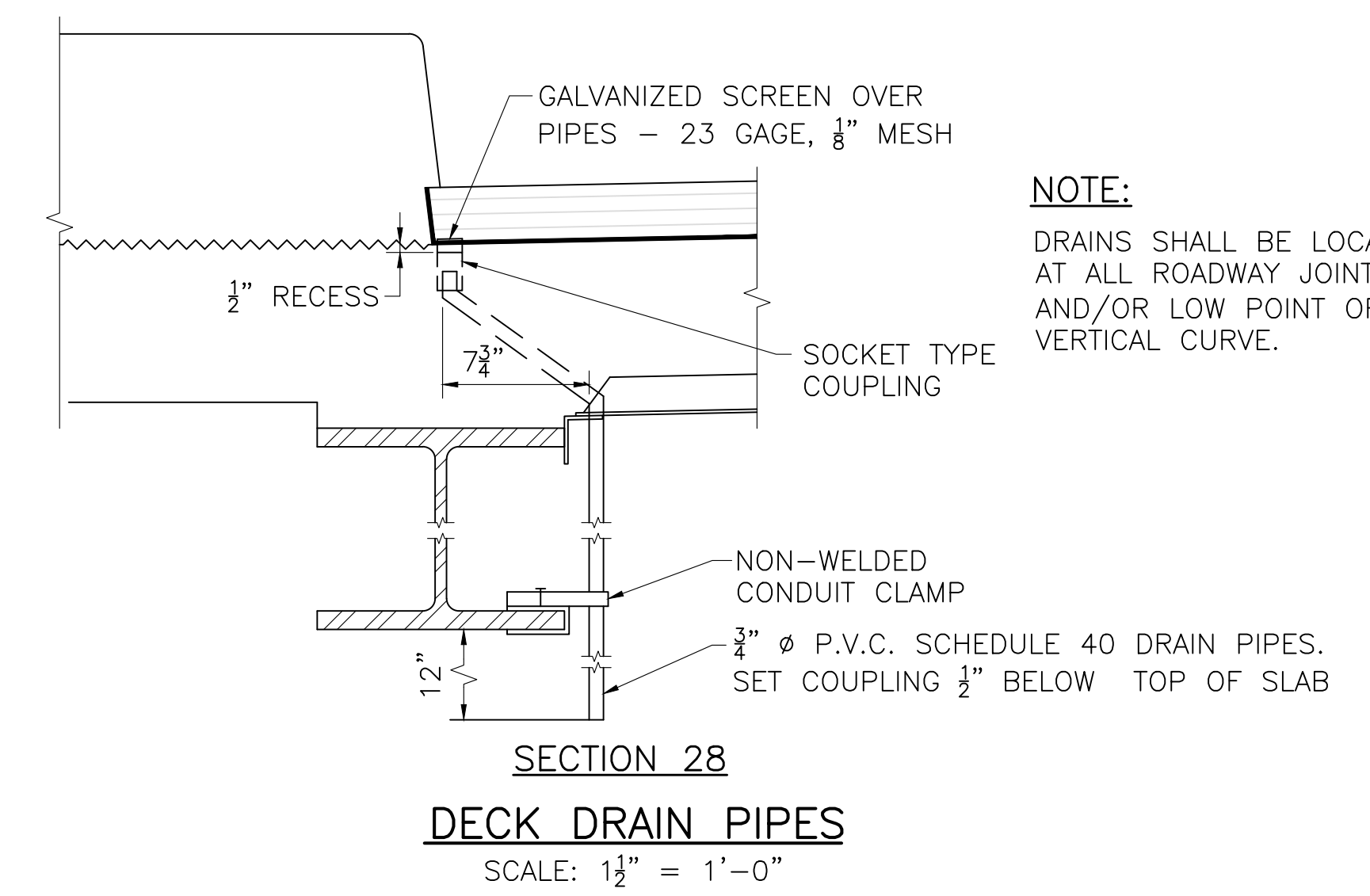
NOTES:

1. ROADWAY DECK SLAB SHALL BE 4000 PSI, 3/4\"/>
2. LONGITUDINAL REINFORCEMENT SHALL BE PLACED PARALLEL TO THE CL OF CONSTRUCTION. TRANSVERSE (PRIMARY) REINFORCEMENT SHALL BE PLACED PERPENDICULAR TO THE CL OF CONSTRUCTION.
3. ALL REINFORCEMENT AND SUPPORT DEVICES SHALL BE COATED.
4. THE FINISHED SURFACE OF BRIDGE DECK SHALL BE SMOOTH AND WITHOUT ANY PROJECTIONS THAT COULD PUNCTURE THE MEMBRANE WATERPROOFING OR DEPRESSIONS THAT COULD RETAIN WATER.



DECK PLAN

SECTION 27



SECTION 28  
DECK DRAIN PIPES

SCALE: 1 1/2\"/>

NOTE:

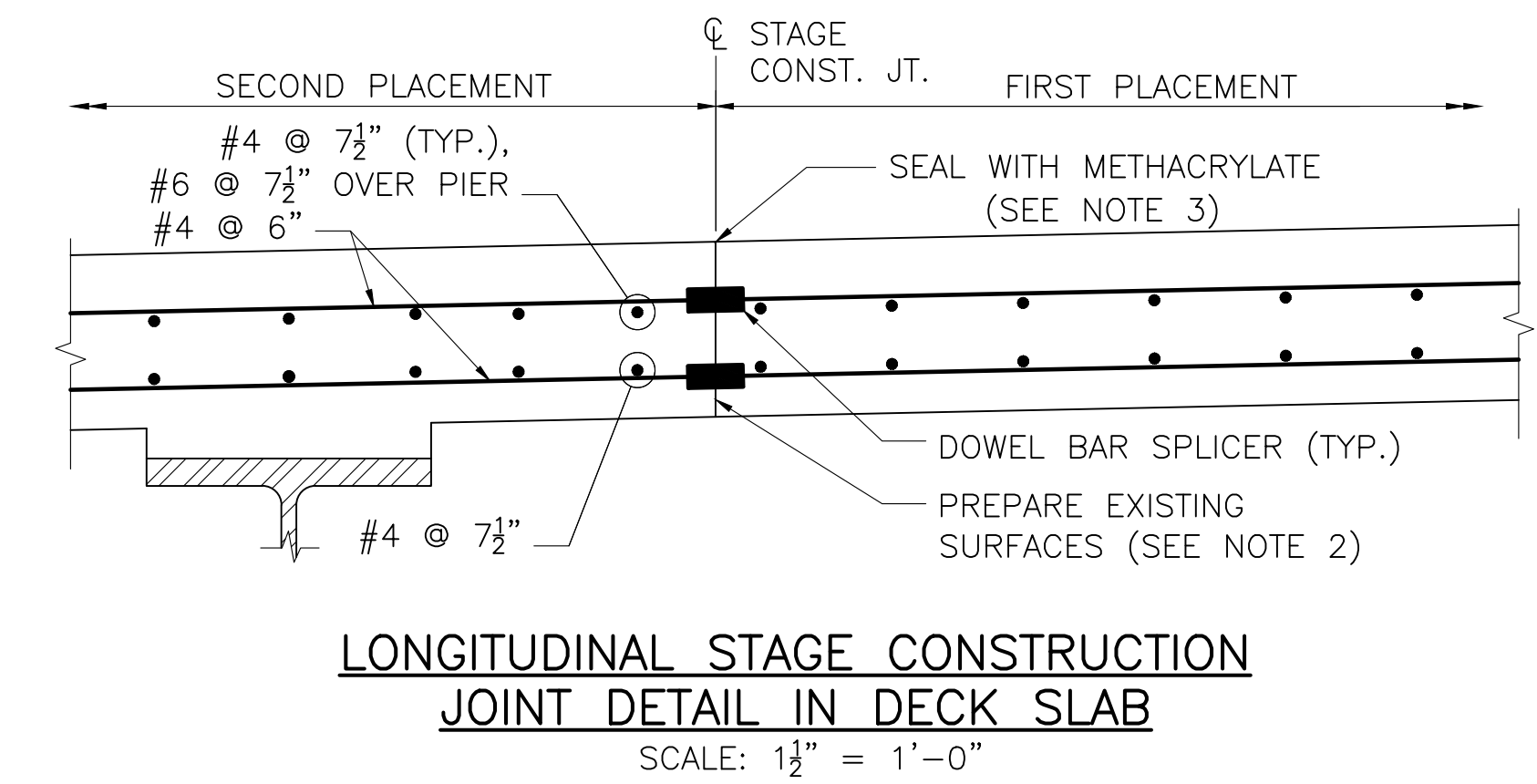
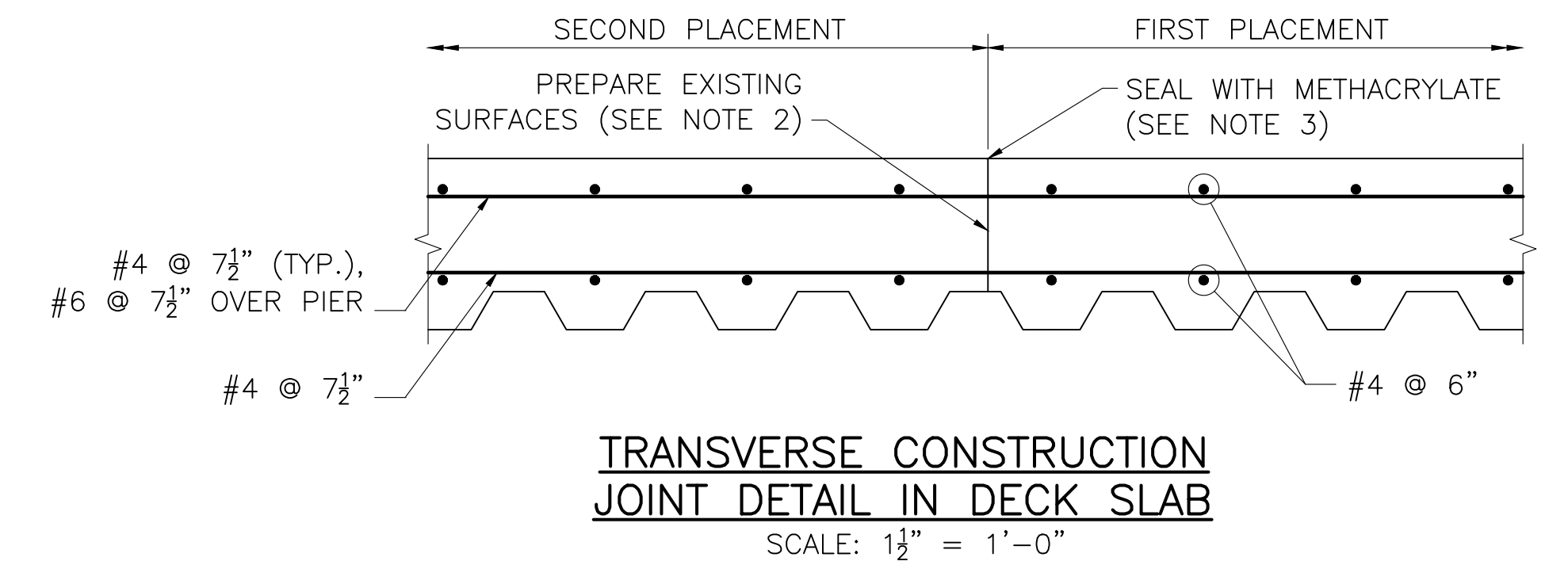
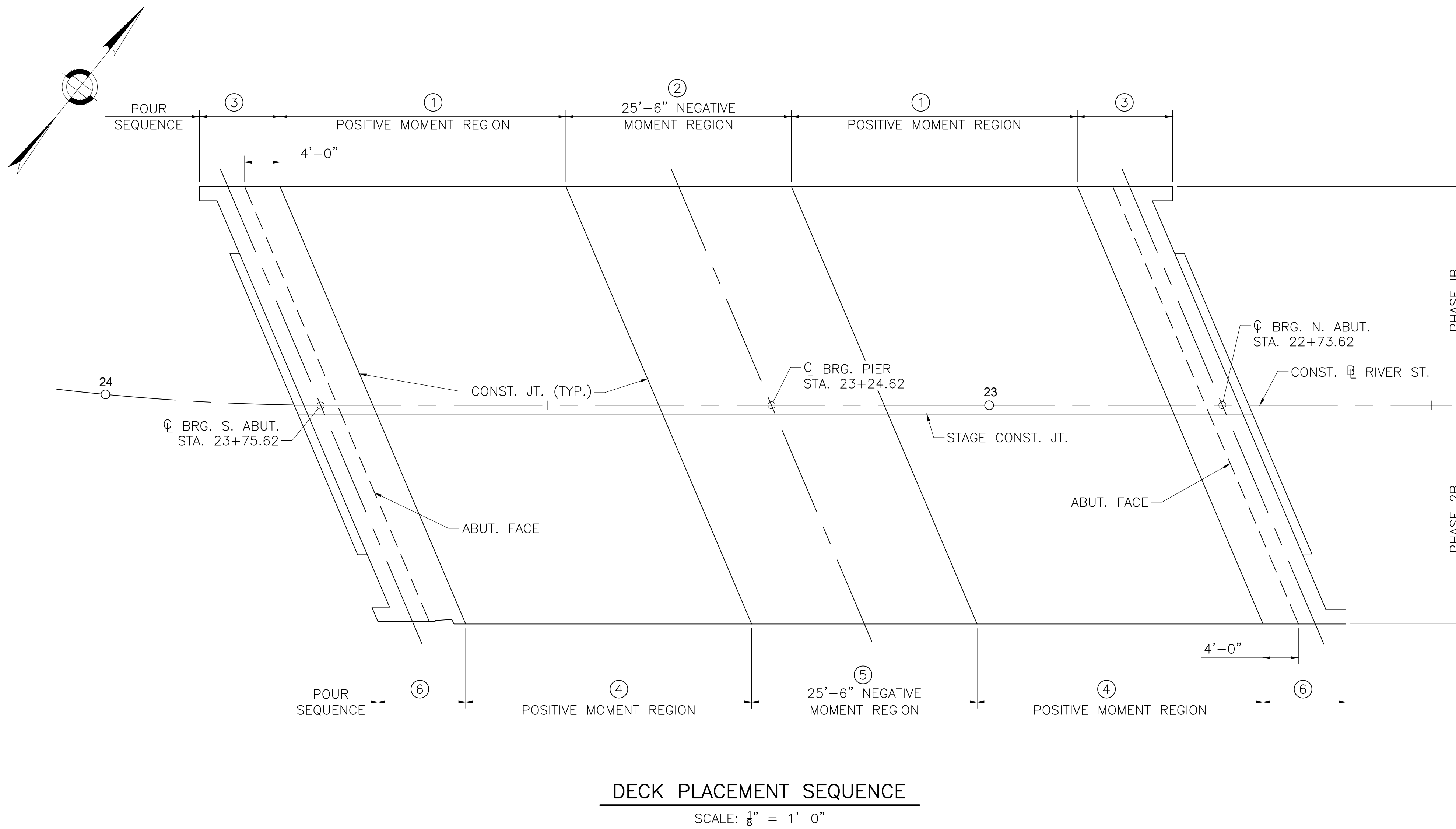
DRAINS SHALL BE LOCATED AT ALL ROADWAY JOINTS AND/OR LOW POINT OF VERTICAL CURVE.

DATE	DESCRIPTION
SEPT 23, 2023	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	

FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	55	67
PROJECT FILE NO.		607680	

DECK DETAILS (2 OF 3)

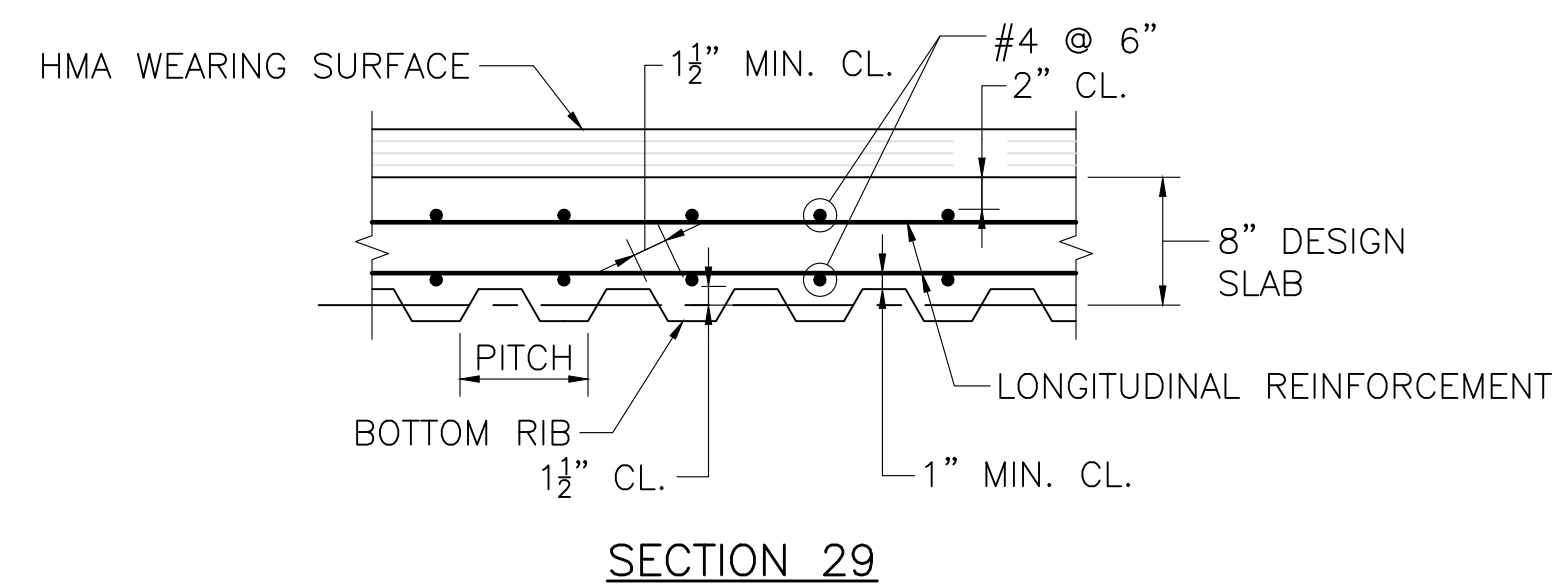
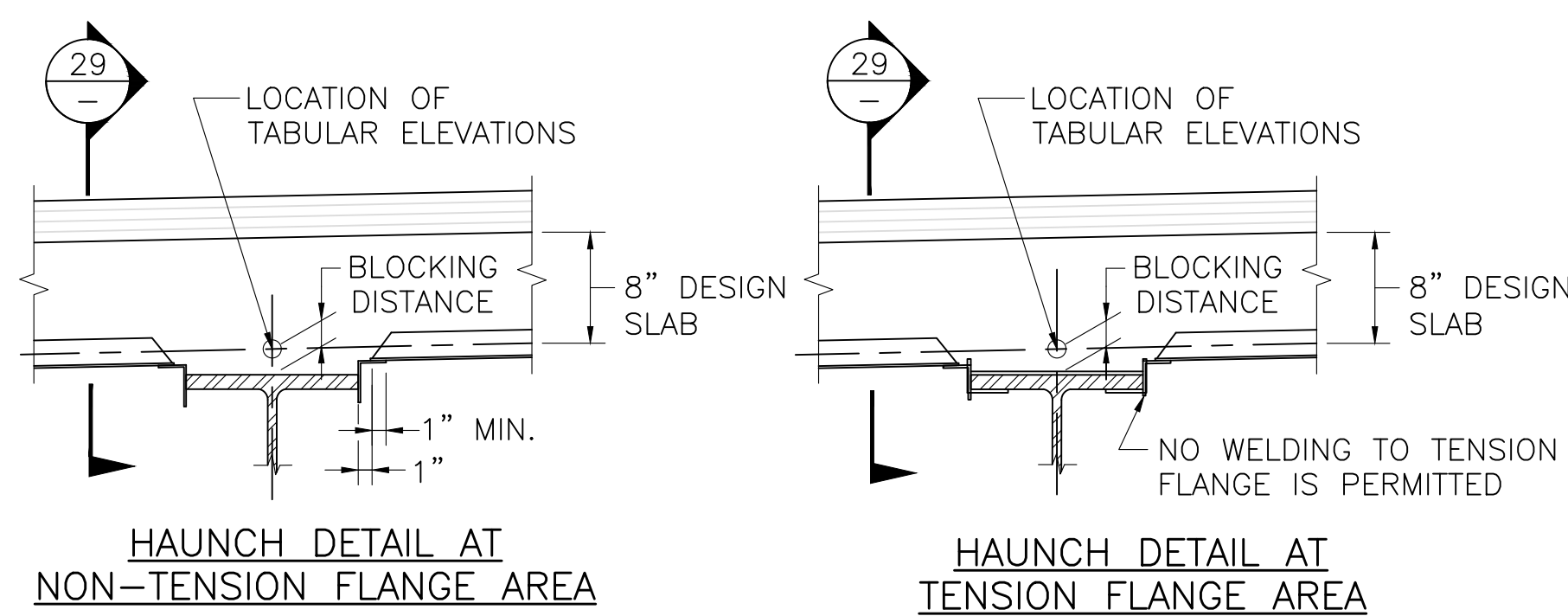


NOTES:

- BRIDGE DECK SLAB SHALL BE PLACED IN ACCORDANCE WITH THE PLACEMENT SEQUENCE SHOWN ON THE PLANS.
- THE SURFACE OF THE PREVIOUSLY CAST CONCRETE SHALL BE BLAST CLEANED, ROUGHENED, WETTED WITH CLEAN WATER, AND THEN FLUSHED WITH A MORTAR COMPOSED OF EQUAL PARTS OF THE CEMENT AND SAND SPECIFIED FOR THE NEW CONCRETE, BEFORE NEW CONCRETE IS PLACED ADJACENT THERETO. NEW CONCRETE SHALL BE PLACED BEFORE MORTAR HAS TAKEN INITIAL SET.
- IN LIEU OF THE MORTAR, AN EPOXY ADHESIVE SUITABLE FOR BONDING FRESH CONCRETE TO HARDENED CONCRETE FOR LOAD BEARING APPLICATIONS MAY BE USED. THE EPOXY ADHESIVE SHALL CONFORM TO AASHTO M 235 TYPE V AND SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

NOTES:

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



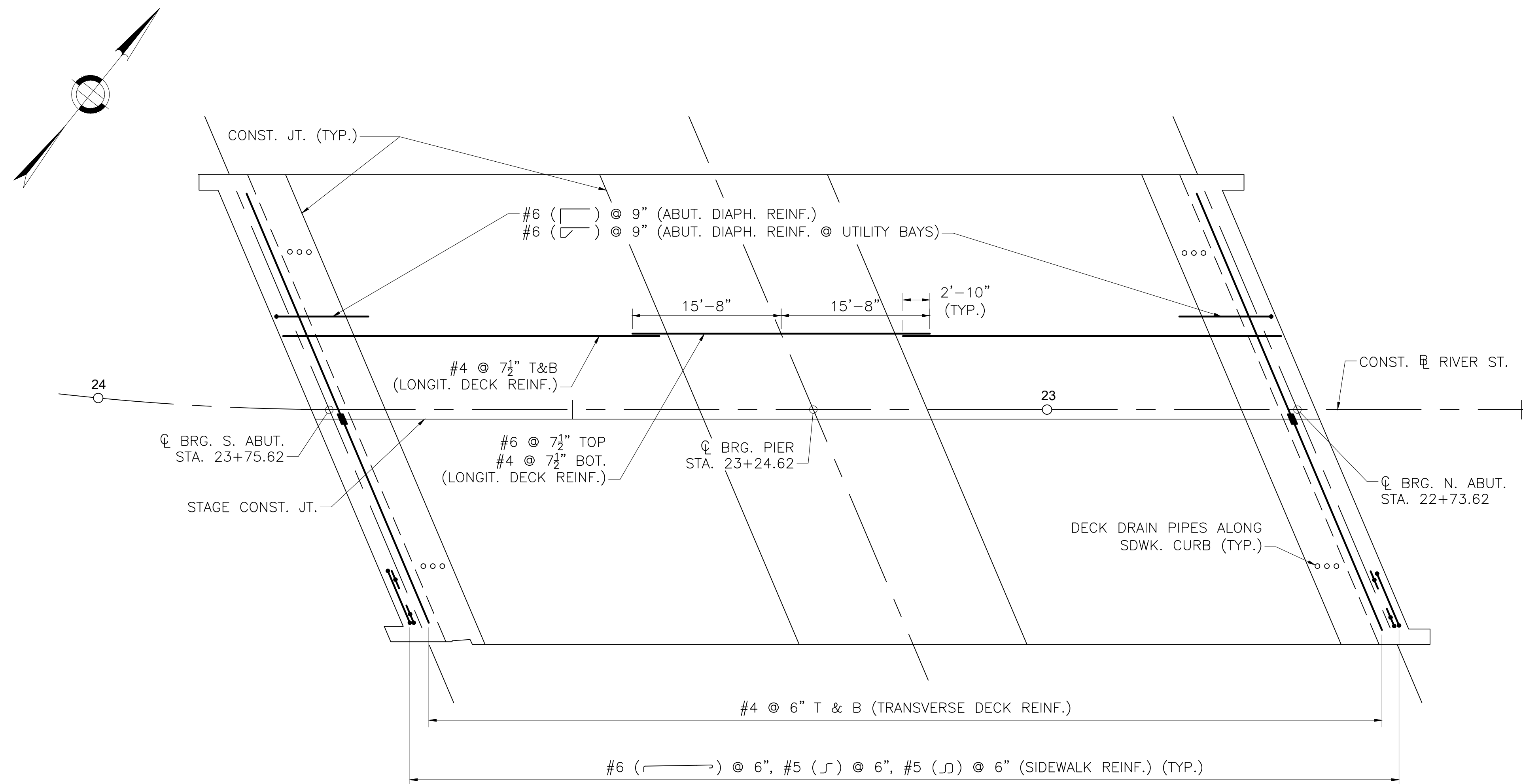
SECTION 29  
STAY-IN-PLACE FORM DETAILS  
NOT TO SCALE

DATE	DESCRIPTION
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	56	67
PROJECT FILE NO.		607680	

DECK DETAILS (3 OF 3)



**NOTE:**  
SIDEWALK AND REINFORCING ABOVE  
DECK SLAB OMITTED FOR CLARITY.

**DECK PLAN**

SCALE:  $\frac{1}{8}'' = 1'-0''$

**CONSTRUCTION NOTES:**

1. ALL REINFORCEMENT SHALL BE COATED.
2. THE CONTRACTOR SHALL FOLLOW THE DECK PLACEMENT SEQUENCE AS SHOWN ON THESE CONSTRUCTION DRAWINGS.
3. ALL CONCRETE SHALL CONTAIN SUPERPLASTICIZER TO ENSURE ADEQUATE CONSOLIDATION.
4. THE CONTRACTOR MAY USE MECHANICAL REINFORCING BAR SPLICERS IN LIEU OF TENSION LAP SPLICES TO FACILITATE CONSTRUCTION. HOWEVER, NO ADDITIONAL COMPENSATION WILL BE PROVIDED FOR THE USE OF MECHANICAL REINFORCING BAR SPLICERS. MECHANICAL REINFORCING BAR SPLICERS SHALL BE INSTALLED TO MAKE THIS REINFORCEMENT CONTINUOUS.
5. MECHANICAL REINFORCING BAR SPLICERS SHALL BE INSTALLED AT STAGE CONSTRUCTION JOINTS FOR ALL TRANSVERSE REINFORCEMENT.

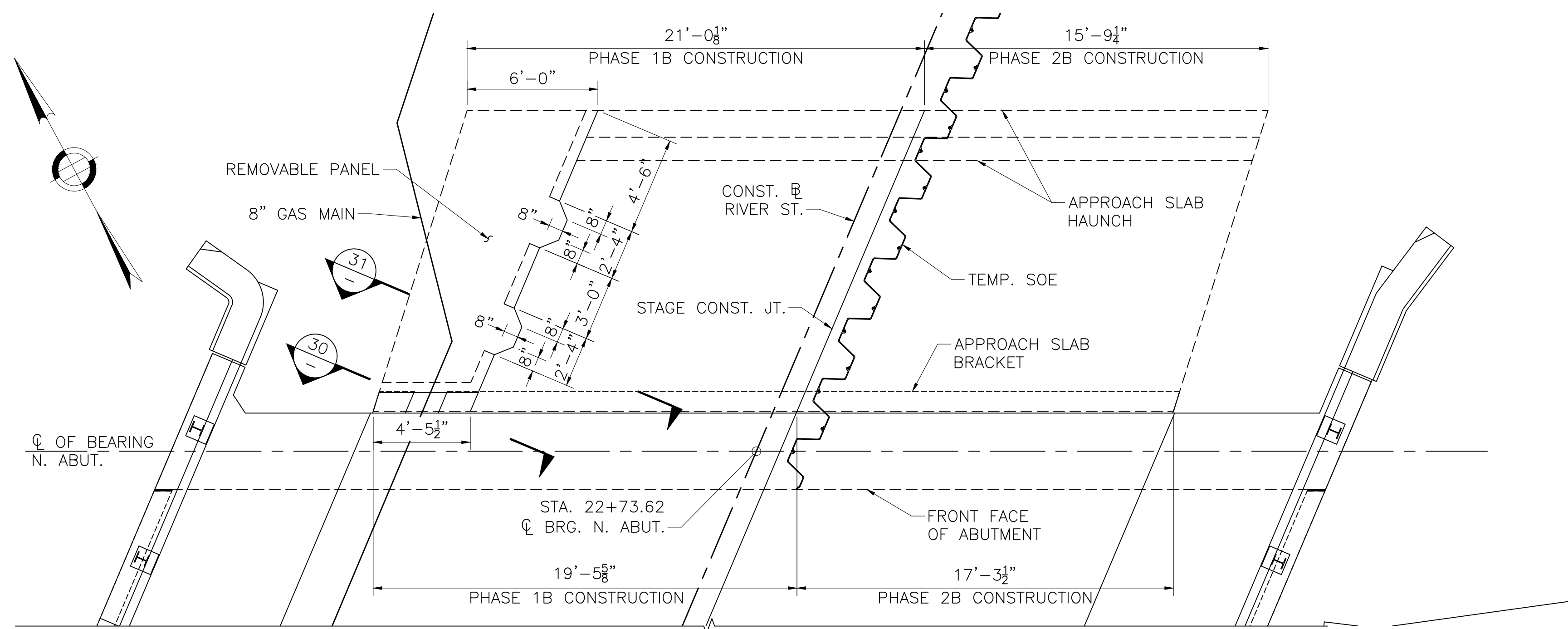
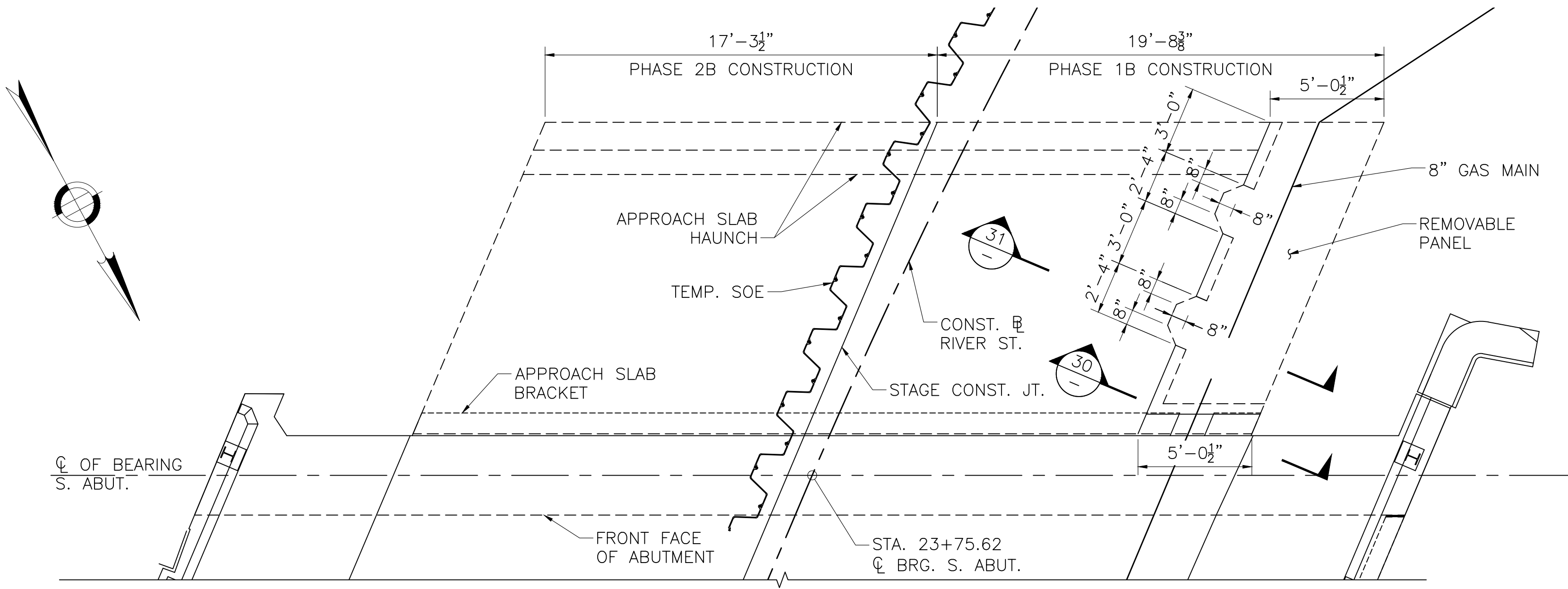
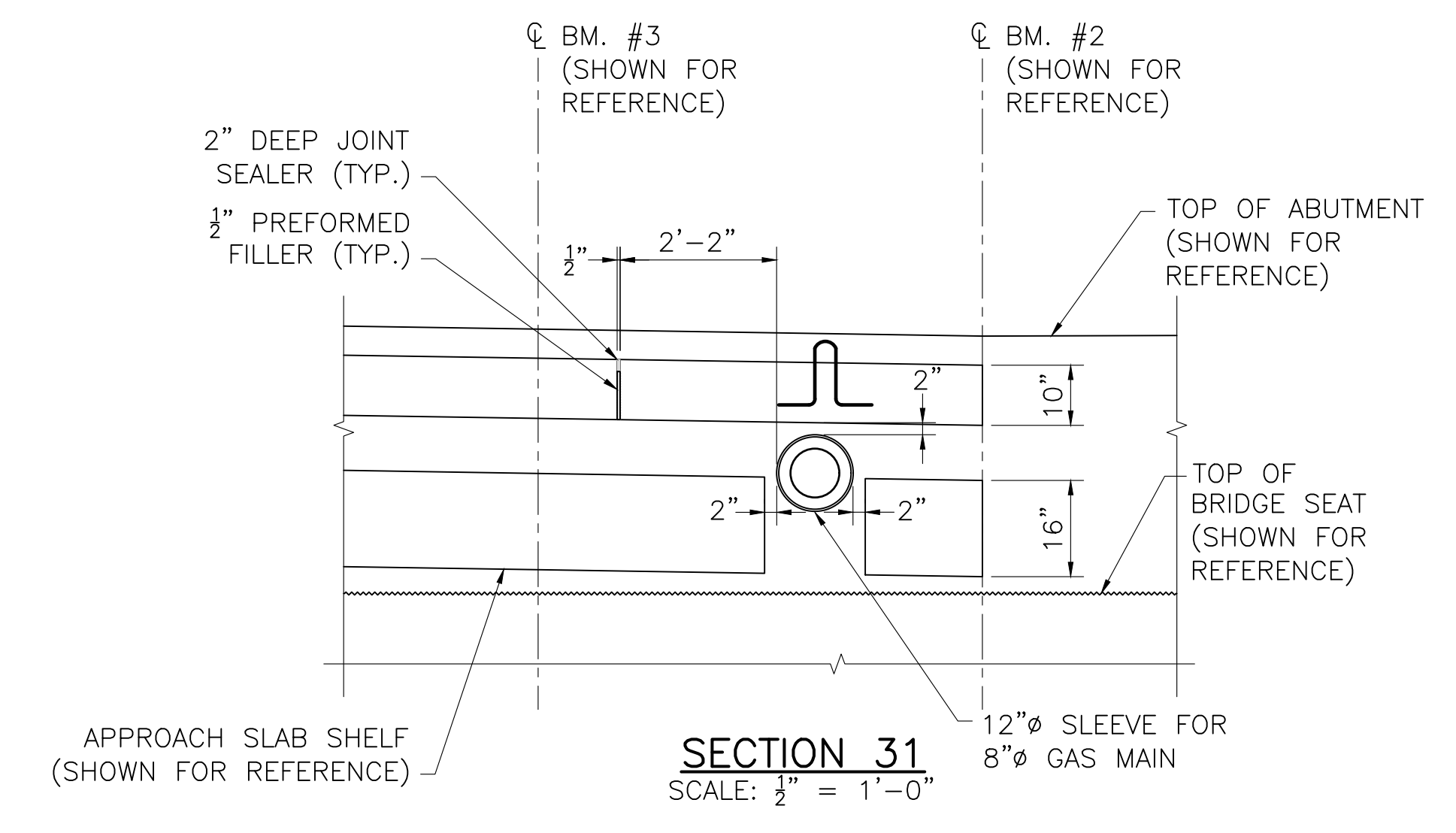
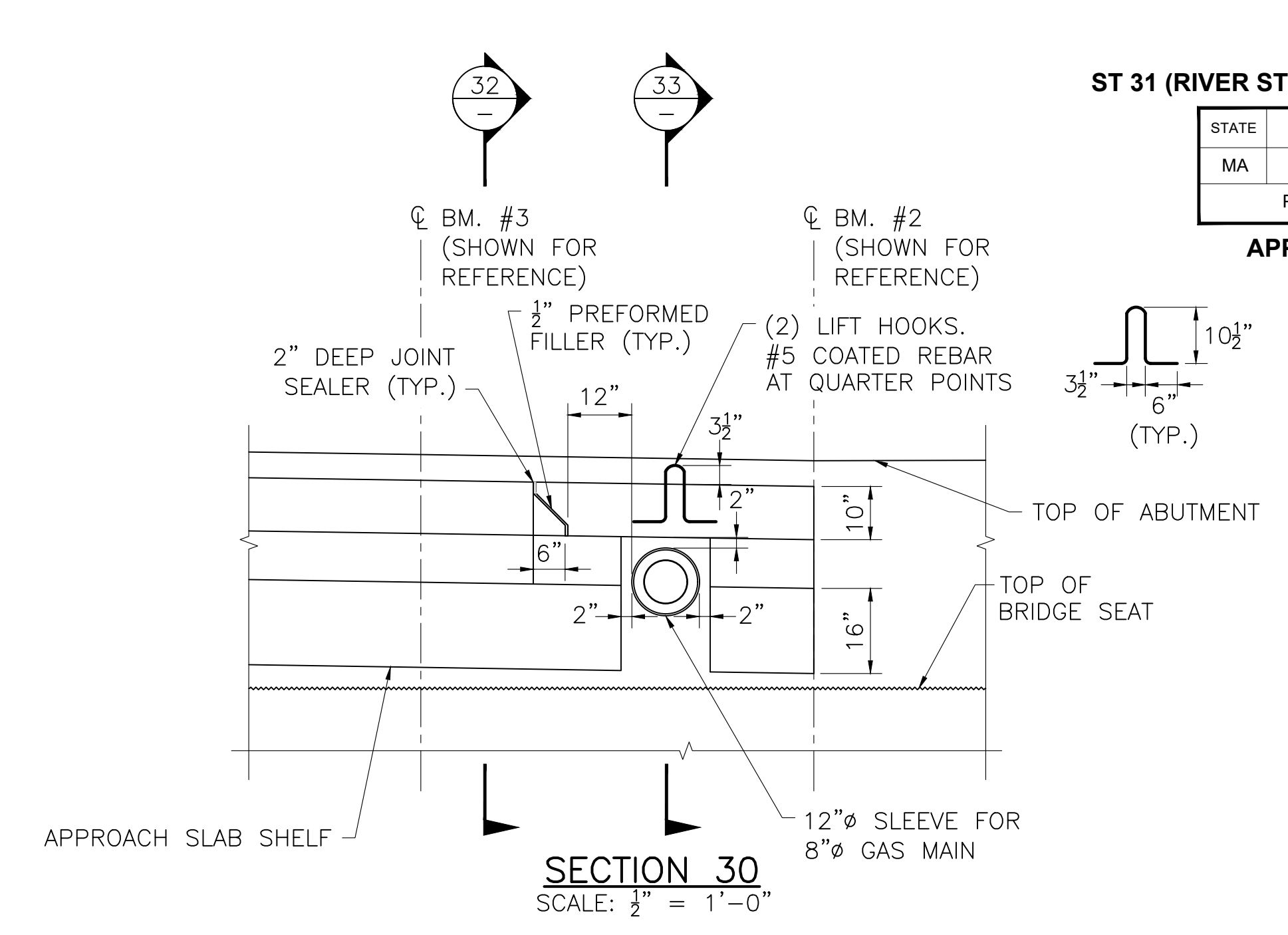
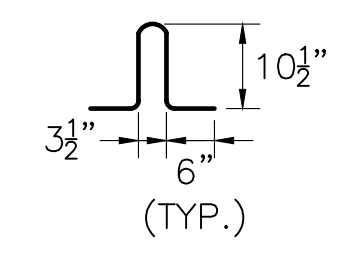
DATE	DESCRIPTION
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

SHEET 32 OF 38 SHEETS BRIDGE NO. F-04-010 (1KR)

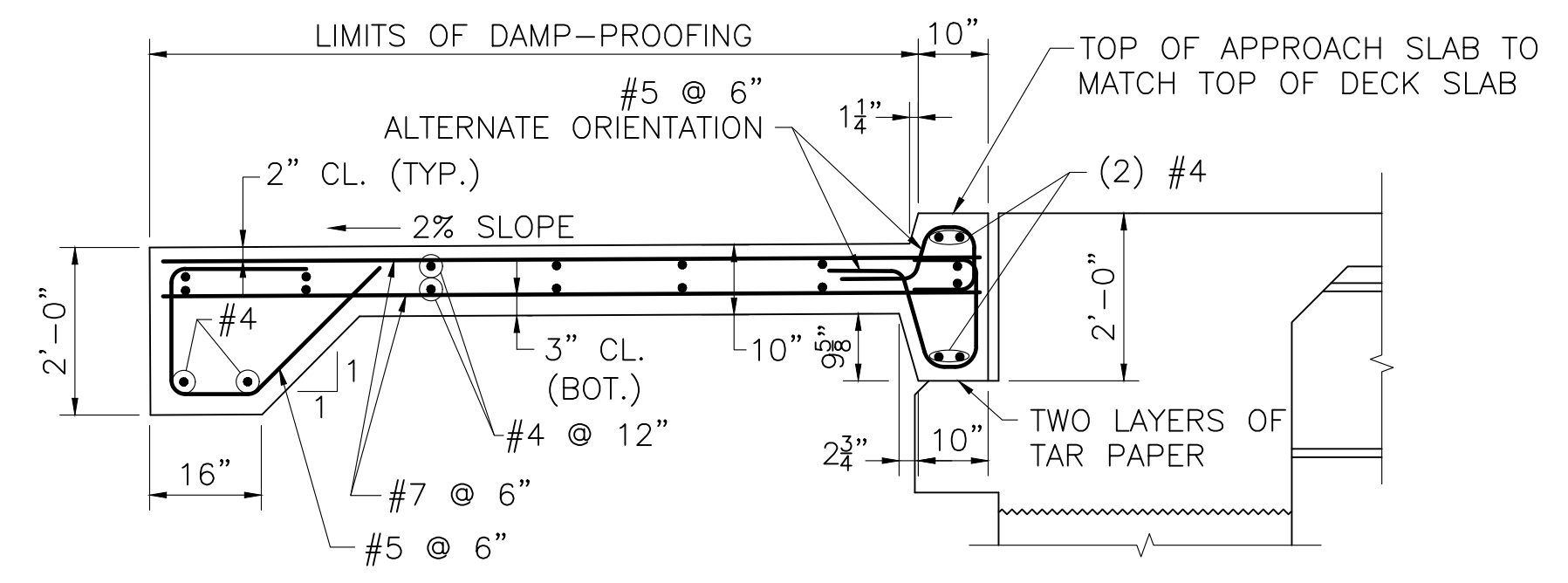


STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	57	67
PROJECT FILE NO.		607680	

APPROACH SLAB DETAILS

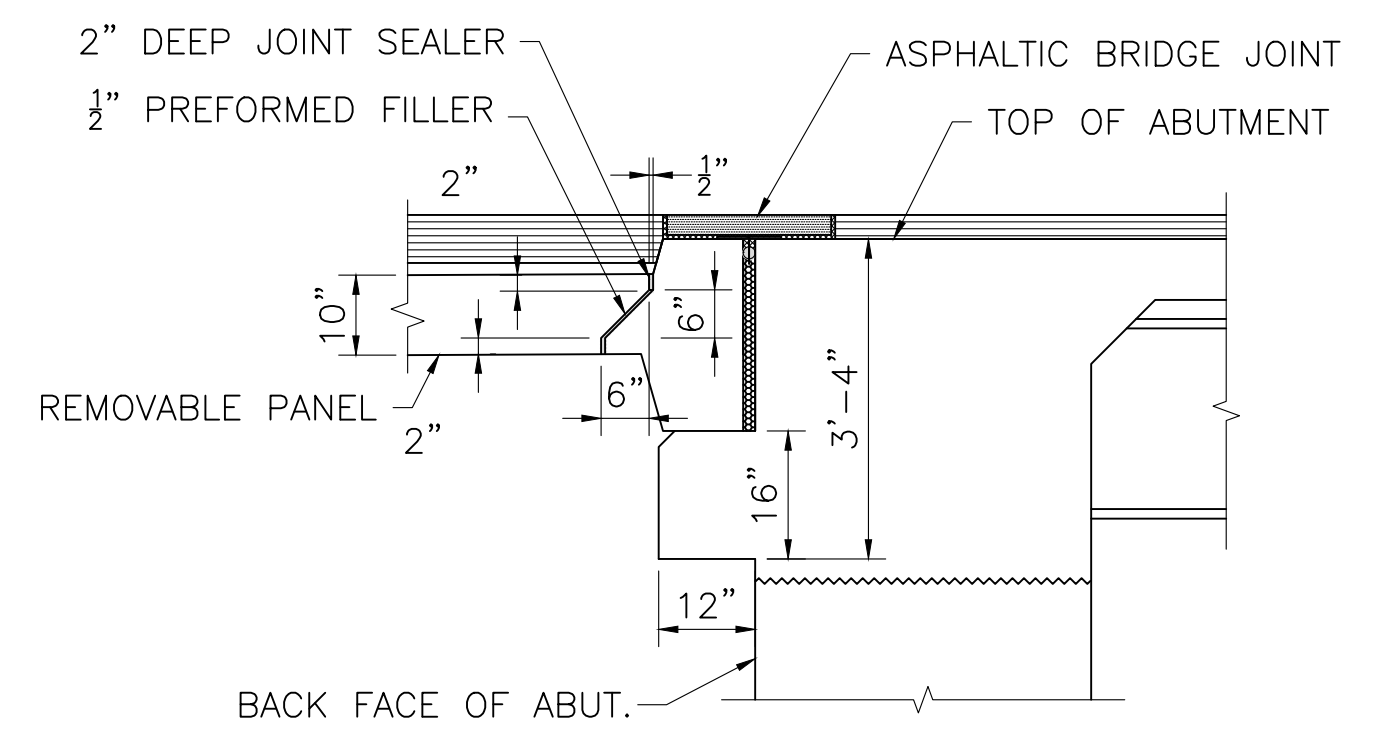


NOTE:  
ROTARY FEATURES NOT SHOWN AT APPROACH SLAB AT NORTH ABUTMENT. SEE CIVIL DRAWINGS FOR DETAILS.

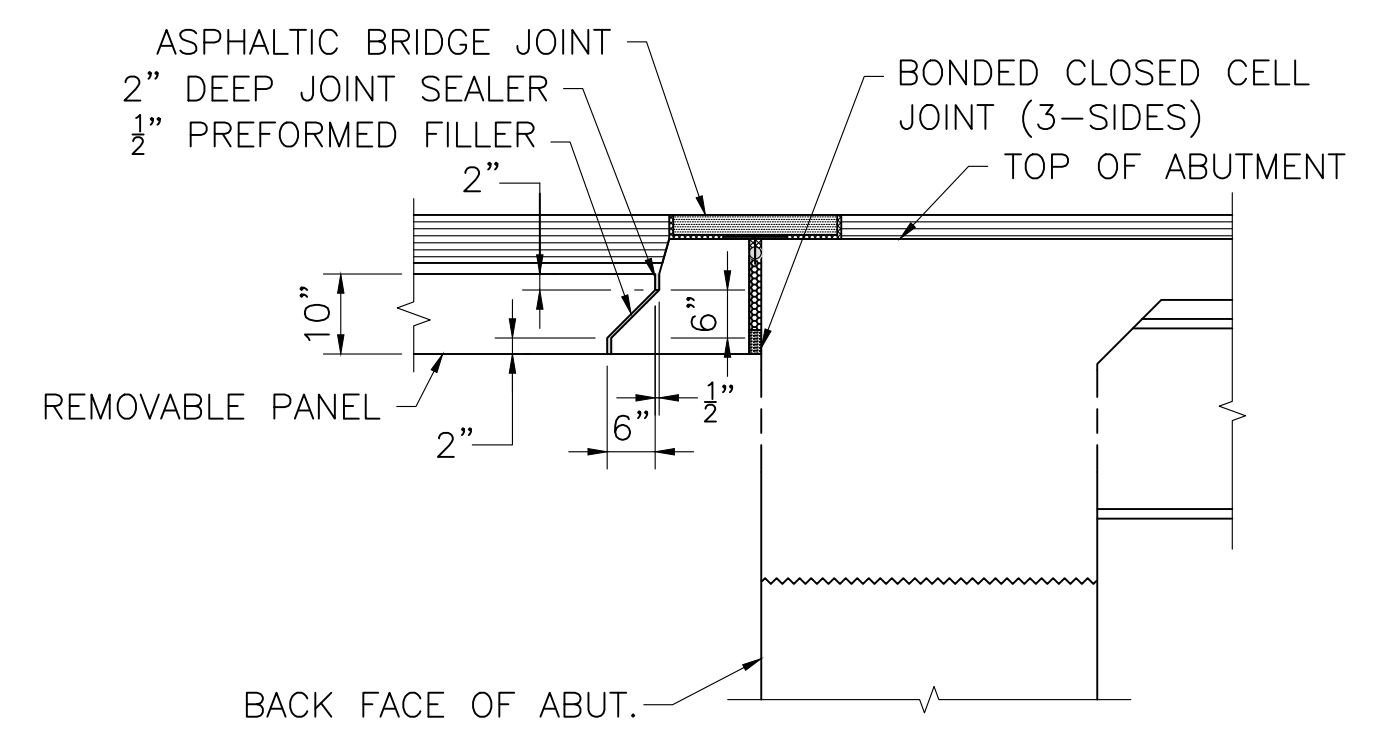


- NOTES:
- APPROACH SLAB TO BE 4000 PSI, 1 1/2 INCH, 565 CEMENT CONCRETE.
  - PLACE LONGITUDINAL REINFORCEMENT PARALLEL TO BEAMS.  
PLACE TRANSVERSE REINFORCEMENT PARALLEL TO ABUTMENT.

APPROACH SLAB DETAILS  
SCALE: 1/2" = 1'-0"



SECTION 32  
SCALE: 1/2" = 1'-0"



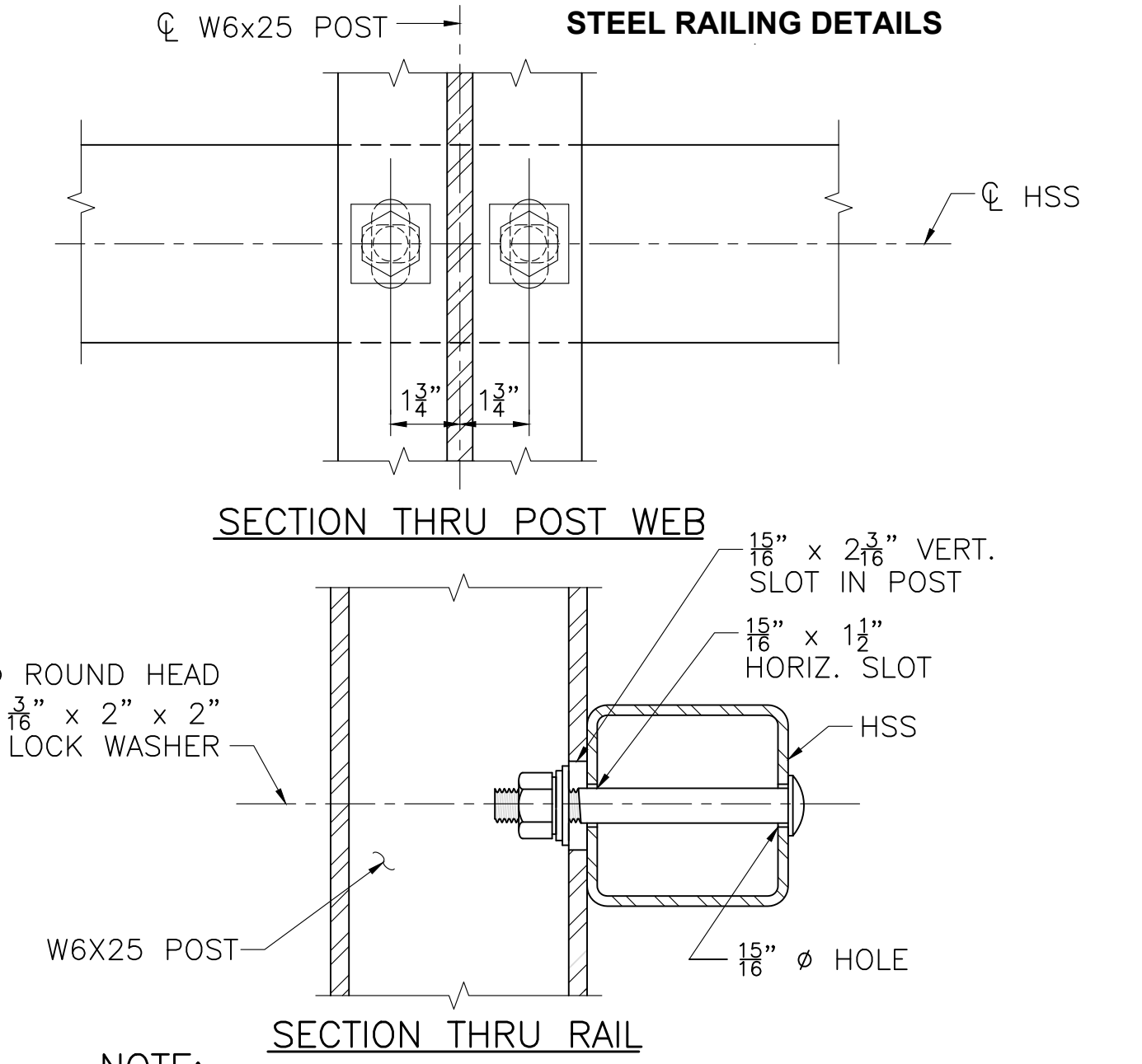
SECTION 33  
SCALE: 1/2" = 1'-0"

SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

607680\_BR 33 (APPROACH SLAB DETAILS).DWG Plotted on 14-Sep-2023 10:49 AM 11-AUG-2023 Final Structural Submittal (SF)

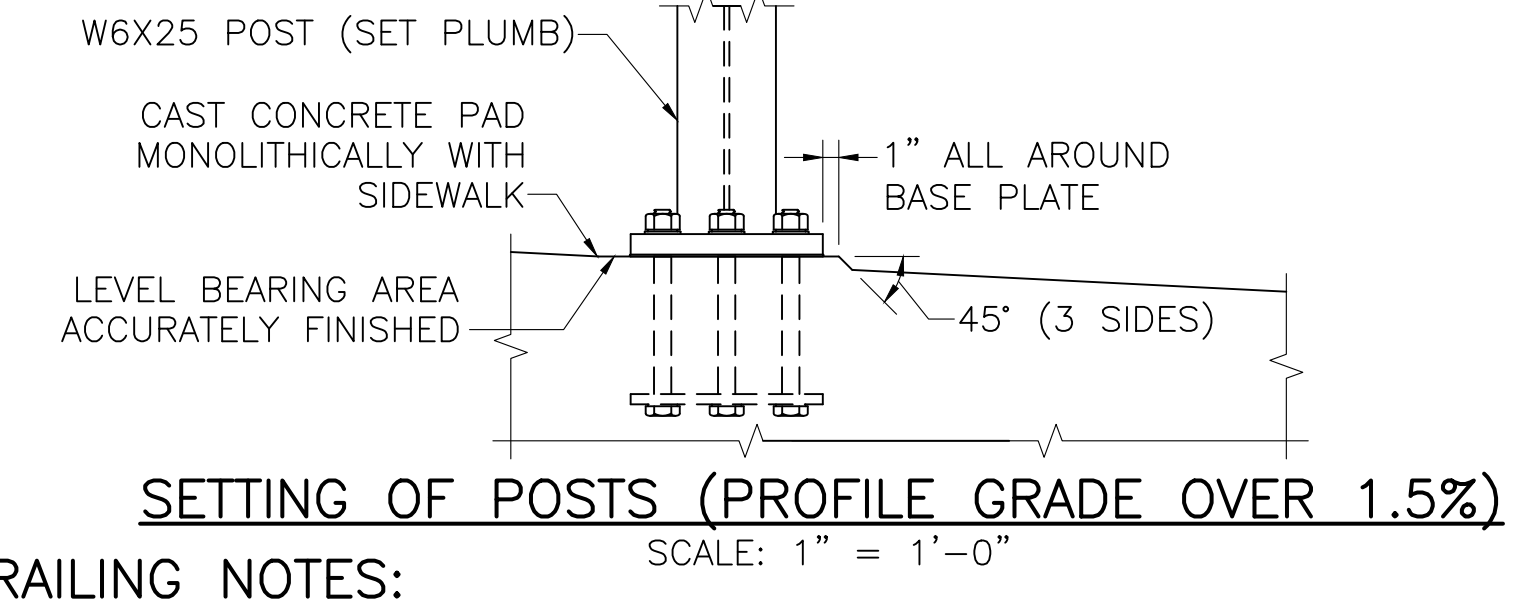
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	58	67
PROJECT FILE NO.		607680	

**STEEL RAILING DETAILS**



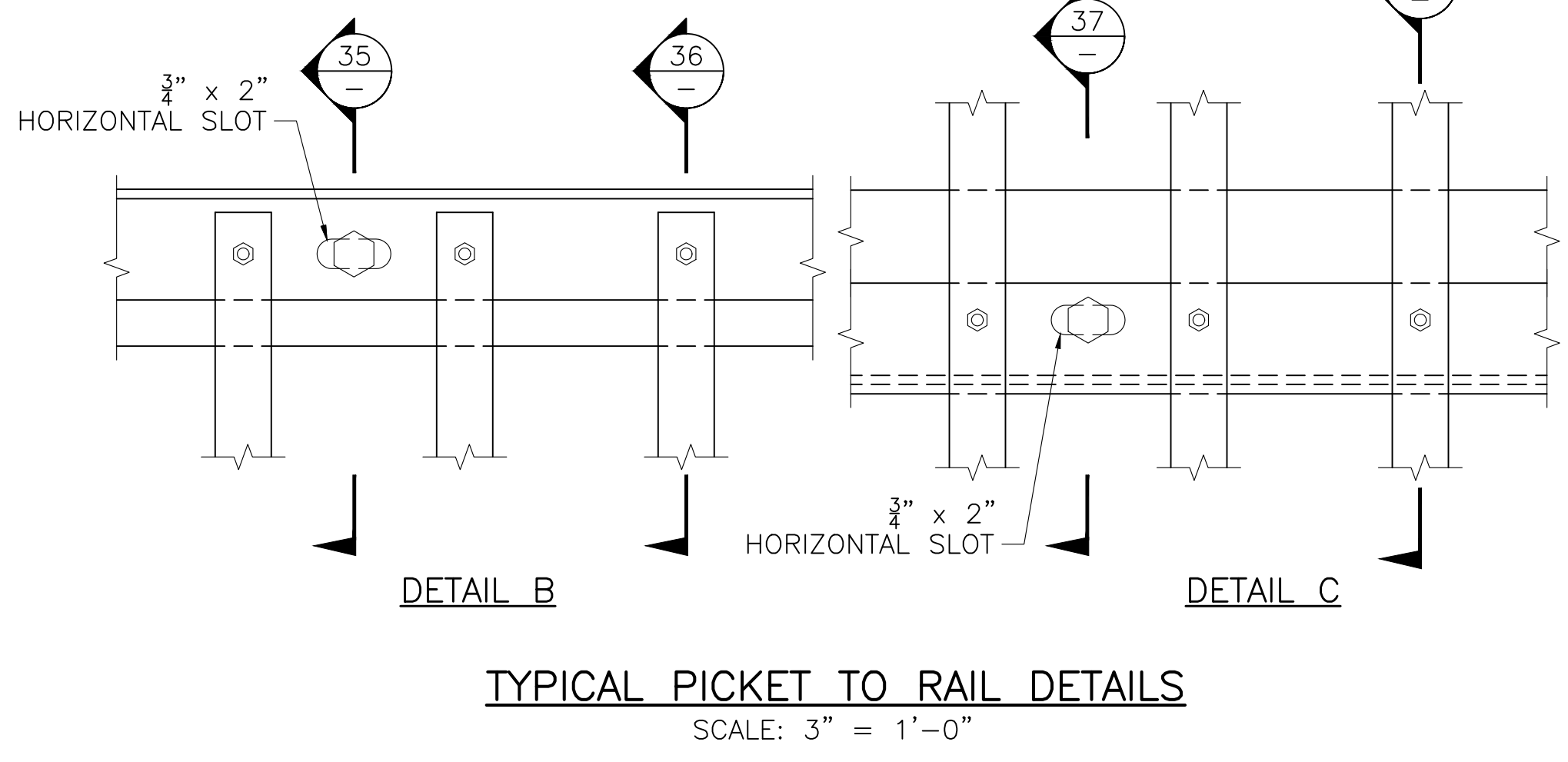
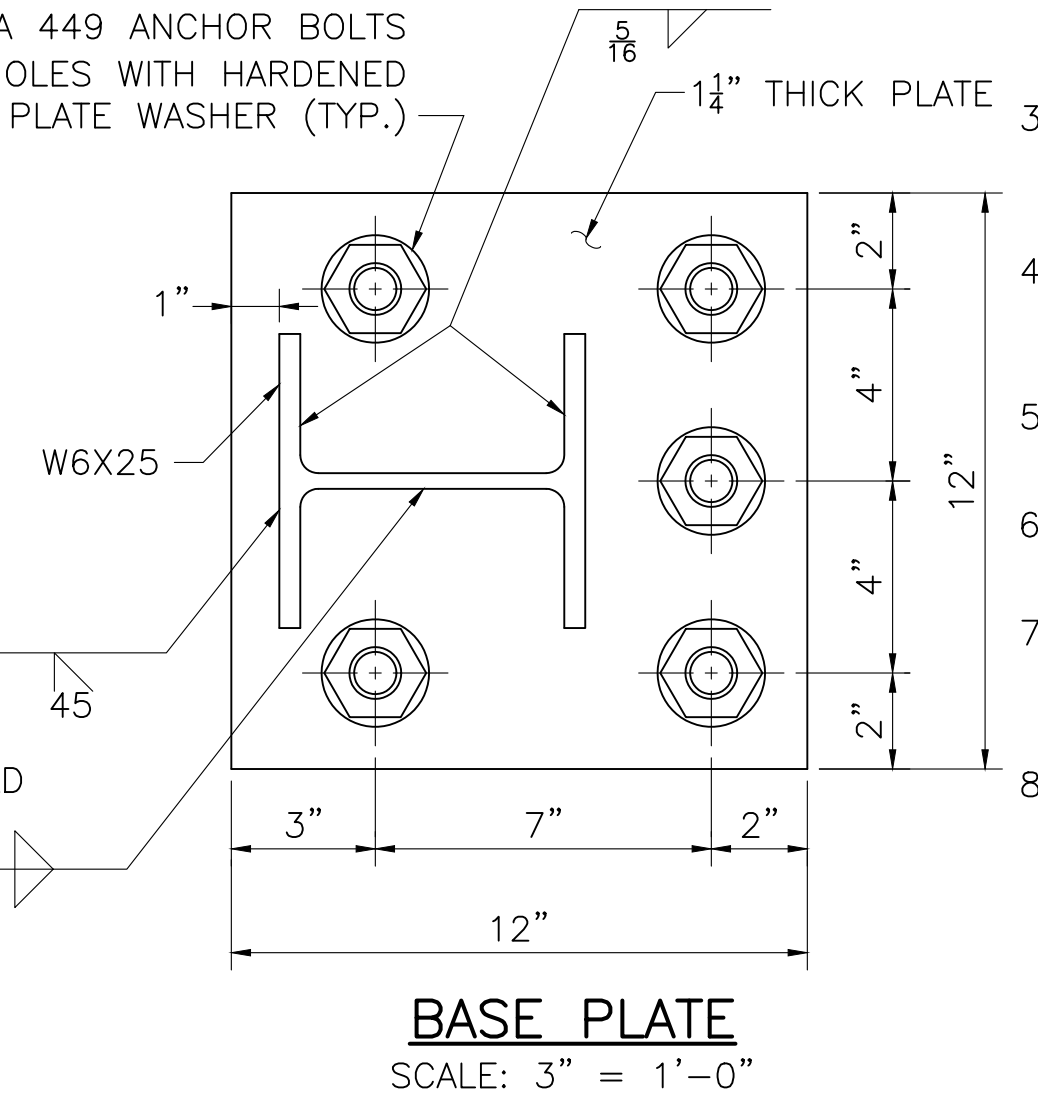
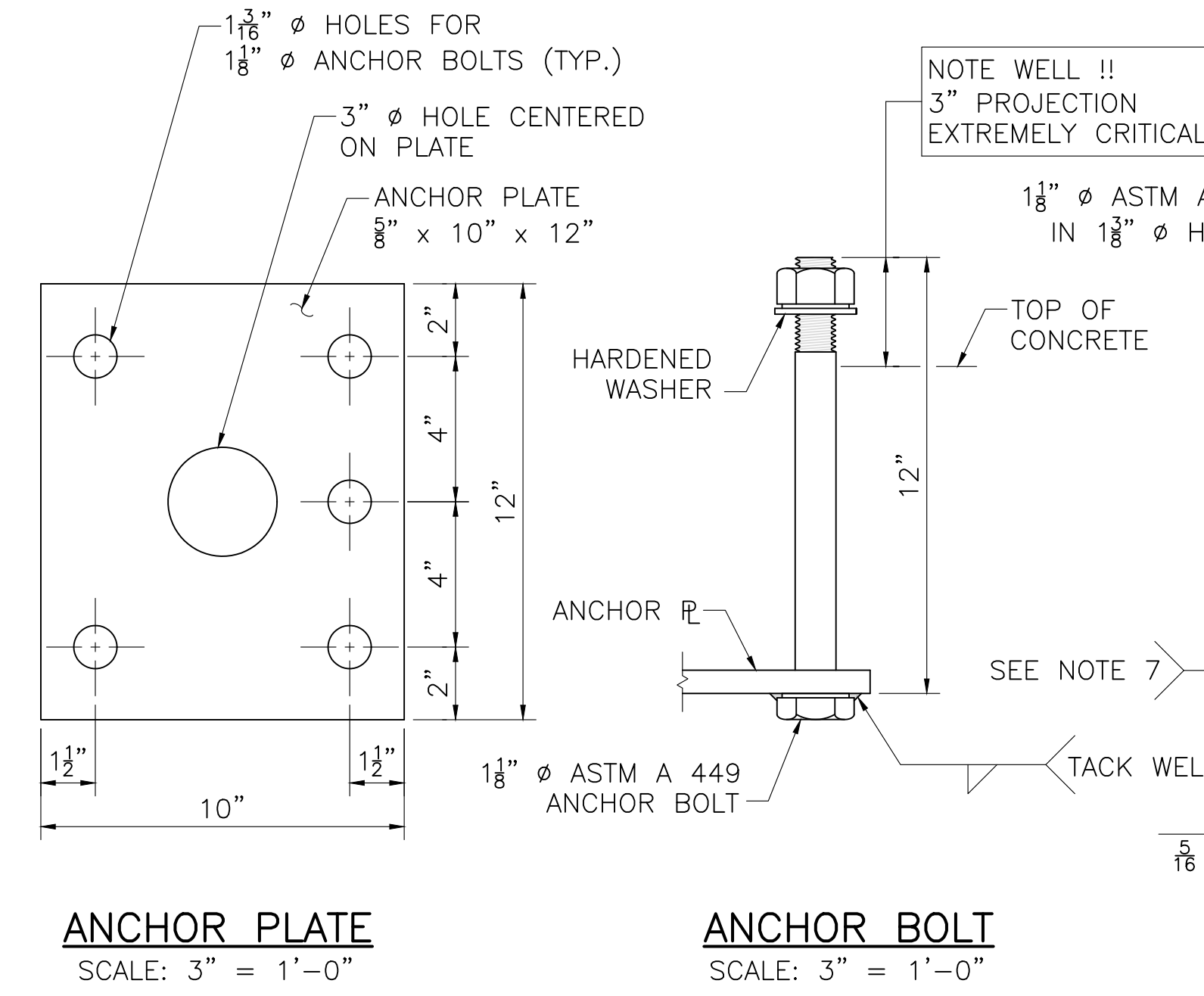
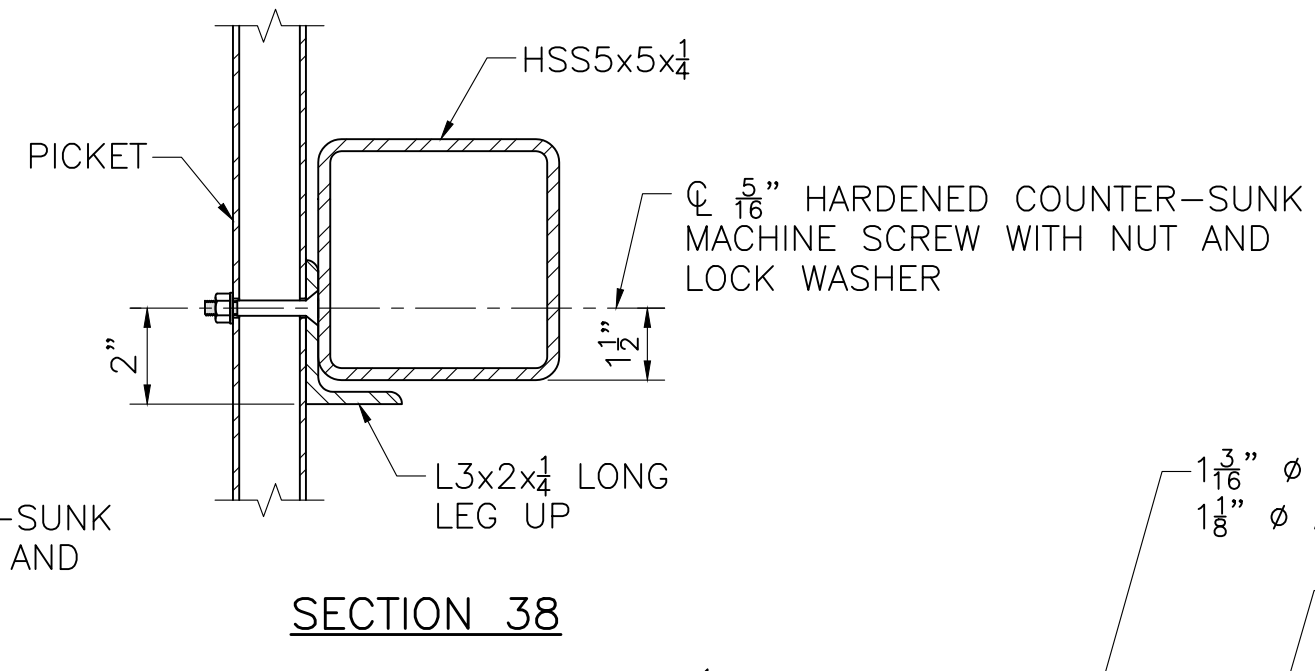
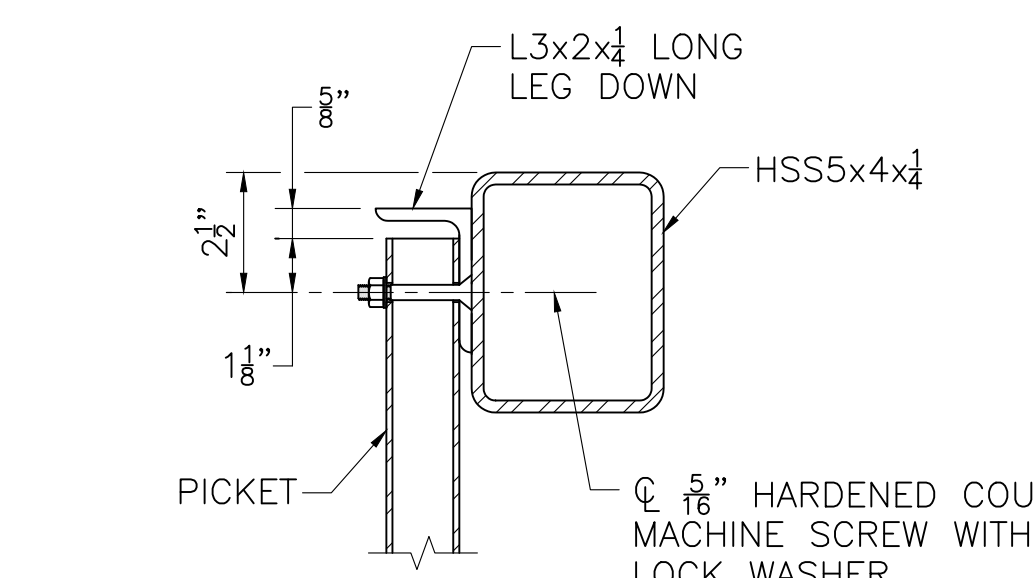
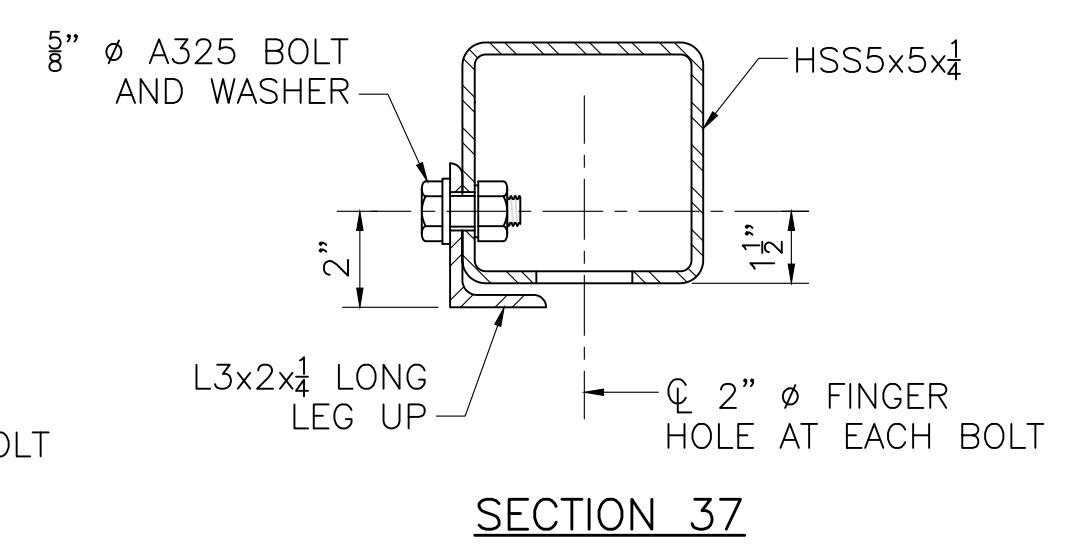
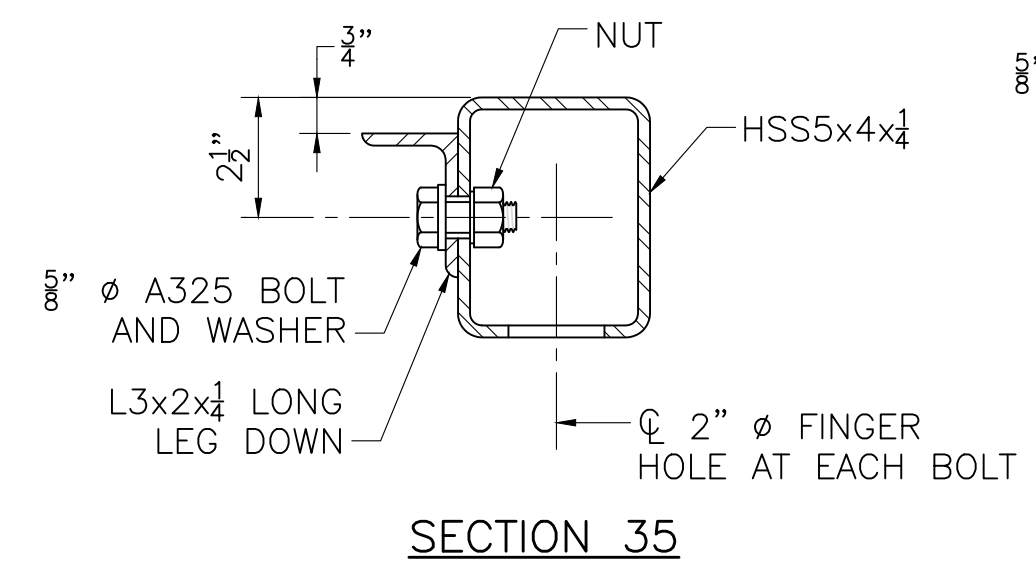
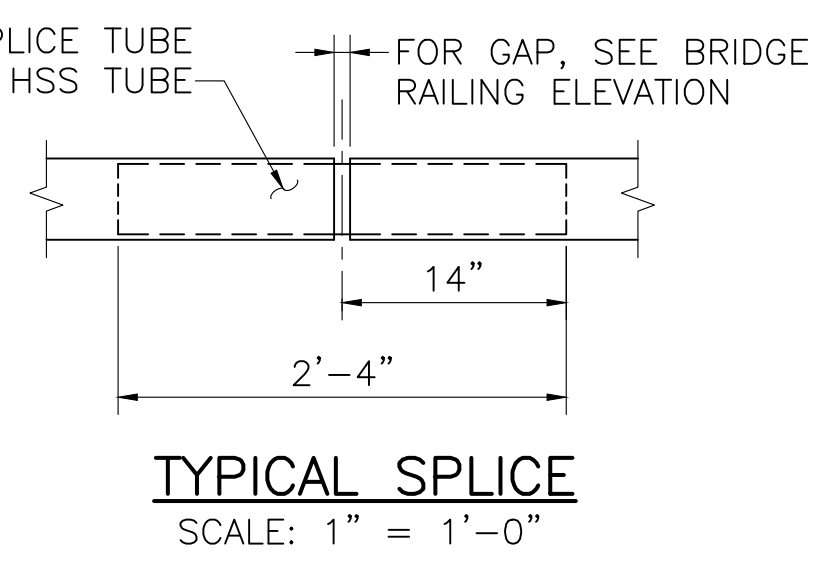
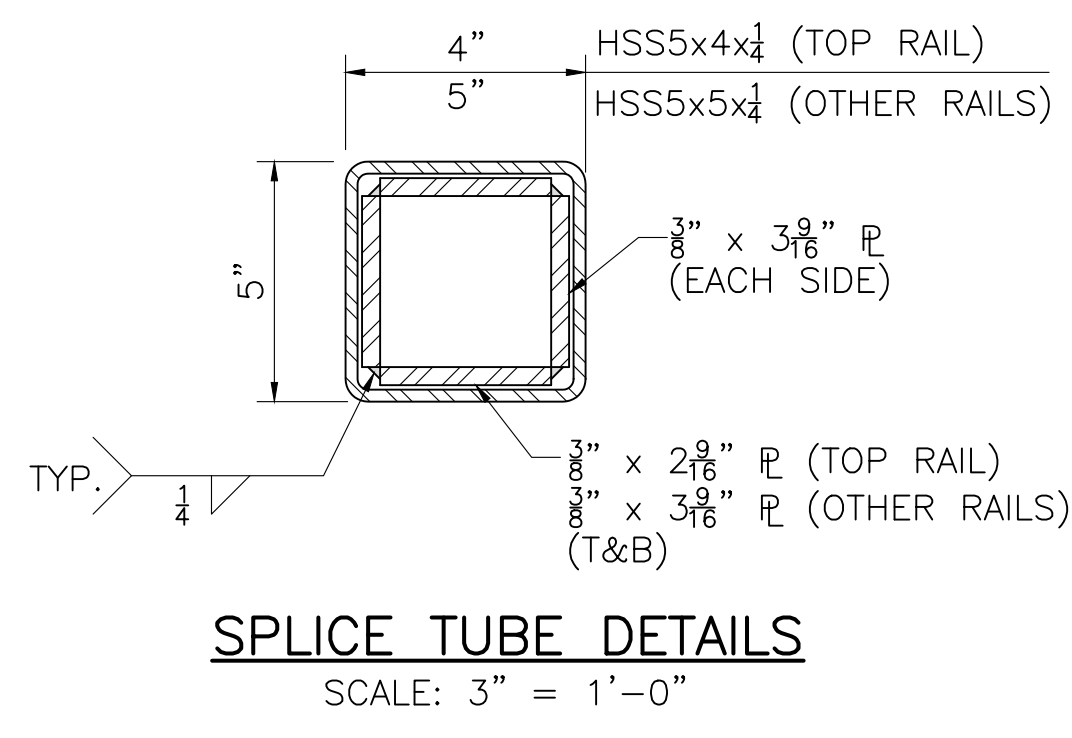
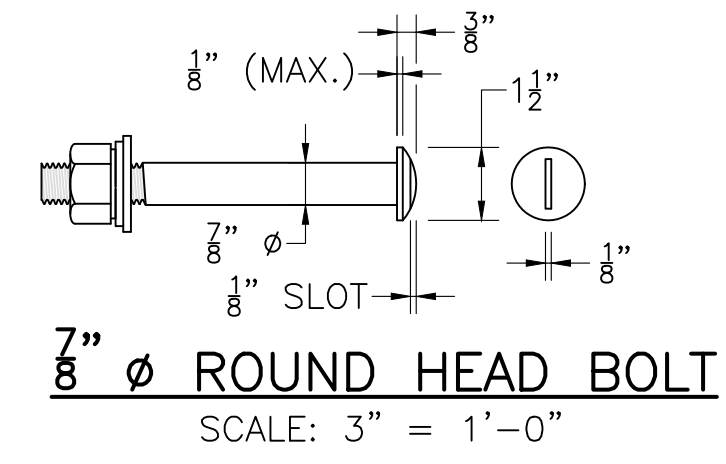
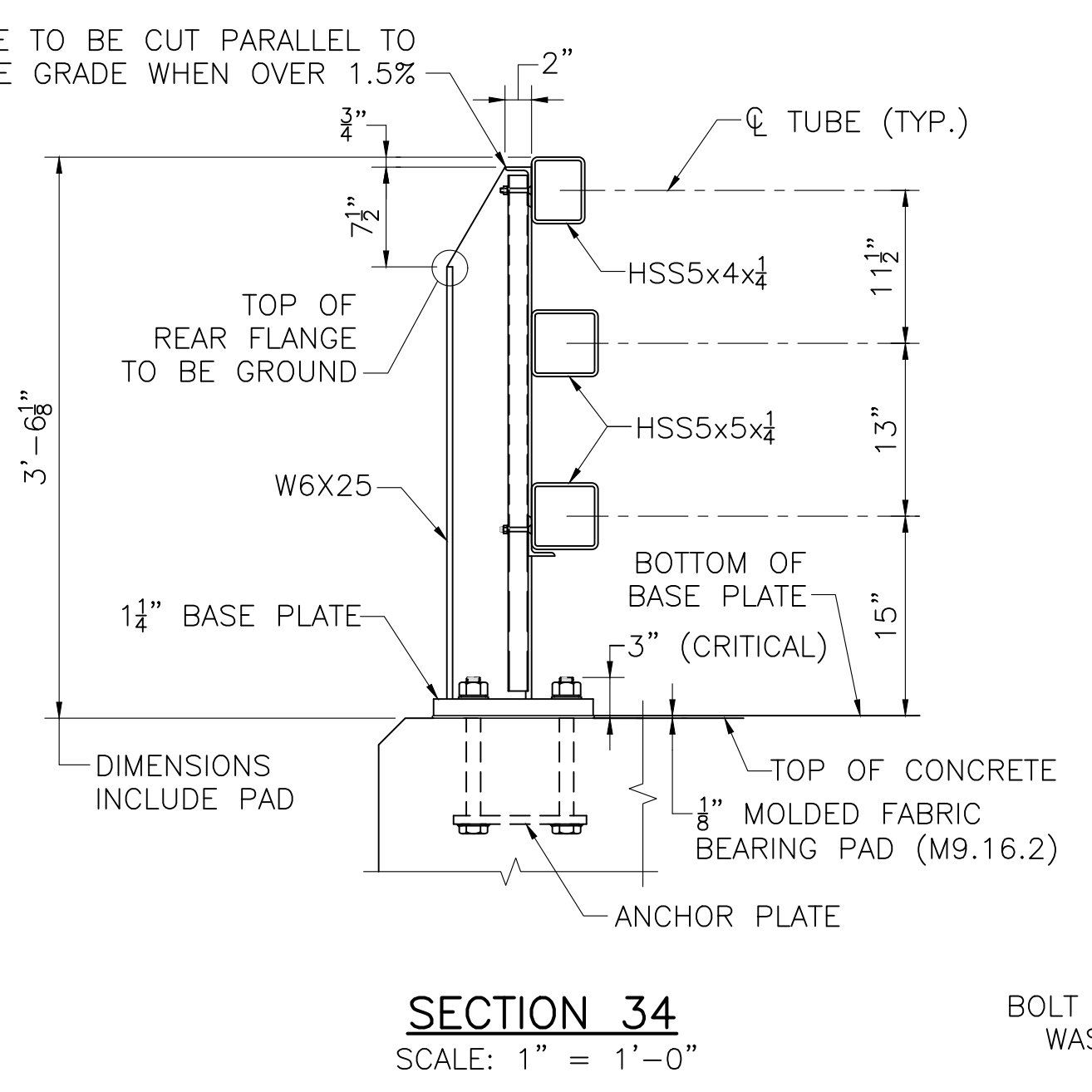
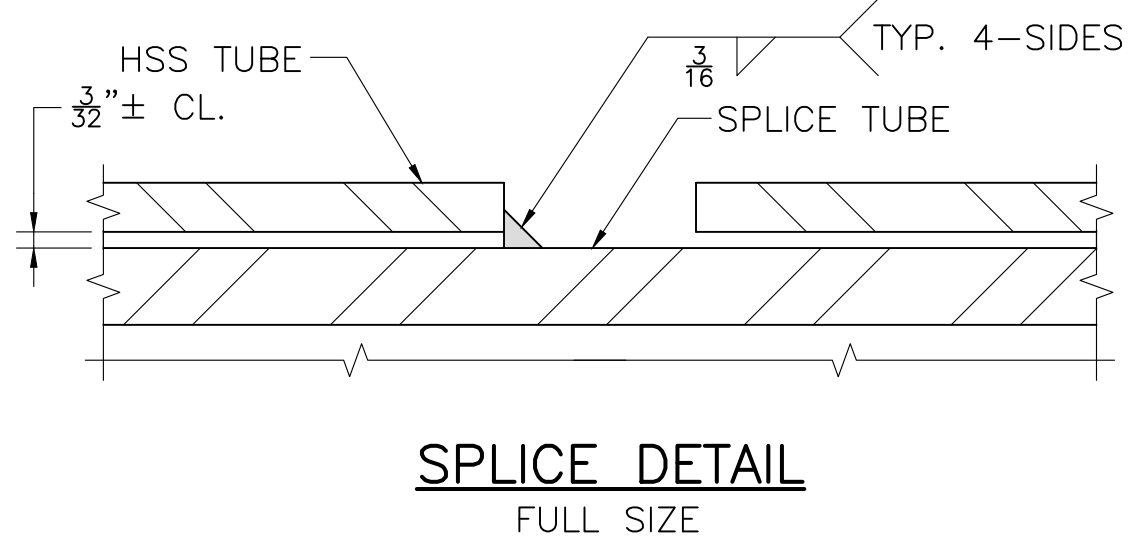
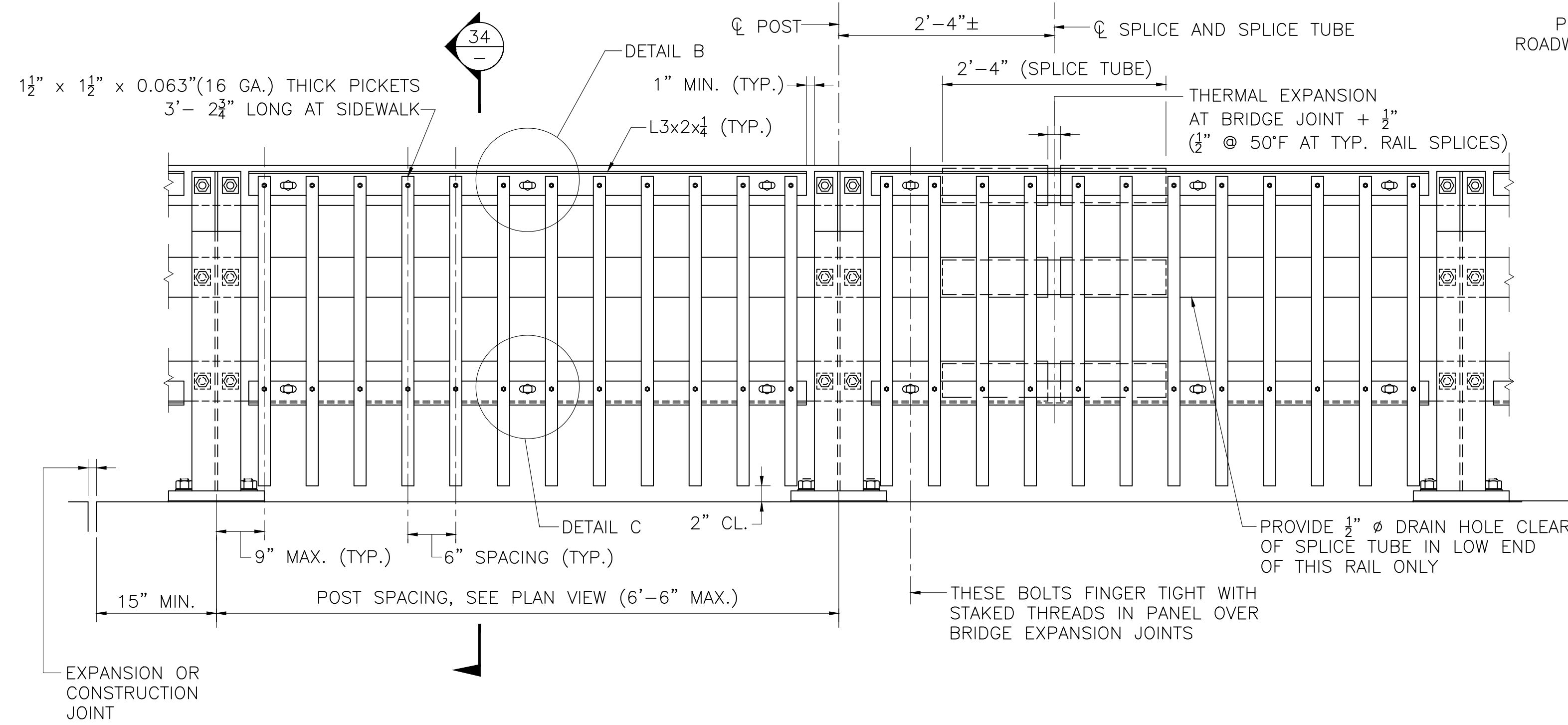
**NOTE:**  
 CONNECTIONS AT LOWER RAILS SHOWN.  
 CONNECTIONS AT TOP RAIL SIMILAR.

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



- 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" Ø 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 1/2 TURN AFTER STEEL IS IN PLACE.
  - RAILS SHALL BE CONTINUOUS OVER A MINIMUM OF FOUR (4) POSTS WITHOUT SPLICES WHERE POSSIBLE. RAILS SHALL BE SPLICED IN THE PANELS OVER EXPANSION JOINT.
  - 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 FLANGE WELD DOES NOT REQUIRE MAGNETIC PARTICLE TESTING. WELD SHALL BE BACK-GOUGED ON BACK SIDE EXCEPT AT WEB. WELD IS THE SAME ON BOTH FLANGES.
  - 7/8" Ø ROUND HEAD BOLTS SHALL CONFORM TO THE CHEMICAL AND PHYSICAL REQUIREMENTS OF AASHTO M 164.

DATE	DESCRIPTION
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

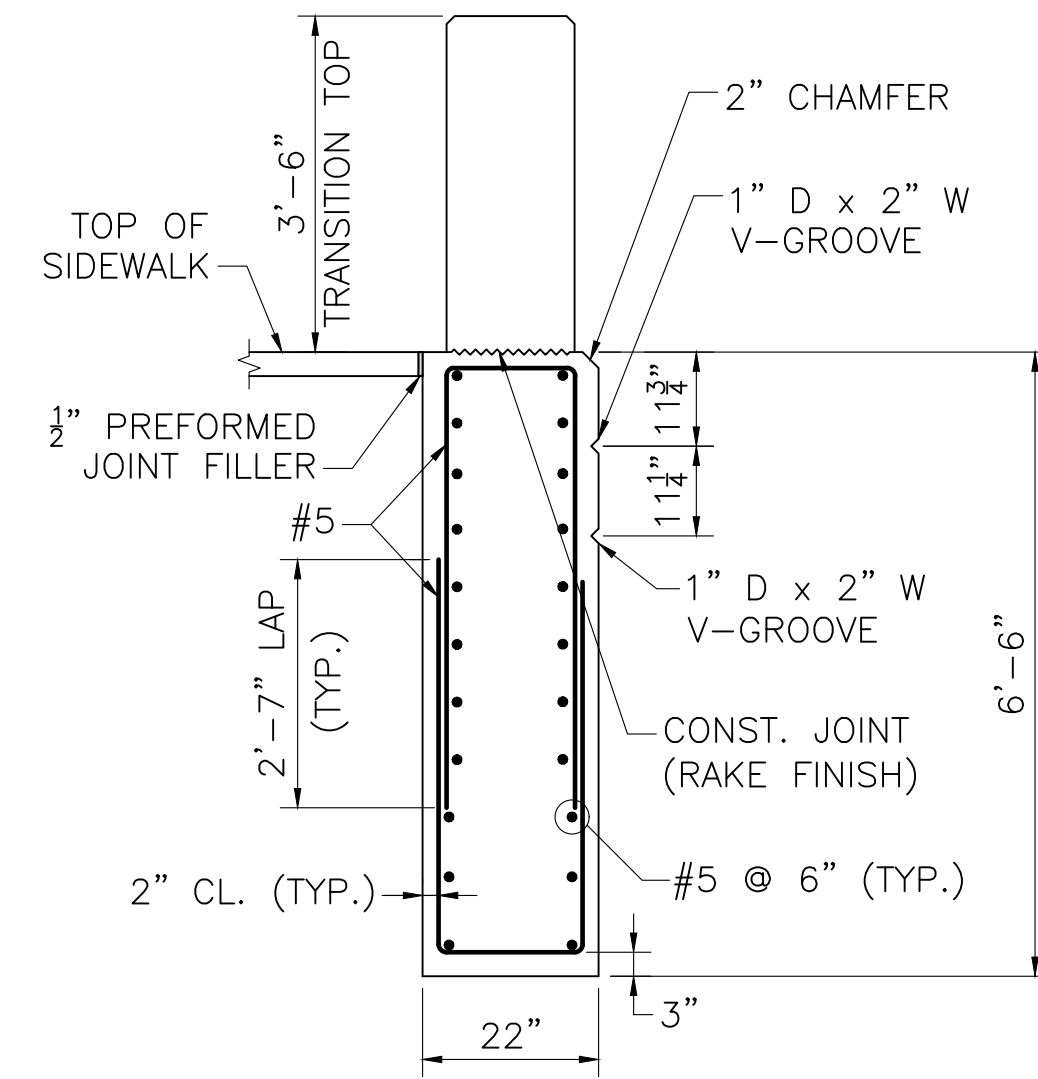
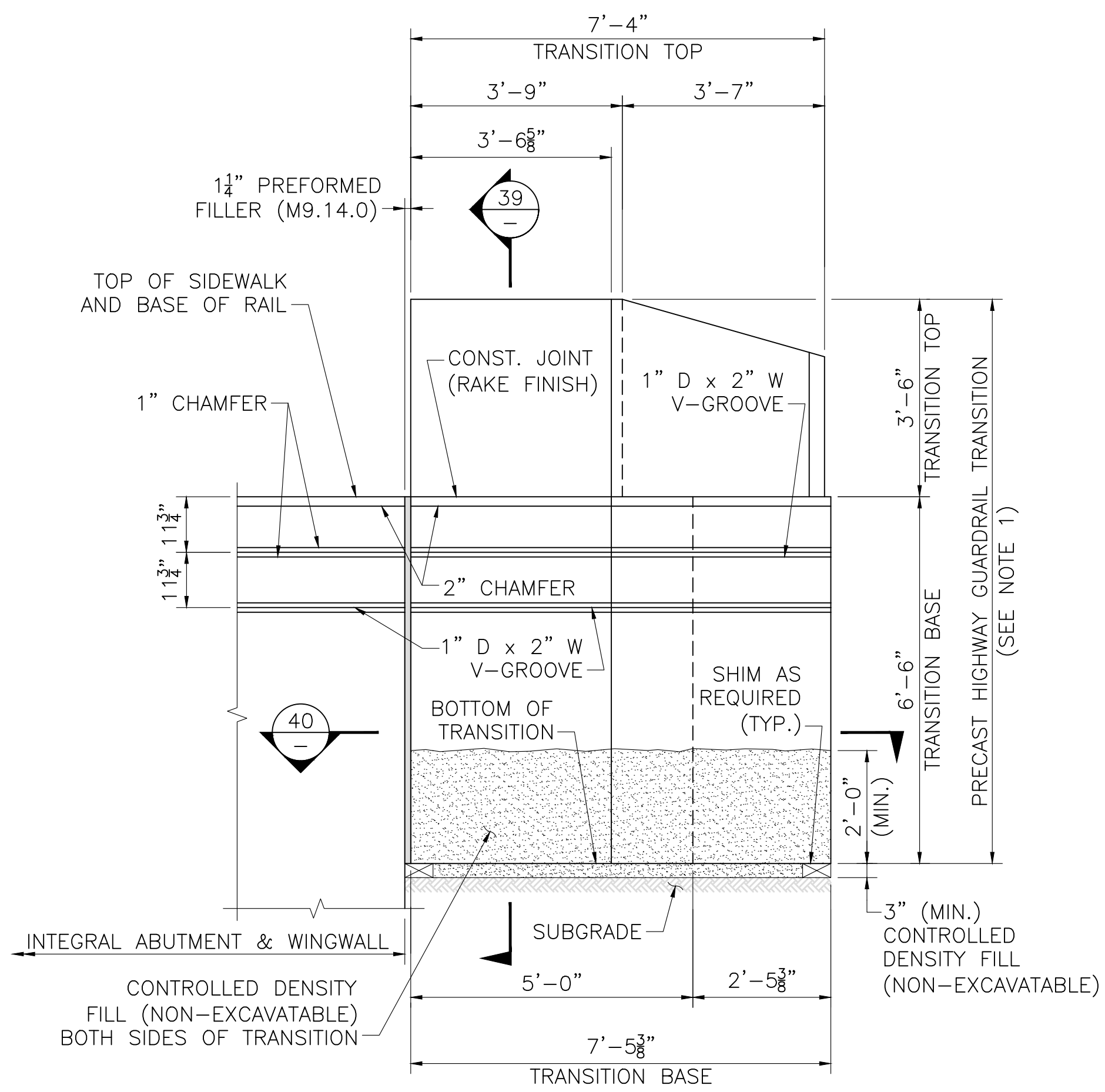


**S3-TL4 BRIDGE RAILING**

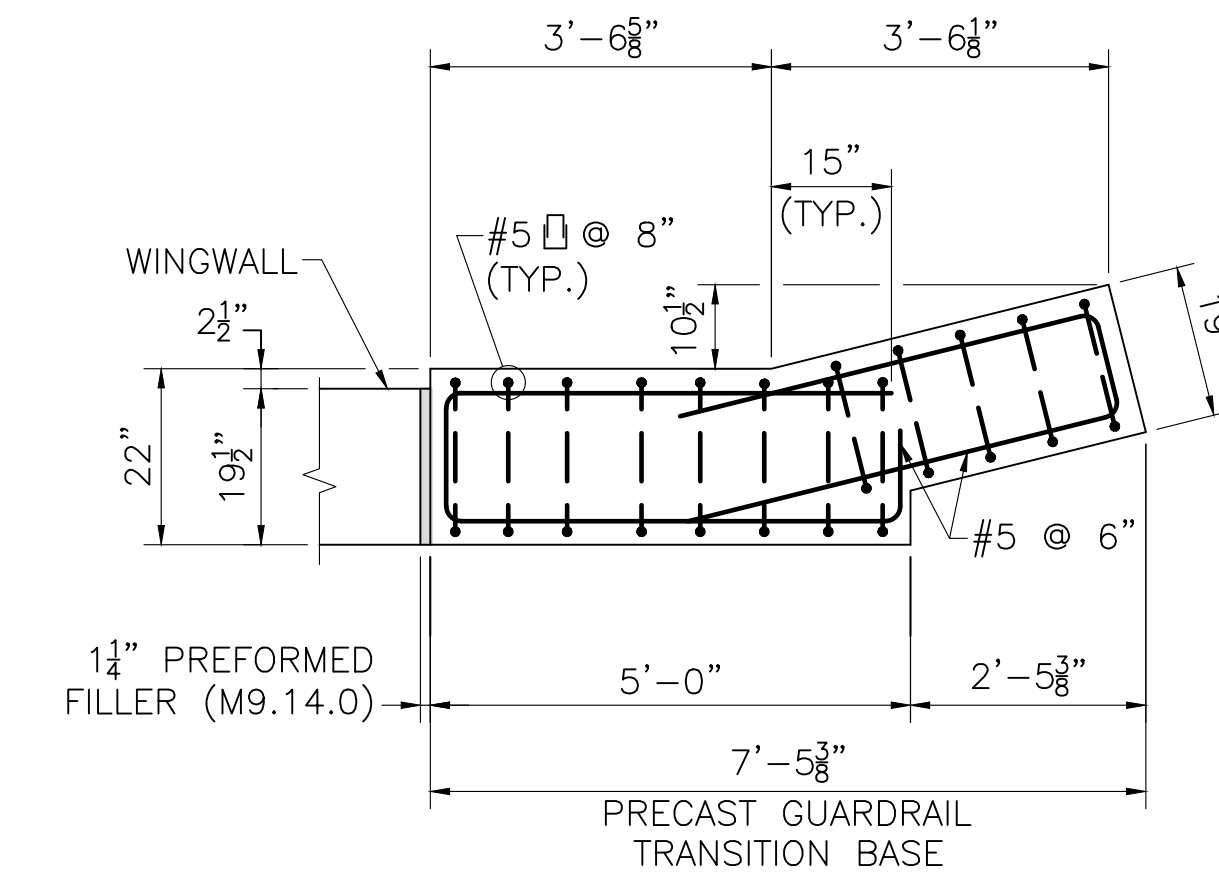
607680\_BR 34 (STEEL RAILING DETAILS).DWG Plotted on 14-Sep-2023 10:49 AM 11-AUG-2023 Final Structural Submittal (SF)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	59	67
PROJECT FILE NO.		607680	

GUARDRAIL TRANSITION BASE DETAILS



SECTION 39  
SCALE: 1/2" = 1'-0"



NOTE:  
WINGWALL REINFORCEMENT NOT SHOWN FOR CLARITY.

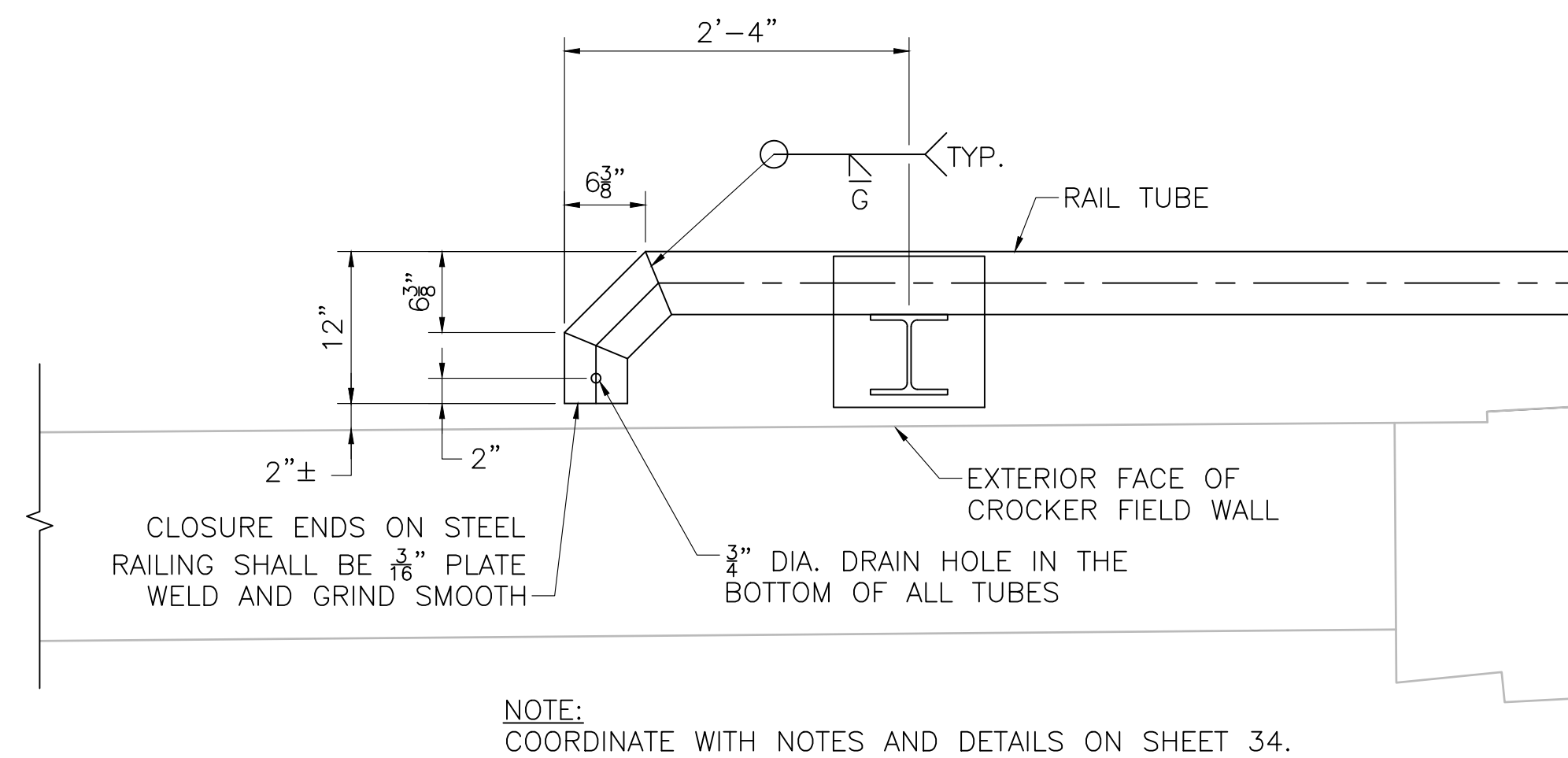
SECTION 40  
SCALE: 1/2" = 1'-0"

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 DENSITY FILL (NON-EXCAVATABLE) TO THE ELEVATION SHOWN.

PRECAST GUARDRAIL TRANSITION  
ELEVATION AT NE WINGWALL

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



NOTE:  
COORDINATE WITH NOTES AND DETAILS ON SHEET 34.

RAILING END DETAIL AT SOUTHEAST CORNER

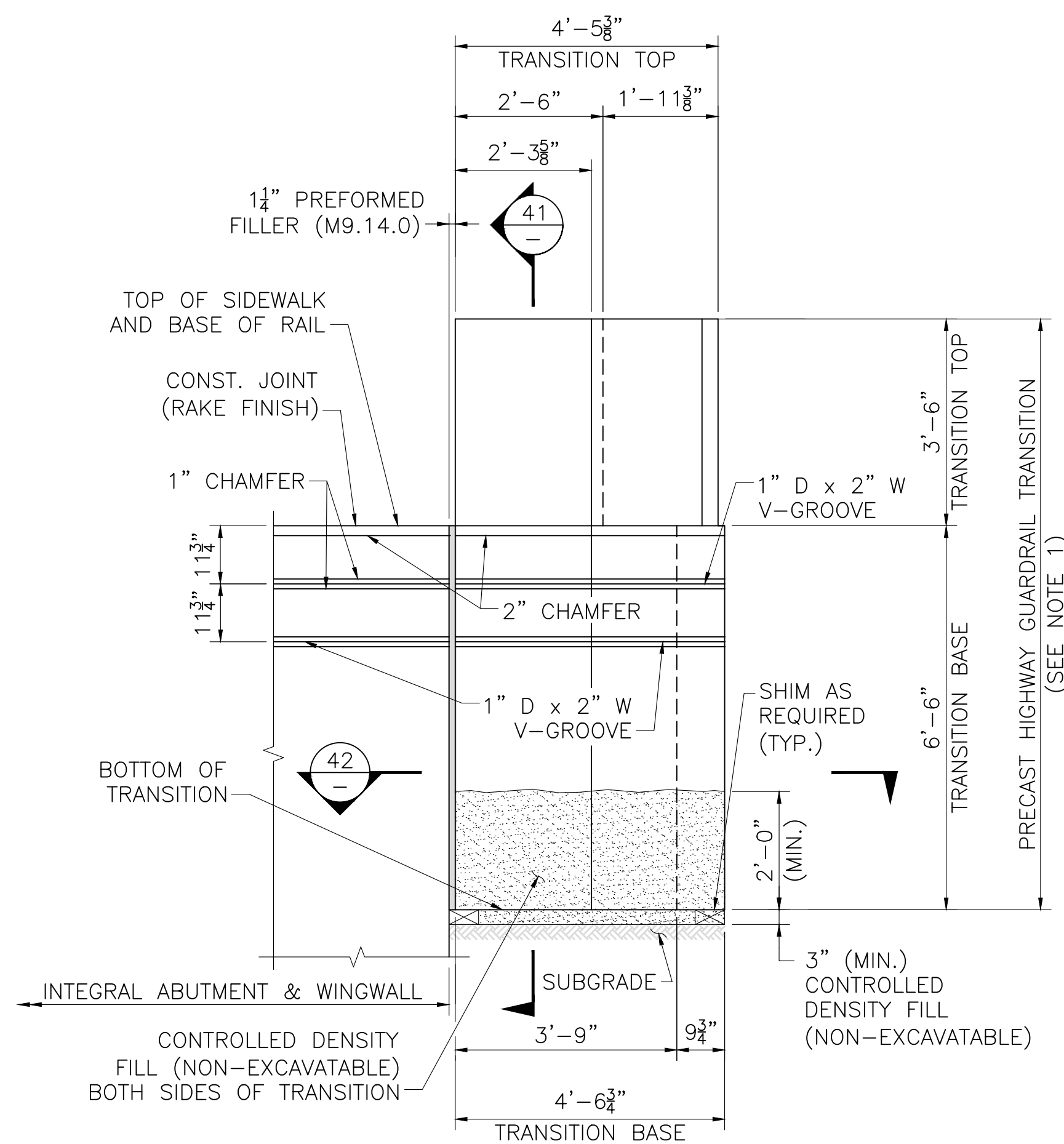
SCALE: 1" = 1'-0"

DATE	DESCRIPTION
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	60	67
PROJECT FILE NO.		607680	

CURVED GUARDRAIL TRANSITION BASE DETAILS

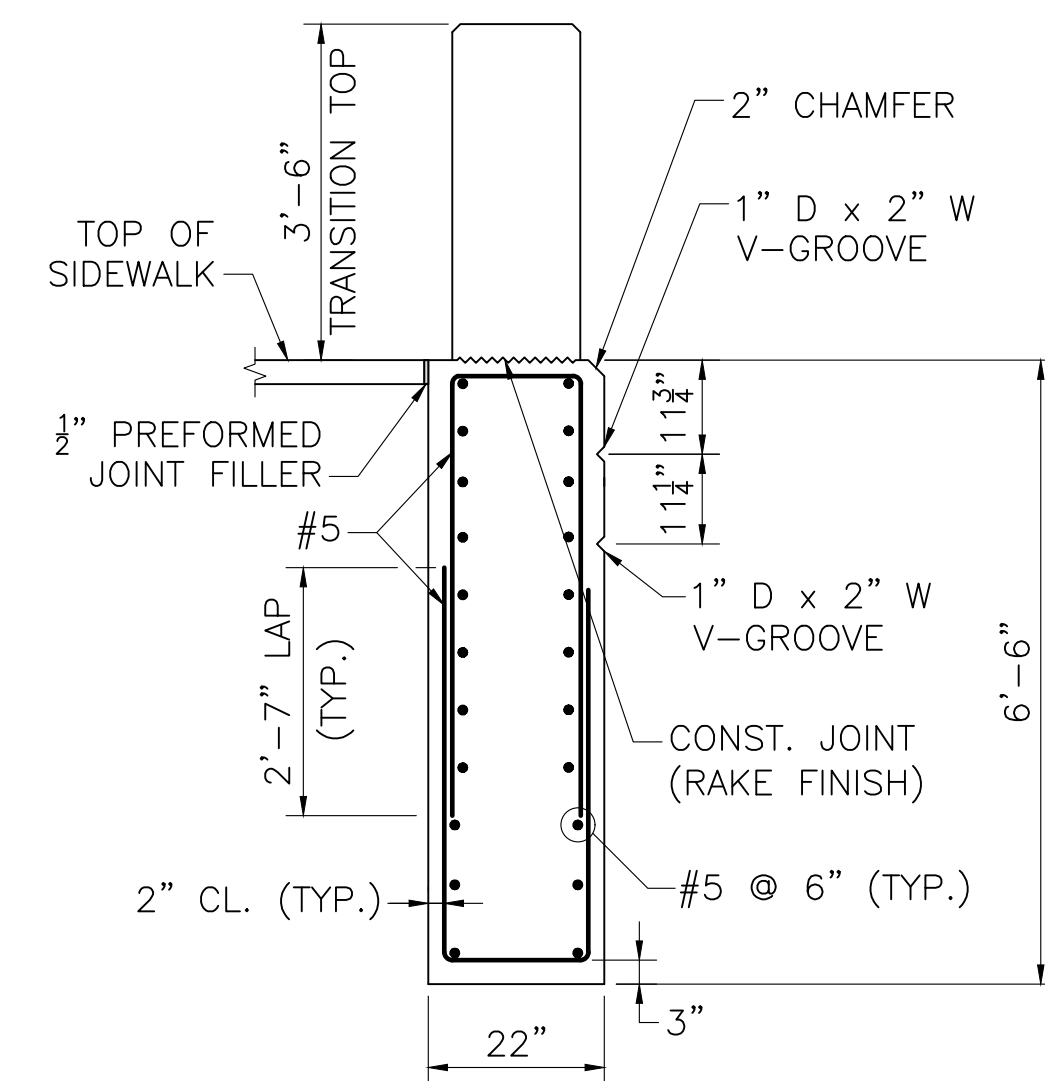


NOTES:

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 DENSITY FILL (NON-EXCAVATABLE) TO THE ELEVATION SHOWN.

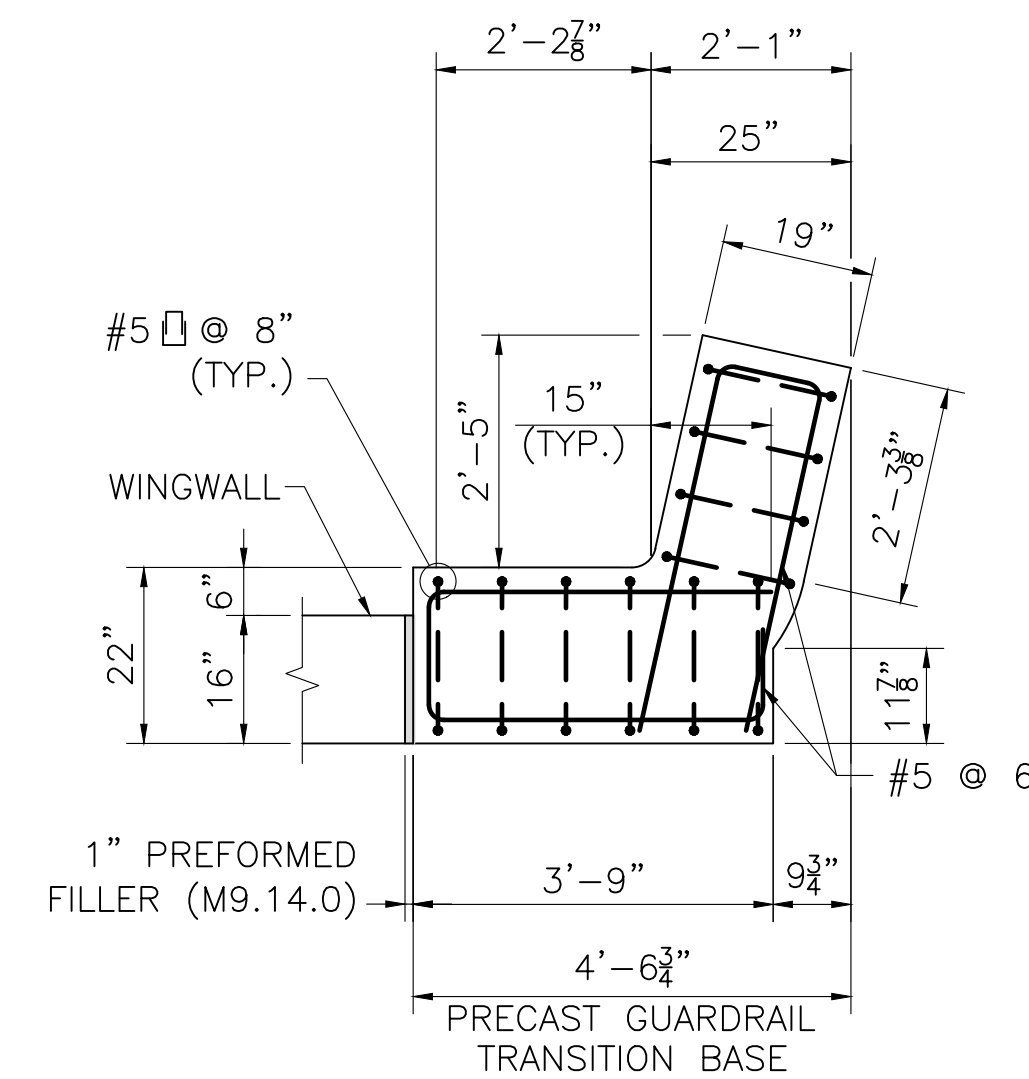
PRECAST GUARDRAIL TRANSITION  
ELEVATION AT NW & SW WINGWALL

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



SECTION 41

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



NOTE:

WINGWALL REINFORCEMENT NOT SHOWN FOR CLARITY.

SECTION 42

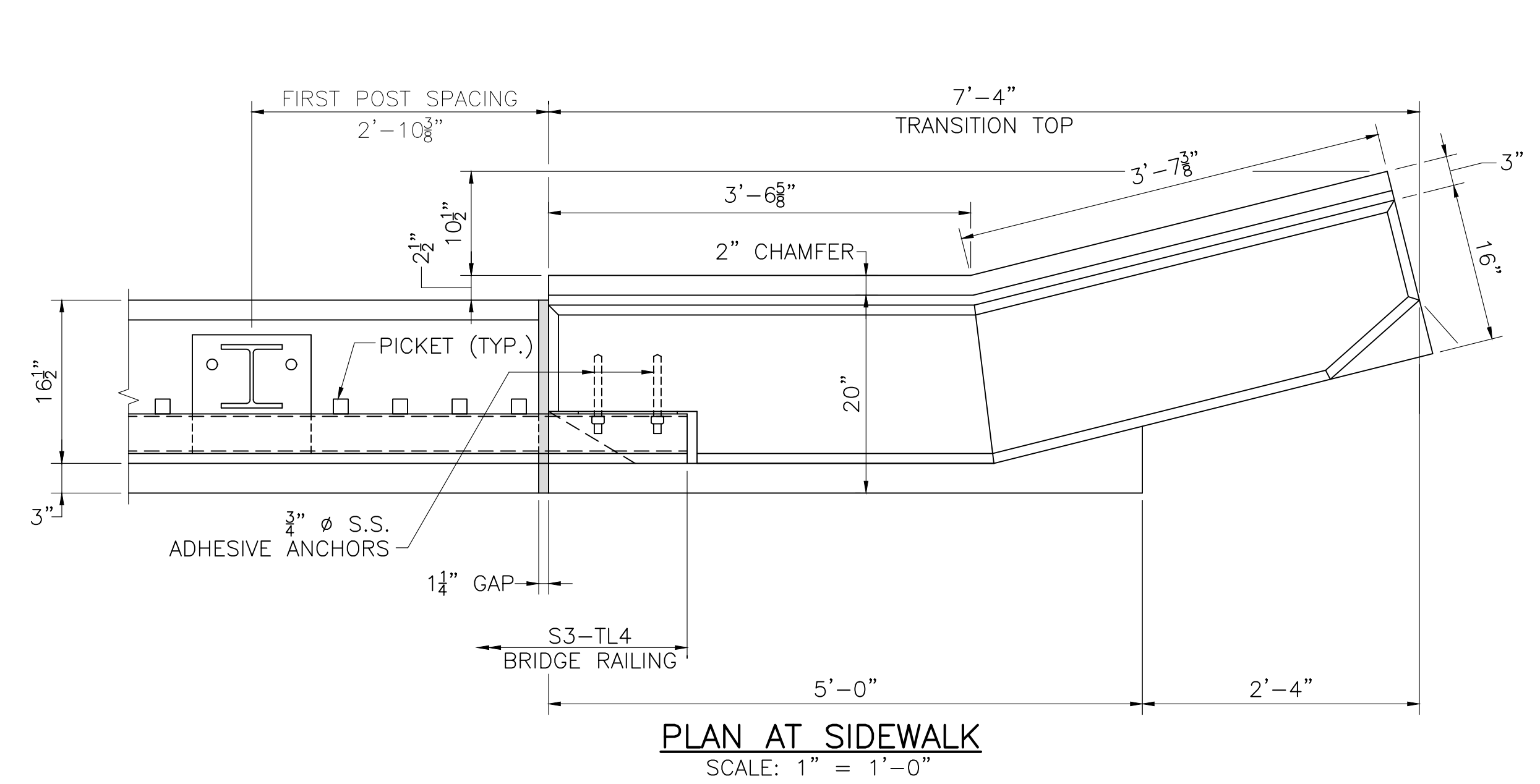
SCALE: 1/2" = 1'-0"

SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
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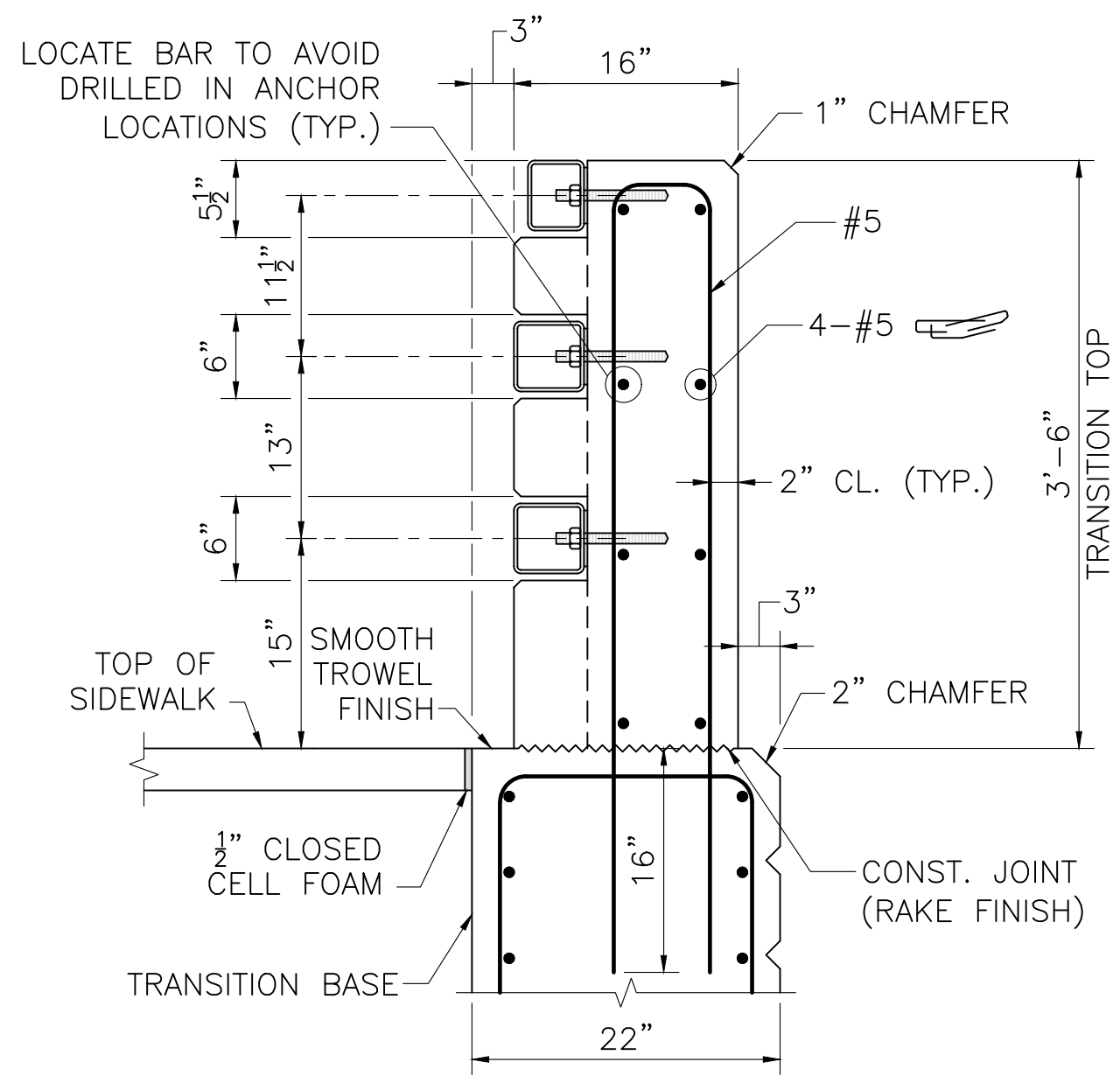
**FITCHBURG  
ST 31 (RIVER STREET) OVER NORTH NASHUA RIVER**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	61	67
PROJECT FILE NO.		607680	

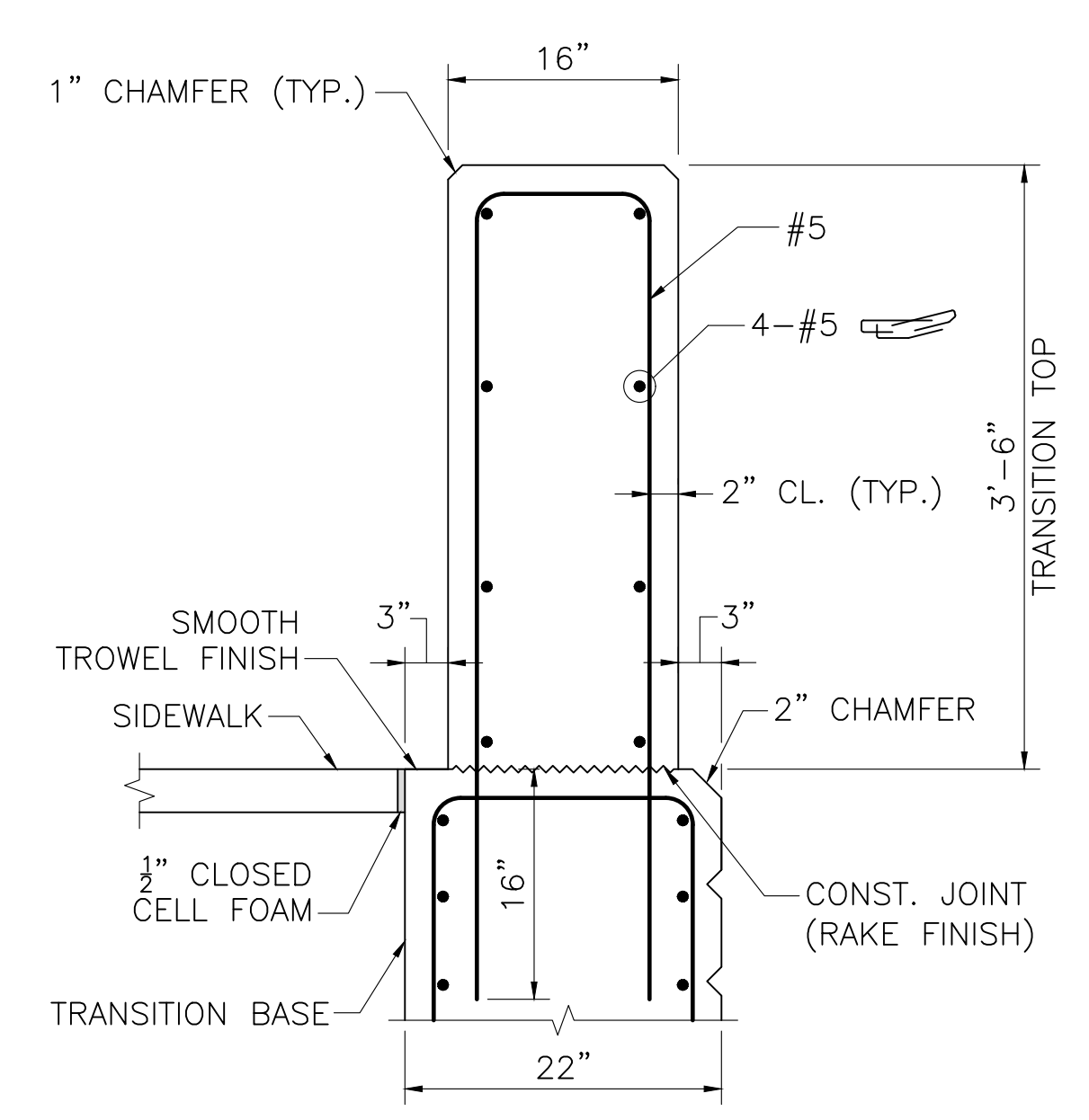
**GUARDRAIL TRANSITION TOP DETAILS**



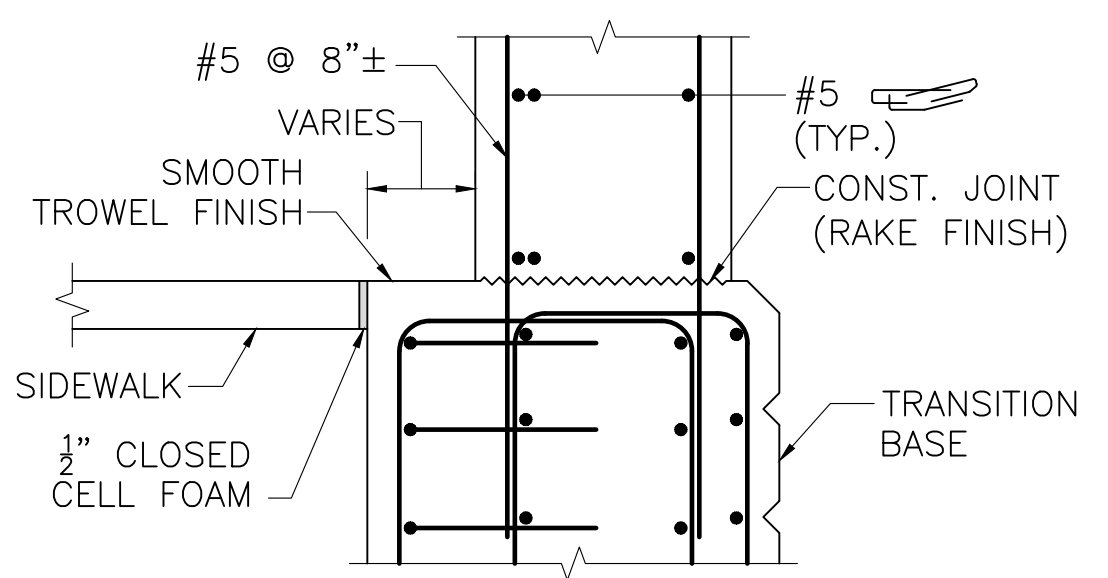
**PLAN AT SIDEWALK**  
SCALE: 1" = 1'-0"



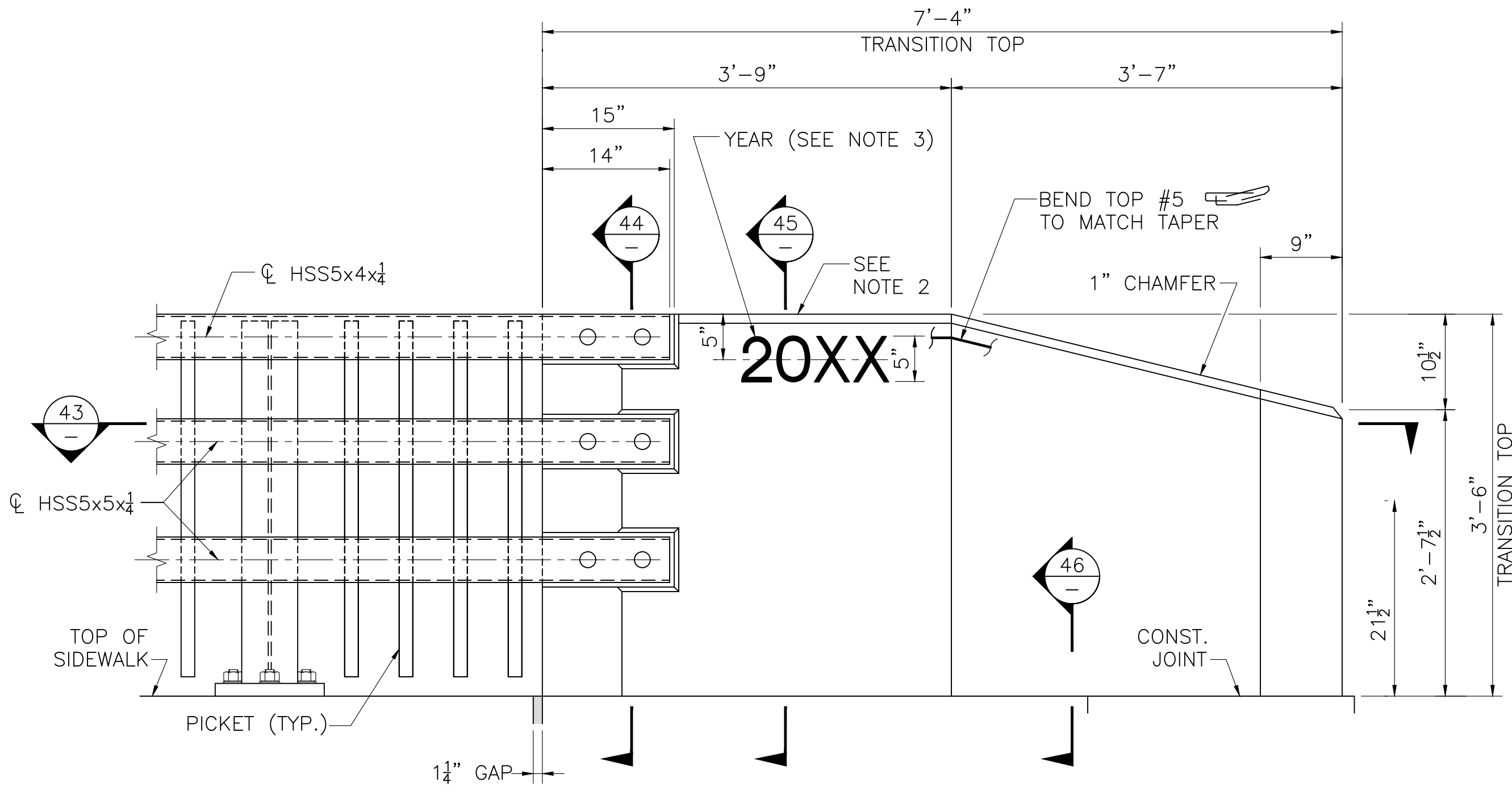
**SECTION 44 AT SIDEWALK**  
SCALE: 1" = 1'-0"



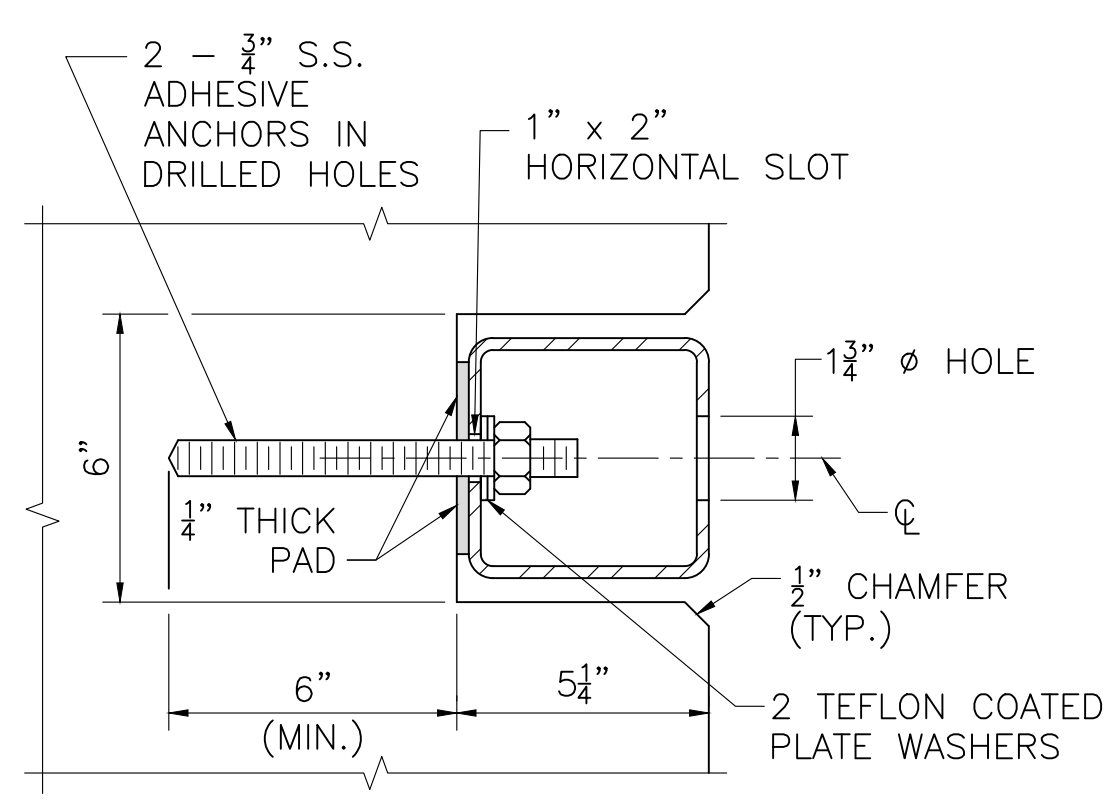
**SECTION 45 AT SIDEWALK**  
SCALE: 1" = 1'-0"



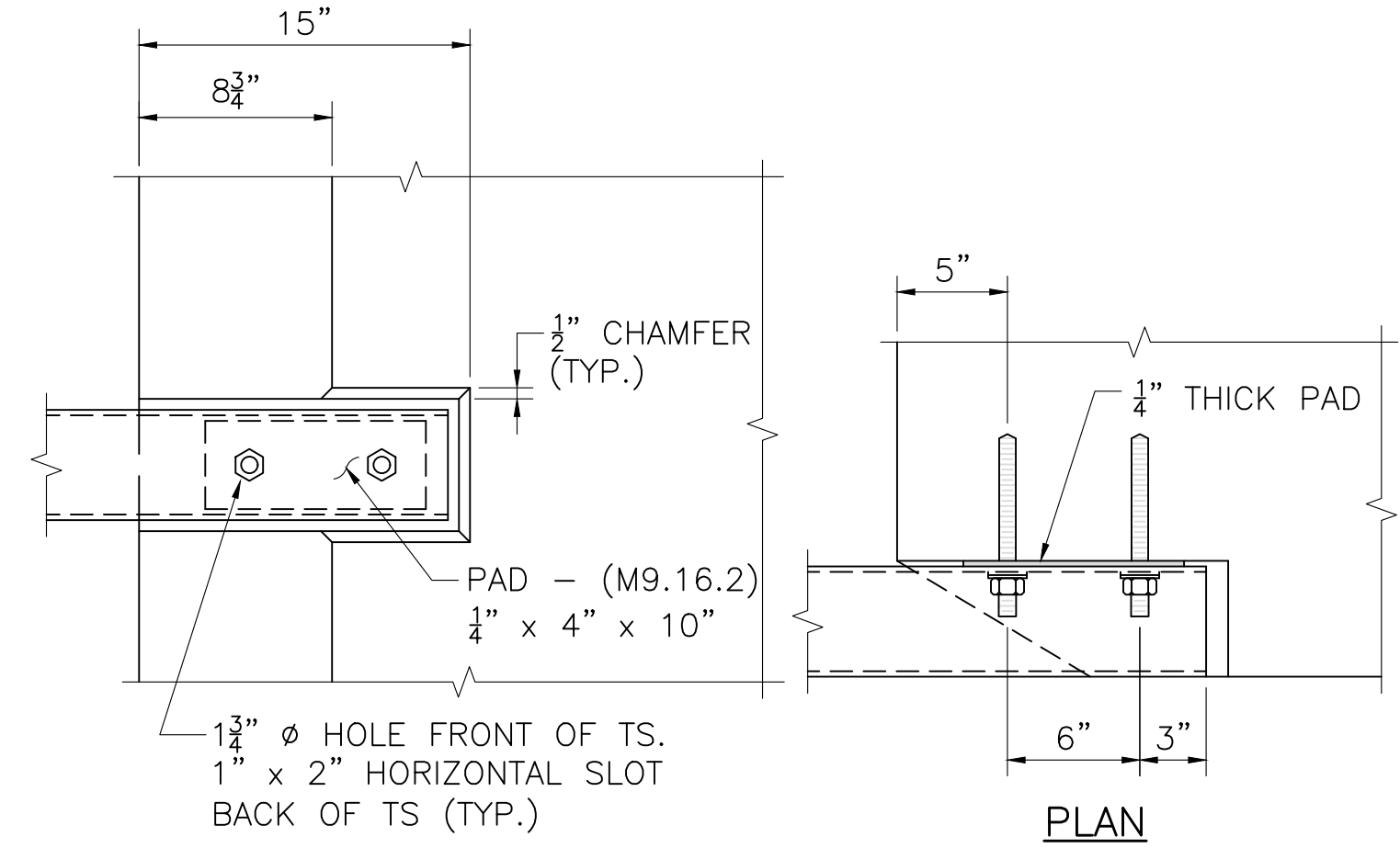
**SECTION 46 AT SIDEWALK**  
SCALE: 1" = 1'-0"



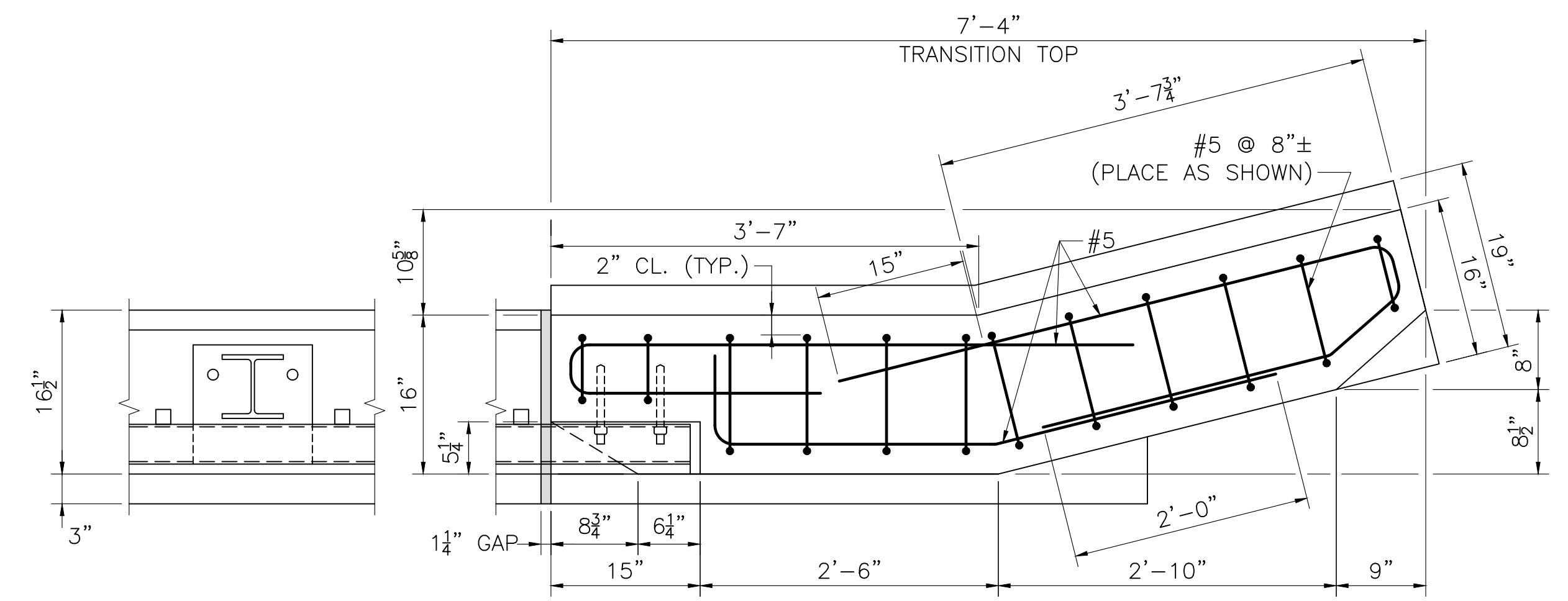
**ELEVATION AT SIDEWALK**  
SCALE: 1" = 1'-0"



**SECTION 47**  
SCALE: 3" = 1'-0"



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



**SECTION 43**  
SCALE: 1" = 1'-0"

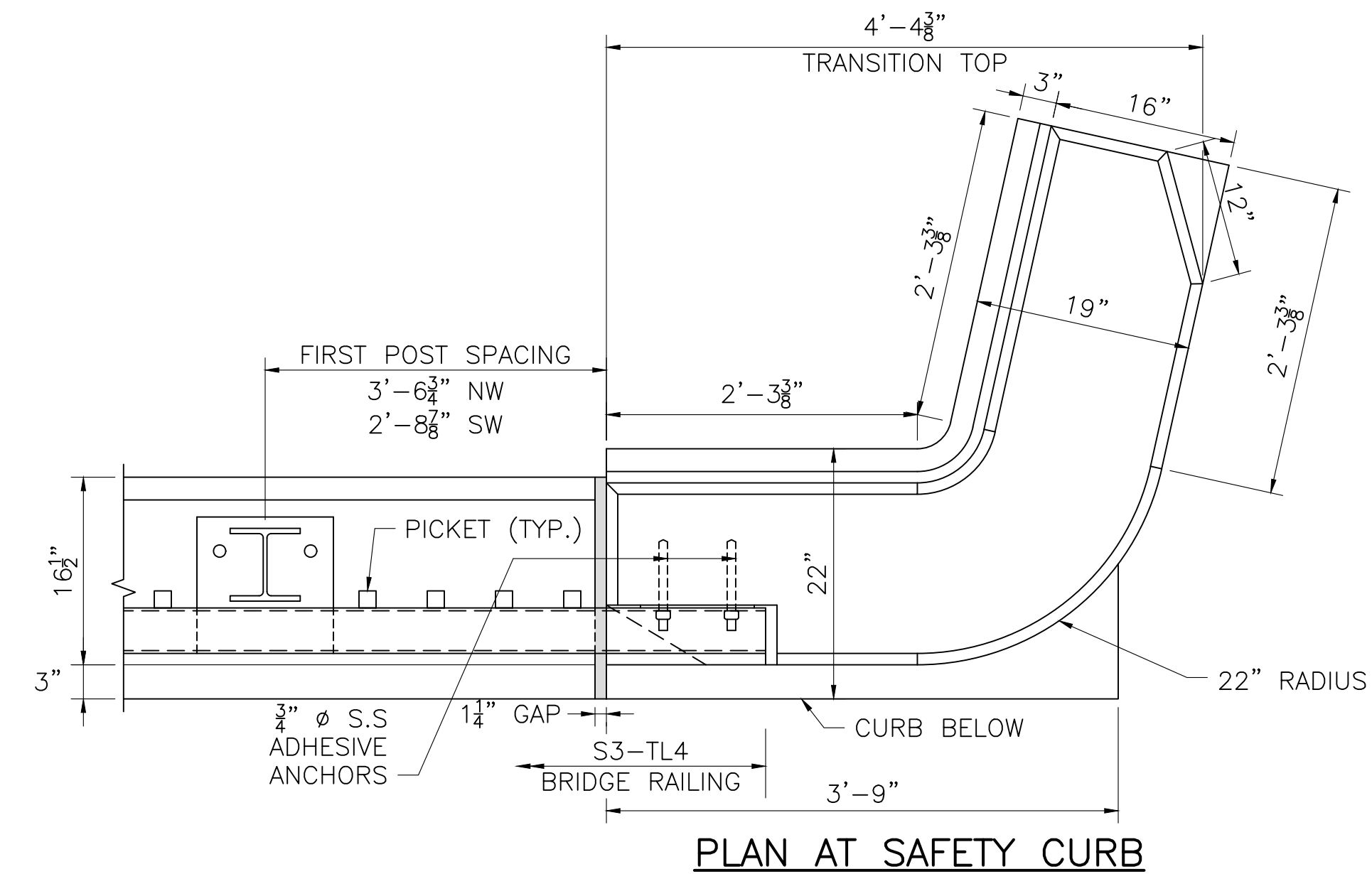
- NOTES:**
1. THREADED INSERTS SHALL BE PREQUALIFIED BY THE MANUFACTURER AS BEING CAPABLE OF DEVELOPING A NOMINAL SHEAR RESISTANCE OF 20 KIPS PER 5/8" Ø S.S. BOLT. S.S. BOLTS SHALL BE 5/8" Ø x 1 1/2" LONG FULLY THREADED AISI TYPE 304N STAINLESS STEEL. INSERTS FOR 7/8" S.S. BOLTS SHALL BE GALVANIZED AND CAST INTO THE TRANSITION.
  2. FOR AN APPROACH GRADE UP TO 3%, THE TRANSITION MAY BE CAST SQUARE AND SET PLUMB WITH THE MINIMUM EMBEDMENT DEPTH SHOWN.  
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.
  3. USE LATEST CONTRACT COMPLETION YEAR IN EFFECT WHEN THE FIRST GUARDRAIL TRANSITION IS CAST. USE THIS YEAR FOR ALL GUARDRAIL TRANSITIONS.
  4. ALL CONCRETE FOR THE PRECAST HIGHWAY GUARDRAIL TRANSITION SHALL BE 5000 PSI, 3/4", 685 HP CEMENT CONCRETE.
  5. 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 1/4" 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.

**TOP OF PRECAST HIGHWAY GUARDRAIL TRANSITION FOR S3-TL4 RAILING**

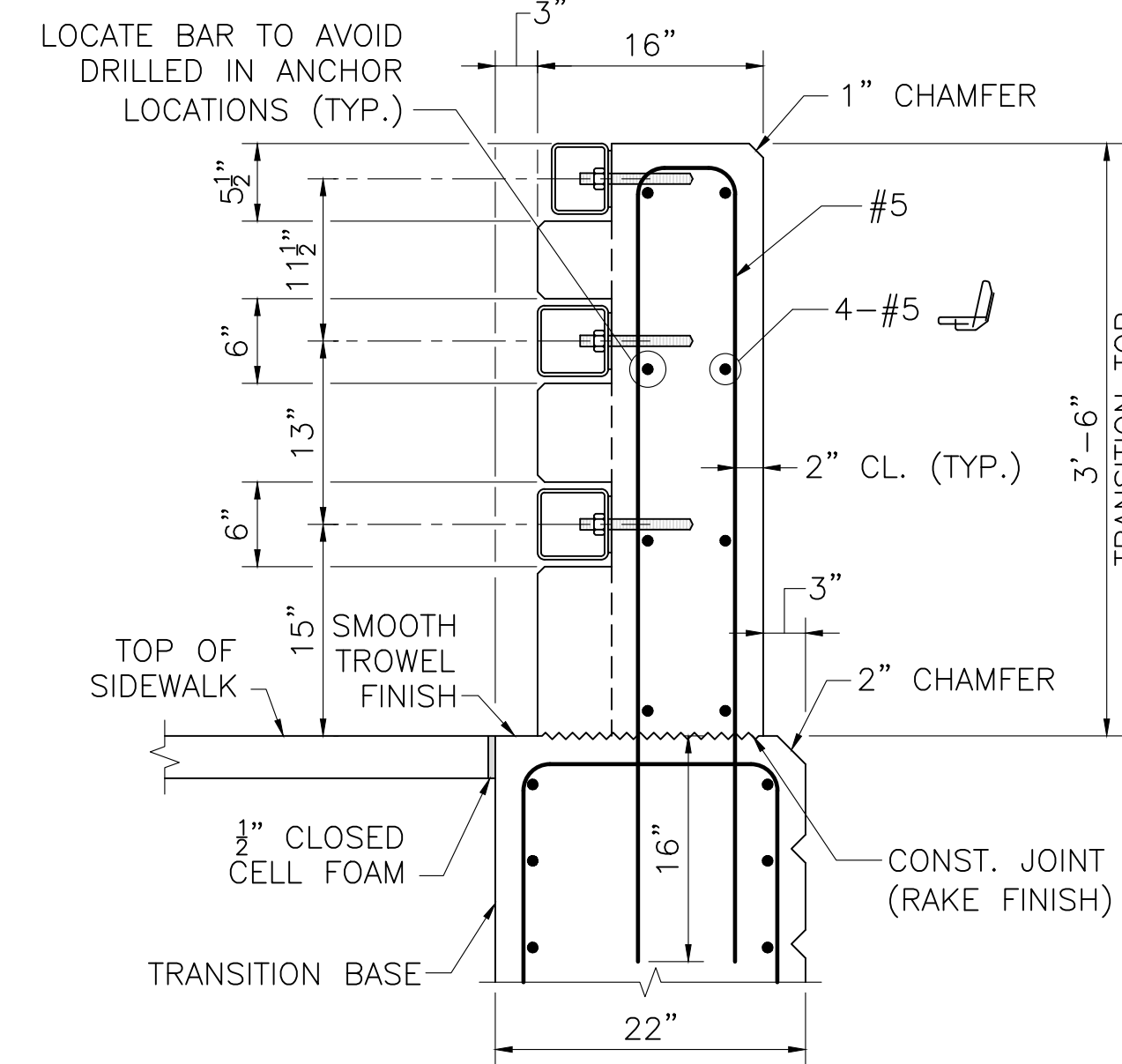
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	62	67
PROJECT FILE NO.		607680	

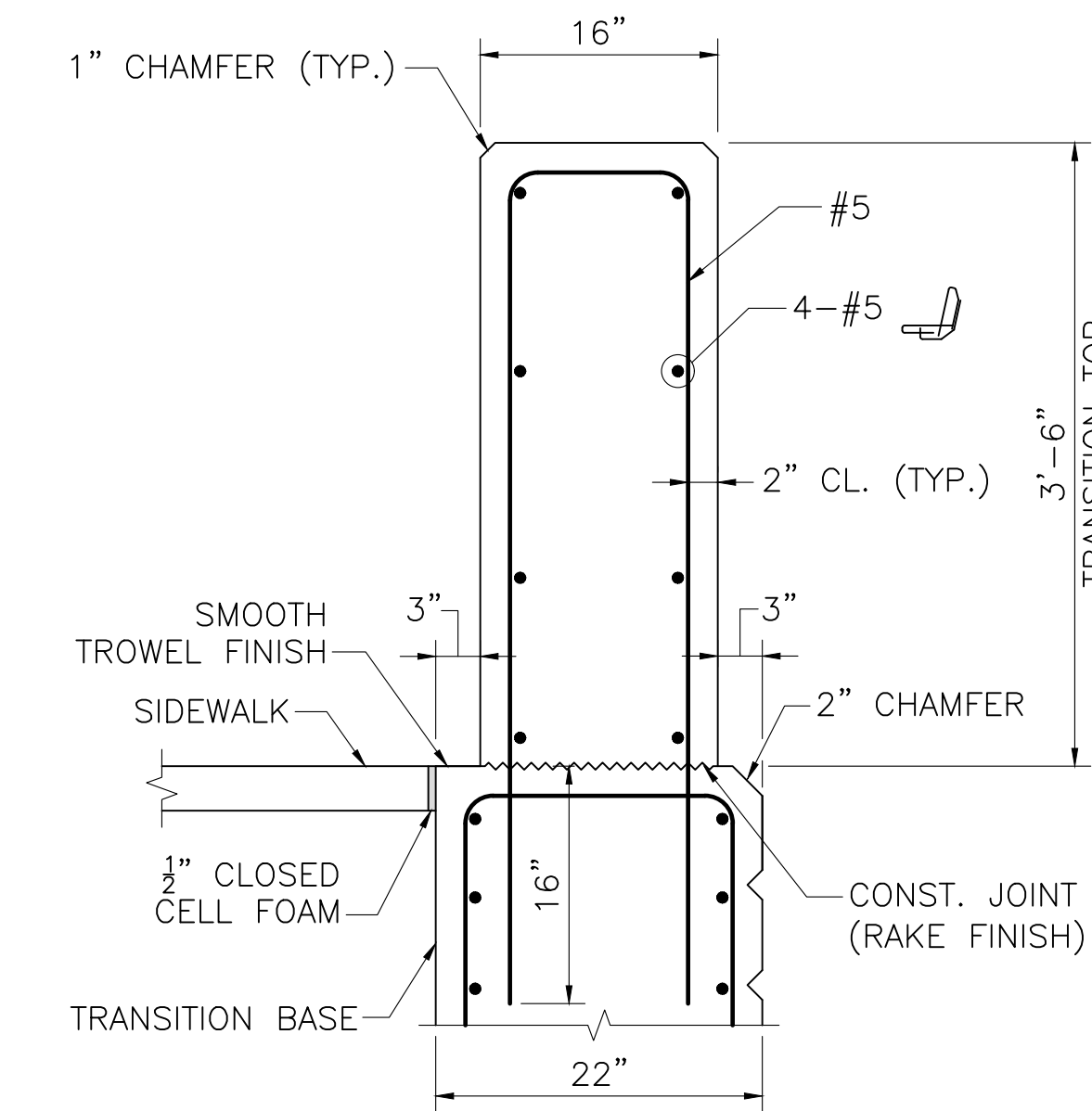
CURVED GUARDRAIL TRANSITION TOP DETAILS



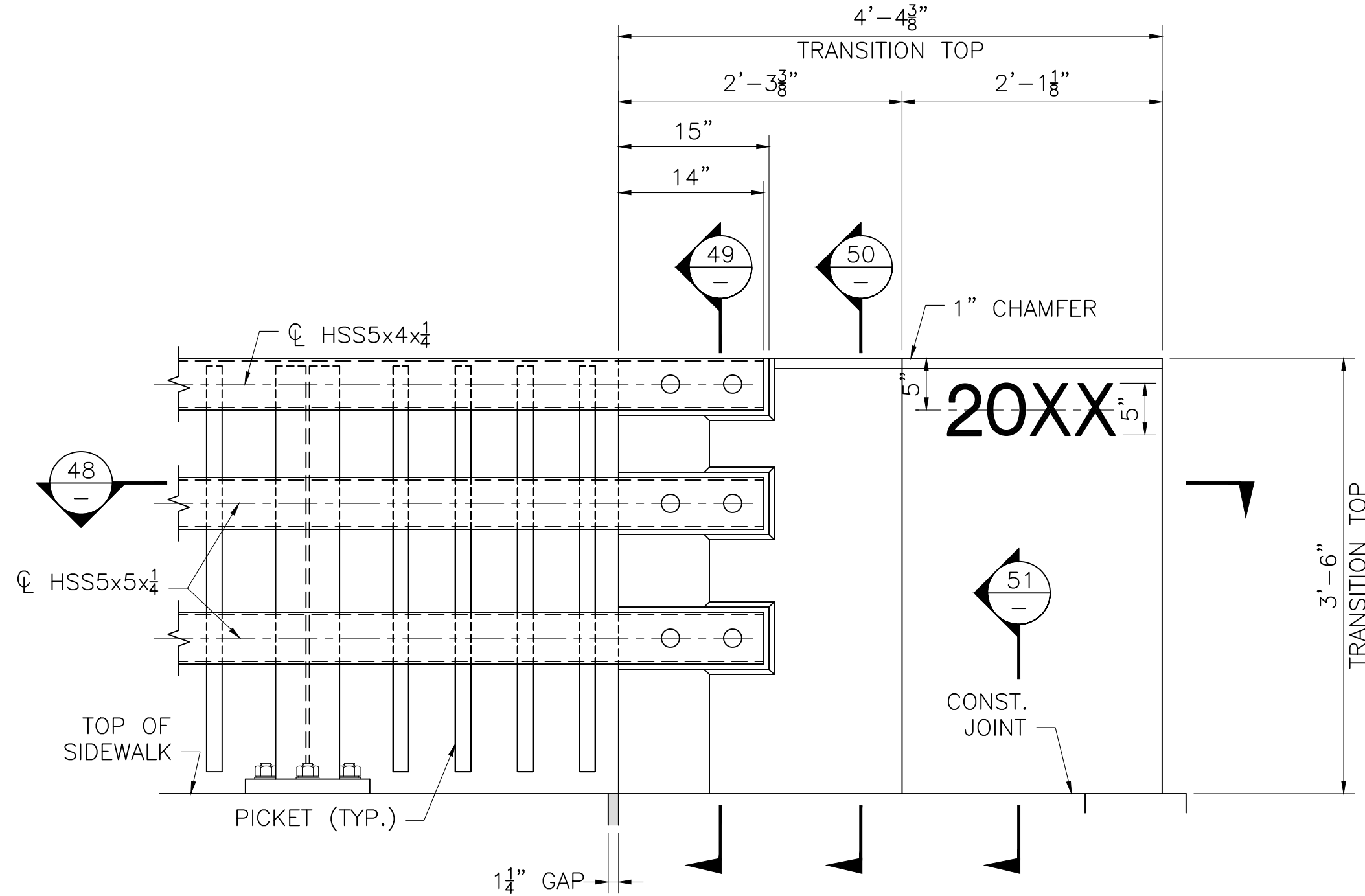
PLAN AT SAFETY CURB  
SCALE: 1" = 1'-0"



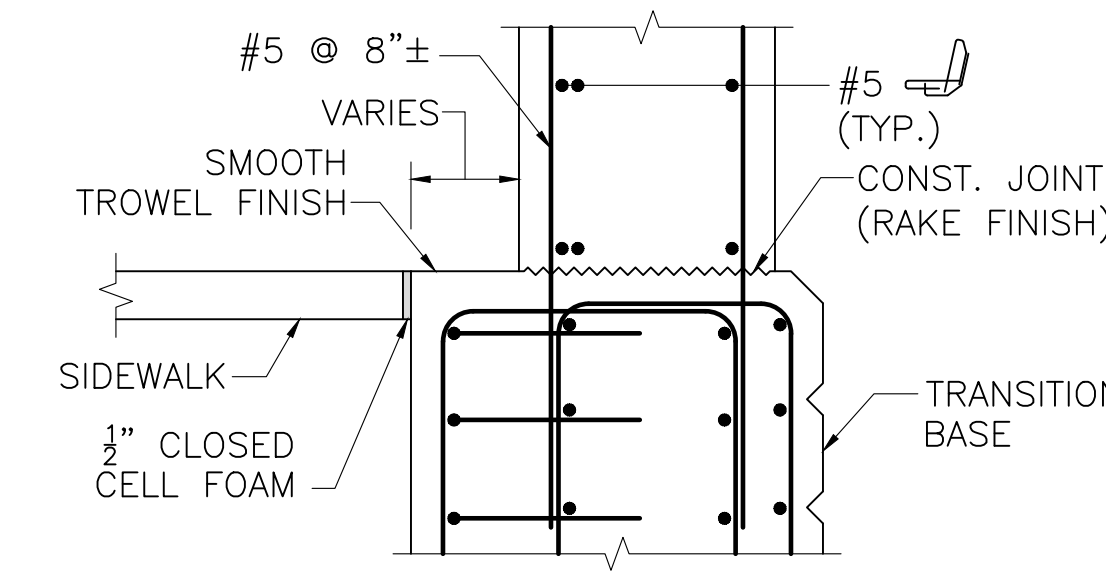
SECTION 49 AT SIDEWALK  
SCALE: 1" = 1'-0"



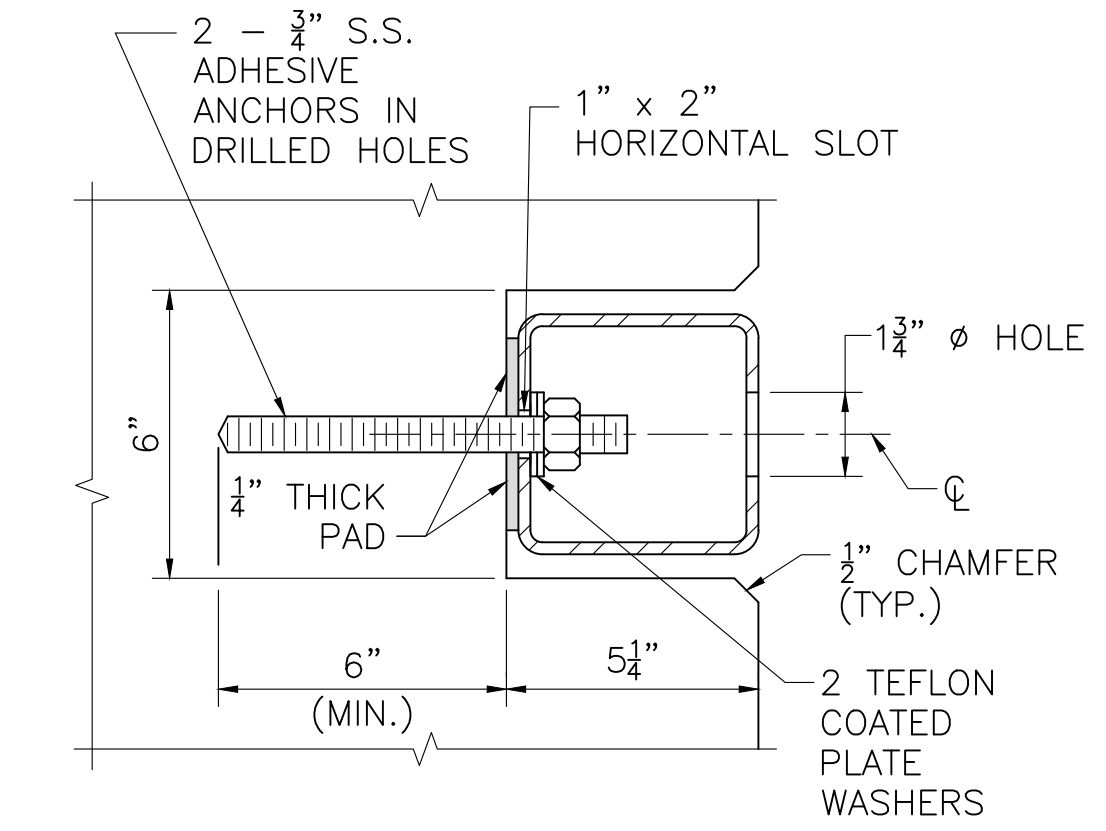
SECTION 50 AT SIDEWALK  
SCALE: 1" = 1'-0"



ELEVATION AT SIDEWALK  
SCALE: 1" = 1'-0"

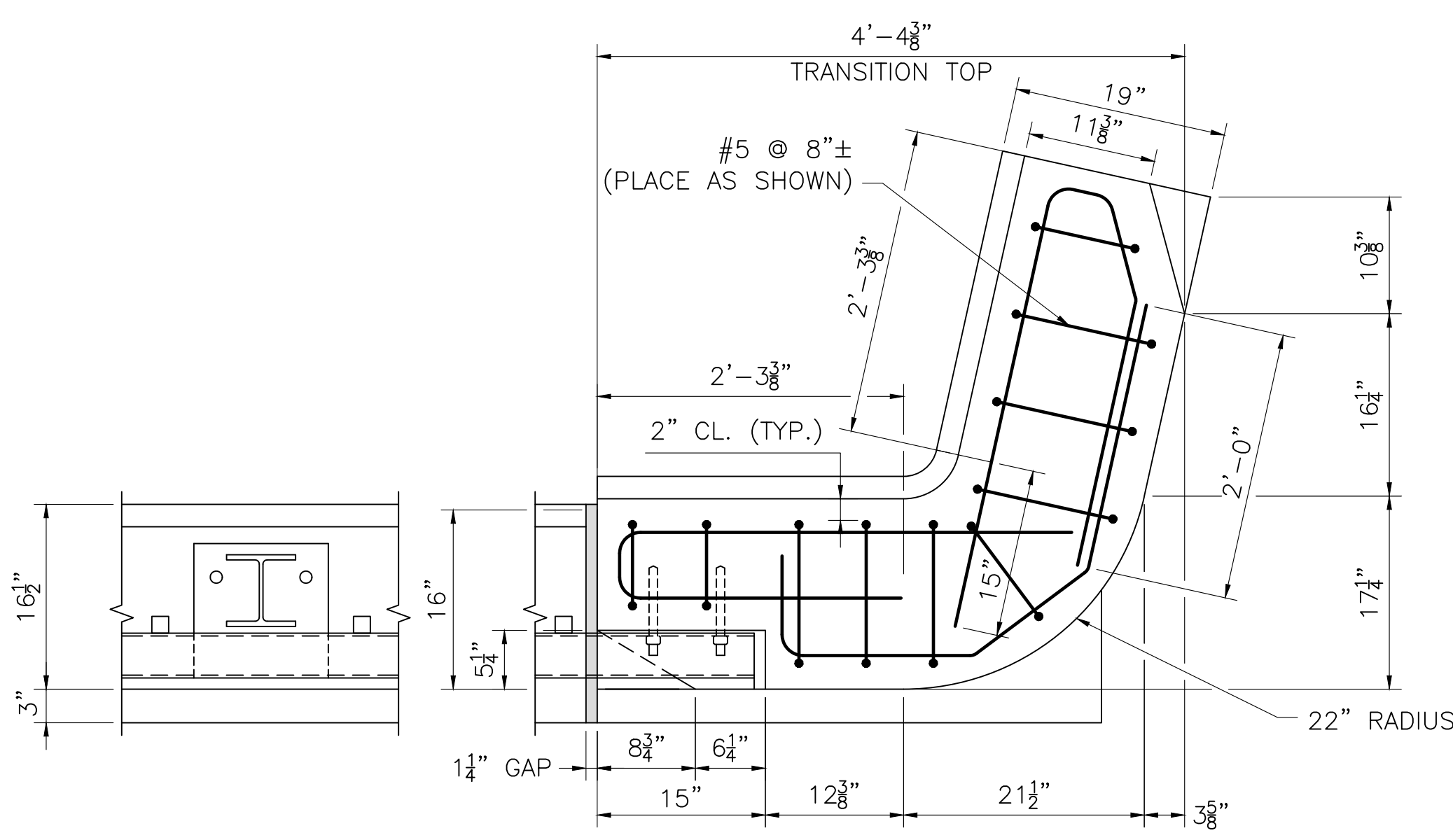


SECTION 51 AT SIDEWALK  
SCALE: 1" = 1'-0"

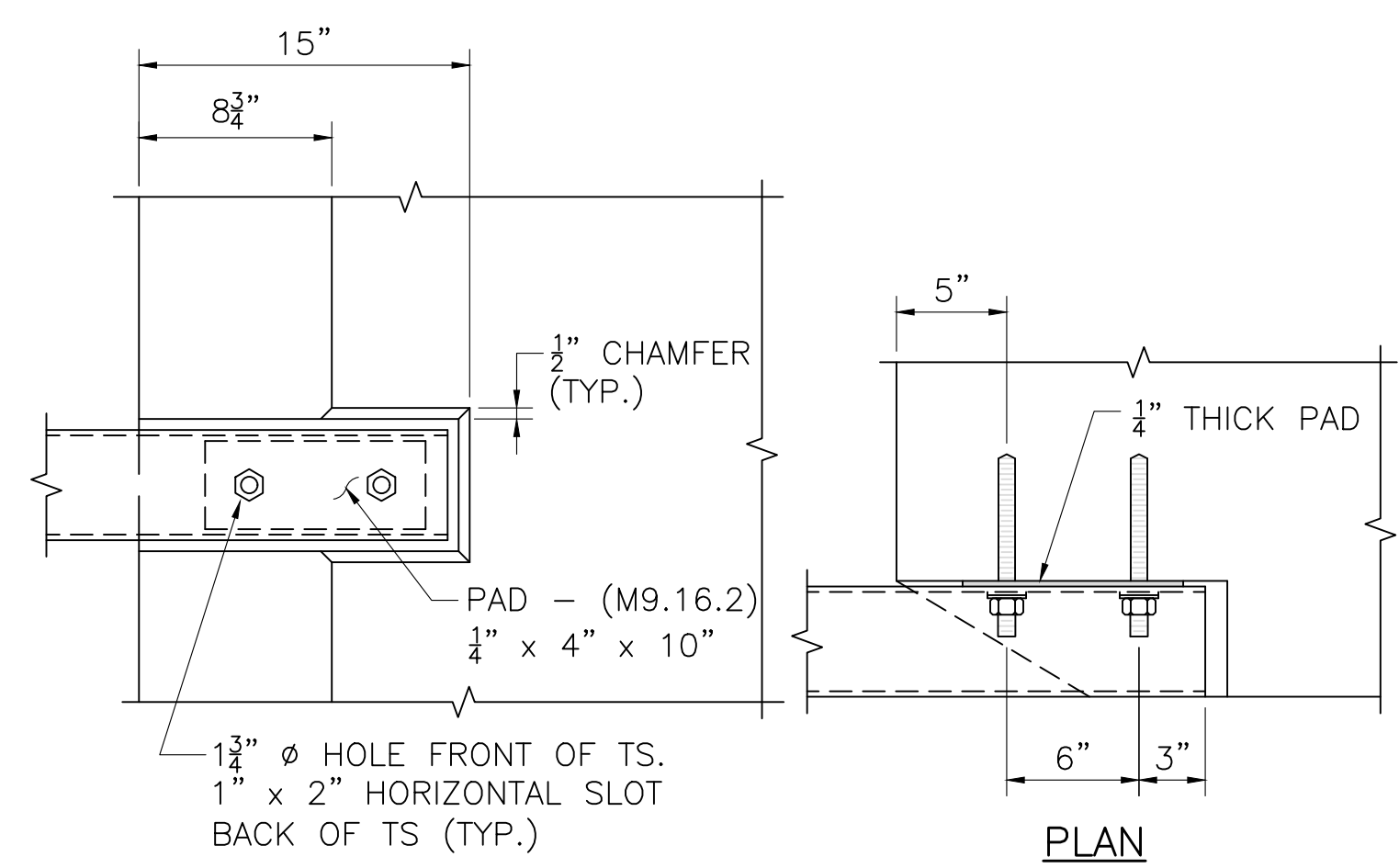


SECTION 52  
SCALE: 3" = 1'-0"

NOTE:  
SEE SHEET 37 FOR GUARDRAIL TRANSITION TOP DETAIL NOTES.



SECTION 48  
SCALE: 1" = 1'-0"



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

TOP OF PRECAST HIGHWAY GUARDRAIL TRANSITION FOR S3-TL4 RAILING

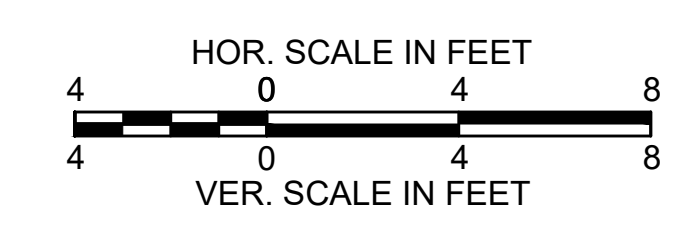
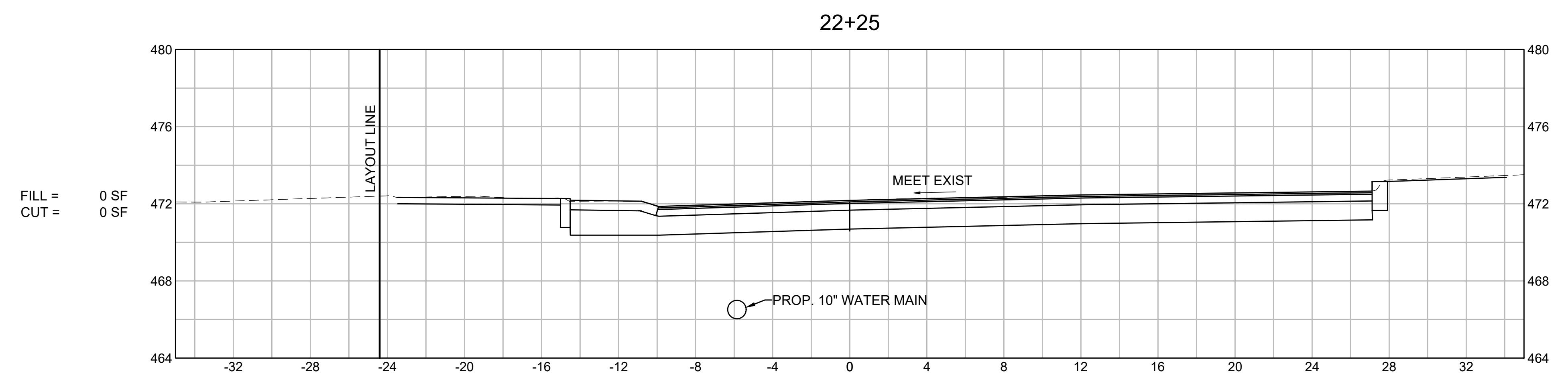
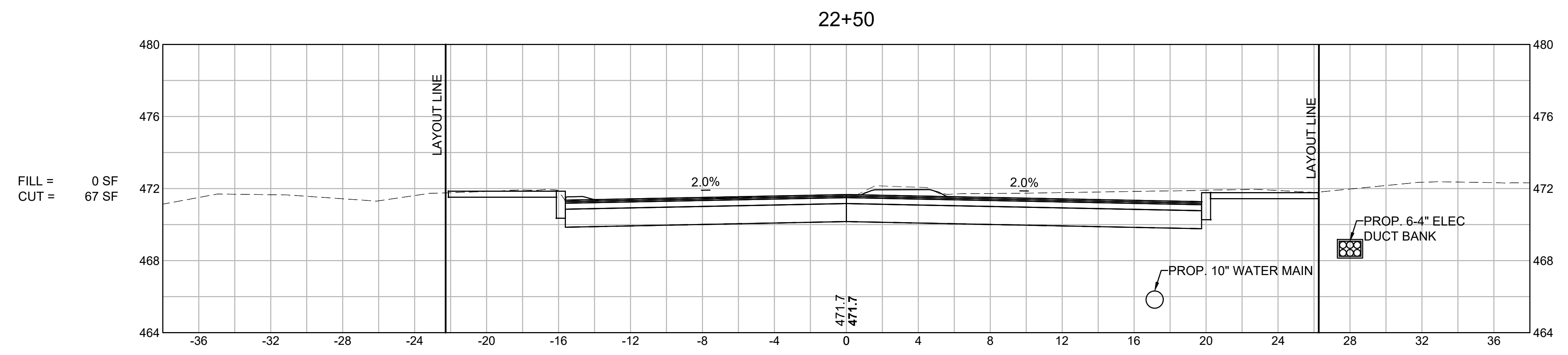
DATE	DESCRIPTION
SEPT 23, 2023	ISSUED FOR CONSTRUCTION
	CONSTRUCTION BY MASSDOT
	AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
	USE ONLY PRINTS OF LATEST DATE

607680\_BR 38 (CURVED GUARDRAIL TRANSITION TOP DETAILS).DWG Plotted on 14-Sep-2023 10:50 AM 11-AUG-2023 Final Structural Submittal (SF)

**FITCHBURG  
RIVER STREET/ROUTE 31**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	63	67
PROJECT FILE NO.		607680	

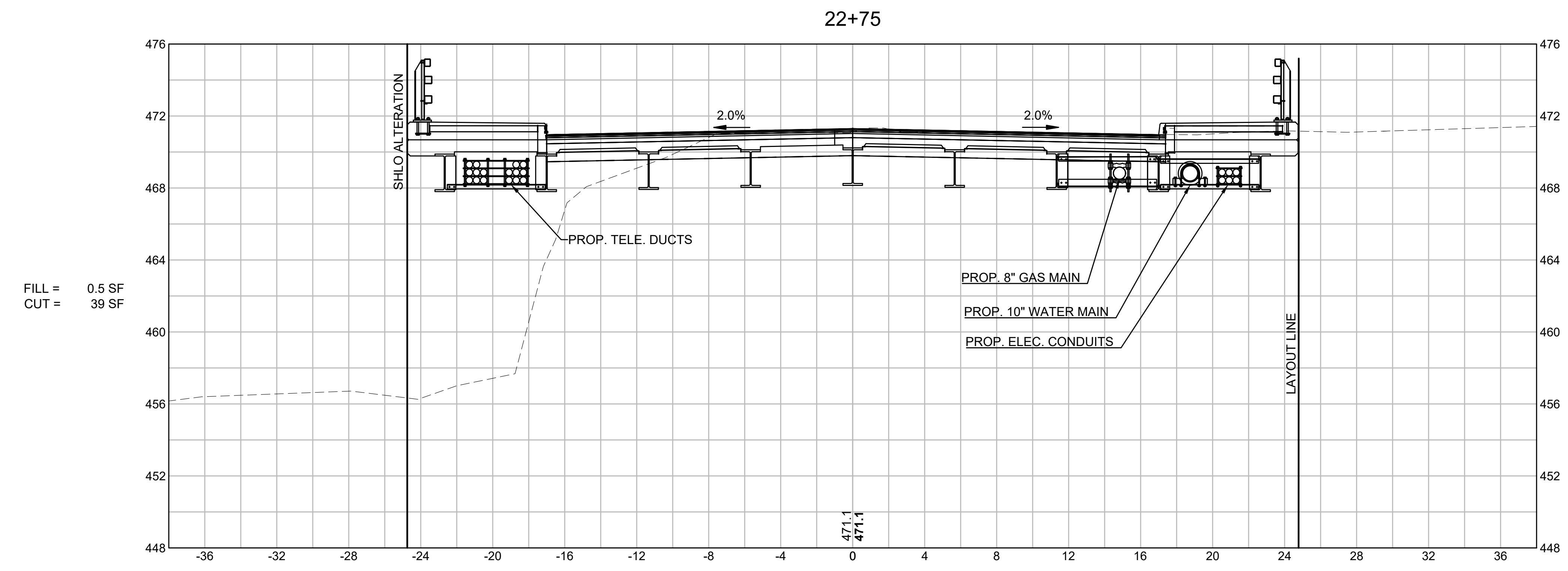
**CROSS SECTIONS 1 OF 5**



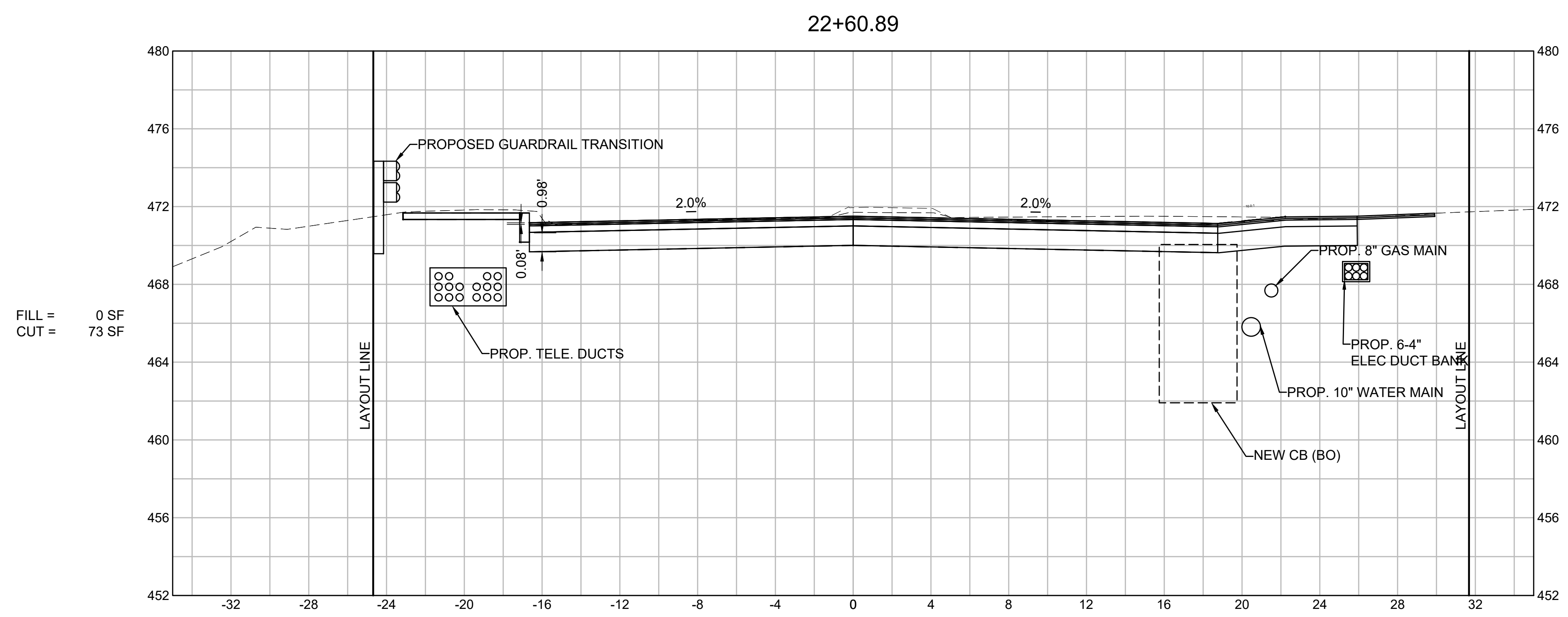
**FITCHBURG  
RIVER STREET/ROUTE 31**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	64	67
PROJECT FILE NO.		607680	

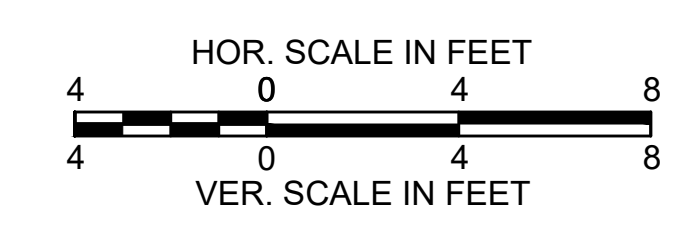
**CROSS SECTIONS 2 OF 5**



FILL = 0.5 SF  
CUT = 39 SF



FILL = 0 SF  
CUT = 73 SF

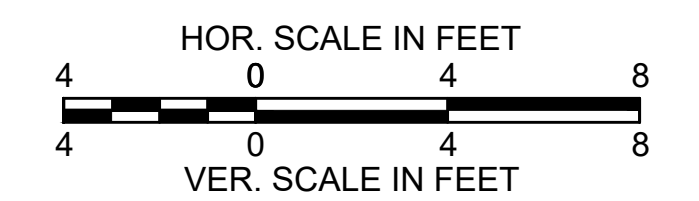
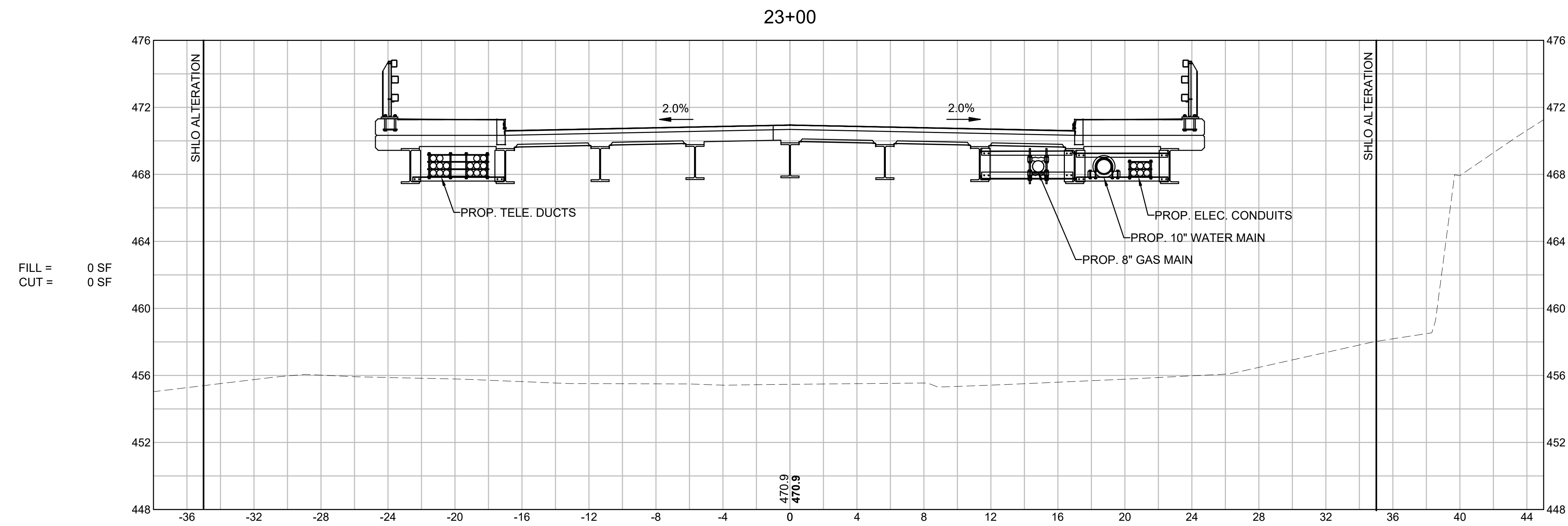
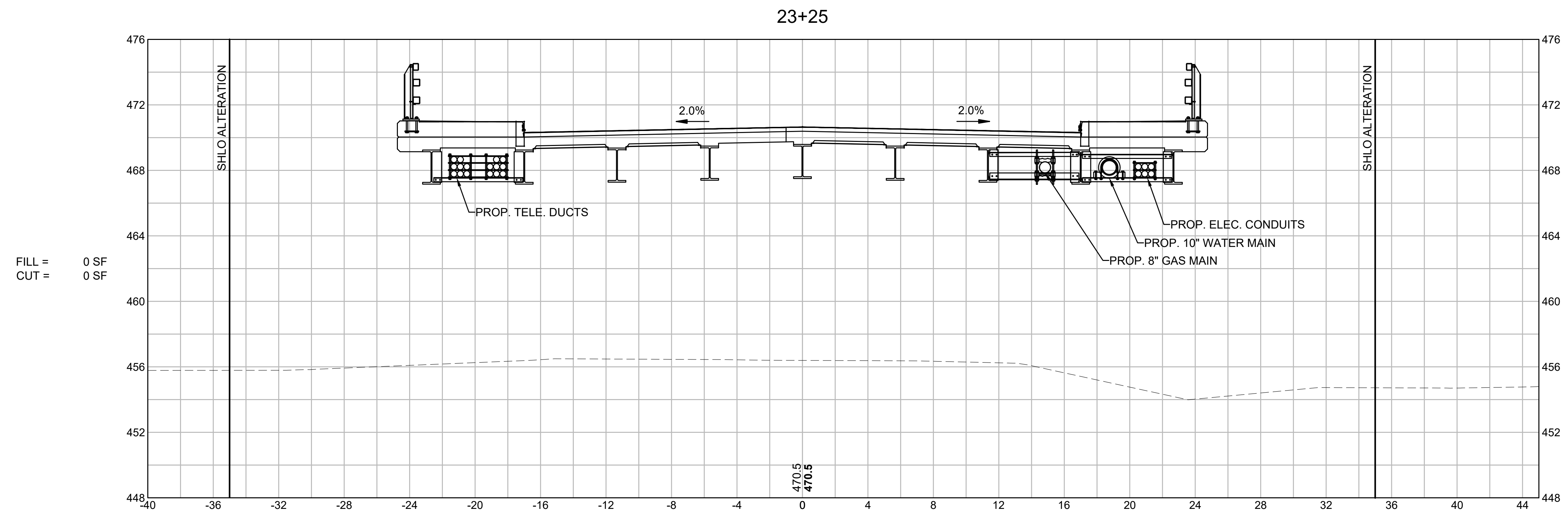




FITCHBURG  
RIVER STREET/ROUTE 31

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	65	67
PROJECT FILE NO.		607680	

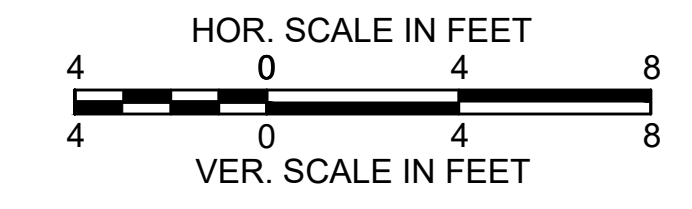
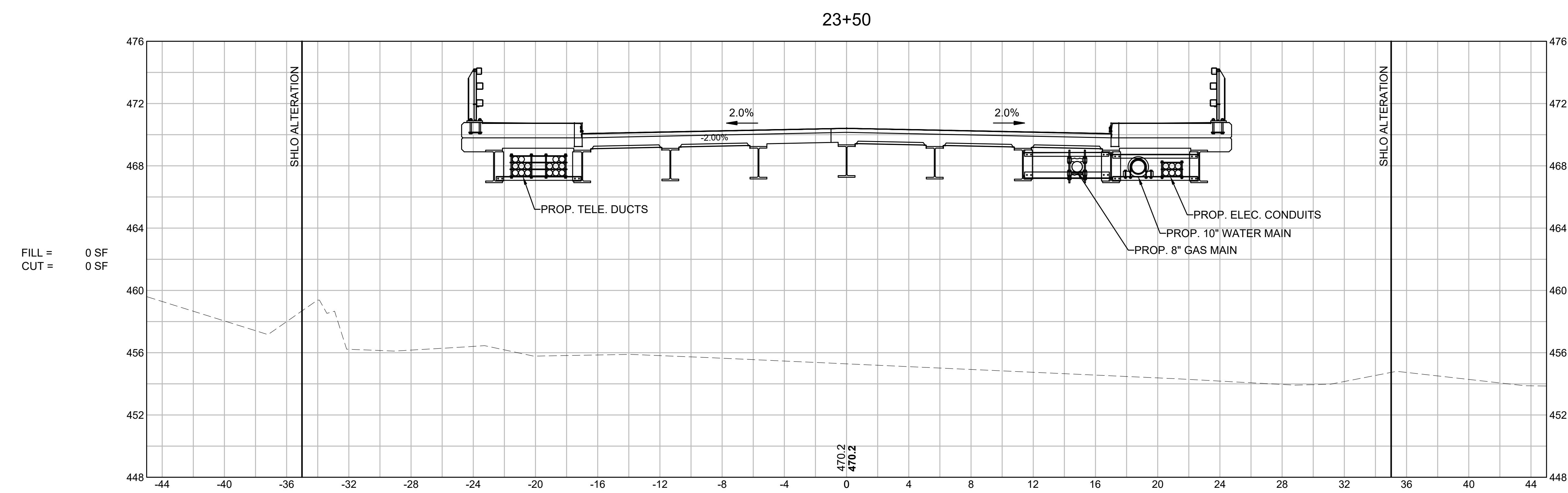
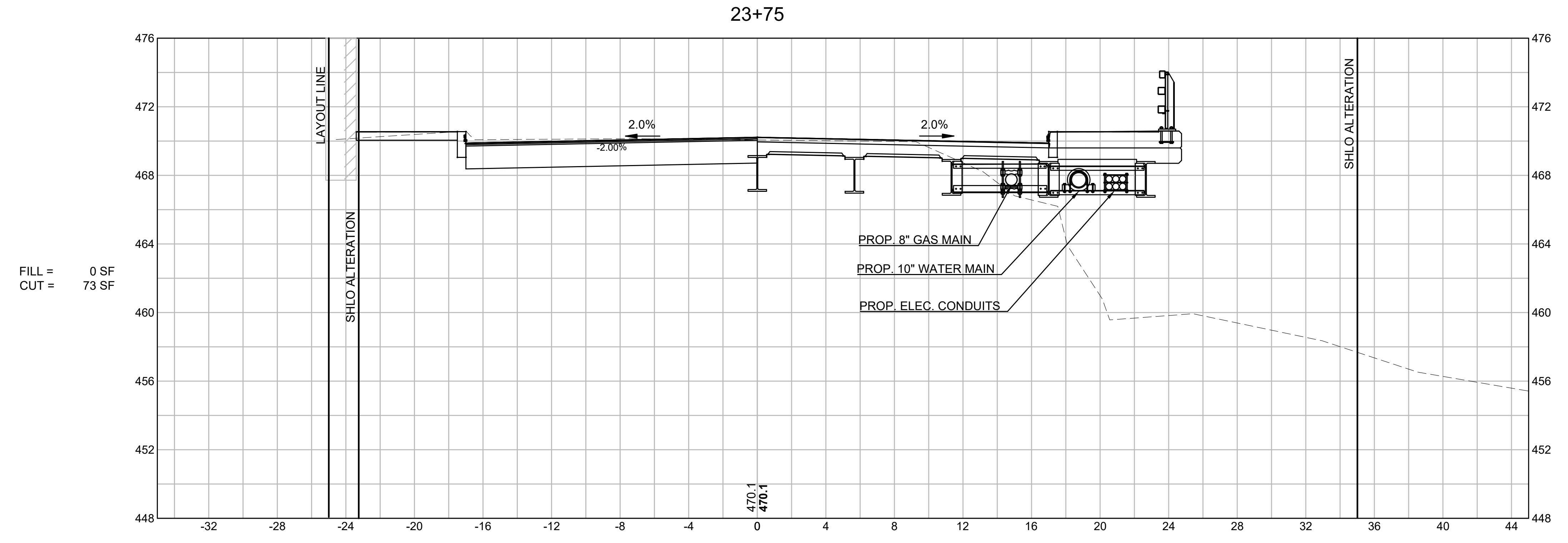
CROSS SECTIONS 3 OF 5



**FITCHBURG  
RIVER STREET/ROUTE 31**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	66	67
PROJECT FILE NO.		607680	

**CROSS SECTIONS 4 OF 5**



**FITCHBURG  
RIVER STREET/ROUTE 31**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	67	67
PROJECT FILE NO.		607680	

**CROSS SECTIONS 5 OF 5**

