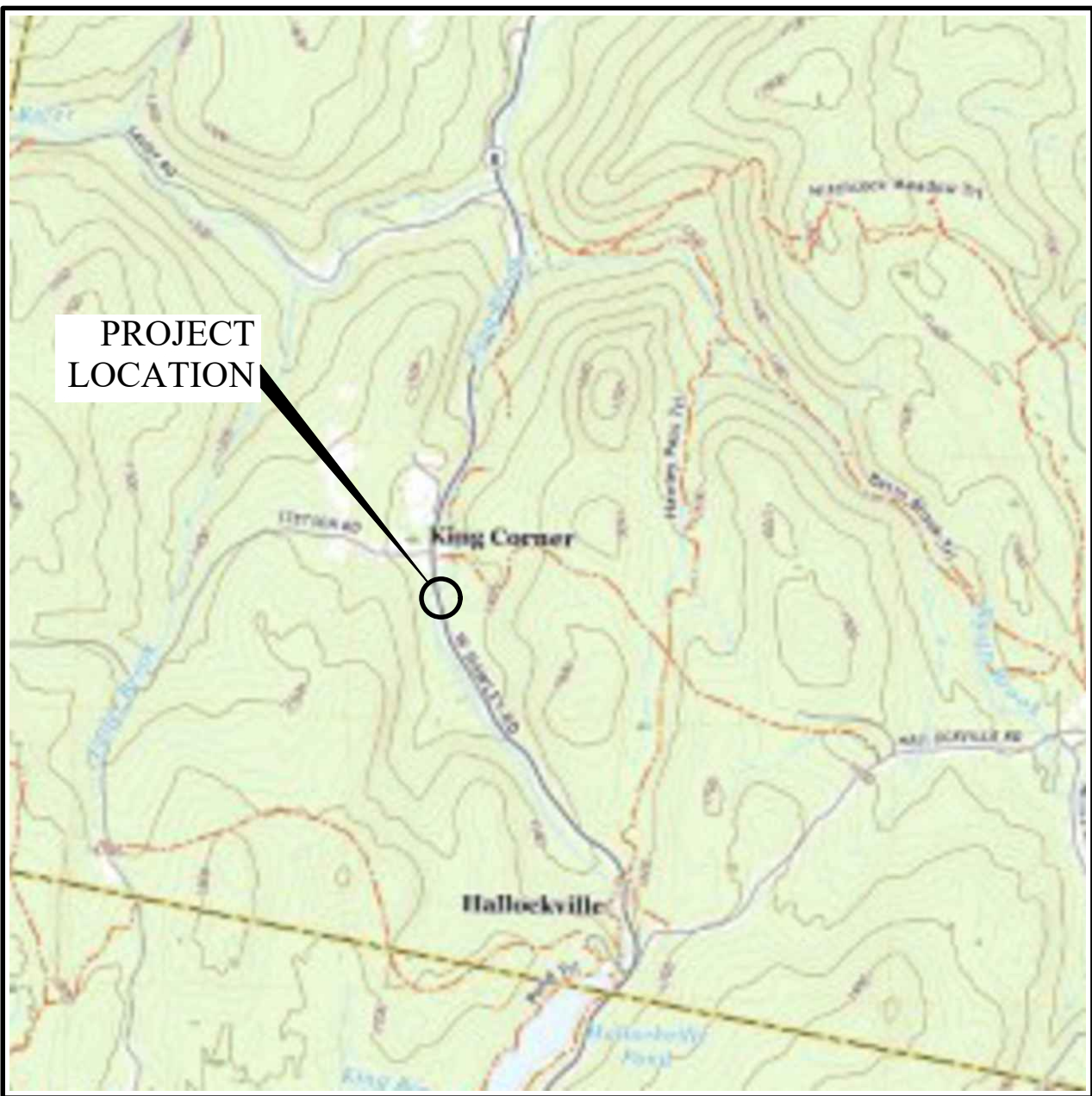


KING CORNER
CULVERT REPLACEMENT PROJECT
HAWLEY, MASSACHUSETTS
MASSDOT BRIDGE NO. H-13 018 (CQC)
MARCH 13, 2026

DRAWING LIST

- C-0 COVER
- C-1 BRIDGE KEY PLAN, PROFILES, LOCUS & SHEET INDEX
- C-2 GENERAL NOTES
- C-3 BORING LOGS AND NOTES
- C-4 EXISTING CONDITONS PLAN
- C-5 TEMPORARY EROSION, SEDIMENT, AND WATER CONTROL PLAN
- C-6 TEMPORARY EROSION, SEDIMENT, AND WATER CONTROL DETAILS AND NOTES
- C-7 SITE PLAN
- C-8 GRADING PLAN, WEST HAWLEY ROAD PLAN & PROFILE
- C-9 RESTORATION PLAN
- C-10 OVERALL DETOUR PLAN
- C-11 GENERAL BRIDGE PLAN & ELEVATION
- C-12 FOUNDATION PLAN & DETAILS
- C-13 BRIDGE SECTION & DETAILS
- C-14 WINGWALL LAYOUT PLAN & DETAILS
- C-15 ROADWAY CROSS-SECTIONS
- C-16 MOMENT SLAB & HEADWALL DETAILS
- C-17 GUARDRAIL END SECTION DETAILS
- C-18 GUARDRAIL TRANSITION TO BRIDGE RAIL (FACE OF CURB)
- C-19 S3-TL4 BRIDGE RAIL
- C-20 TOP OF PRECAST HIGHWAY GUARDRAIL TRANSITION FOR S3-MTL4 RAILING
- C-21 PRECAST HIGHWAY GUARDRAIL TRANSITION BASE DETAILS



LOCUS PLAN
KING CORNER
U.S.G.S. Plainfield, MA Quad
1" = 2000'



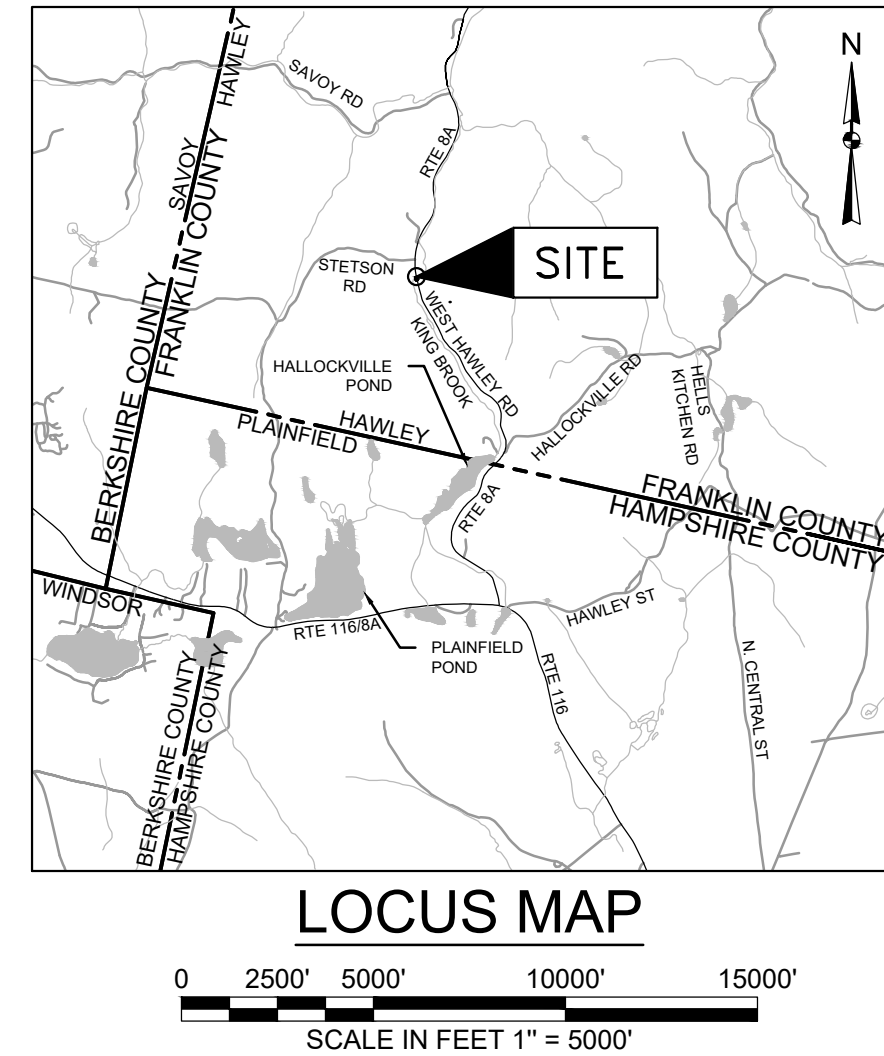
PREPARED FOR:

Town of Hawley
8 Pudding Hollow Road
Hawley, MA 01339

DESIGNER:

**GZA GeoEnvironmental, Inc.
Engineers and Scientists**
ONE FINANCIAL PLAZA
1350 Main Street, Suite 1400
Springfield, MA 01103
413-726-2100



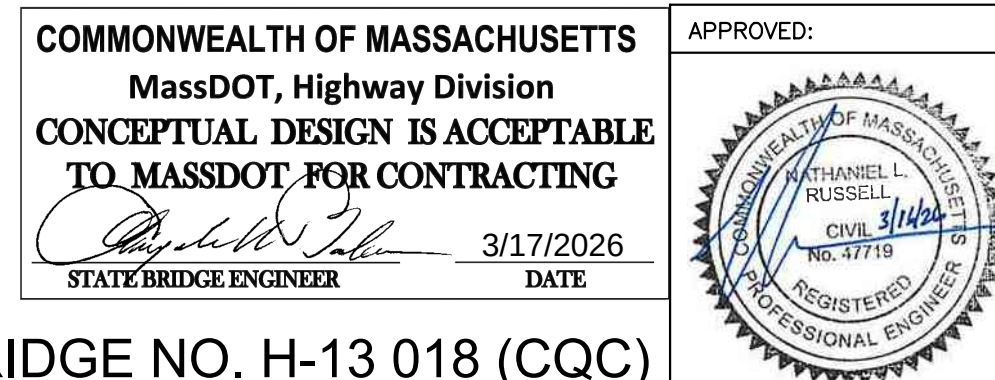


PROJECT SPECIFICATIONS

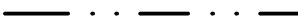
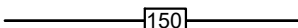
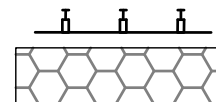
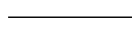
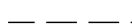
THE CONTRACT SPECIFICATIONS, THE 2025 COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD DRAWINGS FOR HIGHWAYS AND BRIDGES, THE 2025 CONSTRUCTION STANDARD DRAWINGS, MassDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE LATEST MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS, 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, WILL GOVERN.

CHAPTER 85 SECTION 35 REVIEW AND APPROVAL

IN ACCORDANCE AND COMPLIANCE WITH THE REQUIREMENTS OF CHAPTER 85 SECTION 35 OF THE MASSACHUSETTS GENERAL LAWS, THE CONTRACTOR SHALL SUBMIT TO THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION ALL CONSTRUCTION DRAWINGS AND DESIGN CALCULATIONS THAT SHALL BE USED TO FABRICATE AND CONSTRUCT THE STRUCTURE DEDICATED ON THESE PLANS FOR REVIEW AND APPROVAL. THIS APPROVAL SHALL CONSTITUTE THE FINAL APPROVAL AS STIPULATED BY CHAPTER 85 SECTION 35 OF THE MASSACHUSETTS GENERAL LAWS.



LEGEND

	EXISTING WETLAND BWV		PROPOSED LIMIT OF WORK
	EXISTING WETLAND BANK		PROPOSED TREE CLEARING LIMIT
	EXISTING WETLAND MAHW		PROPOSED EROSION CONTROL BARRIER
WF G45 + 	EXISTING WETLAND FLAG		PROPOSED CONTOUR
	EXISTING 100-FT WETLAND BUFFER		PROPOSED EDGE OF PAVEMENT
	EXISTING 50-FT WETLAND BUFFER		PROPOSED EDGE PAVEMENT MILLINGS
	100-FT RIVERFRONT RESOURCE AREA		PROPOSED GUARDRAIL
	EXISTING EDGE OF STREAM		PROPOSED RIPRAP BANK PROTECTION
	EXISTING APPROXIMATE PROPERTY LINE		PROPOSED NATURAL STREAMBED MATERIAL
	EXISTING ABUTTER PROPERTY LINE		
	EXISTING 5-FT CONTOUR		
	EXISTING 1-FT CONTOUR		
	EXISTING EDGE OF PAVEMENT		
	EXISTING TREELINE		
	EXISTING BORING LOCATION		
	EXISTING BOLLARD		
	EXISTING TRAFFIC SIGN		
	EXISTING METAL POST		
	EXISTING BOUND FOUND		
	EXISTING STORMDRAIN MANHOLE		
	EXISTING DRY HYDRANT		
	EXISTING CULVERT		
	EXISTING STORMDRAIN LINE		
	CONSTRUCTION BASE LINE		

 PROPOSED LIMIT OF WORK
 PROPOSED TREE CLEARING LIMIT
 PROPOSED EROSION CONTROL BARRIER
 PROPOSED CONTOUR
 PROPOSED EDGE OF PAVEMENT
 PROPOSED EDGE PAVEMENT MILLINGS
 PROPOSED GUARDRAIL
 PROPOSED RIPRAP BANK PROTECTION
 PROPOSED NATURAL STREAMBED MATERIAL

BASE PLAN NOTES

1. THE INFORMATION SHOWN HEREON IS BASED ON AN ON-THE-GROUND SURVEY PERFORMED ON JANUARY 7, 2020 BY S&H LAND SERVICES, LLC.
2. EXISTING CONDITIONS AND TOPOGRAPHIC INFORMATION TAKEN FROM ELECTRONIC AUTOCAD FILE [202326 TOPO.dwg] BY S&H LAND SERVICES, LLC., DATED 01/11/21.
3. LOT LINES AND RIGHT OF WAY LINES (R.O.W.) SHOWN ARE APPROXIMATE BASED ON TAX MAP 10 & [HTTP://MASSGIS.STATE.MA.US](http://MASSGIS.STATE.MA.US).
4. HORIZONTAL CONTROL:

THIS PROJECT IS REFERENCED TO THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM BASED ON THE NORTH AMERICAN DATUM OF 1983 TAKEN FROM STATIC GPS OBSERVATIONS.
5. VERTICAL CONTROL:

THIS PROJECT IS REFERENCED TO NORTH AMERICAN VERTICAL DATUM 1988 TAKEN FROM STATIC GPS OBSERVATIONS.

<u>BENCHMARKS:</u>			
<u>DESCRIPTION</u>	<u>NORTHING</u>	<u>EASTING</u>	<u>ELEVATION</u>
MAG NAIL IN TWIN 12" HARDWOOD	3034070.2760	265683.1389	1358.08
HMA6 IN 20" PINE	3033907.3315	265725.4559	1355.36

6. WETLAND BOUNDARY DELINEATED BY GZA GEOENVIRONMENTAL, INC, MAY 2023, LOCATED GZA GEOENVIRONMENTAL, INC. BY GLOBAL POSITIONING SYSTEM, MAY 2023.

ROADWAY CLASSIFICATION

1. WEST HAWLEY ROAD, (ROUTE 8A) IS CLASSIFIED AS A RURAL MAJOR COLLECTOR BY THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION.

WEST HAWLEY ROAD CULVERT RECONSTRUCTION – GENERAL SITE
CONSTRUCTION NOTES:

1. WORK SHALL NOT PROCEED WITHOUT WRITTEN APPROVAL FROM THE TOWN OF HAWLEY.
2. PLANS DO NOT PURPORT TO SHOW ALL UTILITIES. CONTRACTOR SHALL CONTACT DIG-SAFE (1-888-344-7233) A MINIMUM OF 72 HOURS PRIOR TO BEGINNING EXCAVATION WORK AT THE SITE.
3. THE ACCURACY AND COMPLETENESS OF ANY UNDERGROUND AND OVERHEAD UTILITIES AS SHOWN ON THE PLANS ARE NOT GUARANTEED. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE THE EXACT LOCATION, SIZE, TYPE, ETC. OF ALL UTILITIES THAT MAY BE AFFECTED BY THE WORK OF THIS PROJECT.
4. PRIOR TO COMMENCING ANY WORK, THE CONTRACTOR SHALL REVIEW SCHEDULING AND SITE SAFETY WITH THE OWNER. CONTRACTOR SHALL ENSURE THAT THEIR OPERATIONS HAVE THE MINIMUM POSSIBLE IMPACT ON ALL ASPECTS OF THE PROPERTY. CONTRACTOR'S AREA OF WORK WILL BE CLOSED TO THE PUBLIC DURING THE LIFE OF THE PROJECT; HOWEVER, THE PERIMETER OF THE LIMIT OF THE AREA OF WORK IS NOT ENTIRELY FENCED AND IS SUBJECT TO RANDOM ENTRY BY UNAUTHORIZED PERSONNEL. THE CONTRACTOR SHALL SUPPLY SUITABLE SIGNAGE INDICATING THAT THE WORK SITE IS CLOSED TO THE PUBLIC AND SHALL PROTECT THE PUBLIC FROM THE HAZARDS ASSOCIATED WITH THEIR WORK AT ALL TIMES, INCLUDING THE INSTALLATION OF TEMPORARY BARRICADES OR FENCING AT ACCESS POINTS TO ACTIVE WORK AREAS.
5. CONTRACTOR SHALL COORDINATE ALL WORK WITH THE TOWN OF HAWLEY HIGHWAY DEPARTMENT; POLICE DEPARTMENT; AND FIRE DEPARTMENT, AS NECESSARY.
6. UNLESS OTHERWISE NOTED, ALL WORK AND MATERIALS SHALL COMPLY WITH APPLICABLE SECTIONS OF THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION'S (MassDOT) "2024 STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES", AS AMENDED.
7. CONTRACTOR SHALL NOT REMOVE TREES UNLESS SPECIFICALLY LOCATED WITHIN THE WORK AREA OR IF SPECIFICALLY DIRECTED TO DO SO BY THE OWNER'S REPRESENTATIVE. LIMBS MAY BE PRUNED AS NECESSARY FOR ACCESS, UPON APPROVAL OF THE OWNER'S REPRESENTATIVE. ROOT SYSTEMS SHALL BE PROTECTED AND LEFT UNDISTURBED TO THE MAXIMUM EXTENT PRACTICAL. WHERE ROOTS MUST BE CUT, ROOTS SHALL BE NEATLY AND CLEANLY PRUNED, SHALL BE KEPT CONTINUALLY MOIST, AND SHALL BE BACKFILLED AS SOON AS POSSIBLE.
8. CONTRACTOR SHALL PERFORM ALL EXCAVATIONS IN STRICT CONFORMANCE WITH APPLICABLE LOCAL, STATE AND O.S.H.A. RULES, AS AMENDED.
9. CONTRACTOR SHALL DEMOLISH, RAZE, REMOVE, AND DISPOSE OF ALL PAVEMENTS, PIPING, VEGETATION STRUCTURES, AND OTHER OBSTRUCTIONS TO NEW WORK, EXCEPT OPERATING UTILITIES AND THOSE ITEMS FOR WHICH OTHER PROVISIONS HAVE BEEN MADE FOR REMOVAL AND/OR PROTECTION. MATERIALS TO BE DISPOSED OF SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE DISPOSED OF AT AN OFF-SITE LOCATION, IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS.
10. AT ALL AREAS OF PAVEMENT REMOVAL, THE PAVING DEPTH TO REMAIN SHALL BE SAWCUT THROUGH THE ENTIRE PAVEMENT THICKNESS AND SHALL FORM A CLEAN EDGE.
11. REPLACE DISTURBED SURFACES WITH MATERIALS AND THICKNESS TO MATCH EXISTING.
12. ALL AREAS NOT OTHERWISE SURFACED SHALL RECEIVE MINIMUM 6" LOAM AND SHALL BE SEEDED, MULCHED, AND ESTABLISHED AS TURF OR OTHERWISE VEGETATED AREAS, AS INDICATED BY REQUIRED SEED TYPE.

DESIGN:

1. THE CONTRACTOR SHALL SUBMIT DESIGN CALCULATIONS PREPARED IN ACCORDANCE WITH THE LATEST ASHSTO LRFD BRIDGE DESIGN SPECIFICATIONS AND THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION BRIDGE MANUAL WHILE USING ENGLISH UNITS FOR HL-93 LOADING FOR APPROVAL BY THE ENGINEER. THE DESIGN COMPUTATIONS SHALL CONSIDER ALL LOADING AS APPROPRIATE DURING FABRICATION, SHIPMENT, ERECTION, CONSTRUCTION, AND AFTER COMPLETION OF CONSTRUCTION BASED UPON THESE CONSTRUCTION DRAWINGS. CALCULATION SHOULD BE PREPARED AND DRAWINGS SHALL BE STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN MASSACHUSETTS.
2. PRECAST FOOTINGS, MODULAR BLOCK RETAINING WALLS, PRECAST MOMENT SLABS AND PRECAST RIGID FRAME TO BE DESIGNED BY SUPPLIER. DESIGN TO BE STAMPED BY MASSACHUSETTS REGISTERED STRUCTURAL ENGINEER AND SUBMITTED FOR REVIEW AND APPROVAL BY ENGINEER OF RECORD AND MassDOT .
3. PRECAST RIGID FRAME FOOTING AND STEM WALLS TO BE PRECAST. PRECAST DESIGN TO INCLUDE LIFTING PROCEDURES AND MAX STRESSES. MANUFACTURER TO PROVIDE THE ENGINEER OF RECORD AND MassDOT SHOP DRAWINGS AND CALCULATIONS FOR APPROVAL.
4. SHOP DRAWINGS FROM PRECAST MANUFACTURER SHALL BE SUBMITTED TO ENGINEER OF RECORD AND MassDOT FOR APPROVAL AT NO ADDITIONAL COMPENSATION. APPROVED SHOP DRAWINGS SHALL BE INCORPORATED INTO THE APPROVED CONCEPTUAL DESIGN PLANS.
5. IF THERE ARE REVISIONS TO APPROVED PLANS THE CONTRACTOR SHALL SUBMIT THESE CHANGES TO THE ENGINEER OF RECORD AND MassDOT FOR REVIEW AND APPROVAL.

FOUNDATION NOTES:

1. PRECAST CONCRETE FOUNDATIONS SHALL BE DESIGNED BY SUPPLIER UTILIZING THE DESIGN CRITERIA FOUND IN GZA GEOTECHNICAL REPORT. DESIGN TO BE STAMPED BY MASSACHUSETTS REGISTERED STRUCTURAL ENGINEER AND SUBMITTED FOR REVIEW AND APPROVAL BY THE ENGINEER OF RECORD AND MassDOT.
2. BOTTOM OF THE FOUNDATION ELEVATIONS PROVIDED ON THE DRAWINGS SHALL BE CONSIDERED MINIMUM DEPTHS. CONTRACTOR SHALL REMOVE UNSUITABLE MATERIALS AS REQUIRED. UNSUITABLE MATERIALS SHALL INCLUDE, BUT NOT LIMITED TO, Boulders, ROOTS, ORGANIC SOILS, OR SILT/CLAY ENCOUNTERED WITHIN THE FOOTING BEARING ZONE, DEFINED BY A 14:1 HORIZONTAL INCHES DOWNWARD AND OUTWARD FROM 1 FOOT BEYOND THE EDGE OF FOOTING.
3. A MINIMUM OF 12" OF CRUSHED STONE SHALL BE PLACED UNDER STRIP FOOTING.

GEOTECHNICAL DESIGN PARAMETERS:

1. GEOTECHNICAL REPORT: "GEOTECHNICAL ENGINEERING REPORT – ROUTE 8A (WEST HAWLEY ROAD) OVER KING BROOK, BRIDGE NO. H-13–018 (CQC), HAWLEY, MASSACHUSETTS," PREPARED FOR TOWN OF HAWLEY, MASSACHUSETTS, PREPARED BY GZA GEOTECHNICAL, INC., DATED FEBRUARY 13, 2026.
2. MINIMUM EMBEDMENT FOR FROST PROTECTION FOR FOOTINGS FOUNDED ON SOIL = 4 FEET BELOW ADJACENT GROUND SURFACE
3. MAXIMUM ALLOWABLE SETTLEMENT = 1.00 INCHES TOTAL, 0.5 INCH DIFFERENTIAL
4. BACKFILL UNIT WEIGHT: 120 POUNDS PER CUBIC FOOT (PCF)
5. BACKFILL ANGLE OF INTERNAL FRICTION: 37 DEGREES
6. FACTORED BEARING RESISTANCE:
 - 6.1. PRECAST RIGID FRAME:

FACTORED BEARING RESISTANCE = 2.43 KSF, STRENGTH LIMIT STATE, FOR AN ASSUMED EFFECTIVE FOOTING WIDTH OF 6 FEET. FACTORED BEARING RESISTANCE IS THE PRODUCT OF THE NOMINAL BEARING RESISTANCE AND A RESISTANCE FACTOR OF 0.45.
 - 6.2. WINGWALLS:

FACTORED BEARING RESISTANCE = 5.0 KSF, STRENGTH LIMIT STATE, FOR AN ASSUMED EFFECTIVE FOOTING WIDTH OF 8 FEET. FACTORED BEARING RESISTANCE IS THE PRODUCT OF THE NOMINAL BEARING RESISTANCE AND A RESISTANCE FACTOR OF 0.45.
7. FACTORED RESISTANCE AGAINST SLIDING:
 - 7.1. CAST-IN-PLACE CONCRETE AGAINST SOIL:

"C" = 1.0
RESISTANCE FACTOR = 0.8
 - 7.2. PRECAST CONCRETE AGAINST SOIL:

"C" = 0.9
RESISTANCE FACTOR = 0.9
8. LATERAL EARTH PRESSURES FOR RIGID FRAME AND WINGWALLS SHALL BE CALCULATED AND APPLIED IN ACCORDANCE WITH 2020 AASHTO LRFD:
 - 8.1. LATERAL EARTH PRESSURE COEFFICIENTS:

STATIC, $K_0 = 0.4$
ACTIVE, $K_A = 0.23$
PASSIVE, $K_P = 4.04$ (IGNORE PASSIVE RESISTANCE FOR SLIDING AND OVERTURNING)
 - 8.2. SURCHARGE:

HORIZONTAL FORCE FROM THE PRESSURE DISTRIBUTION PRODUCED BY THE AASHTO HL–93 VEHICULAR LIVE LOAD.

REINFORCEMENT NOTES:

1. REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M31 (ASTM A 615) GRADE 60. UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DRAWINGS, ALL BARS SHALL BE LAPPED AS FOLLOWS:
- | <u>MODIFICATION CONDITION</u> | <u>#4 BARS</u> | <u>#5 BARS</u> | <u>#6 BARS</u> |
|---|----------------|----------------|----------------|
| 1. NONE | 16" | 19" | 23" |
| 2. 12" OF CONCRETE BELOW BAR | 20" | 25" | 30" |
| 3. EPOXY COATED BARS, COVER $<3d_b$
OR CLEAR SPACING $<6d_b$ | 23" | 29" | 34" |
| 4. COATED BARS, ALL OTHER CASES | 18" | 23" | 27" |
| 5. CONDITION 2. AND 3. | 26" | 32" | 39" |
| 6. CONDITION 2. AND 4. | 24" | 30" | 36" |
2. THE MINIMUM REBAR SPICE LENGTH SCHEDULE IS BASED ON $F'_c = 4,000$ PSI AND $F_y = 60,000$ PSI.
3. IF THE CLEAR SPACING BETWEEN THE REBARS IS LESS THAN FIVE BAR DIAMETERS, OR IF THE COVER IS LESS THAN TWO BAR DIAMETERS, INCREASE THE SPICE LENGTH BY AN ADDITIONAL 50%.
4. IF LIGHTWEIGHT CONCRETE IS USED, INCREASE THE SPICE LENGTH BY AN ADDITIONAL 30%.
5. WHEN BARS OF DIFFERENT SIZE ARE LAP SPICED, THE SPICE LENGTH SHALL BE THE LARGER OF EITHER THE DEVELOPMENT LENGTH OF THE LARGER BAR OR THE SPICE LENGTH OF THE SMALLER BAR.
6. ALL REINFORCING STEEL SHALL BE EPOXY COATED.

CONCRETE DESIGN AND CONSTRUCTION NOTES:

1. SECTION DIMENSIONS, MATERIALS, AND REINFORCEMENT DETAILS FOR RIGID FRAME BRIDGE UNITS AND ASSOCIATED HEADWALLS SHALL BE ACCORDING TO THE REQUIREMENTS FOR ASTM C27.
2. PRECAST DESIGN LOADING:
 - 2.1. BRIDGE UNITS-HL-93
 - 2.2. MODULAR BLOCK WINGWALLS: EARTH PRESSURE + LIVE LOAD
 - 2.3. DESIGN FILL HEIGHT: 3'-6" TO 3'-8" FROM TOP OF PRECAST STRUCTURE TO TOP OF PAVEMENT
 - 2.4. DESIGN METHOD: LOAD RESISTANCE FACTOR DESIGN PER AASHTO LRFD SPECIFICATION
3. CONCRETE SHALL BE IN ACCORDANCE WITH THE SPECIFIED MINIMUM 28-DAY COMPRESSIVE STRENGTH AS FOLLOWS

CONCRETE TYPE	APPLICATION
5,000 PSI, ¾", 685 HP CEMENT CONCRETE	PRECAST RIGID FRAME BRIDGE UNITS

PRECAST CONCRETE BRIDGE STRUCTURE NOTES:

3. ITEM 995.01, BRIDGE STRUCTURE SHALL INCLUDE THE PRECAST CONCRETE RIGID FRAME, PEDESTAL FOOTINGS USED TO SUPPORT THE RIGID FRAME, PRECAST MOMENT SLAB HEADWALLS, AND PRECAST GUARDRAIL TRANSITIONS. JOINT MATERIALS, MEMBRANE, AND ANY OTHER MATERIALS OR ITEMS REQUIRED FOR INSTALLATION OF THE PRECAST CONCRETE BRIDGE STRUCTURE SHALL BE SUBSIDIARY.
4. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS, AND DESIGN CALCULATIONS SEALED AND SIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN MASSACHUSETTS TO THE ENGINEER FOR REVIEW AND ACCEPTANCE TO ENSURE CONFORMANCE WITH THE CONTRACT DOCUMENTS AND THEN TO MassDOT FOR REVIEW AND APPROVAL. DESIGN SHALL ENCOMPASS THE RIGID FRAME, PRECAST PEDESTAL FOUNDATIONS, AND PRECAST MOMENT SLAB HEADWALLS. SHOP DRAWINGS AND CALCULATIONS SHALL BE SUBMITTED PRIOR TO FABRICATION FOR ALL PRECAST CONCRETE ELEMENTS. SHOP DRAWINGS SHALL SHOW JOINT DETAILS AND REINFORCEMENT SIZE AND LOCATION.
5. CHANGES OR MODIFICATIONS DURING THE FABRICATION PROCESS MUST BE SUBMITTED TO THE ENGINEER FOR ACCEPTANCE AND THEN TO MassDOT FOR APPROVAL. ALL CHANGES WILL BE INCORPORATED INTO THE FINAL APPROVED CONCEPTUAL PLANS.
6. DIMENSIONS SHOWN FOR THE PRECAST CONCRETE ELEMENTS ARE APPROXIMATE AND BASED ON CONCEPTUAL DESIGN. NO ADJUSTMENTS TO QUANTITIES OR PAYMENTS WILL BE MADE AS A RESULT OF PROVIDING PRECAST UNITS SIZED DIFFERENTLY THAN SHOWN ON THE PLANS. CONTRACTOR TO ADJUST WIDTH AND THICKNESS OF THE PRECAST RIGID FRAME BRIDGE UNITS AS NEEDED DEPENDING ON MANUFACTURER'S SPECIFICATIONS, PROVIDED THE OPENING SIZE IS MAINTAINED. IF PRECAST ELEMENT SIZES SELECTED BY CONTRACTOR DIFFER, SEE ALSO ITEM 995 IN THE SPECIAL PROVISIONS.
7. THE QUALITY OF MATERIALS, THE PROCESS OF MANUFACTURE, AND THE FINISHED PRECAST UNITS SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY THE ENGINEER.
8. JOINTS BETWEEN ABUTTING PRECAST UNITS SHALL BE MECHANICALLY CONNECTED, WATERTIGHT, GROUTED, AND MEMBRANED.
9. WATERPROOF MEMBRANE SHALL BE PROVIDED OVER THE STRUCTURE ACROSS THE ENTIRE ROADWAY WIDTH.
10. SHEET MEMBRANE SHALL BE 2' WIDE WITH PROTECTION BOARD (SUBSIDIARY) AND PLACED CENTERED OVER JOINTS.
11. EXPOSED CONCRETE SURFACES SHALL BE TREATED WITH WATER REPELLENT (SILANE/SILOXANE).
12. PRECAST MOMENT HEADWALLS AND RIGID FRAME SECTIONS SHALL BE DESIGNED TO ACCOUNT FOR ALL EARTH PRESSURE, LIVE LOAD SURCHARGES, AND BRIDGE RAILING LIVE LOAD AS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR NHRSP 350 TL-4 TEST LEVEL.
13. WEEP HOLES SHALL BE PLACED 6'-0" (TYP.) ABOVE THE TOP OF THE PEDESTAL FOOTING AND ONE (1) WEEP SHALL BE PROVIDED DON BOTH SIDES OF EACH RIGID FRAME UNIT OR 10'-0" (MAX) SPACING ALONG FOOTING.
14. TOP SURFACES OF FOOTING UNITS SHALL BE SET UNIFORMLY TRUE & LEVEL TO A TOLERANCE OF $\pm 3/8"$.
15. RIGID FRAME AND PRECAST FOOTING SHALL BE INSTALLED IN THE DRY. SEE DEWATERING NOTES ON SHEET C-6.

PRECAST GUARDRAIL TRANSITION NOTES:

1. PRECAST GUARDRAIL TRANSITIONS FOR ONCOMING TRAFFIC SHALL HAVE YEAR IMPRINTED PER SHEET C-17.
2. USE LATEST CONTRACT COMPLETION YEAR IN EFFECT WHEN THE FIRST GUARDRAIL TRANSITION IS CAST. USE THIS YEAR FOR ALL GUARDRAIL TRANSITIONS.
3. ALL CONCRETE FOR THE PRECAST HIGHWAY GUARDRAIL TRANSITIONS SHALL BE 5000 PSI, ¾", 685 HP CEMENT CONCRETE.

CHAPTER 85 SECTION 35 REVIEW AND APPROVAL NOTES:

1. IN ACCORDANCE AND COMPLIANCE WITH THE REQUIREMENTS OF CHAPTER 85 SECTION 35 OF THE MASSACHUSETTS GENERAL LAWS, THE CONTRACTOR SHALL SUBMIT TO THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION ALL CONSTRUCTION DRAWINGS AND DESIGN CALCULATIONS THAT SHALL BE USED TO FABRICATE AND CONSTRUCT THE STRUCTURE DENOTED ON THESE PLANS FOR REVIEW AND APPROVAL. THIS APPROVAL SHALL CONSTITUTE THE FINAL APPROVAL AS STIPULATED BY CHAPTER 85 SECTION 35 OF THE MASSACHUSETTS GENERAL LAWS.
2. FINAL SHOP DRAWINGS AT DESIGN CALCULATIONS SHALL BE SUBMITTED TO THE ENGINEER AND Mossdorf FOR FINAL APPROVAL. ONCE APPROVED THE SHOP DRAWINGS SHALL BE AFFIXED WITH THE FOLLOWING STAMPED SEAL

COMMONWEALTH OF MASSACHUSETTS	
MassDOT, Highway Division	
APPROVED UNDER PROVISIONS OF	
MASS. GEN. LAWS CH 85 S 35	
STATE BRIDGE ENGINEER	DATE

3. FINAL CHAPTER 85 APPROVAL MUST BE OBTAINED PRIOR TO FABRICATION OF BRIDGE ELEMENTS. CONTRACTOR SHALL BE RESPONSIBLE FOR EDITS AND/OR REVISIONS REQUIRED FOR FINAL CHAPTER 85 APPROVAL AT SOLE COST TO THE CONTRACTOR.

COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING

 3/17/2026
STATE BRIDGE ENGINEER DATE

APPROVED:

 NATHANIEL L. RUSSELL
CIVIL 3/14/20
No. 47719

SEISMIC DESIGN CRITERIA	
GN RETURN PERIOD (YEARS)	1,000
DESIGN SPECTRA	
	0.092
	0.208
	0.096
CLASS	D
MIC DESIGN CATEGORY (SDC)	A

HYDRAULIC DESIGN DATA	
DRAINAGE AREA (SQ. MILES)	2.3
DESIGN FLOOD DISCHARGE (C.F.S.)	416
DESIGN FLOOD FREQUENCY (YEARS)	25
DESIGN FLOOD VELOCITY (F.P.S.)	5.1
DESIGN FLOOD ELEVATION (FEET, NAVD)	1348.8

BASE (100-YEAR) FLOOD DATA	
BASE FLOOD DISCHARGE (C.F.S.)	638
BASE FLOOD ELEVATION (FEET, NAVD)	1350.2

DESIGN AND CHECK SCOUR DATA	
DESIGN SCOUR FLOOD EVENT RETURN FREQUENCY (YEARS)	50
DESIGN FLOOD ABUTMENT SCOUR DEPTH (FEET)	2.4
DESIGN FLOOD PIER SCOUR DEPTH (FEET)	N/A
CHECK SCOUR FLOOD EVENT RETURN FREQUENCY (YEARS)	100
CHECK FLOOD ABUTMENT SCOUR DEPTH (FEET)	2.8
CHECK FLOOD PIER SCOUR DEPTH (FEET)	N/A

FLOOD OF RECORD	
DISCHARGE (C.F.S.)	UNKNOWN
FREQUENCY (IF KNOWN, YEARS)	UNKNOWN
MAXIMUM ELEVATION (FEET, NAVD)	UNKNOWN
DATE (MM/YYYY)	UNKNOWN
HISTORY OF ICE FLOES	UNKNOWN
EVIDENCE OF SCOUR AND EROSION	UNKNOWN

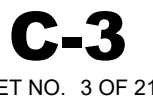
TEMPORARY WATER CONTROL DESIGN DATA	
DESIGN FLOOD DISCHARGE (C.F.S.)	122
DESIGN FLOOD FREQUENCY (YEARS)	2
DESIGN FLOOD VELOCITY (F.P.S.)	3.46
DESIGN FLOOD ELEVATION (FEET, NAVD)	1347.3

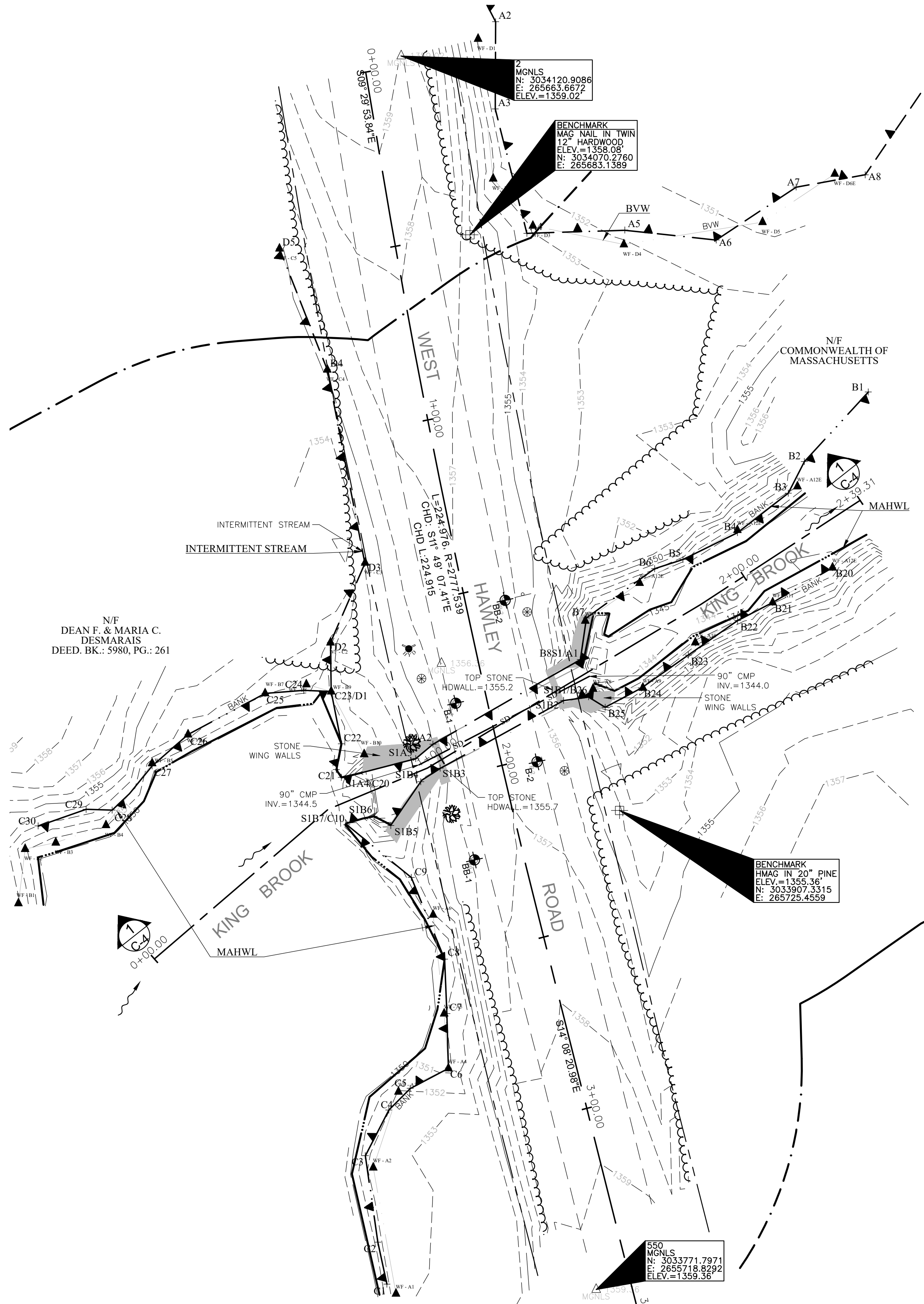
NO	ISSUE / DESCRIPTION	BY	DATE

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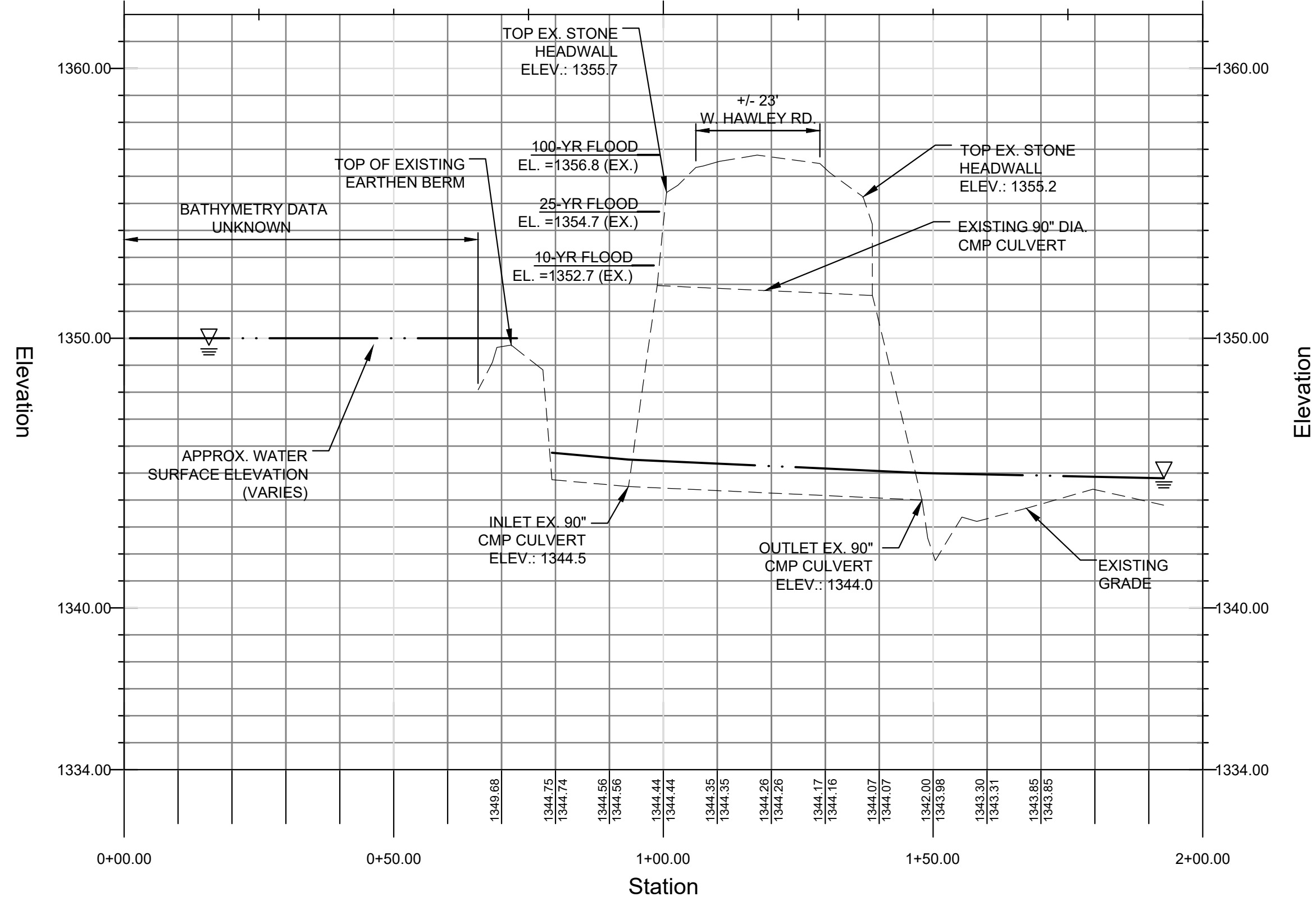
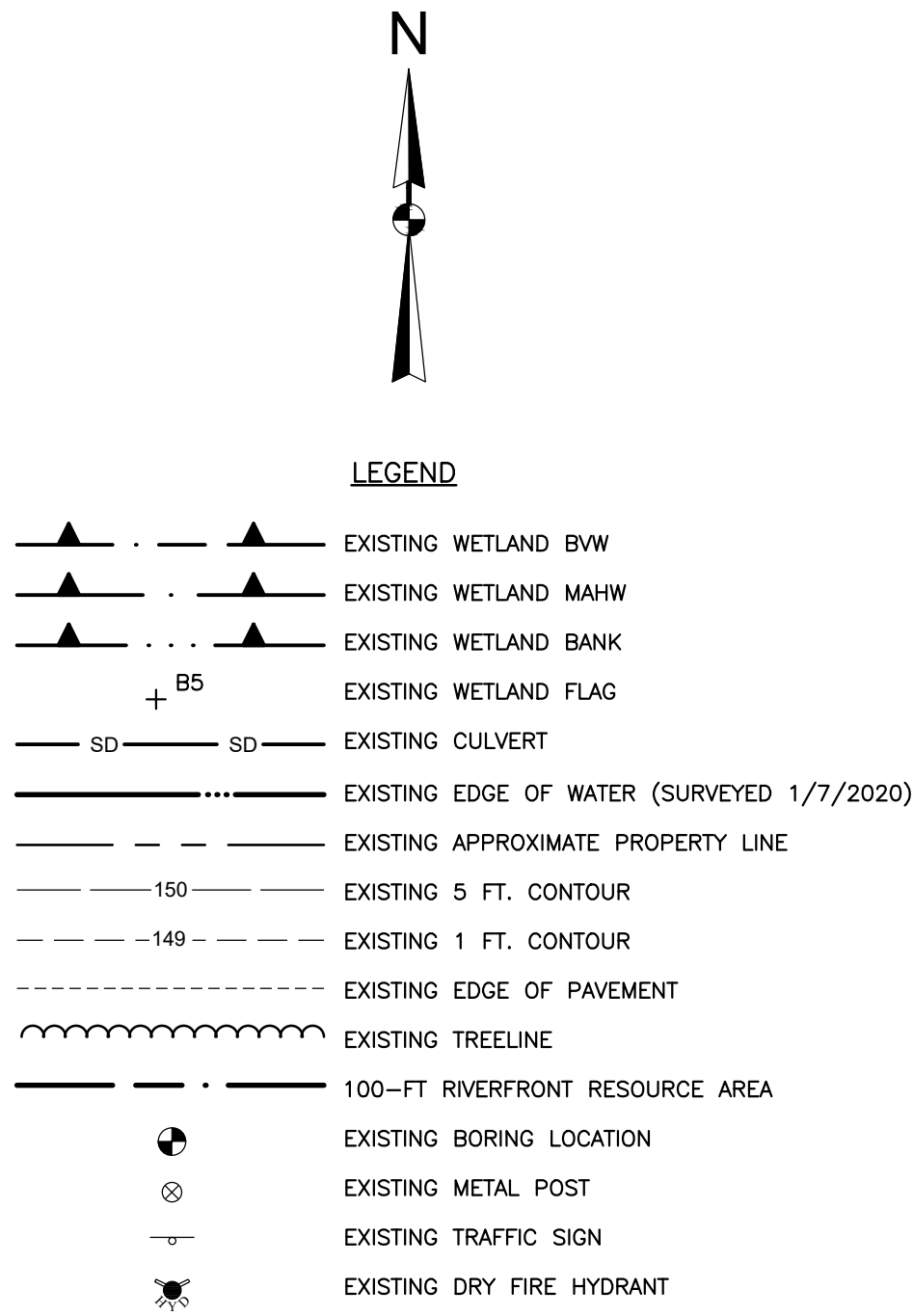
KING BROOK CULVERT DESIGN SERVICES
W. HAWLEY ROAD
HAWLEY, MA 01339
BRIDGE NO. H-13 018 (CQC)

GENERAL NOTES				
PREPARED BY:  GZA GeoEnvironmental, Inc. www.gza.com			PREPARED FOR: TOWN OF HAWLEY 8 PUDDING HOLLOW ROAD HAWLEY, MA 0339	
PROJ. MGR: RTS	REVIEWED BY: RTS	CHECKED BY: NLR	DRAWING C-2	
DESIGNED BY: MJS	DRAWN BY: MJS	SCALE: AS SHOWN		
DATE: MARCH, 2026	PROJECT NO. 15.0167123.00	REVISION NO. -	SHEET NO. 2 OF 21	





EXISTING CONDITIONS PLAN
0 10' 20' 40' 60'
SCALE IN FEET 1" = 20'

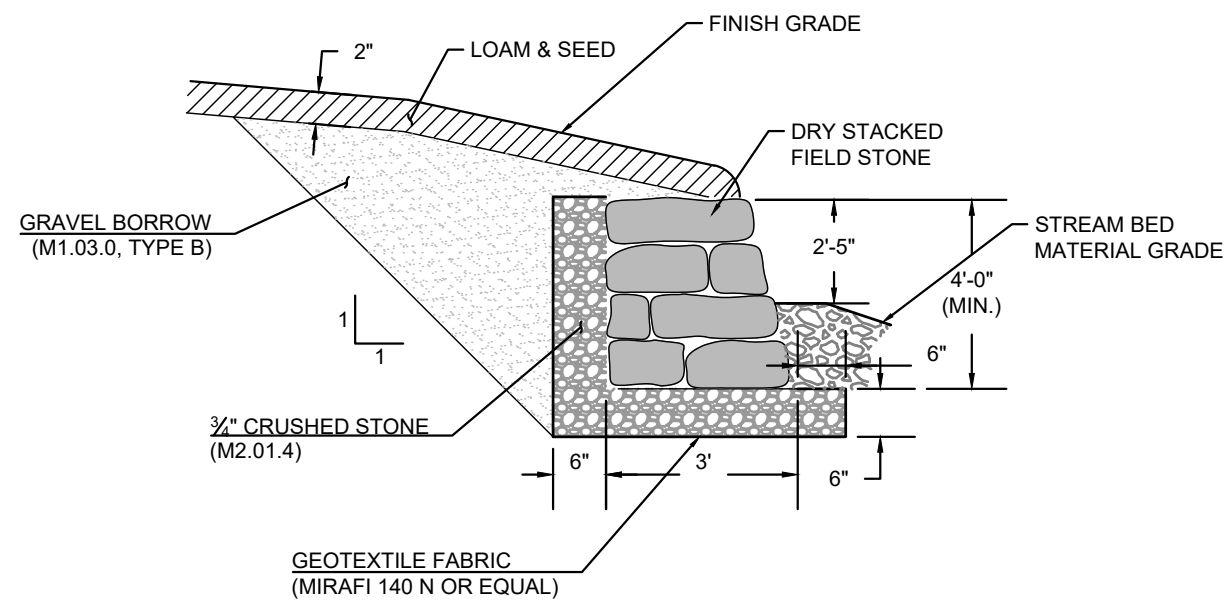
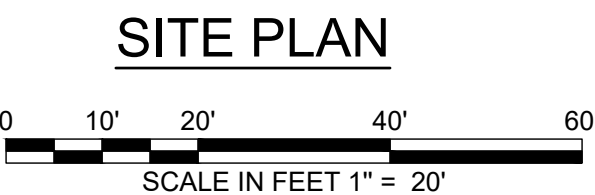


1 KING BROOK EXISTING CONDITIONS PROFILE
C-4
VERTICAL SCALE IN FEET
0 2 4 6 8
HORIZONTAL SCALE IN FEET
0 20 40

NOTES

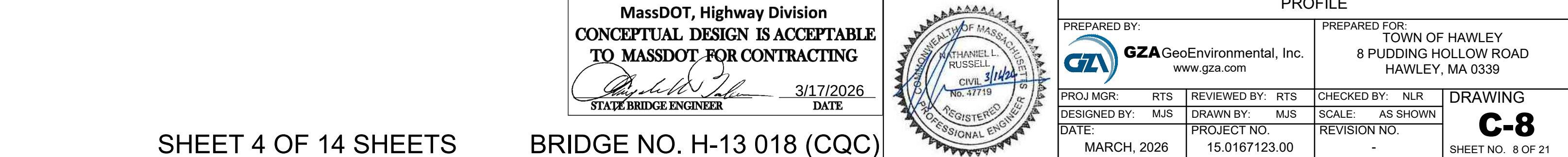
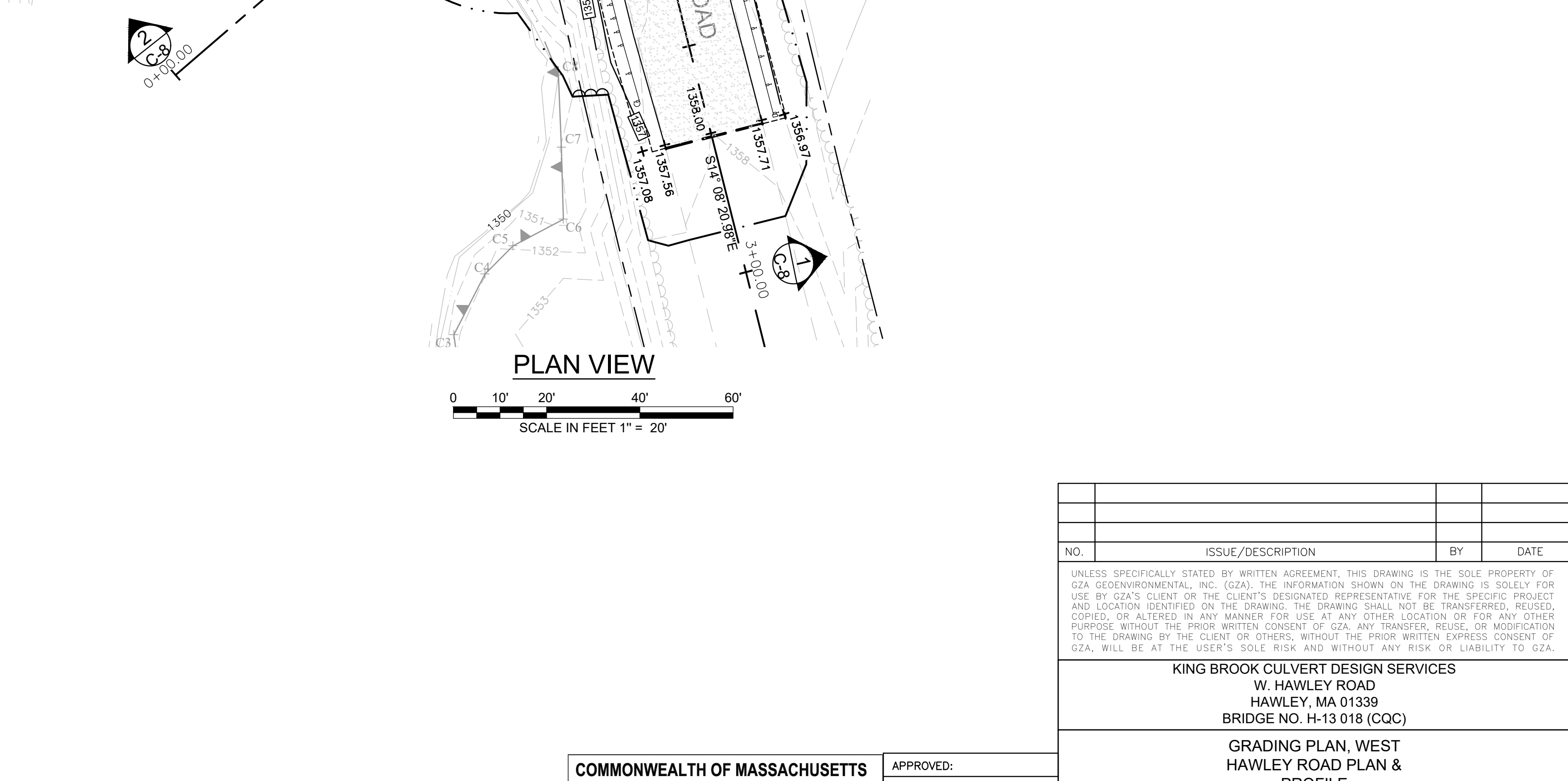
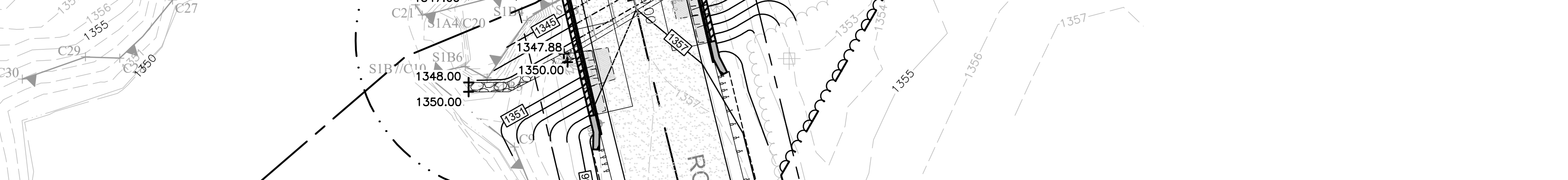
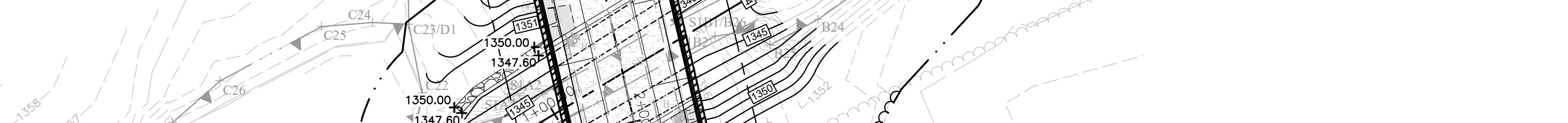
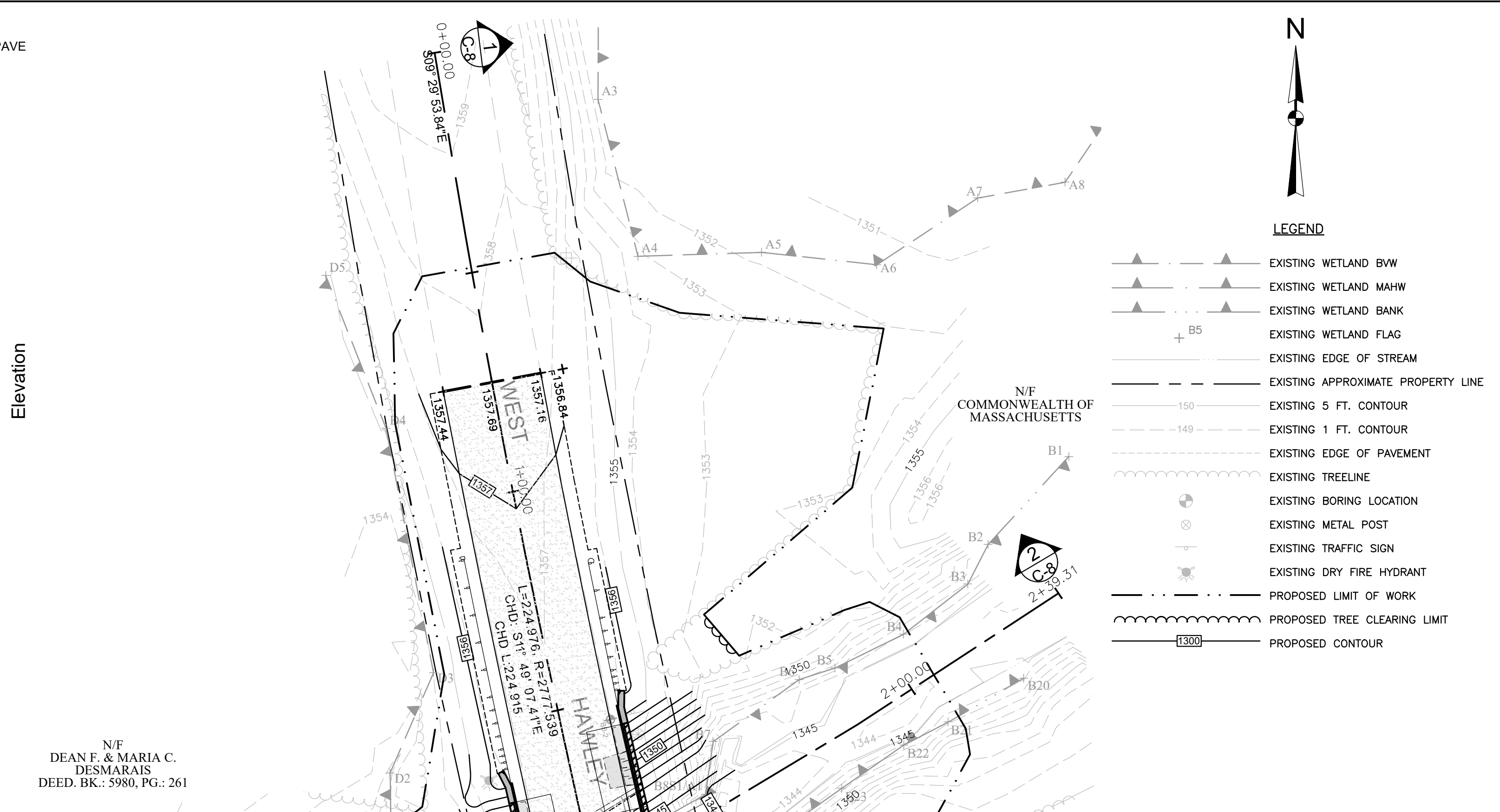
- THE INFORMATION SHOWN HEREON IS BASED ON AN ON-THE-GROUND SURVEY PERFORMED ON JANUARY 7, 2020 BY S&H LAND SERVICES, LLC.
- EXISTING CONDITIONS AND TOPOGRAPHIC INFORMATION TAKEN FROM ELECTRONIC AUTOCAD FILE [202326 TOPO.dwg] BY S&H LAND SERVICES, LLC., DATED 01/11/21.
- LOT LINES AND RIGHT OF WAY LINES (R.O.W.) SHOWN ARE APPROXIMATE BASED ON TAX MAP 10 & HTTP://MASSGIS.STATE.MA.US.
- HORIZONTAL CONTROL:
THIS PROJECT IS REFERENCED TO THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM BASED ON THE NORTH AMERICAN DATUM OF 1983 TAKEN FROM STATIC GPS OBSERVATIONS.
- VERTICAL CONTROL:
THIS PROJECT IS REFERENCED TO NORTH AMERICAN VERTICAL DATUM 1988 TAKEN FROM STATIC GPS OBSERVATIONS.
- WETLAND BOUNDARY DELINEATED BY GZA GEOENVIRONMENTAL, INC. MAY 2023, LOCATED GZA GEOENVIRONMENTAL, INC. BY GLOBAL POSITIONING SYSTEM, MAY 2023.

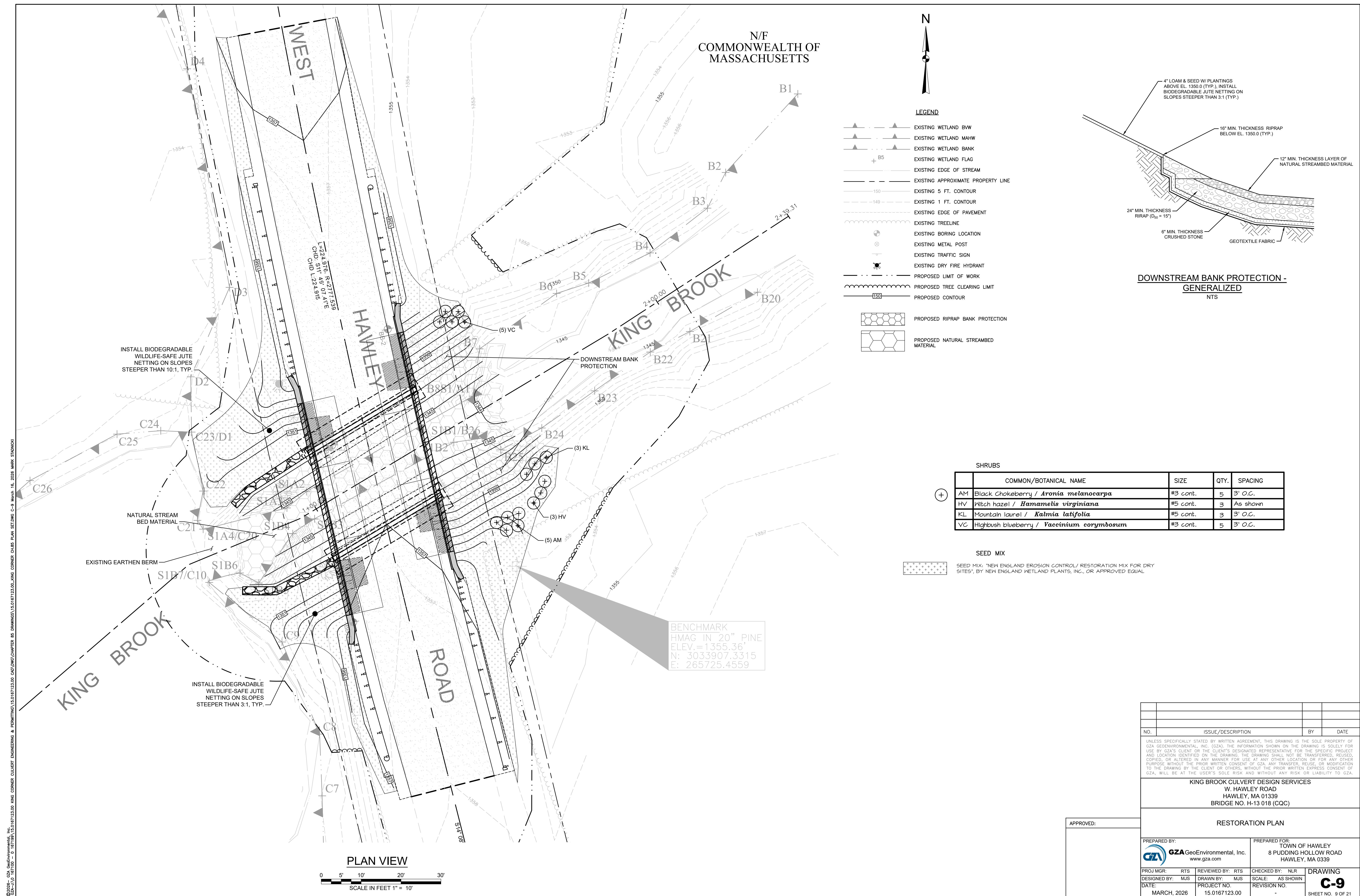
NO.	ISSUE/DESCRIPTION	BY	DATE
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KING BROOK CULVERT DESIGN SERVICES W. HAWLEY ROAD HAWLEY, MA 01339 BRIDGE NO. H-13 018 (CQC)			
EXISTING CONDITIONS PLAN			
APPROVED:			
PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: TOWN OF HAWLEY 8 PUDDING HOLLOW ROAD HAWLEY, MA 0339	
PROJ MGR: RTS	REVIEWED BY: NLR	CHECKED BY: SLL	DRAWING
DESIGNED BY: MJS	DRAWN BY: MJS	SCALE: AS SHOWN	C-4
DATE: MARCH, 2026	PROJECT NO. 15.0167123.00	REVISION NO. -	SHEET NO. 4 OF 21

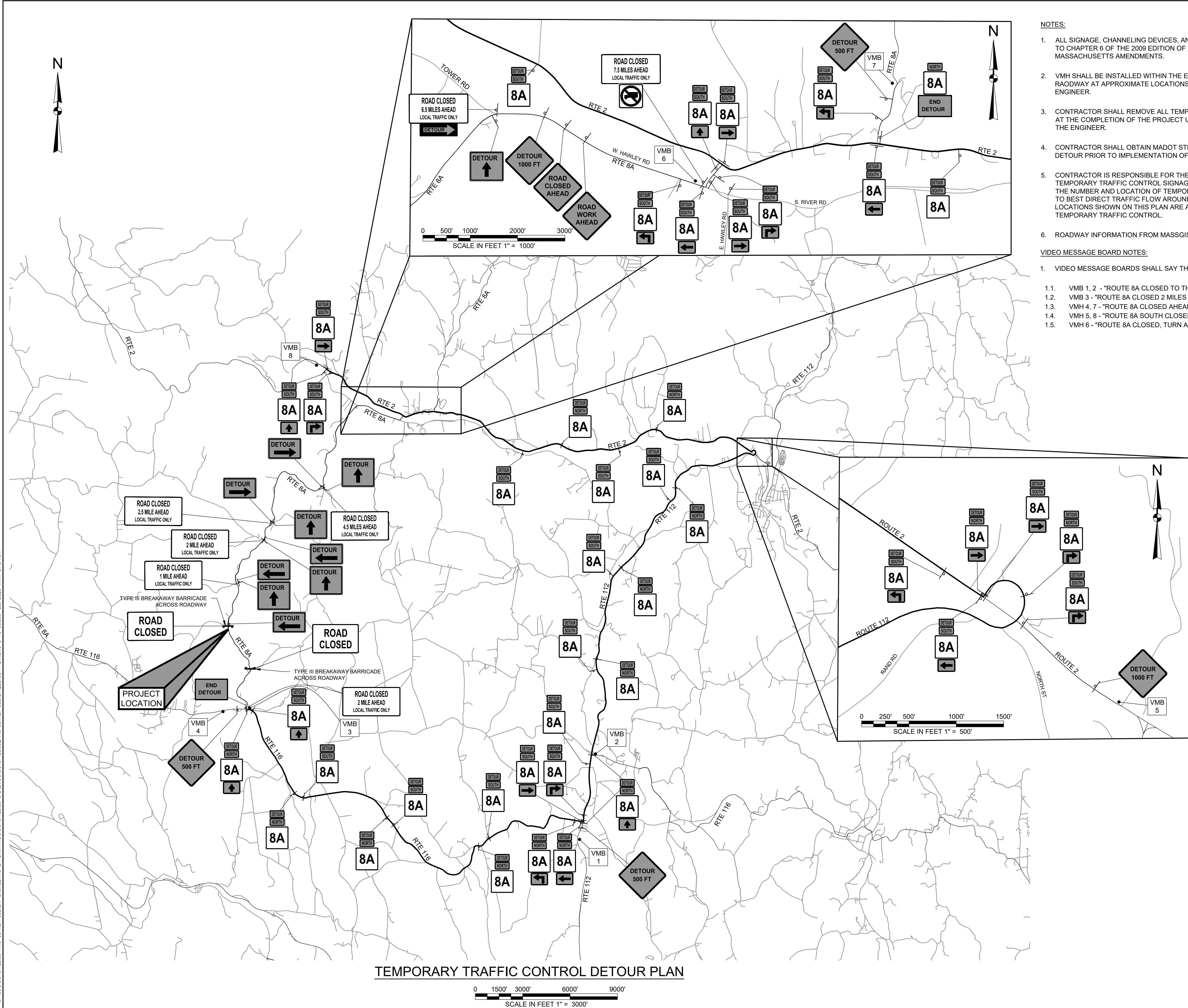


TYPICAL DRY STACKED
STONE WALL
CROSS-SECTION
NTS

No.	ISSUE/DESCRIPTION	By	DATE
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KING BROOK CULVERT DESIGN SERVICES W. HAWLEY ROAD HAWLEY, MA 01339 BRIDGE NO. H-13 018 (CQC)			
SITE PLAN			
PREPARED BY:  GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: TOWN OF HAWLEY 8 PUDDING HOLLOW ROAD HAWLEY, MA 0339	
PROJ MGR: RTS DESIGNED BY: MJS DATE: MARCH, 2026	REVIEWED BY: RTS DRAWN BY: MJS PROJECT NO. 15.0167.123.00	CHECKED BY: NLR SCALE: AS SHOWN REVISION NO. -	DRAWING C-7 SHEET NO. 7 OF 21







NOTES:

1. ALL SIGNAGE, CHANNELING DEVICES, AND DISTANCES SHALL CONFORM TO CHAPTER 6 OF THE 2009 EDITION OF THE MUTCD AND THE MASSACHUSETTS AMENDMENTS.
2. VMH SHALL BE INSTALLED WITHIN THE EXISTING R.O.W. OFF THE ROADWAY AT APPROXIMATE LOCATIONS SHOWN OR AS DIRECTED BY THE ENGINEER.
3. CONTRACTOR SHALL REMOVE ALL TEMPORARY TRAFFIC CONTROL SHOWN AT THE COMPLETION OF THE PROJECT UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
4. CONTRACTOR SHALL OBTAIN MADOT STREET ACCESS PERMIT FOR THE DETOUR PRIOR TO IMPLEMENTATION OF DETOUR.
5. CONTRACTOR IS RESPONSIBLE FOR THE PLACEMENT, RELOCATION OF TEMPORARY TRAFFIC CONTROL SIGNAGE. CONTRACTOR SHALL AMEND THE NUMBER AND LOCATION OF TEMPORARY TRAFFIC CONTROL SIGNAGE TO BEST DIRECT TRAFFIC FLOW AROUND THE PROJECT LOCATION. LOCATIONS SHOWN ON THIS PLAN ARE APPROXIMATE AND THE MINIMUM TEMPORARY TRAFFIC CONTROL.
6. ROADWAY INFORMATION FROM MASSGIS MASSMAPPER.

VIDEO MESSAGE BOARD NOTES:

1. VIDEO MESSAGE BOARDS SHALL SAY THE FOLLOWING:
 - 1.1. VMB 1, 2 - "ROUTE 8A CLOSED THRU TRAFFIC"
 - 1.2. VMB 3 - "ROUTE 8A CLOSED 2 MILES AHEAD"
 - 1.3. VMH 4, 7 - "ROUTE 8A CLOSED AHEAD"
 - 1.4. VMH 5, 8 - "ROUTE 8A SOUTH CLOSED AHEAD"
 - 1.5. VMH 6 - "ROUTE 8A CLOSED, TURN AROUND"

LEGEND

Legend symbols and descriptions:

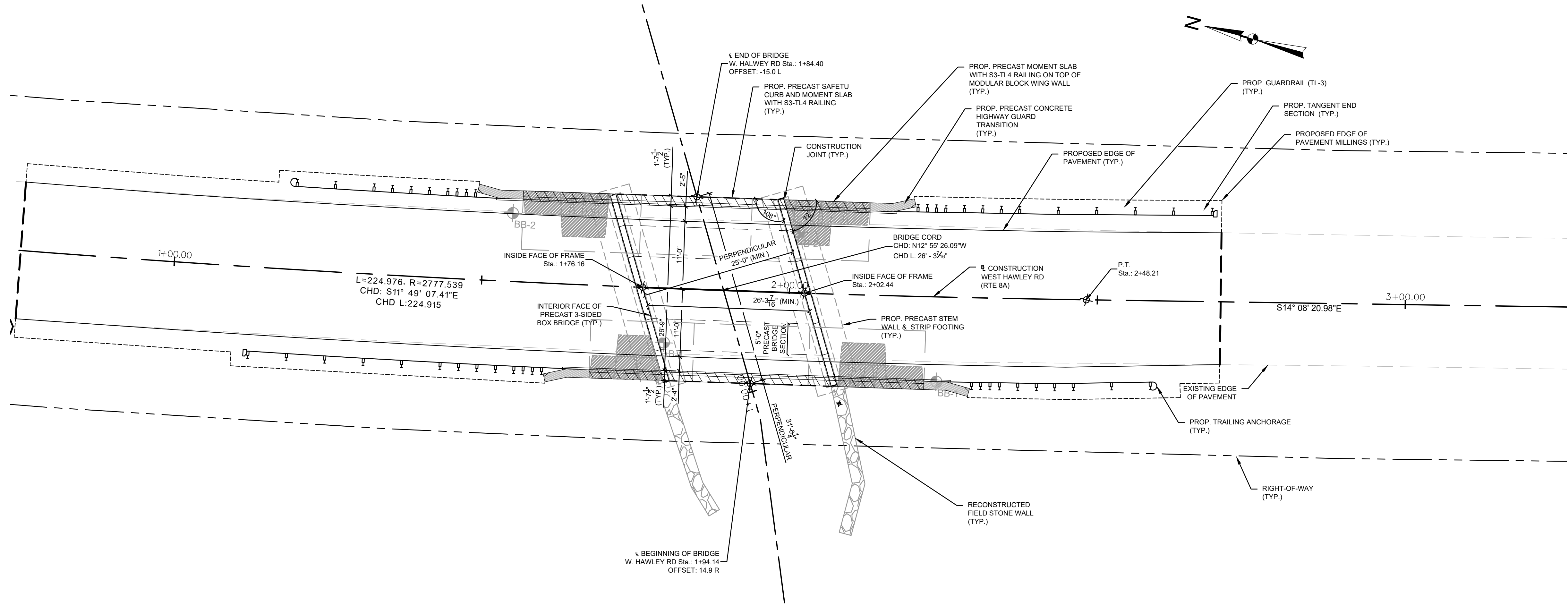
- M6-3, M5-1R, M6-1R, M6-1L, M5-1L, M3-1, M3-3, M4-8, M4-9R, M4-9S, M4-9L, MA-M1-5, M5-2, R11-2 ON TYPE III BREAKAWAY BARRICADE, R11-3a ON TYPE III BREAKAWAY BARRICADE, W20-2b, W20-2c, W20-3, W20-1, VIDEO MESSAGE BOARD (VMB #), TYPE III BREAKAWAY BARRICADE.

KING BROOK CULVERT DESIGN SERVICES
W. HAWLEY ROAD
HAWLEY, MA 01339

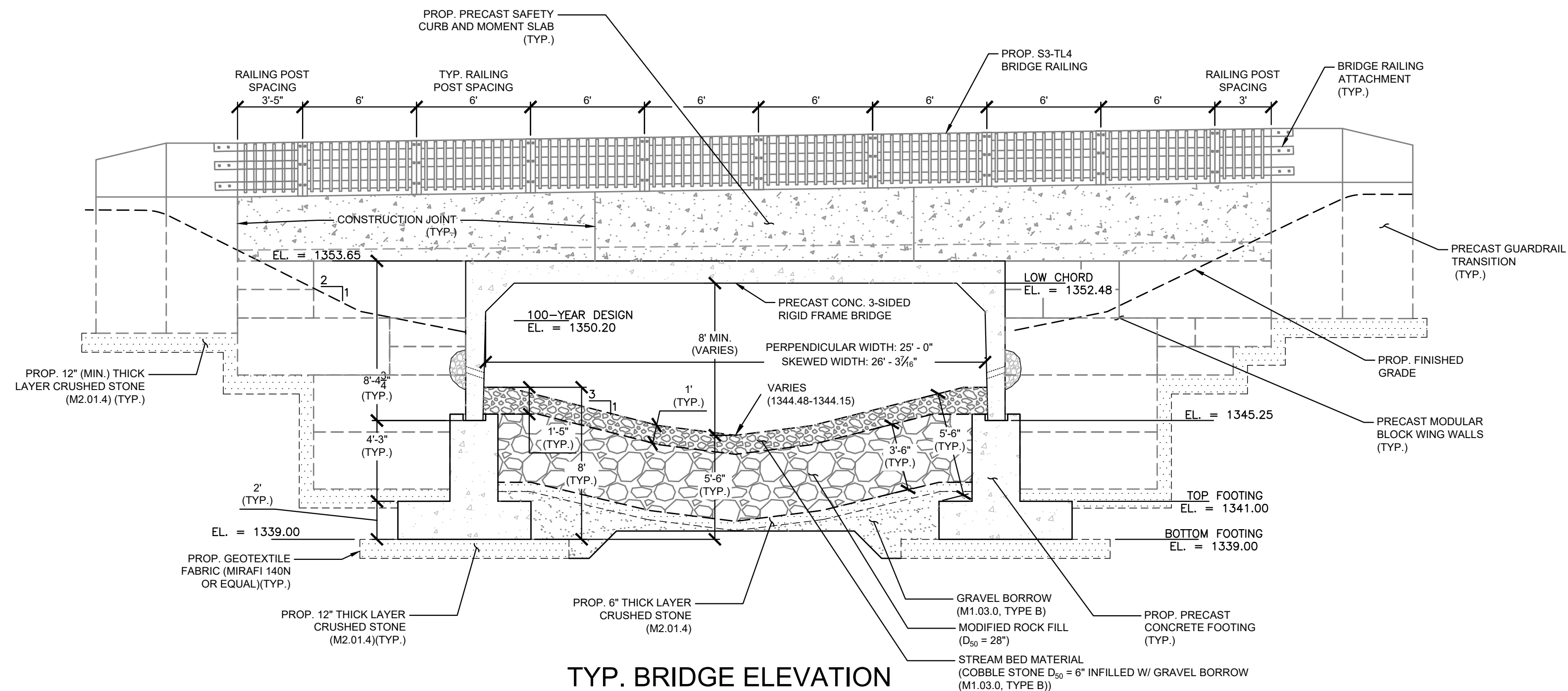
OVERALL DETOUR PLAN

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: TOWN OF HAWLEY 8 PUDDING HOLLOW ROAD HAWLEY, MA 01339	
PROJ MGR: RTS	REVIEWED BY: RTS	CHECKED BY: NLR	DRAWING
DESIGNED BY: MJS	DRAWN BY: MJS	SCALE: AS SHOWN	C-10
DATE: OCTOBER, 2025	PROJECT NO. 15.0167123.00	REVISION NO. -	SHEET NO. 10 OF 20

© 2026 - GZA GeoEnvironmental, Inc. 15.0167123.00 KING CORNER CULVERT ENGINEERING & PERMITTING 15.0167123.00 CAD/DWG/CHAPTER 85 DRAWINGS 15.0167123.00 KING CORNER CULVERT CH.85 PLAN SET.DWG C-11 March 16, 2026 MARK STANOKI



GENERAL BRIDGE PLAN

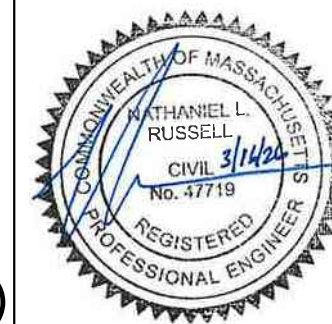


TYP. BRIDGE ELEVATION

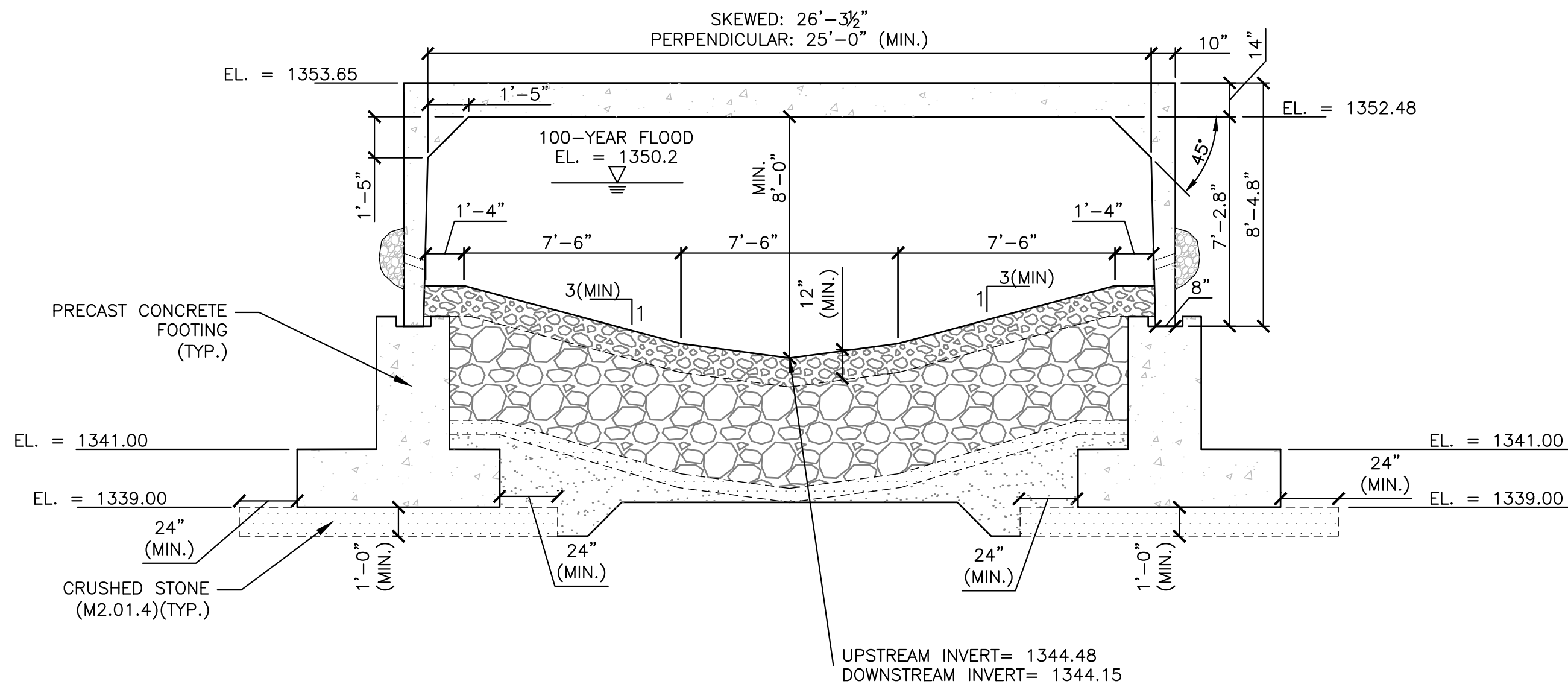
SCALE: 1" = 5'

COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING
3/17/2026
DATE

APPROVED:

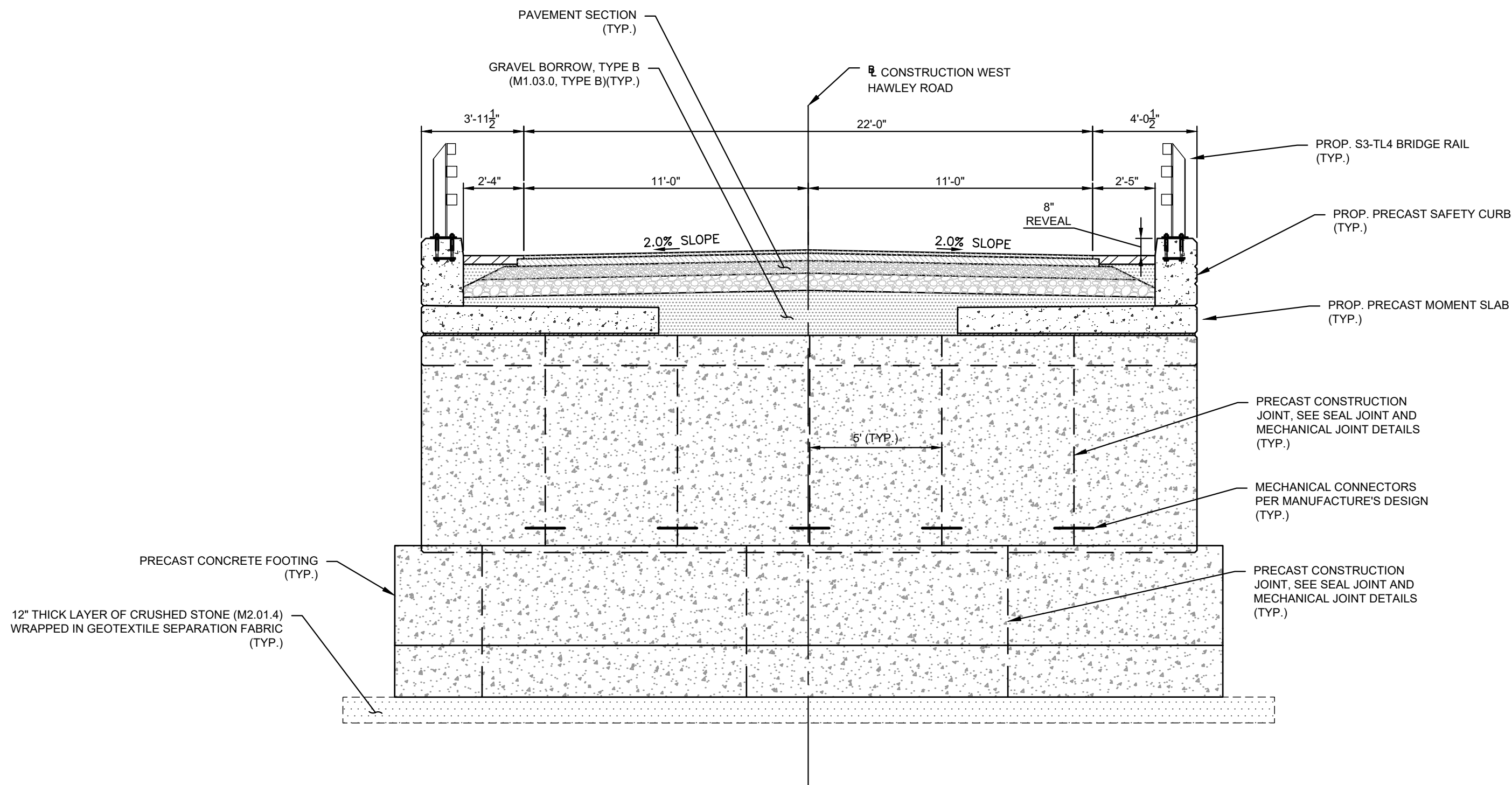


NO.	ISSUE/DESCRIPTION	BY	DATE
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KING BROOK CULVERT DESIGN SERVICES W. HAWLEY ROAD HAWLEY, MA 01339 BRIDGE NO. H-13 018 (CQC)			
GENERAL BRIDGE PLAN & ELEVATION			
PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: TOWN OF HAWLEY 8 PUDDING HOLLOW ROAD HAWLEY, MA 0339	
PROJ MGR: RTS	DESIGNED BY: MJS	REVIEWED BY: RTS	CHECKED BY: NLR
DATE: MARCH, 2026	DRAWN BY: MJS	SCALE: 15.0167123.00	REVISION NO. AS SHOWN
			C-11 SHEET NO. 11 OF 21



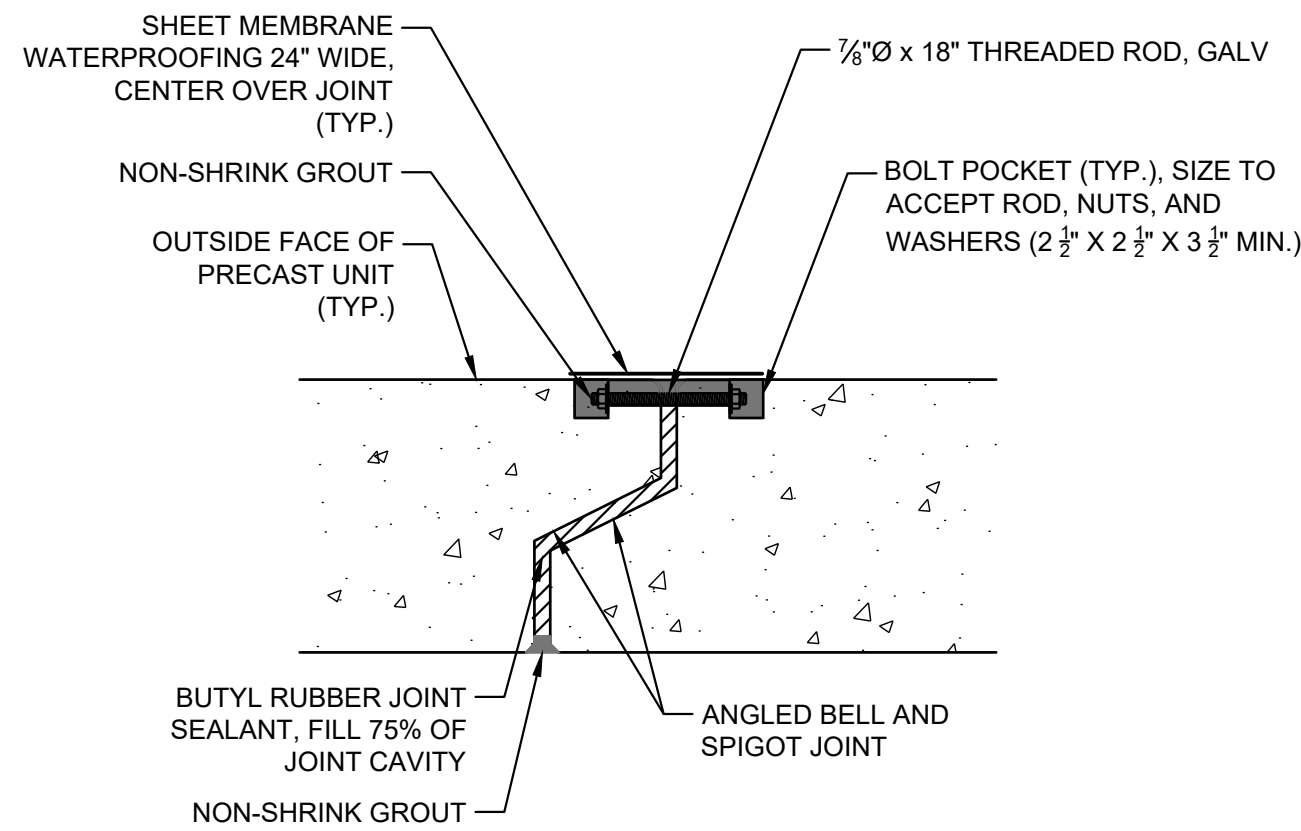
SQUARE RIGID FRAME SECTION AT CONSTRUCTION LOOKING EAST

SCALE: $\frac{1}{4}'' = 1'$



TRANSVERSE SQUARE RIGID FRAME SECTION

SCALE: $\frac{1}{4}'' = 1'$

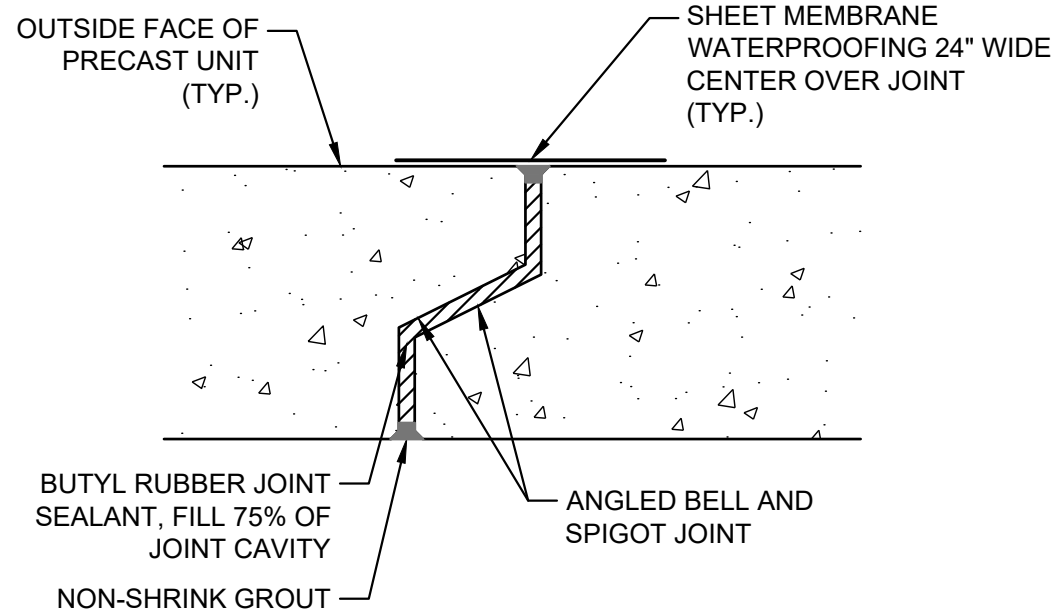


TYPICAL MECHANICAL JOINT

NTS

TYPICAL JOINT NOTES:

- 3-SIDED RIGID FRAME MANUFACTURER TO PROVIDE FINAL JOINT DESIGN.
- PROVIDE BUTYL RUBBER JOINT SEALANT (AASHTO M-198) BETWEEN PRECAST CONCRETE UNITS.
- PROVIDE A MINIMUM OF 5 MECHANICAL CONNECTORS BETWEEN RIGID FRAME UNITS (3 ON TOP AND 1 ON EACH SIDE).
- ALL BOLT POCKETS SHALL BE FILLED WITH NON-SHRINK GROUT.
- SHEET MEMBRANE SHALL BE PLACED IN 2-FOOT WIDE STRIPS, CENTERED OVER THE TOP AND/OR SIDES OF EACH JOINT.



TYPICAL SEAL JOINT

NTS

PRECAST 3-SIDED RIGID FRAME NOTES:

- PRECAST 3-SIDED RIGID FRAME TO BE DESIGNED BY CONTRACTOR; HOWEVER, FINAL DESIGN MUST MAINTAIN HYDRAULIC OPENING; OTHERWISE, THE HYDRAULIC REPORT MUST BE REVISED.
 - 3-SIDED RIGID FRAME DIMENSIONS PROVIDED AS SHOWN ARE TO ESTABLISH THE SIZE OF THE PROPOSED CLEAR OPENING. THE WIDTH, REINFORCEMENT, AND THICKNESS OF EACH FRAME UNIT MAY VARY DEPENDING UPON THE MANUFACTURER'S SPECIFICATIONS, PROVIDED THE HYDRAULIC OPENING IS MAINTAINED.
- GEOTECHNICAL DESIGN PARAMETERS:
- GEOTECHNICAL REPORT: "GEOTECHNICAL ENGINEERING REPORT - ROUTE 8A (WEST HAWLEY ROAD) OVER KING BROOK, BRIDGE NO. H-13-018 (CQC), HAWLEY, MASSACHUSETTS," PREPARED FOR TOWN OF HAWLEY, MASSACHUSETTS, PREPARED BY GZA GEOENVIRONMENTAL, INC., DATED FEBRUARY 13, 2026.
 - MINIMUM EMBEDMENT FOR FROST PROTECTION FOR FOOTINGS FOUNDED ON SOIL = 4 FEET BELOW ADJACENT GROUND SURFACE
 - MAXIMUM ALLOWABLE SETTLEMENT = 1.00 INCHES TOTAL, 0.5 INCH DIFFERENTIAL
 - BACKFILL UNIT WEIGHT: 120 POUNDS PER CUBIC FOOT (PCF)
 - BACKFILL ANGLE OF INTERNAL FRICTION: 37 DEGREES
 - FACTORED BEARING RESISTANCE:
 - PRECAST RIGID FRAME:

FACTORED BEARING RESISTANCE = 2.43 KSF, STRENGTH LIMIT STATE, FOR AN ASSUMED EFFECTIVE FOOTING WIDTH OF 6 FEET. FACTORED BEARING RESISTANCE IS THE PRODUCT OF THE NOMINAL BEARING RESISTANCE AND A RESISTANCE FACTOR OF 0.45.
 - FACTORED RESISTANCE AGAINST SLIDING:
 - CAST-IN-PLACE CONCRETE AGAINST SOIL:

"C" = 1.0
RESISTANCE FACTOR = 0.8
 - PRECAST CONCRETE AGAINST SOIL:

"C" = 0.9
RESISTANCE FACTOR = 0.9
 - LATERAL EARTH PRESSURES FOR RIGID FRAME SHALL BE CALCULATED AND APPLIED IN ACCORDANCE WITH 2020 AASHTO LRFD:
 - LATERAL EARTH PRESSURE COEFFICIENTS:

STATIC, $K_0 = 0.4$
ACTIVE, $K_A = 0.23$
PASSIVE, $K_P = 4.0$
(IGNORE PASSIVE RESISTANCE FOR SLIDING AND OVERTURNING)
 - SURCHARGE:

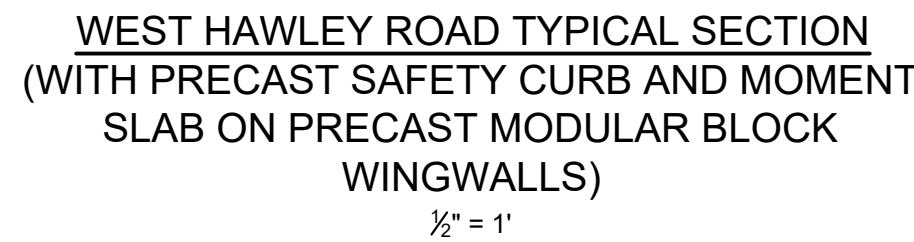
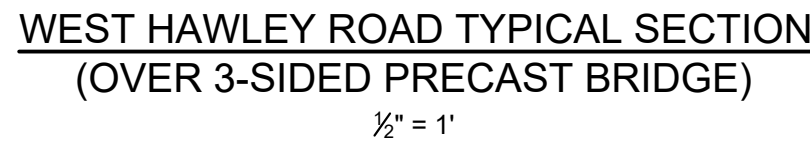
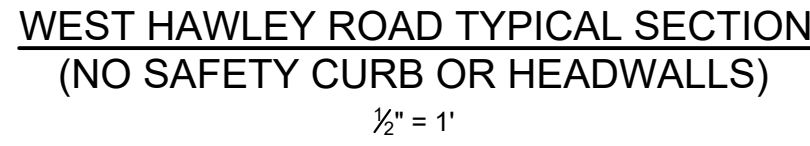
HORIZONTAL FORCE FROM THE PRESSURE DISTRIBUTION PRODUCED BY THE AASHTO HL-93 VEHICULAR LIVE LOAD.

COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING

STATE BRIDGE ENGINEER DATE 3/17/2026



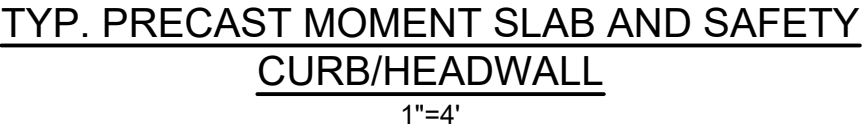
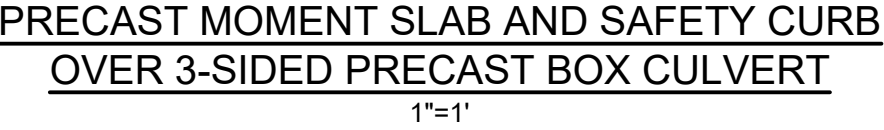
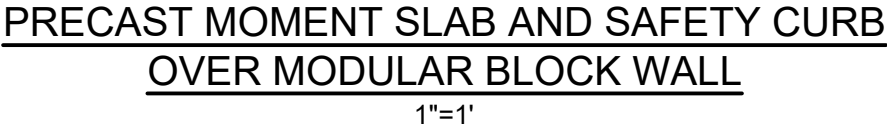
NO.	ISSUE/DESCRIPTION	BY	DATE
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KING BROOK CULVERT DESIGN SERVICES W. HAWLEY ROAD HAWLEY, MA 01339 BRIDGE NO. H-13 018 (CQC)			
BRIDGE SECTION & DETAILS			
PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: TOWN OF HAWLEY 8 PUDDING HOLLOW ROAD HAWLEY, MA 0339	
PROJ MGR: RTS	REVIEWED BY: RTS	CHECKED BY: NLR	DRAWING
DESIGNED BY: MJS	DRAWN BY: MJS	SCALE: AS SHOWN	SCALE: AS SHOWN
DATE: MARCH, 2026	PROJECT NO. 15.0167123.00	REVISION NO. -	REVISION NO. -
			C-13 SHEET NO. 130F 21



1. WEST HAWLEY ROAD:

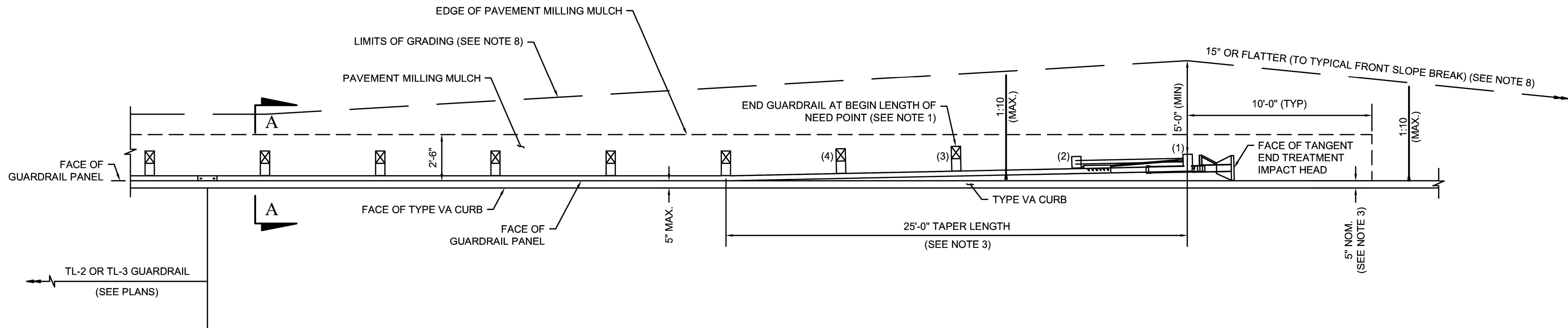
SURFACE COURSE -	1½" SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5) OVER,
INTERMEDIATE COURSE -	3 ½" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC-19.5) OVER,
BASE -	6" DENSE-GRADED CRUSHED STONE (M.2.01.7)
SUB-BASE -	8" GRAVEL BORROW, TYPE B (M.1.03.0 TYPE B)

No.	ISSUE/DESCRIPTION	BY	DATE
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KING BROOK CULVERT DESIGN SERVICES W. HAWLEY ROAD HAWLEY, MA 01339 BRIDGE NO. H-13 018 (CQC)			
ROADWAY CROSS-SECTIONS			
PREPARED BY:  GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: TOWN OF HAWLEY 8 PUDDING HOLLOW ROAD HAWLEY, MA 0339	
PROJ. MGR: RTS DESIGNED BY: MJS DATE: MARCH, 2026	REVIEWED BY: RTS DRAWN BY: MJS PROJECT NO. 15.0167.123.00	CHECKED BY: NLR SCALE: AS SHOWN REVISION NO. -	DRAWING  SHEET NO. 15 OF 21

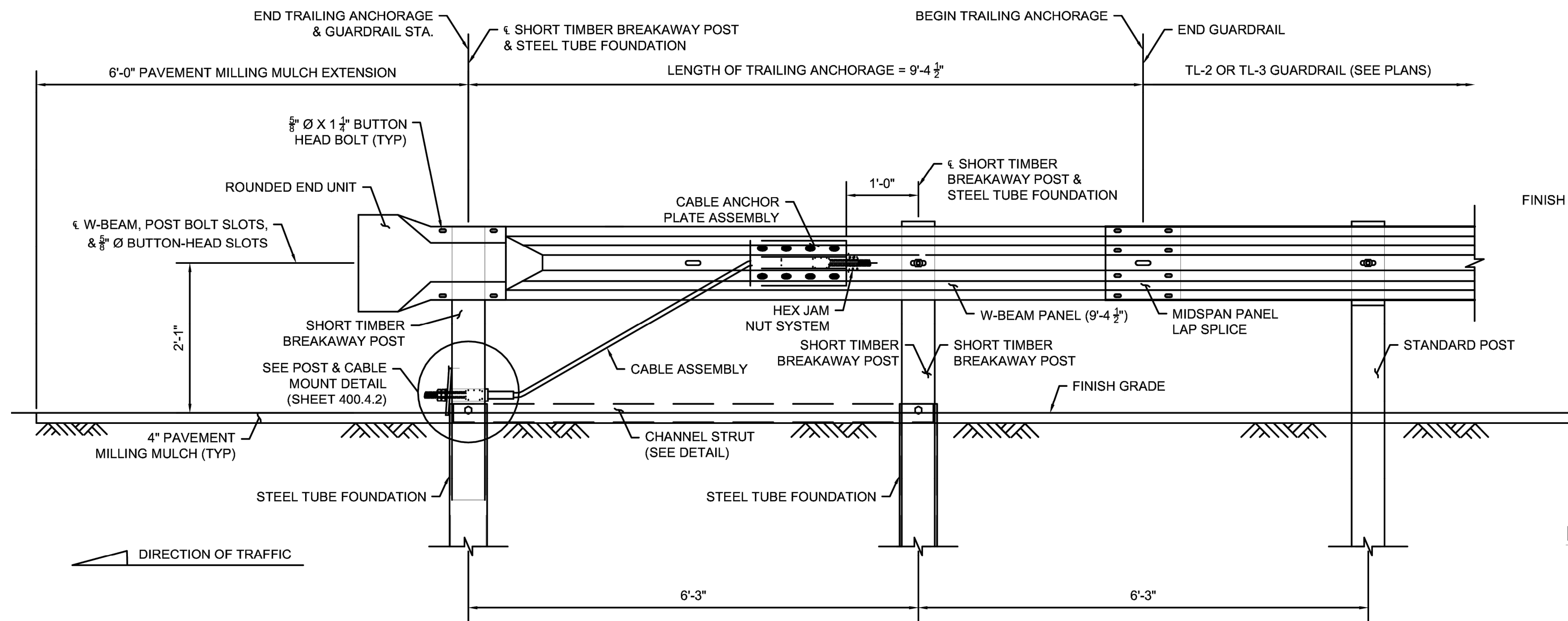


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KING BROOK CULVERT DESIGN SERVICES W. HAWLEY ROAD HAWLEY, MA 01339 BRIDGE NO. H-13 018 (CQC)									
MOMENT SLAB & HEADWALL DETAILS									
PREPARED BY:			PREPARED FOR:						
 GZA GeoEnvironmental, Inc. www.gza.com			TOWN OF HAWLEY 8 PUDDING HOLLOW ROAD HAWLEY, MA 0339						
PROJ MGR:	RTS	REVIEWED BY:	RJS	CHECKED BY:	NLR	DRAWING			
DESIGNED BY:	MJS	DRAWN BY:	MJS	SCALE:	AS SHOWN		C-16		
DATE:	PROJECT NO.		REVISION NO.						
MARCH, 2026	15.0167123.00		-		SHEET NO. 16 OF 21				

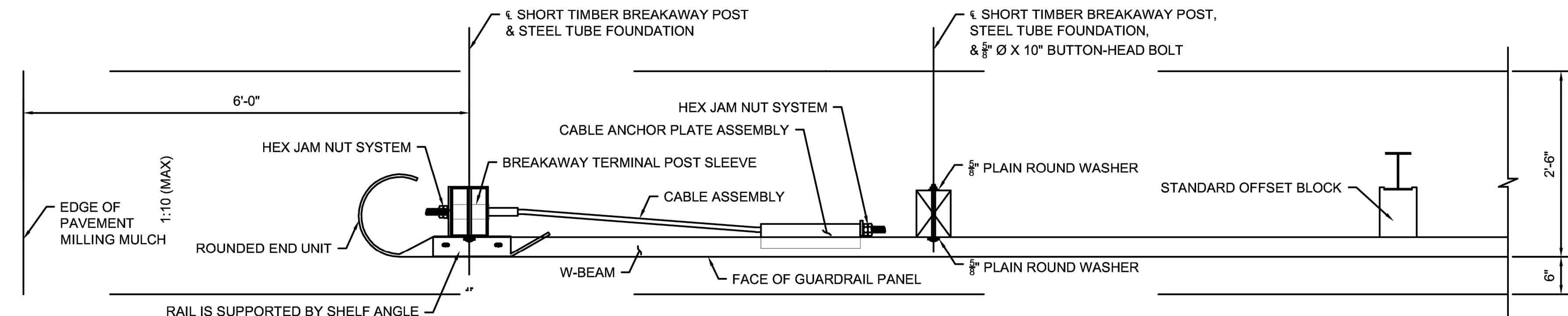
©2026 - GZA GeoEnvironmental, Inc. 15.0167123.00 KING CORNER CULVERT ENGINEERING & PERMITTING/15.0167123.00 CAD/WORK/CHAPTER 85 DRAWINGS/15.0167123.00 KING CORNER CULVERT CH-85 PLAN SET-DETAILS.DWG C-17 March 13, 2026 MARK STAMANDI
GZA-A-10 161105 - 0 167199 15.0167123.00



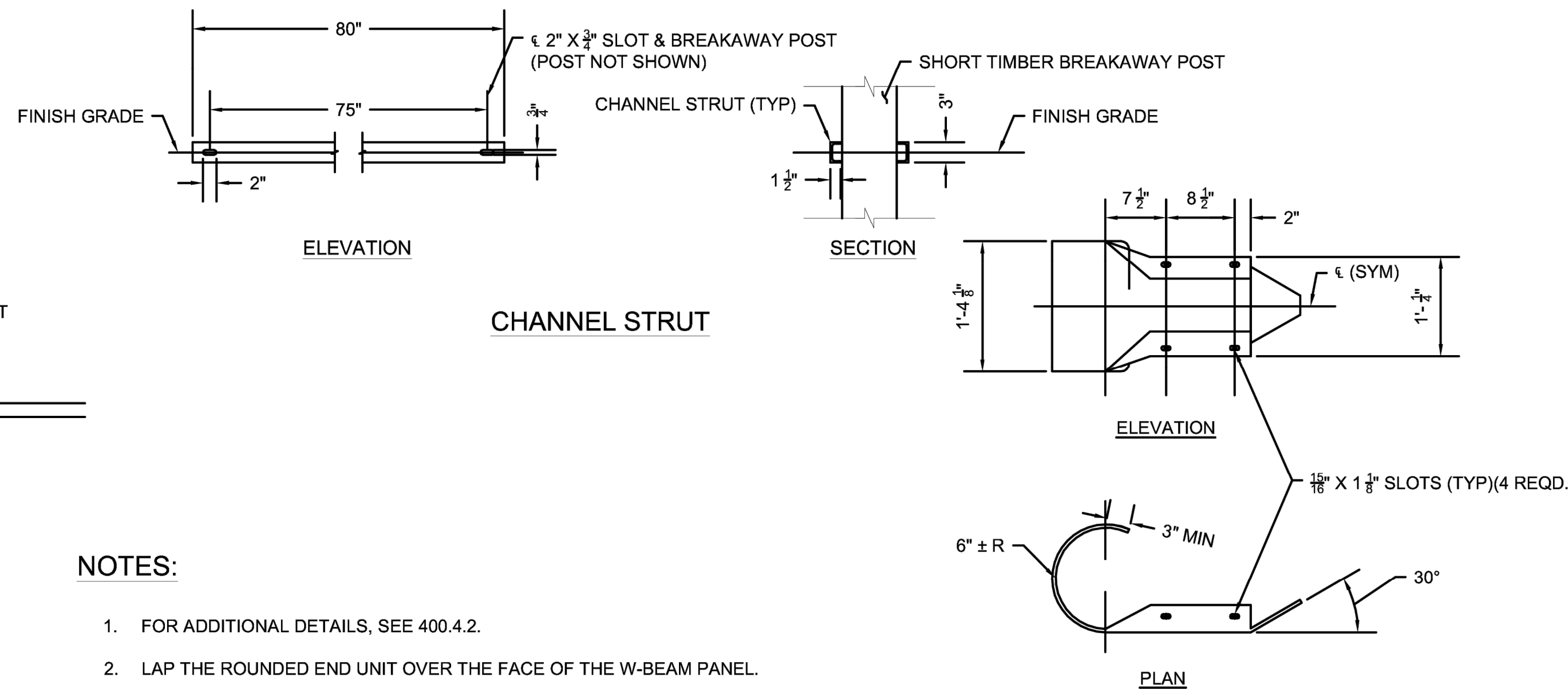
TANGENT END TREATMENT FOR GUARDRAIL
ADJACENT TO CURB - PLAN



ELEVATION



PLAN



NOTES:

- FOR ADDITIONAL DETAILS, SEE 400.4.2.
- LAP THE ROUNDED END UNIT OVER THE FACE OF THE W-BEAM PANEL.
- INSTALL STEEL TUBE FOUNDATIONS BY ONE OF THE FOLLOWING METHODS:
 - EXCAVATE, INSTALL TUBE, BACKFILL, AND SUITABLY COMPACT MATERIALS; OR
 - DRIVE THE TUBE USING A DUMMY TIMBER POST TO PREVENT DAMAGE TO THE SHORT BREAKAWAY POST.

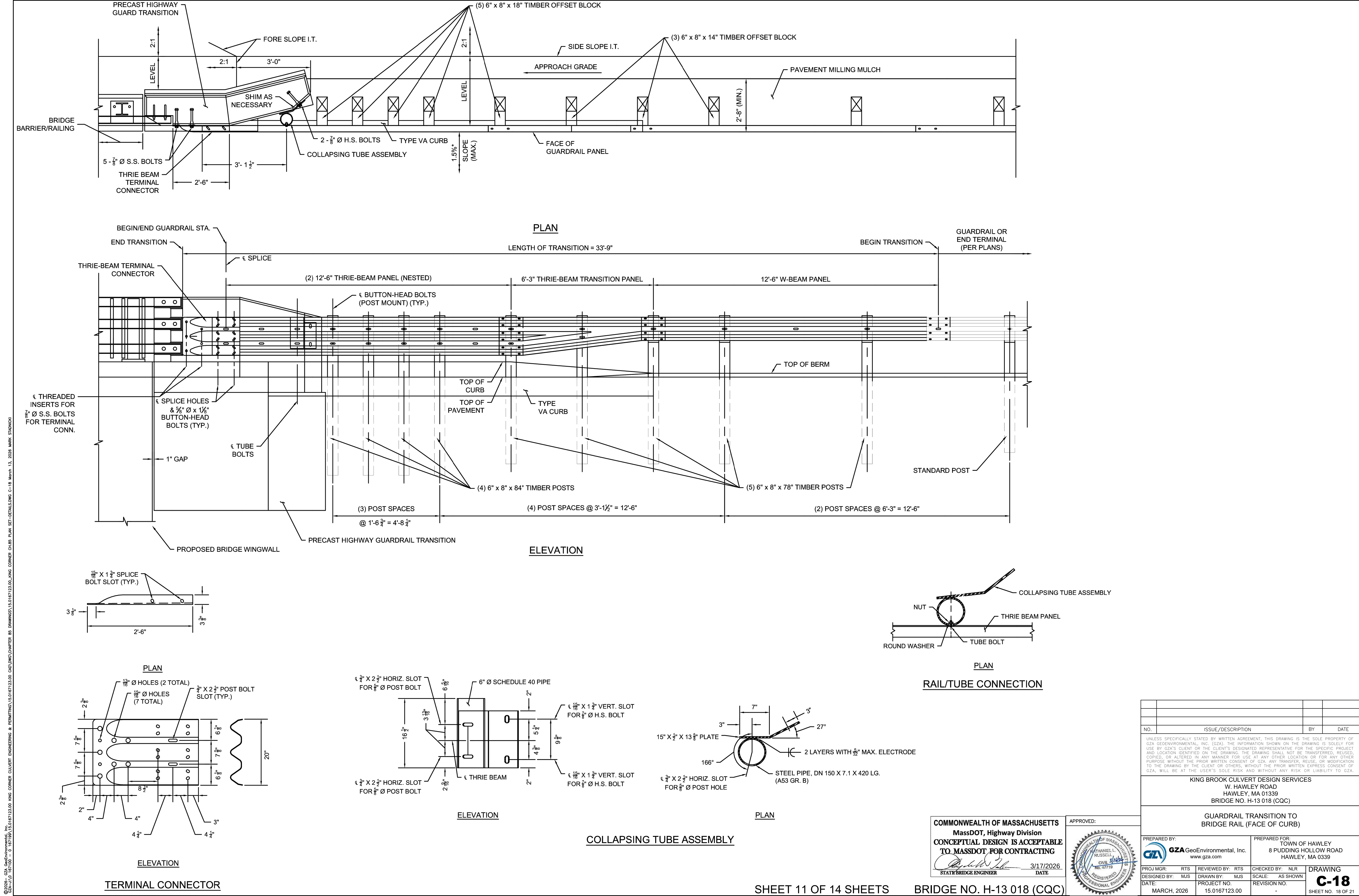
NOTES:

- INSTALL GUARDRAIL AT STATION(S) AND OFFSET(S) SHOWN IN THE PLANS. FOR TANGENT END TREATMENTS ADJACENT TO CURB, THE END OF THE GUARDRAIL SHOWN IN THE PLANS CORRESPONDS WITH THE BEGIN LENGTH OF NEED POINT FOR THE END TREATMENT (SHOWN AT POST 3 IN THESE STANDARDS, BUT MAY VARY BY MANUFACTURER). FOR DOUBLE FACED END TREATMENTS, THE END OF THE GUARDRAIL SHOWN IN THE PLANS CORRESPONDS WITH POST 1.
- PROPRIETARY END TREATMENTS MAY VARY IN SIZE AND SHAPE FROM WHAT IS DEPICTED IN THESE STANDARDS. HOWEVER, THE MAXIMUM SLOPES AND MINIMUM OFFSETS DIMENSIONED FROM THE POSTS SHOWN HEREIN SHALL STILL APPLY.
- END TREATMENT TEST LEVEL SHALL BE SPECIFIED IN THE PLANS.
- CONSTRUCT TANGENT AND DOUBLE FACED END TREATMENTS IN ACCORDANCE WITH THE MANUFACTURER'S UNIQUE DRAWING DETAILS, PROCEDURES, AND SPECIFICATIONS.
- THE FACE OF THE TANGENT END TREATMENT IMPACT HEAD SHALL BE OFFSET A MINIMUM OF 0'-5" AND UP TO 2'-0" FROM THE FACE OF CURB TO MINIMIZE NUISANCE HITS. THE OFFSET SHALL OCCUR OVER THE ENTIRE LENGTH OF THE END TREATMENT UNLESS OTHERWISE SPECIFIED BY THE MANUFACTURER.
- END TREATMENTS SHALL NOT TERMINATE CURVED GUARDRAIL SEGMENTS.
- END TREATMENT IMPACT HEAD DELINEATION SHALL CONFORM TO 601.63.
- INSTALL GRADING AS SHOWN HEREIN UNDER SEPARATE PAY ITEMS. WHERE A TANGENT END TREATMENT FOR GUARDRAIL ADJACENT TO CURB IS INSTALLED IN FRONT OF A SIDEWALK, SEPARATED BIKE FACILITY, OR SHARED-USE PATH, THE GRADING OF THAT FACILITY SHALL SUPERSEDE THE GRADING SHOWN IN THESE STANDARDS.

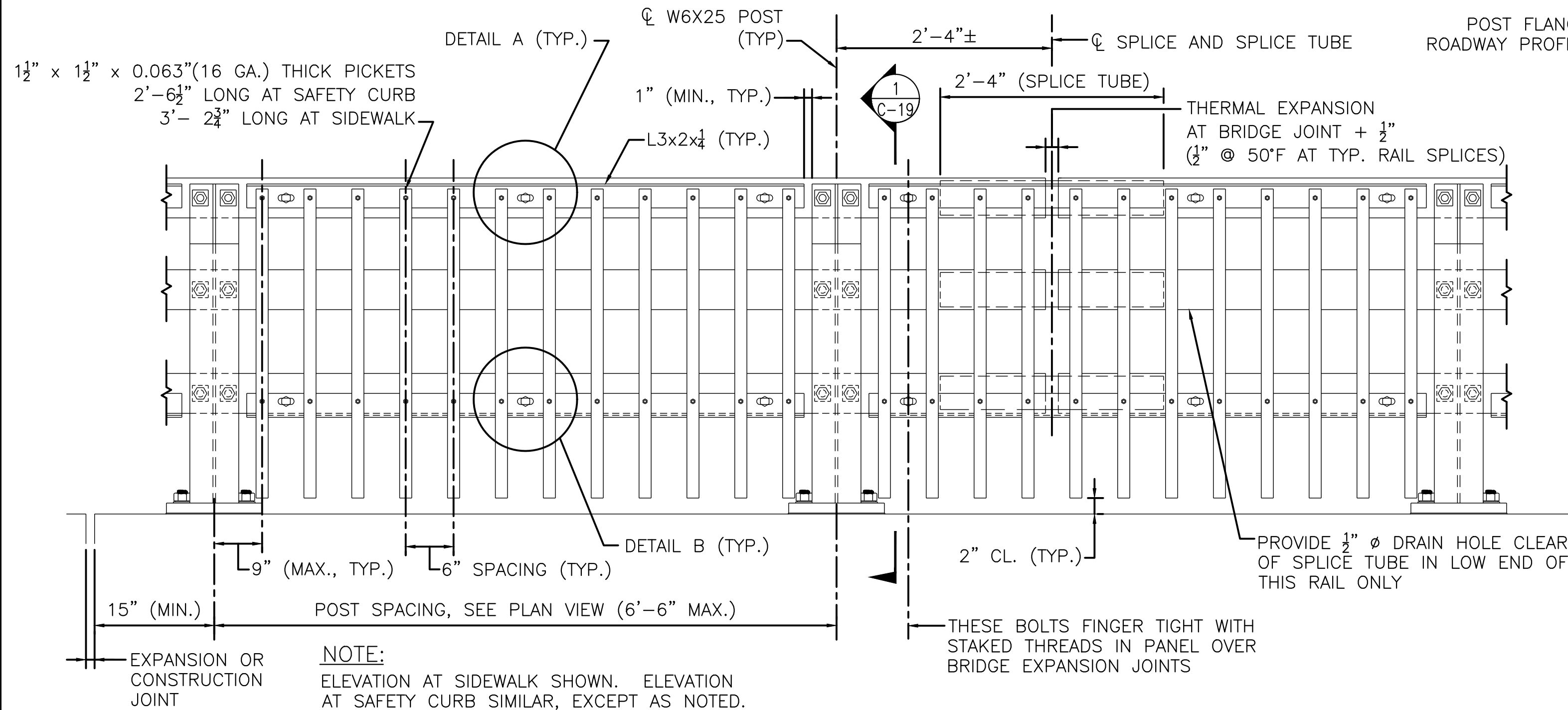
COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING
3/17/2026
DATE

APPROVED:
THOMAS RUSSELL
REGISTERED PROFESSIONAL ENGINEER
16-47718

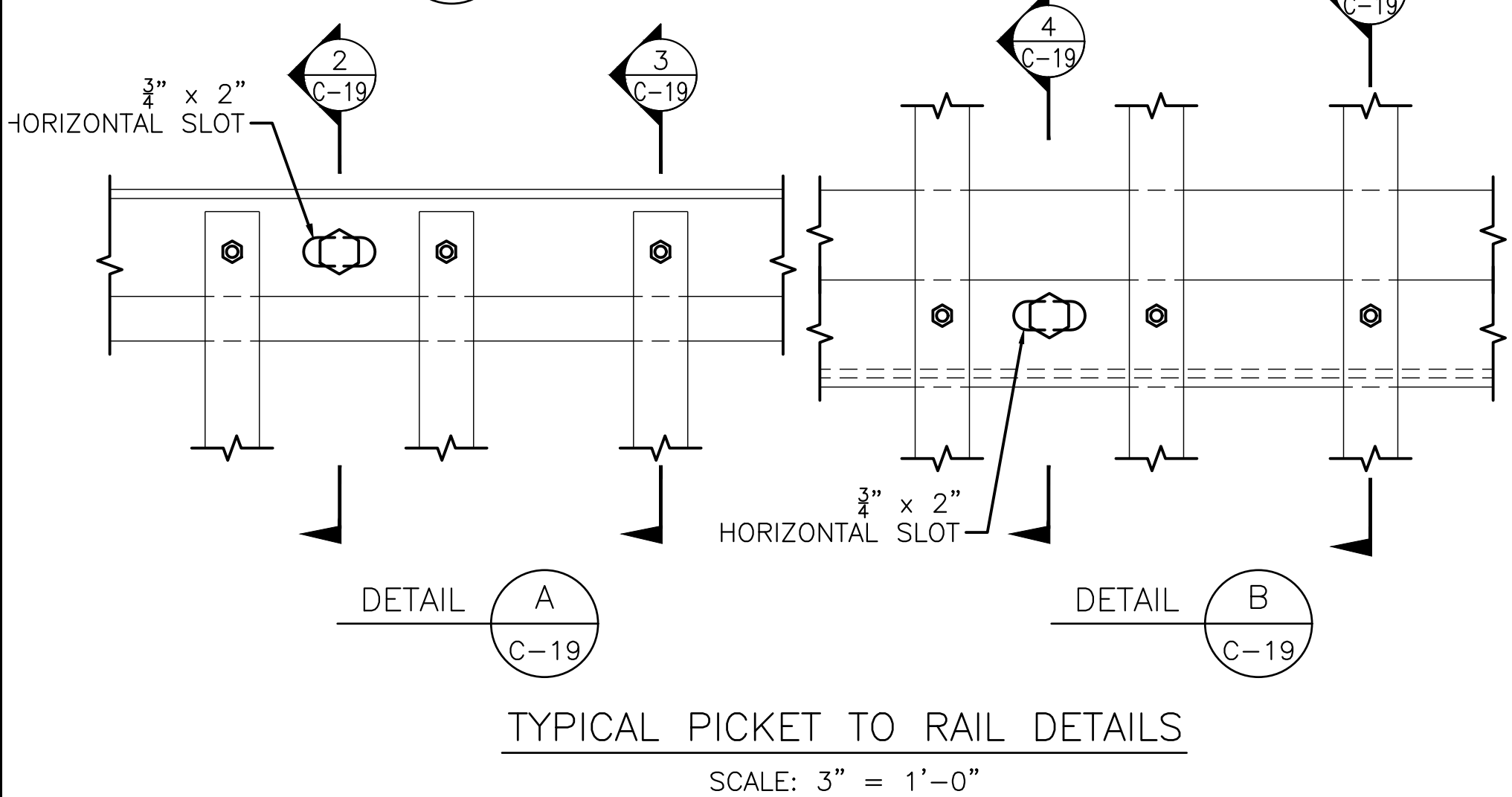
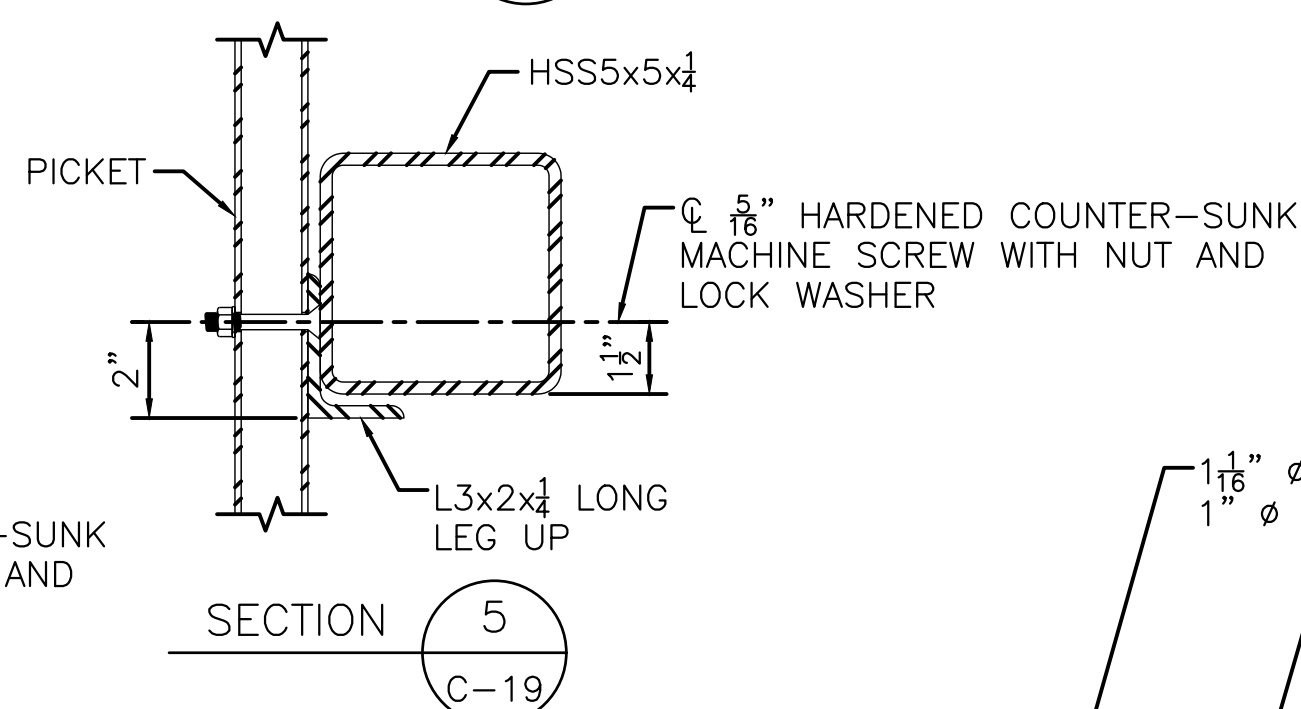
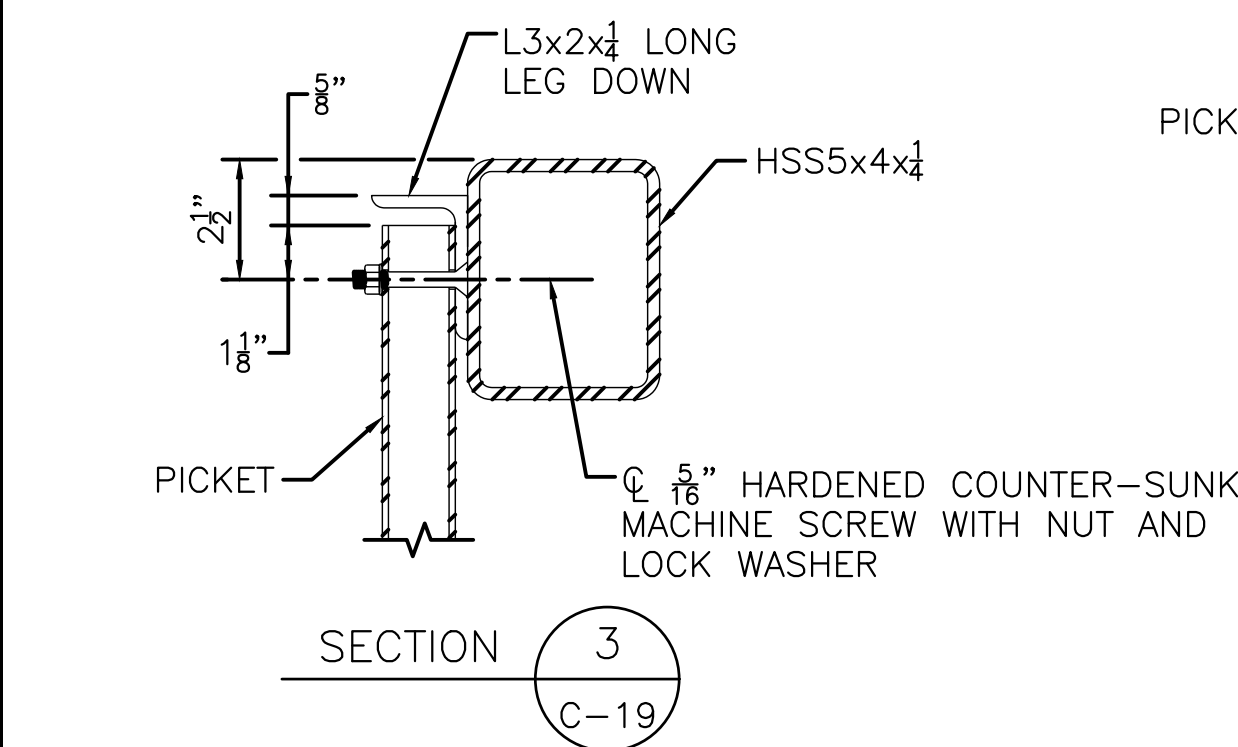
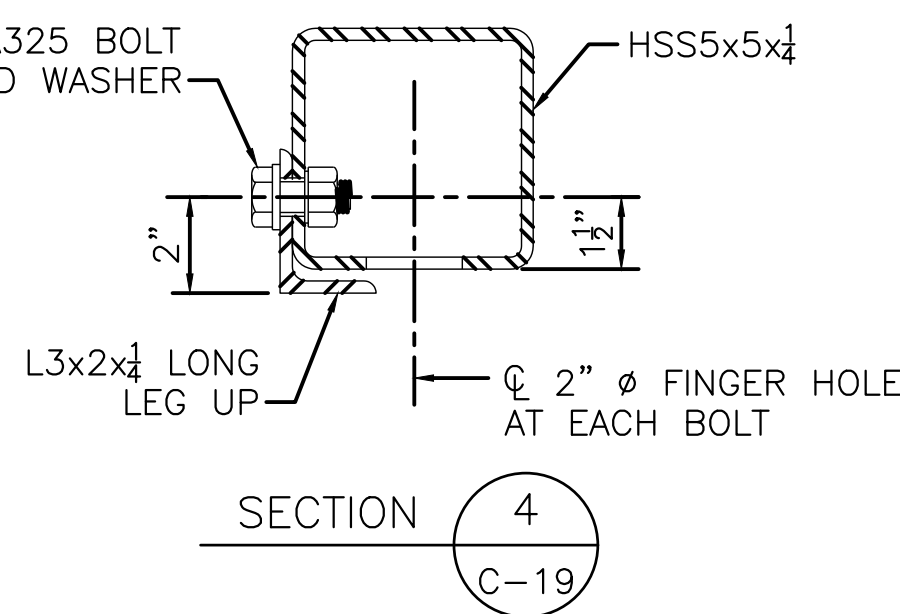
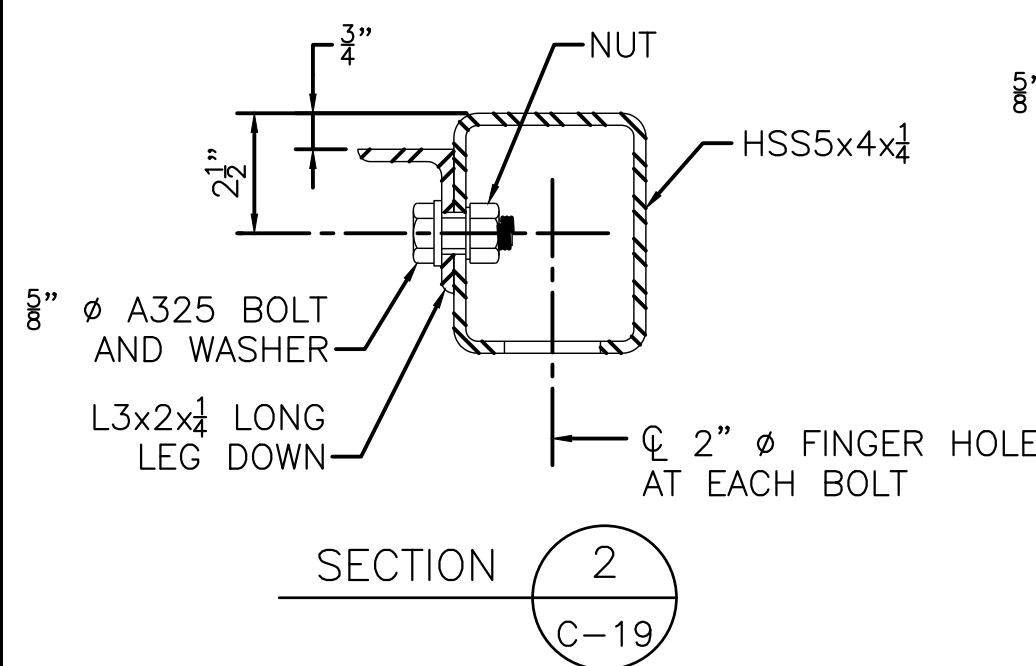
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KING BROOK CULVERT DESIGN SERVICES W. HAWLEY ROAD HAWLEY, MA 01339 BRIDGE NO. H-13 018 (CQC)				
GUARDRAIL END SECTION DETAILS				
PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: TOWN OF HAWLEY 8 PUDDING HOLLOW ROAD HAWLEY, MA 0339		
PROJ MGR: RTS	DESIGNED BY: MJS	REVIEWED BY: RTS	CHECKED BY: NLR	DRAWING
DATE: MARCH, 2026	PROJECT NO. 15.0167123.00	DRAWN BY: MJS	SCALE: AS SHOWN	REVISION NO.
				C-17 SHEET NO. 17 OF 21



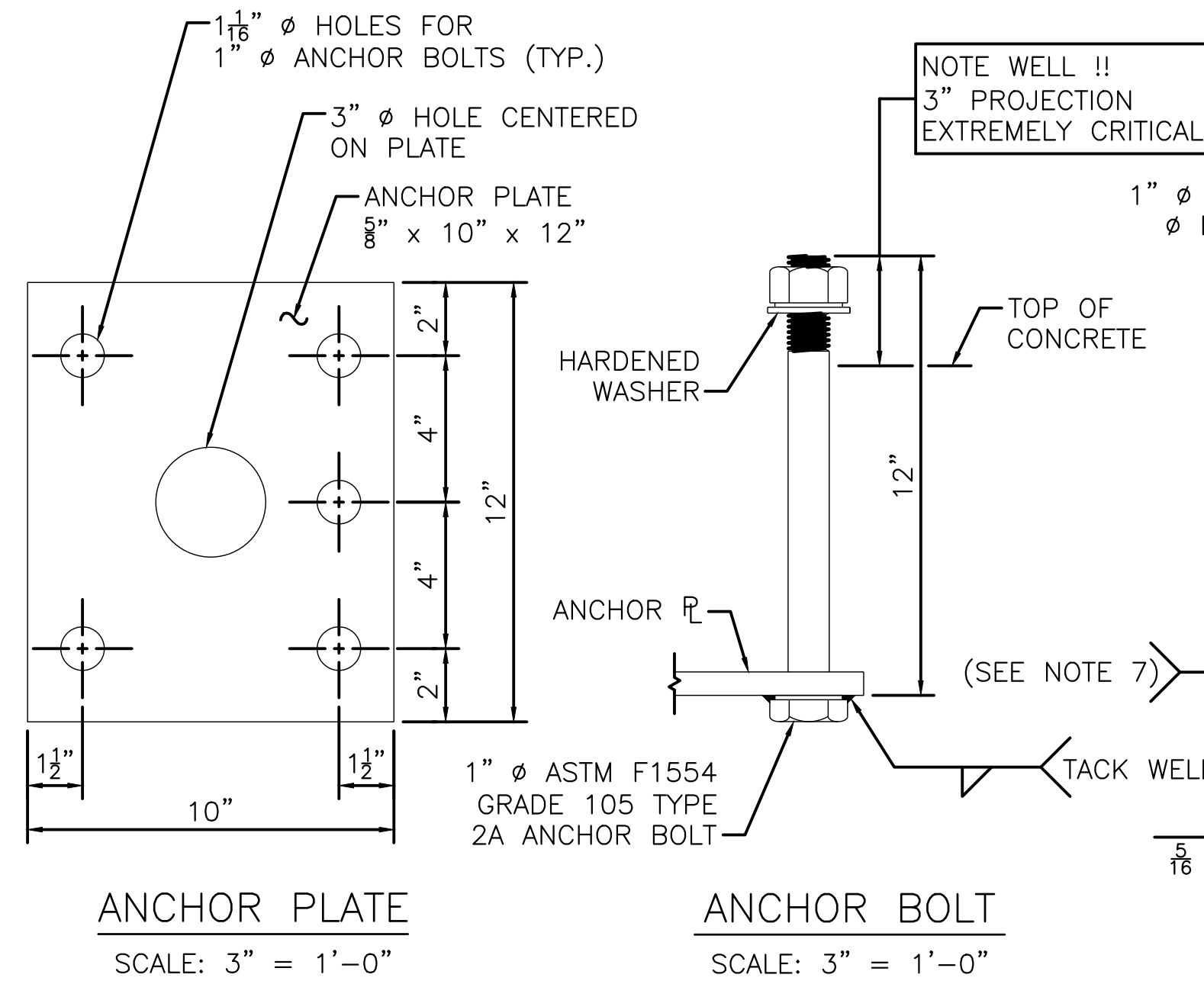
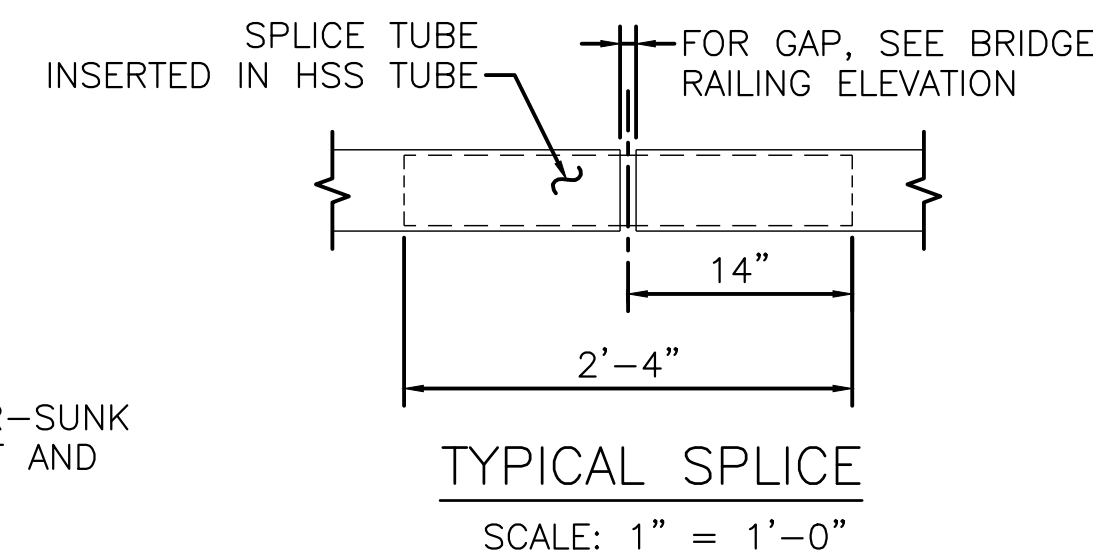
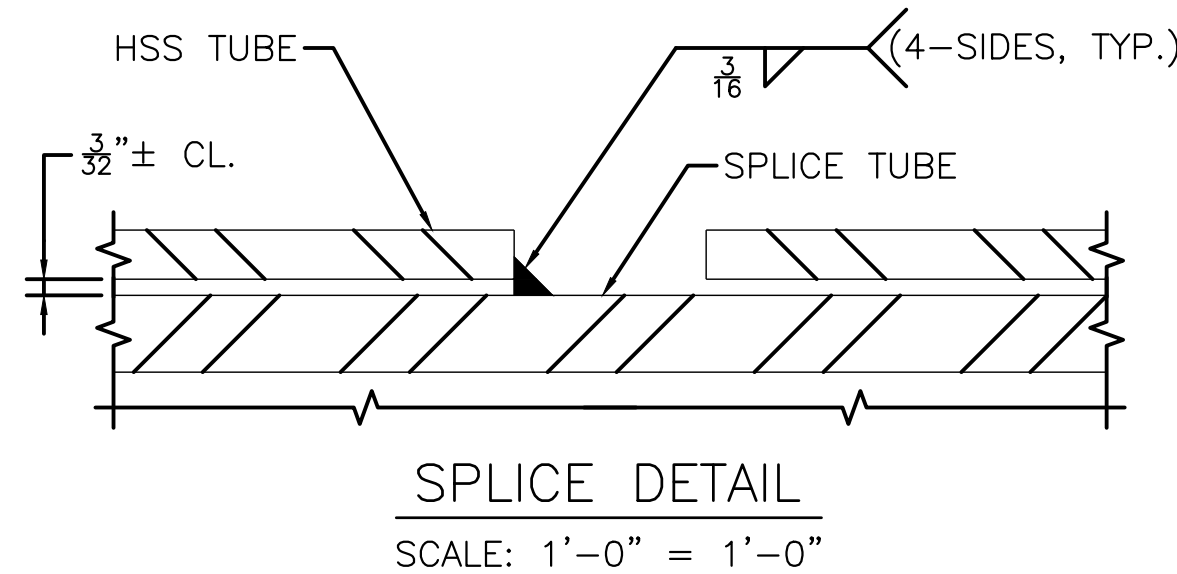
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BRIDGE RAILING ELEVATION
SCALE: 1" = 1'-0"

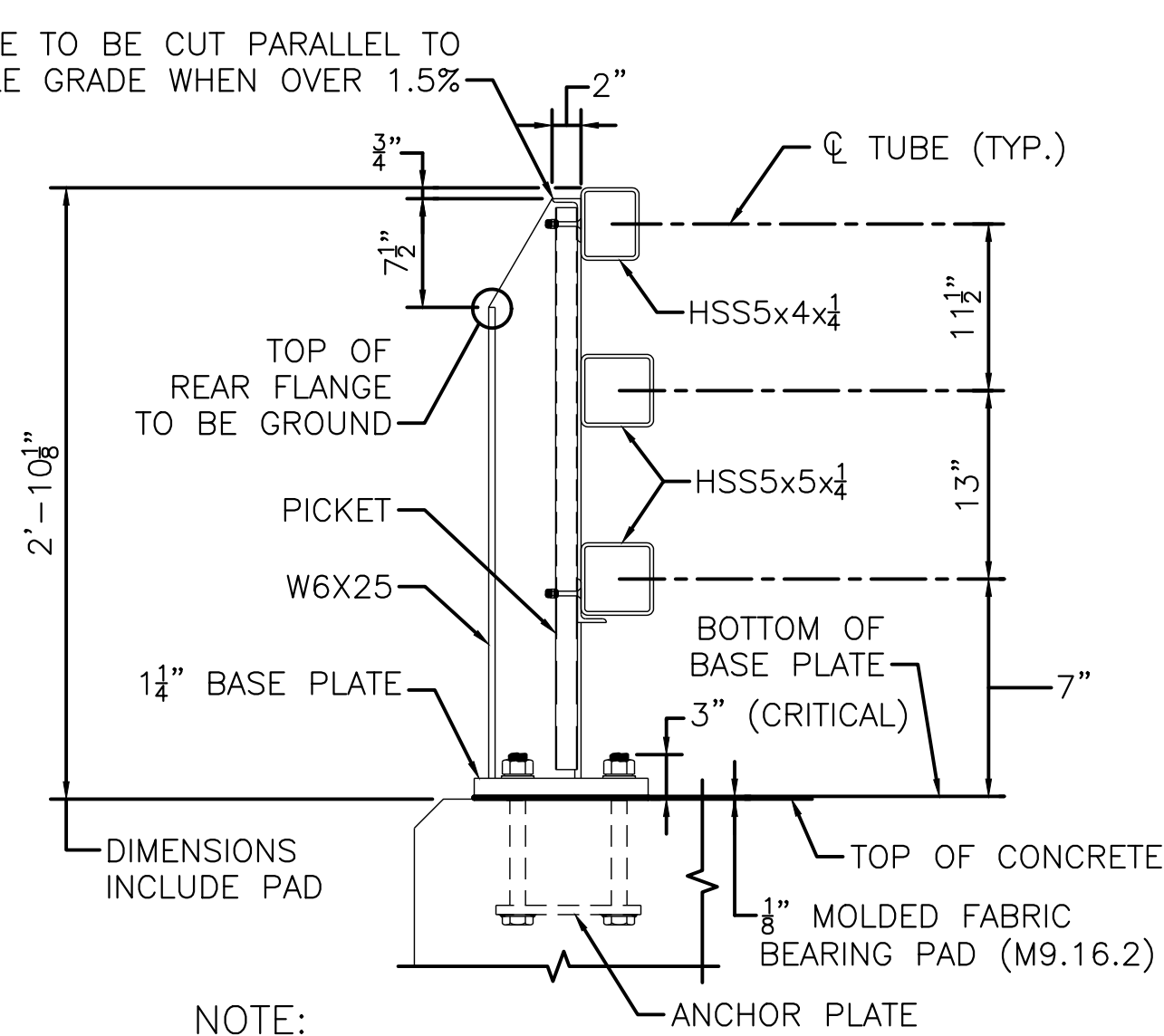


TYPICAL PICKET TO RAIL DETAILS
SCALE: 3" = 1'-0"

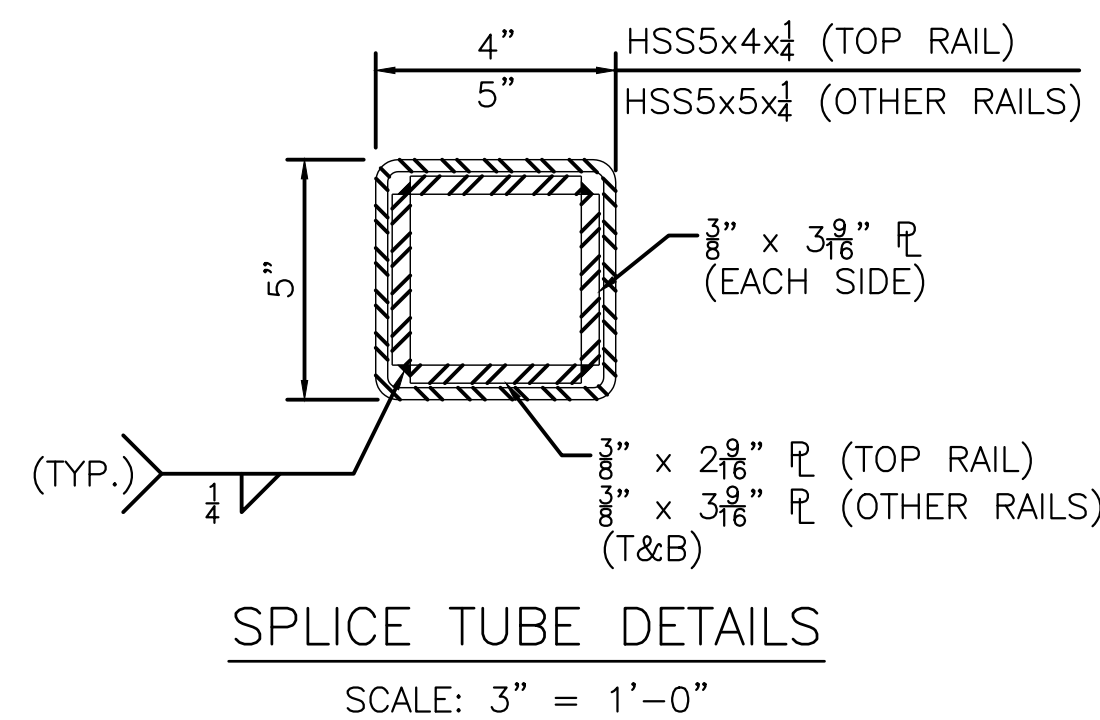
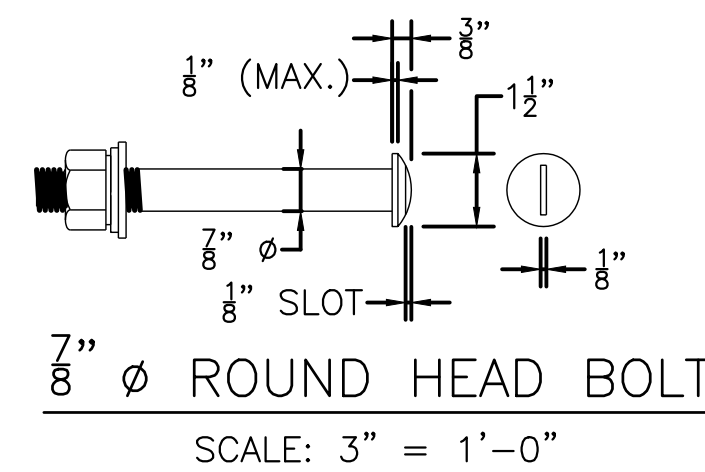


ANCHOR PLATE
SCALE: 3" = 1'-0"

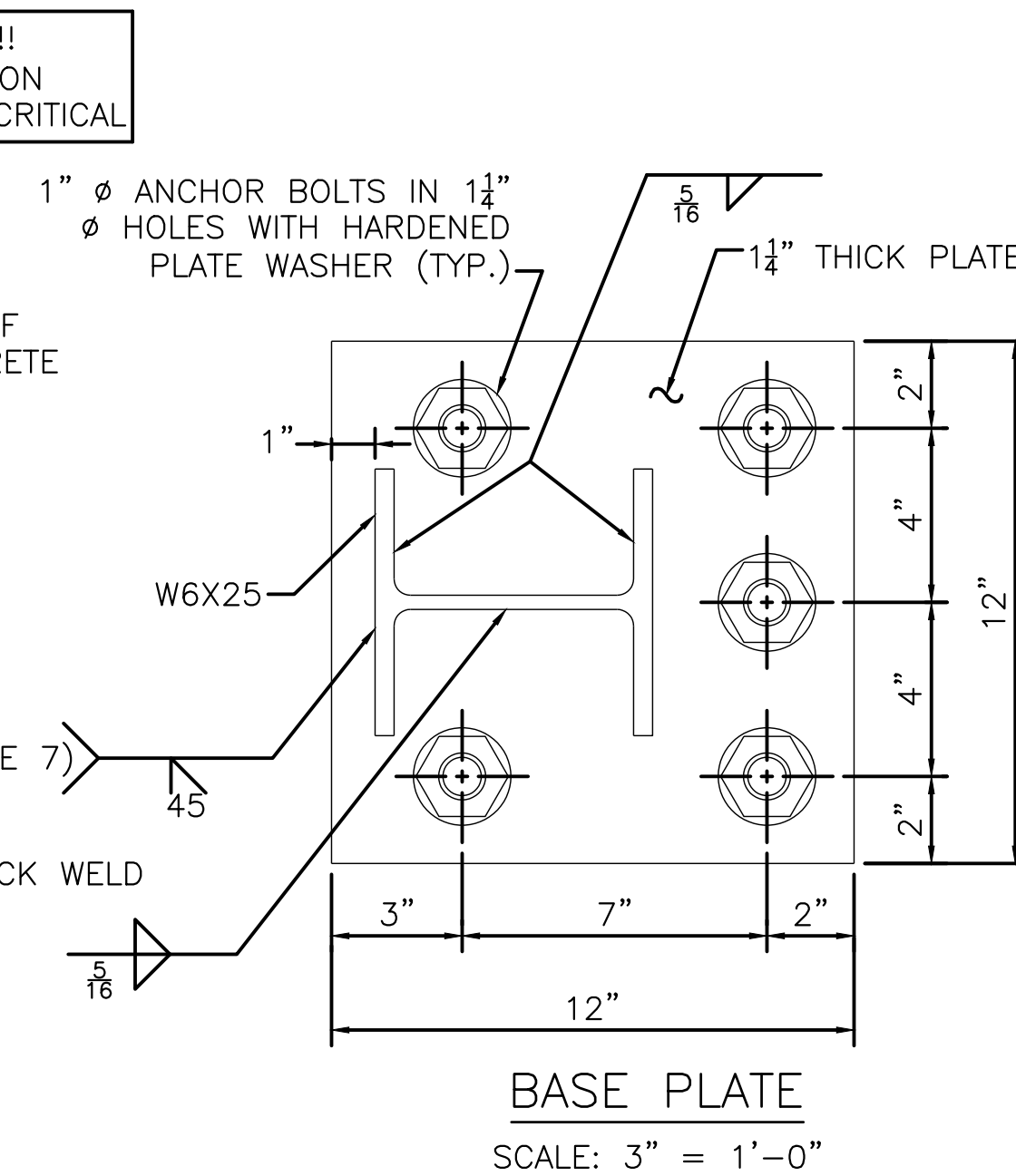
ANCHOR BOLT
SCALE: 3" = 1'-0"



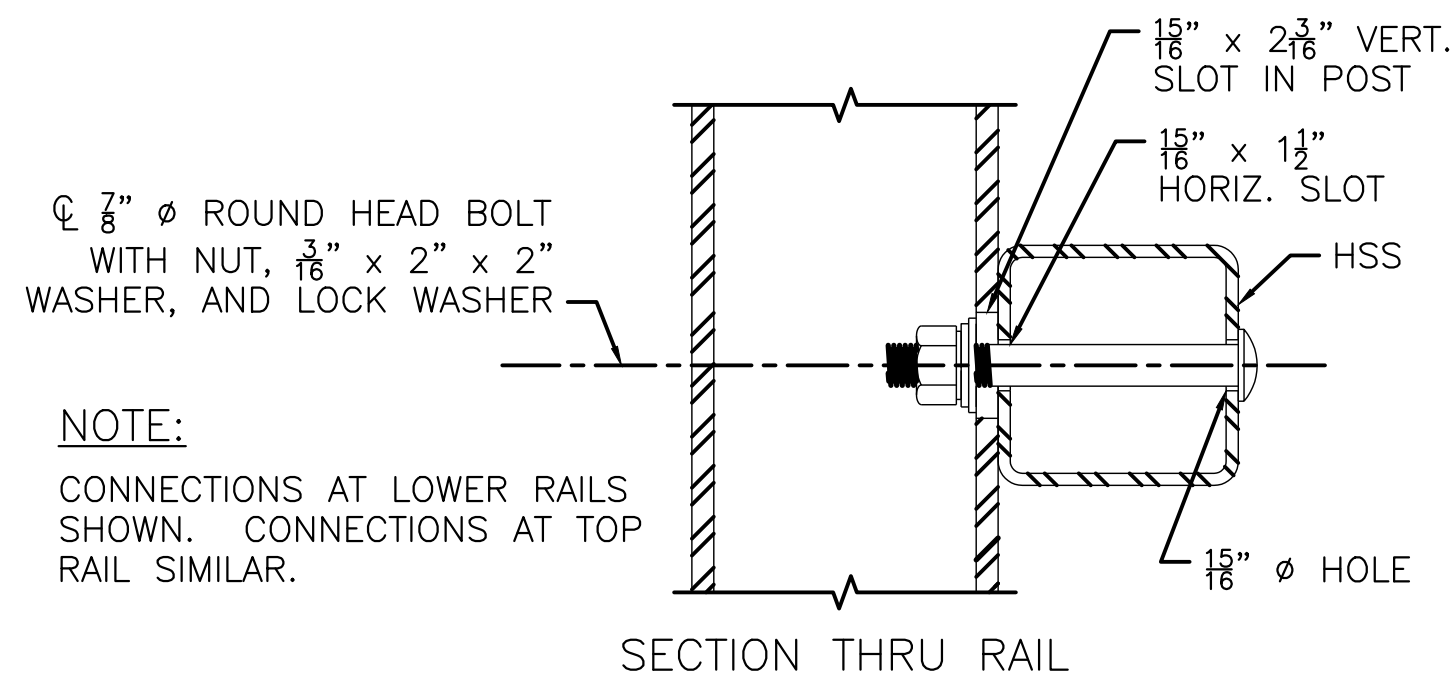
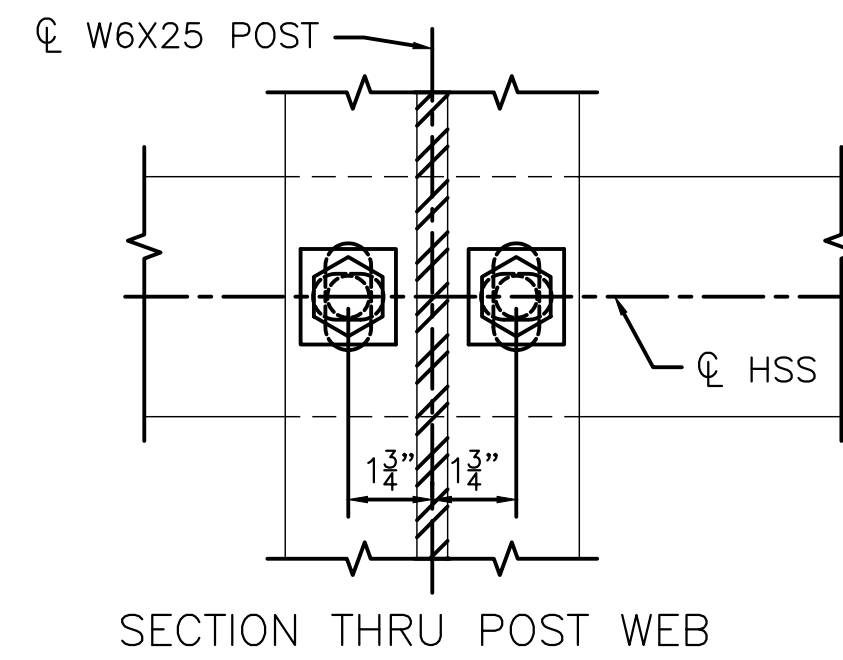
SECTION 1 (C-19)
SCALE: 1" = 1'-0"



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



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



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

RAILING NOTES:

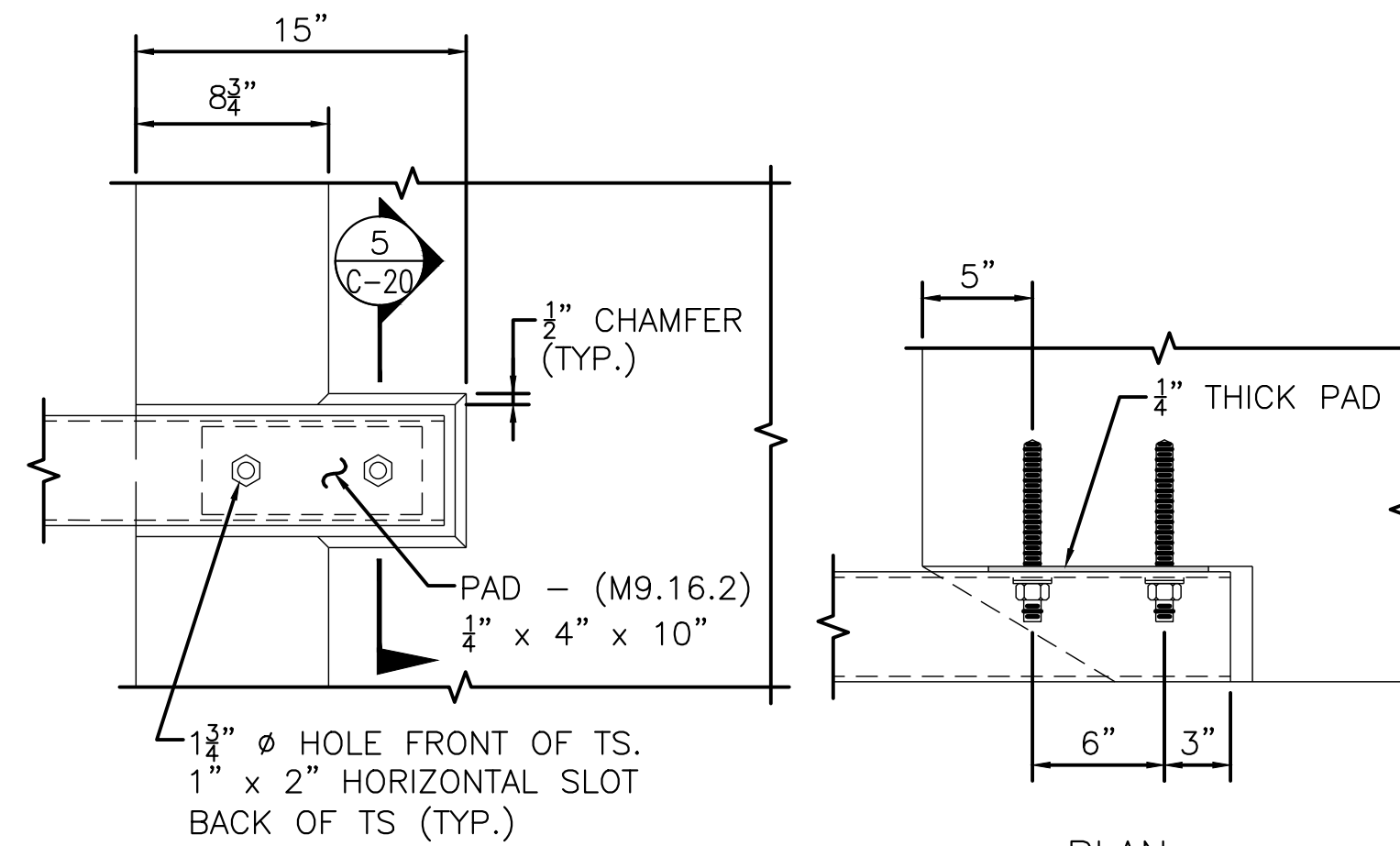
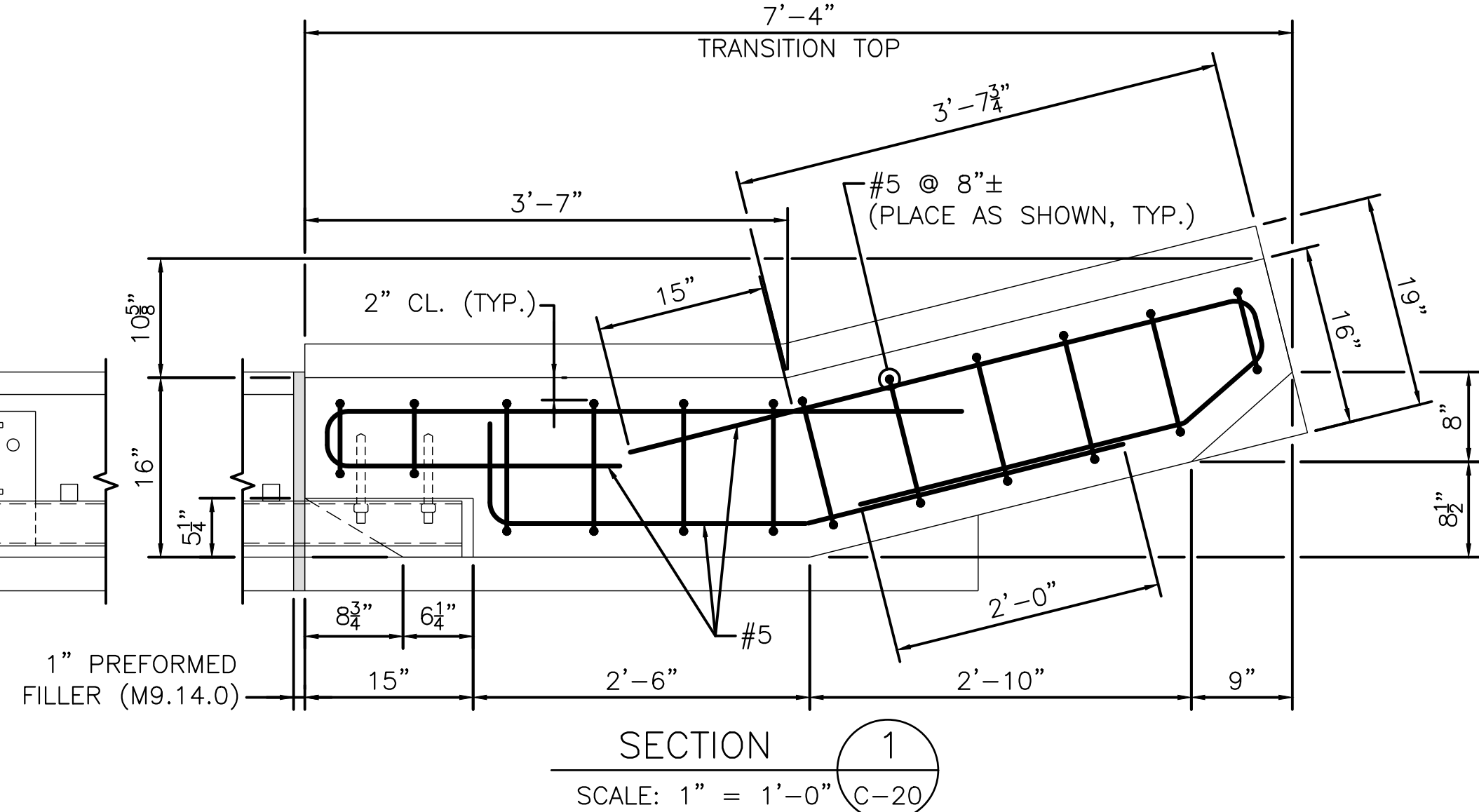
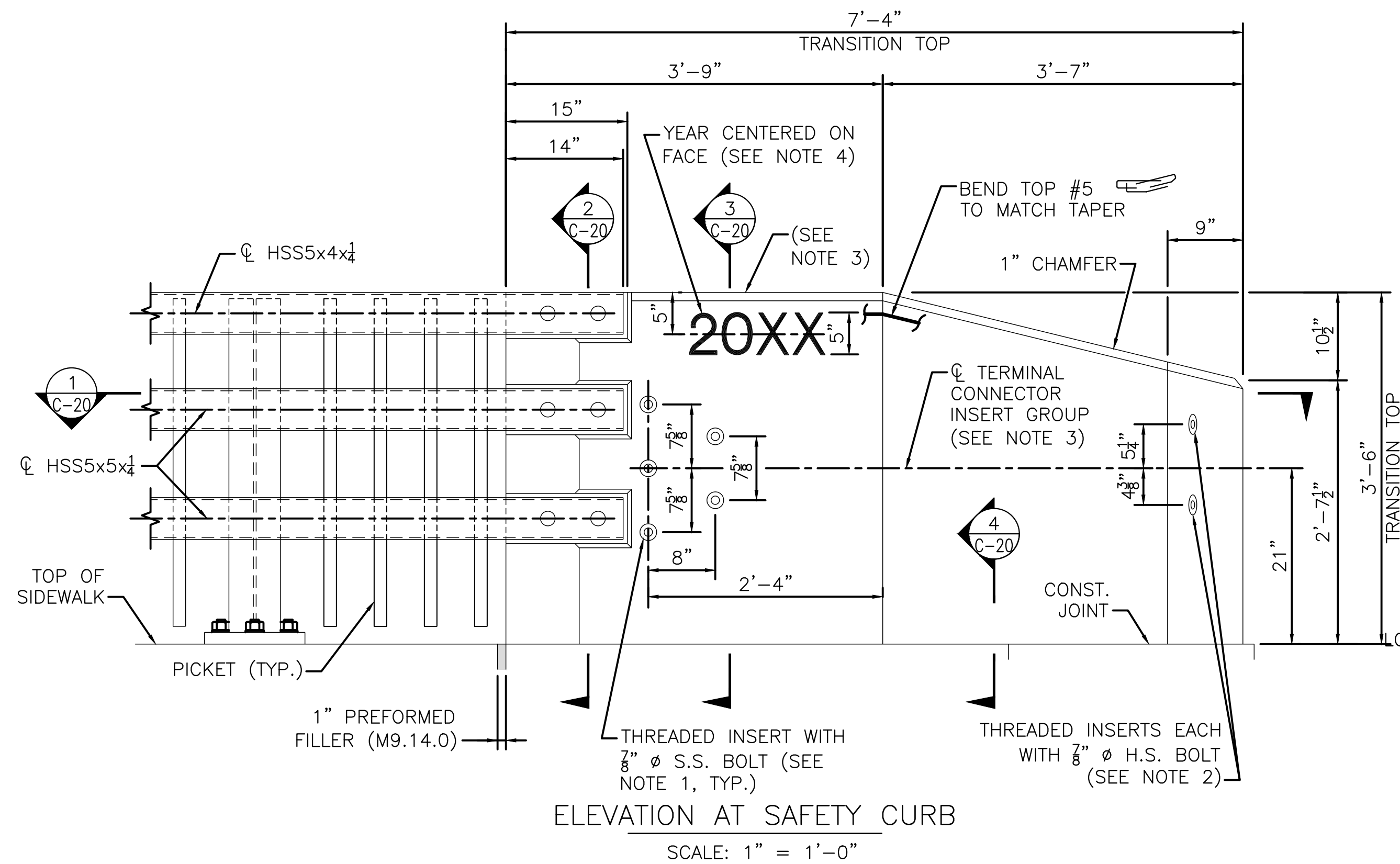
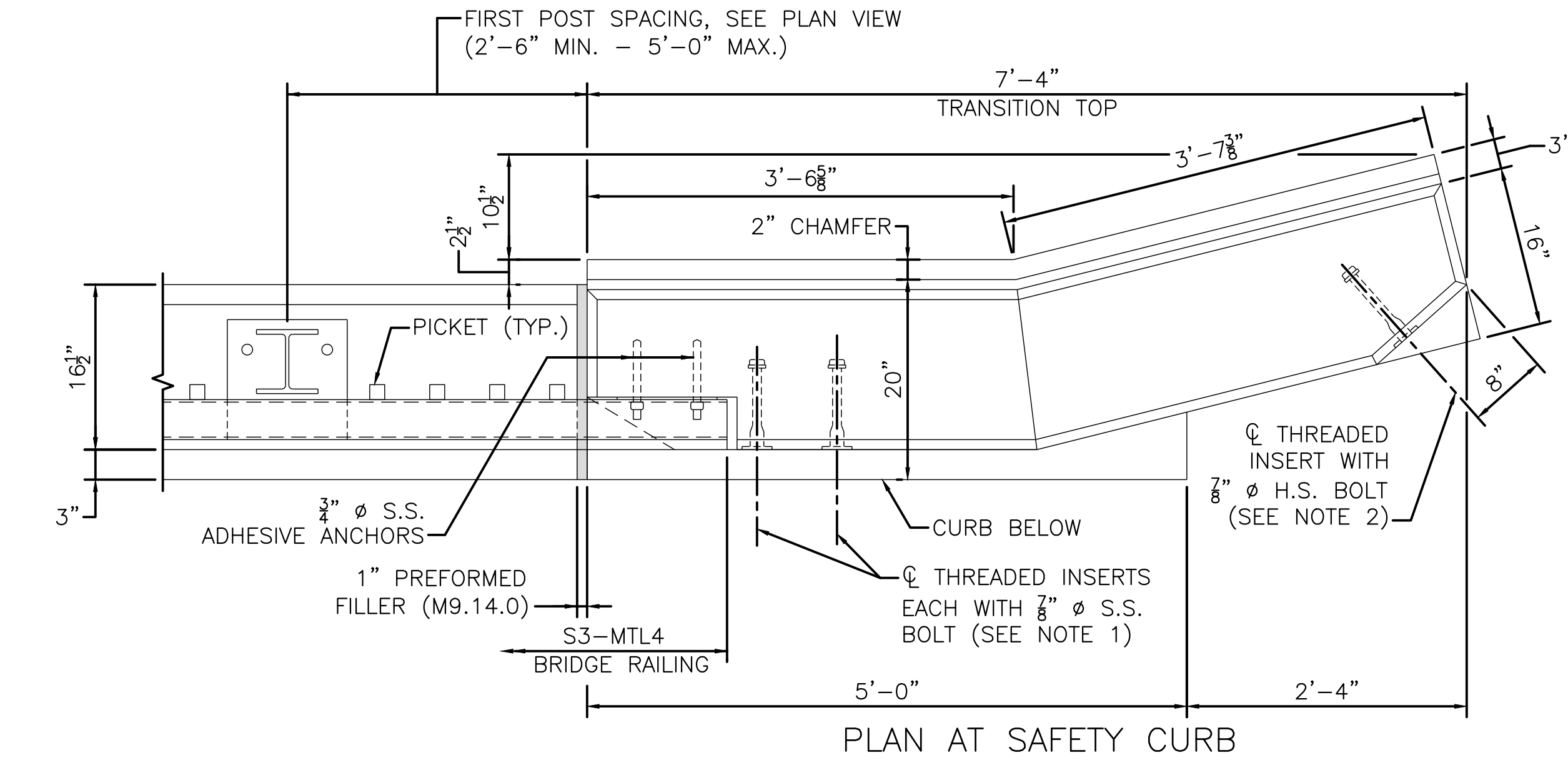
1. RAIL POST AND BASE PLATES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 270 GRADE 50. HOLLOW RAILING STRUCTURAL TUBING (HSS) SHALL CONFORM TO THE REQUIREMENTS OF ASTM A 500 WITH A CERTIFIED $F_y = 50$ KSI MINIMUM. THE MINIMUM HORIZONTAL BENDING RADII OF THE HSS TUBING SHALL BE 8 FEET. PICKET CARRIER 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.
2. ALL STEEL (EXCEPT THE $\frac{5}{8}$ " 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 $\frac{7}{8}$ " ϕ ROUND HEAD BOLTS SHALL BE PAINTED TO MATCH RAIL.
3. 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 $\frac{1}{8}$ TURN AFTER STEEL IS IN PLACE.
4. RAILS SHALL BE CONTINUOUS OVER A MINIMUM OF FOUR (4) POSTS WITHOUT SPLICES WHERE POSSIBLE. IN ADDITION SPLICES SHALL ALSO BE LOCATED IN RAILS OVER BRIDGE EXPANSION JOINTS.
5. ENDS OF TUBE SECTIONS SHALL BE SAWED. GRIND SMOOTH EXPOSED EDGES. ALL CUT ENDS SHALL BE TRUE AND SMOOTH.
6. 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.
7. POST TO FLANGE WELD DOES NOT REQUIRE MAGNETIC PARTICLE TESTING. BEVEL OUTSIDE FLANGES OF POST. FIT POST TO BASE PLATE. WELD $\frac{1}{8}$ " FILLET ON INSIDE OF FLANGE AND WEB. BACKGOUGE OUTSIDE OF FLANGE TO SOUND METAL. COMPLETE GROOVE WELD WITH MINIMUM OF $\frac{3}{8}$ " REINFORCEMENT. WELD IS THE SAME ON BOTH FLANGES.
8. $\frac{7}{8}$ " ϕ ROUND HEAD BOLTS SHALL CONFORM TO THE CHEMICAL AND PHYSICAL REQUIREMENTS OF ASTM F3125 GRADE 325 TYPE 1 GALVANIZED.

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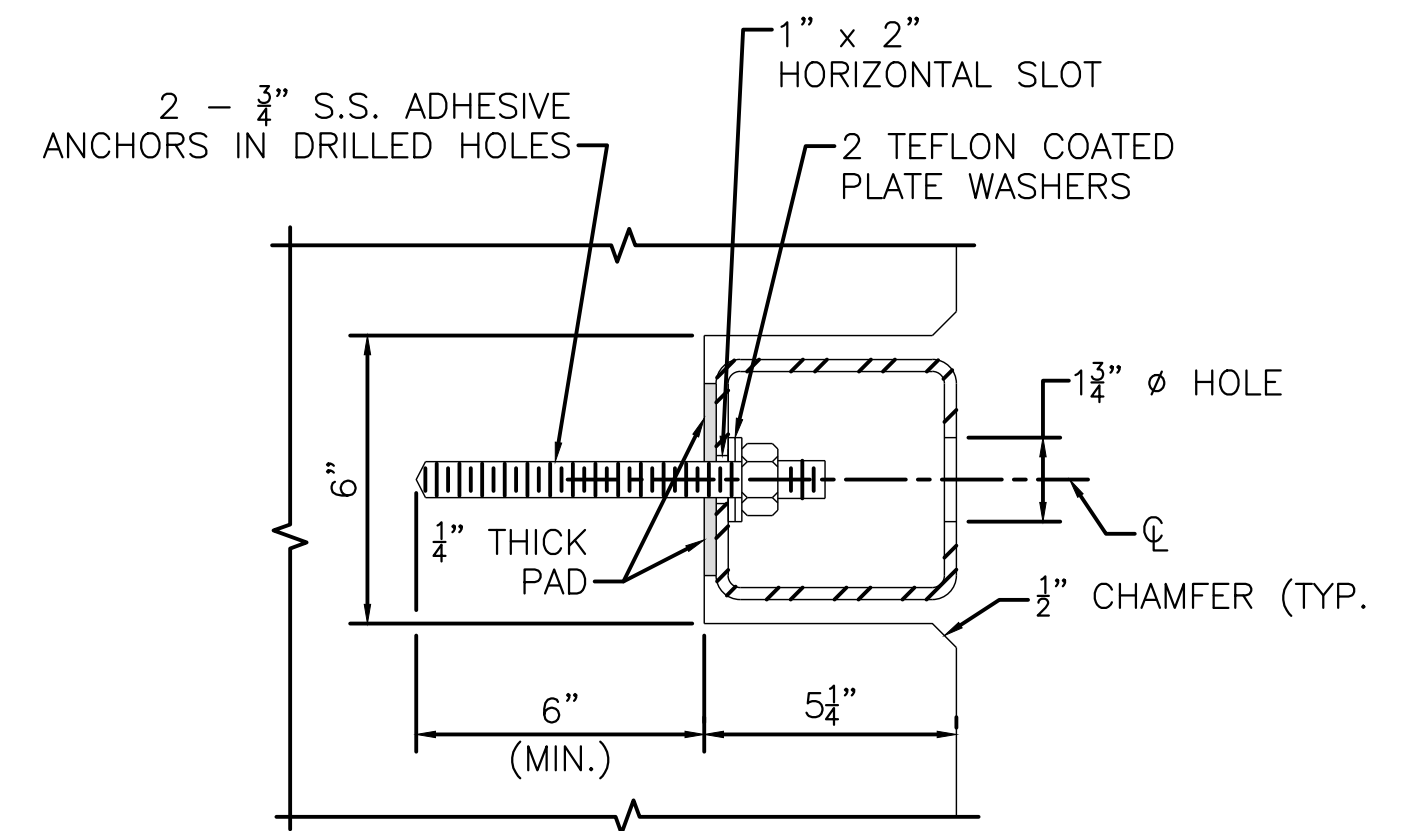
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KING BROOK CULVERT DESIGN SERVICES W. HAWLEY ROAD HAWLEY, MA 01339 BRIDGE NO. H-13 018 (CQC)			
S3-TL4 BRIDGE RAIL			
PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com	PREPARED FOR: TOWN OF HAWLEY 8 PUDDING HOLLOW ROAD HAWLEY, MA 0339	CHECKED BY: NLR SCALE: AS SHOWN REVISION NO. -	
PROJ MGR: RTS DESIGNED BY: MJS DATE: MARCH, 2026	REVIEWED BY: RTS DRAWN BY: MJS PROJECT NO.: 15.0167123.00	DRAWING C-19 SHEET NO. 19 OF 21	

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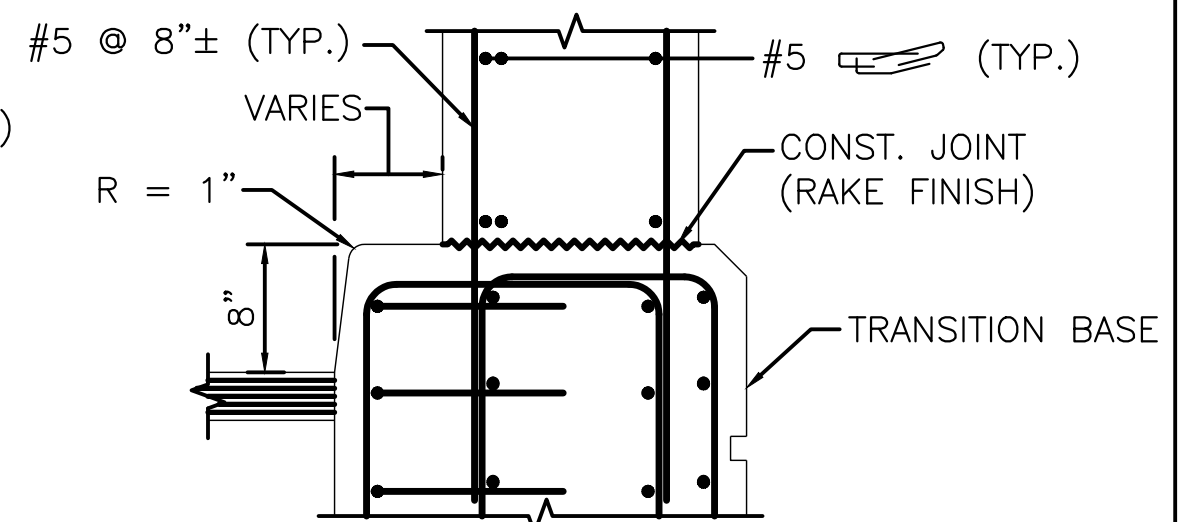
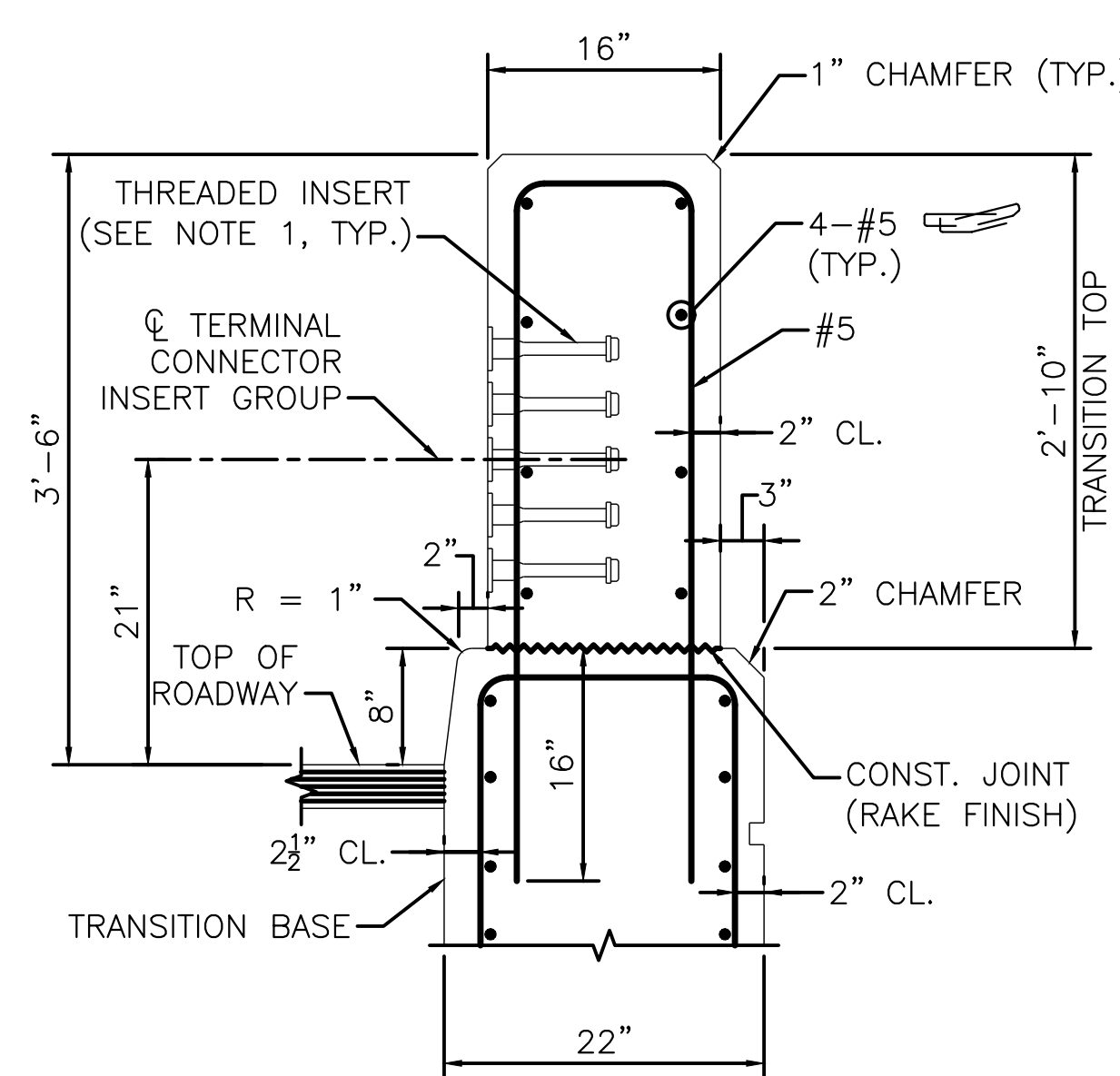
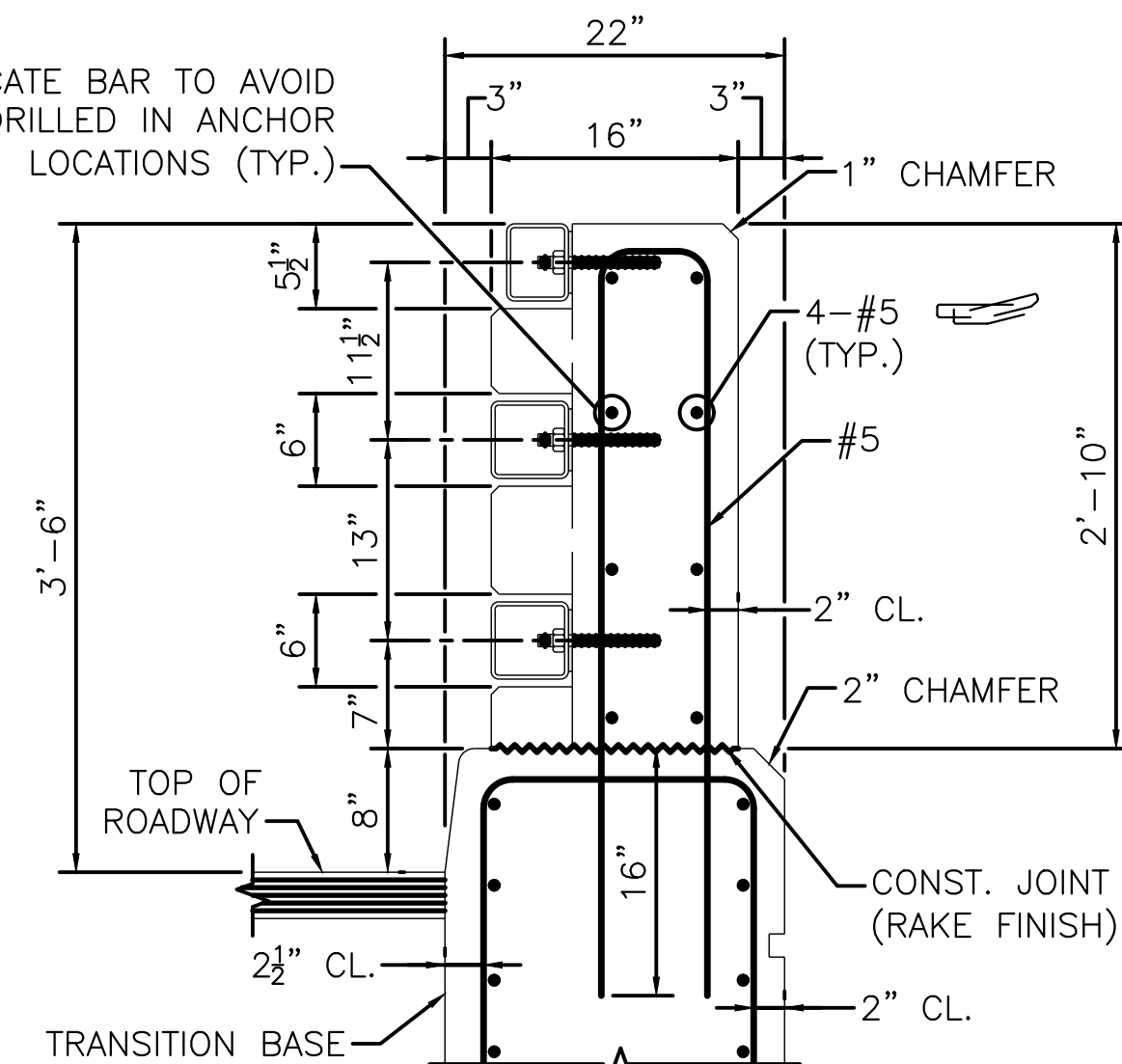
RAIL ATTACHMENT

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



NOTES:

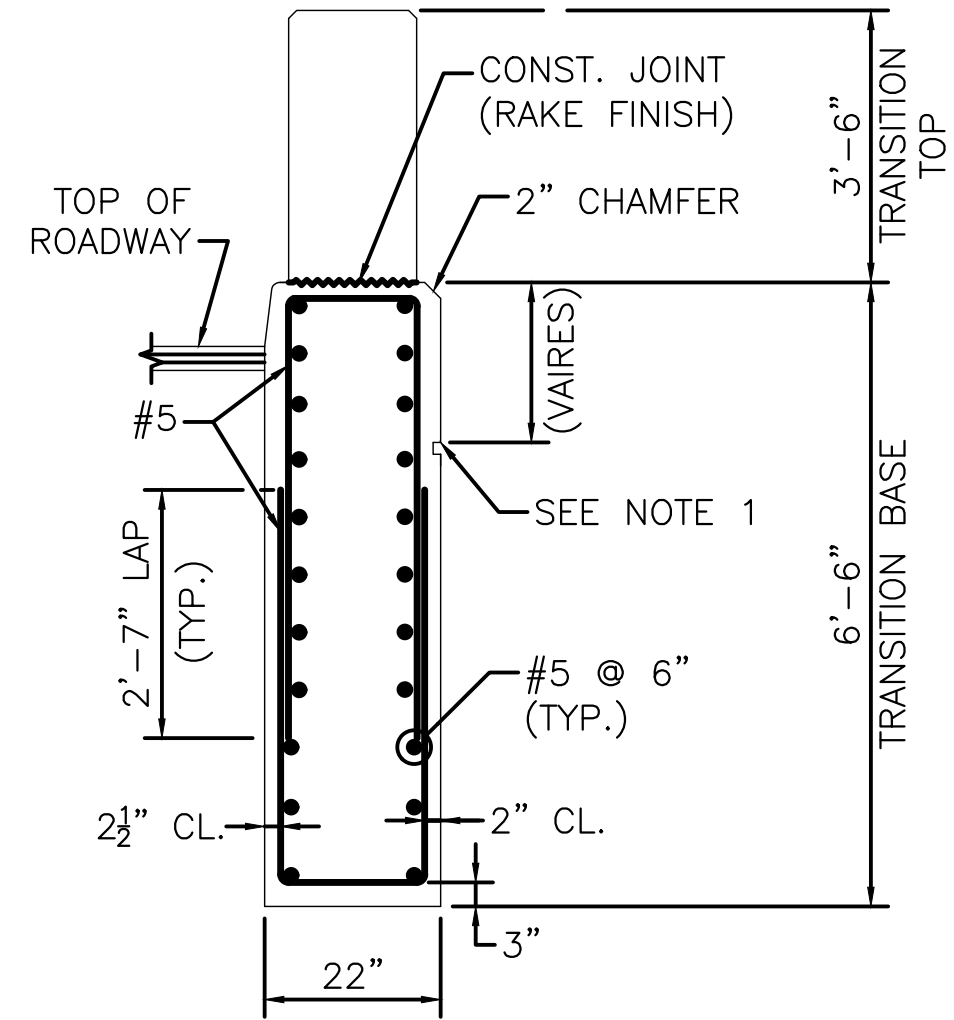
1. THREADED INSERTS SHALL BE PREQUALIFIED BY THE MANUFACTURER AS BEING CAPABLE OF DEVELOPING A NOMINAL SHEAR RESISTANCE OF 20 KIPS PER 7/8" Ø S.S. (STAINLESS STEEL) BOLT. S.S. BOLTS SHALL BE 7/8" Ø x 1 1/2" LONG FULLY THREADED CONFORMING TO ASTM F593D WITH AISI TYPE 304N S.S. WASHERS. INSERTS FOR 7/8"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



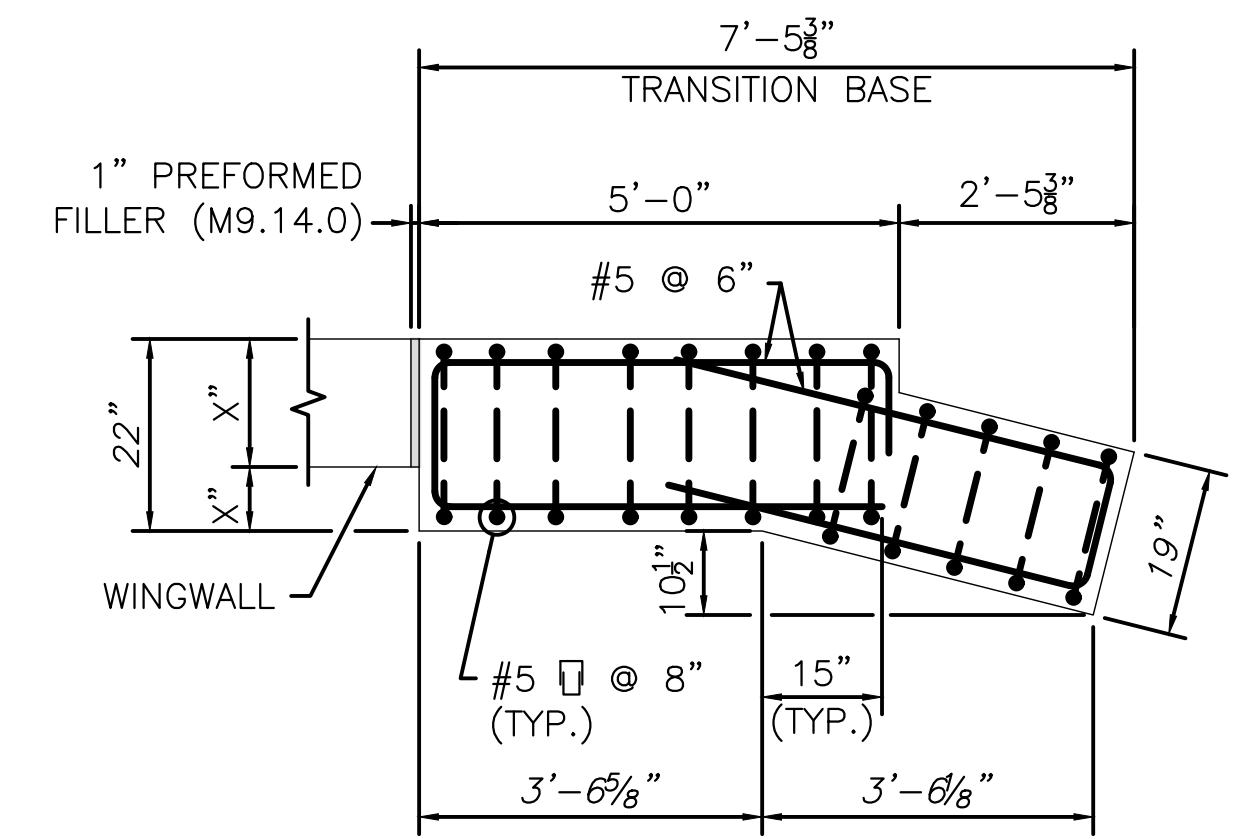
SECTION AT SAFETY CURB

SCALE: 1" = 1'-0" C-20

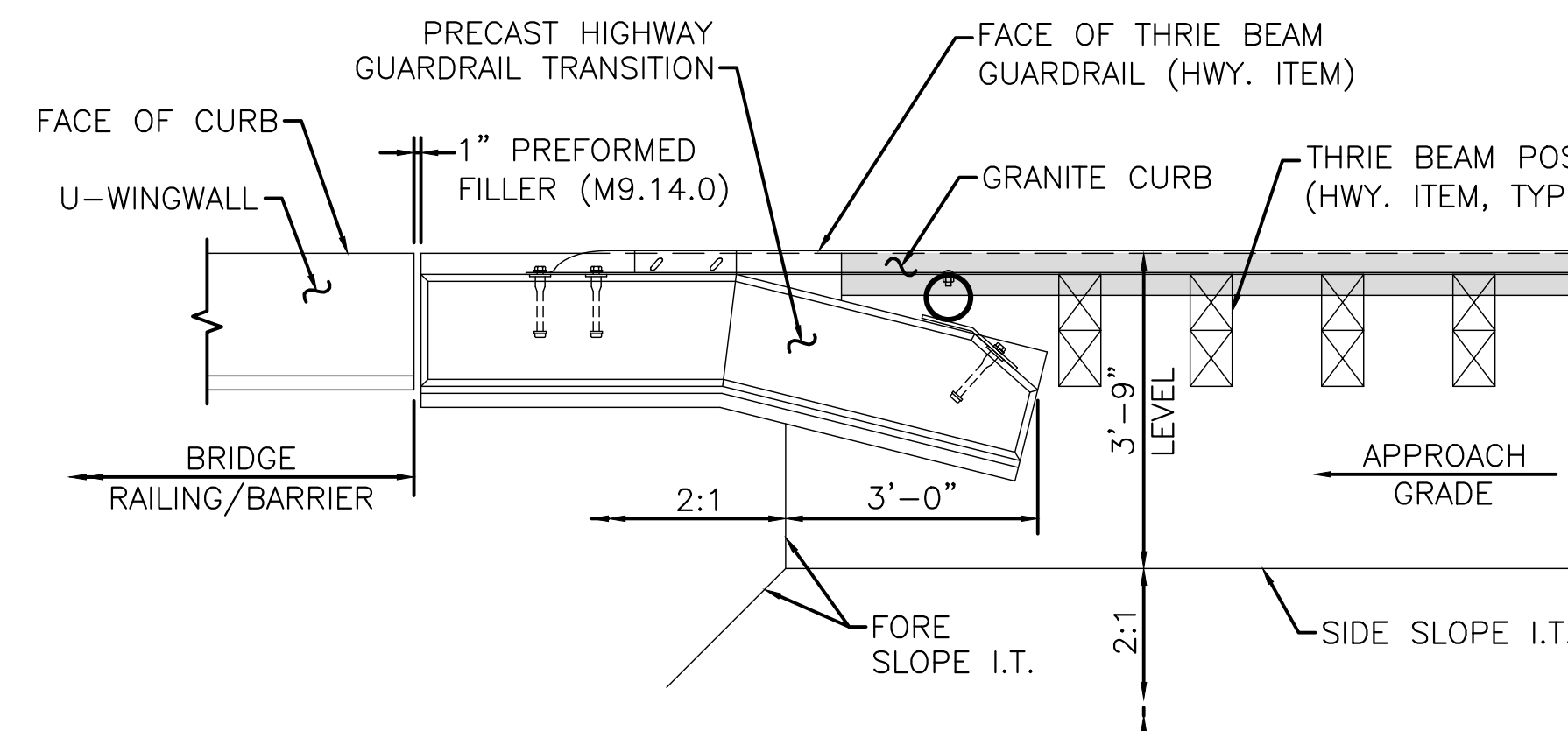
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TOP OF PRECAST HIGHWAY GUARDRAIL TRANSITION FOR S3-MTL4 RAILING				
PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: TOWN OF HAWLEY 8 PUDDING HOLLOW ROAD HAWLEY, MA 0339		
PROJ MGR: RTS	DESIGNED BY: MJS	REVIEWED BY: RTS	CHECKED BY: NLR	DRAWING
DATE: MARCH, 2026	PROJECT NO: 15.0167123.00	SCALE: AS SHOWN	REVISION NO: -	C-20
SHEET NO. 20 OF 21				



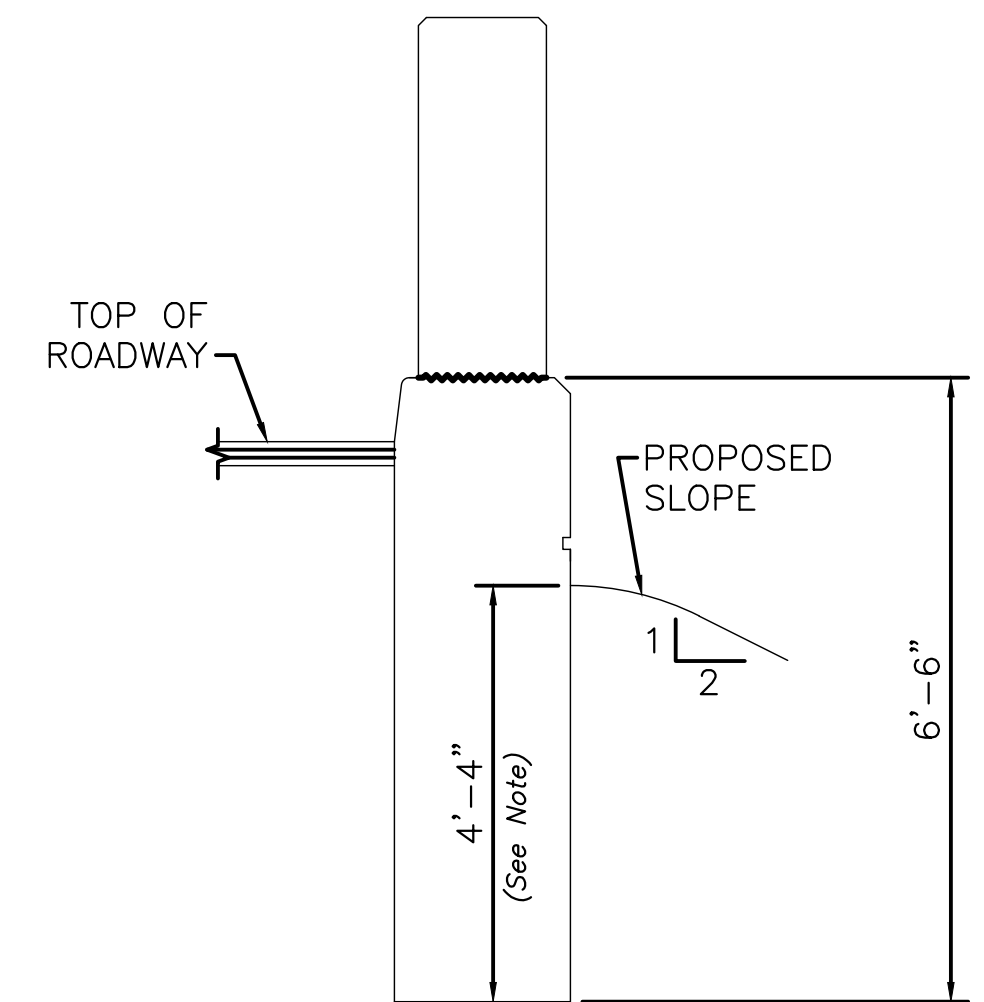
SECTION 1
SCALE: $\frac{1}{2}" = 1'-0"$ C-21



SECTION 2
 SCALE: $\frac{1}{2}" = 1'-0"$ C-21



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



GRADING FOR S3-MTL4 AT SAFETY CURB

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

COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
**CONCEPTUAL DESIGN IS ACCEPTABLE
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KING BROOK CULVERT DESIGN SERVICES W. HAWLEY ROAD HAWLEY, MA 01339 BRIDGE NO. H-13 (H18) (CQC)			
PRECAST HIGHWAY GUARDRAIL TRANSITION BASE DETAILS			
PREPARED BY:  GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: TOWN OF HAWLEY 8 PUDDING HOLLOW ROAD HAWLEY, MA 0339	
PROJ MGR: RTS	REVIEWED BY: RTS	CHECKED BY: NLR	DRAWING C-21 SHEET NO. 21 OF 21
DESIGNED BY: MJS	DRAWN BY: MJS	SCALE: AS SHOWN	
DATE: MARCH, 2026	PROJECT NO. 15.0167(123.00)	REVISION NO. -	