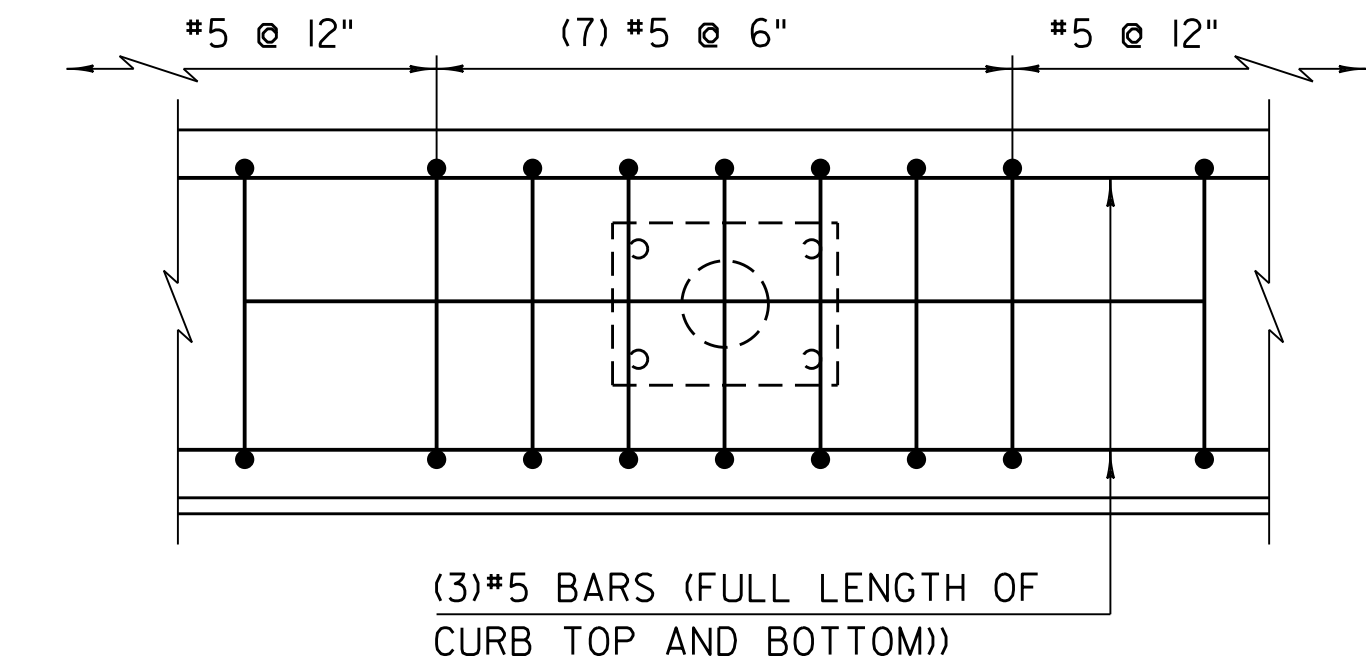
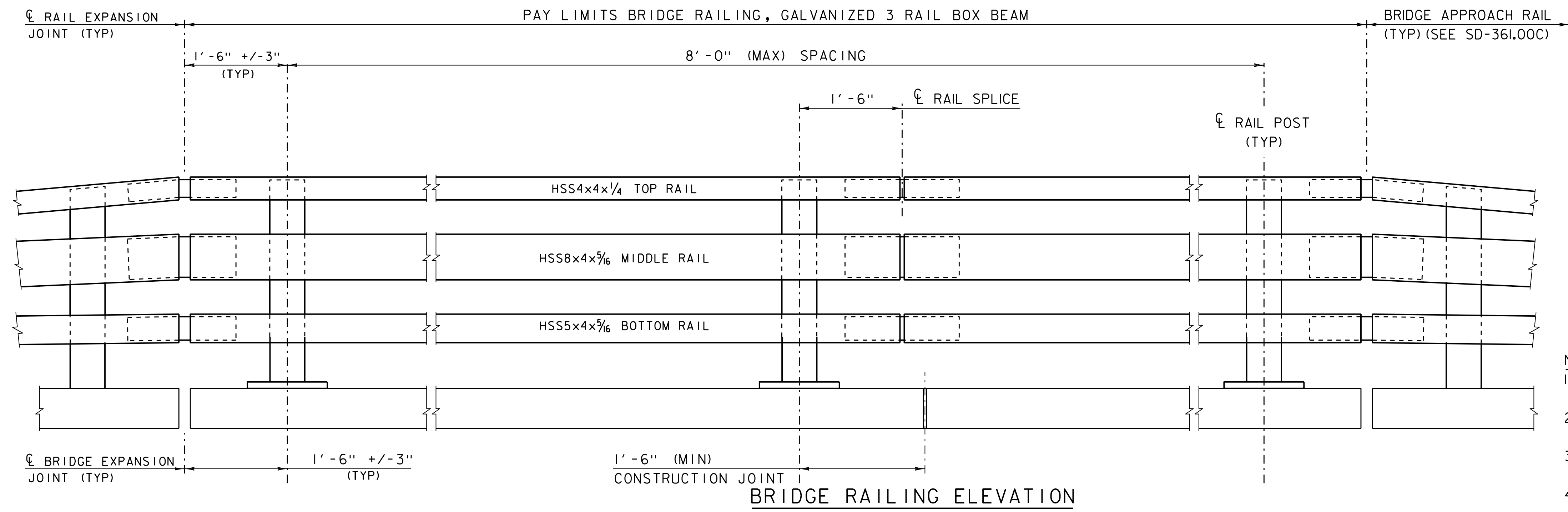
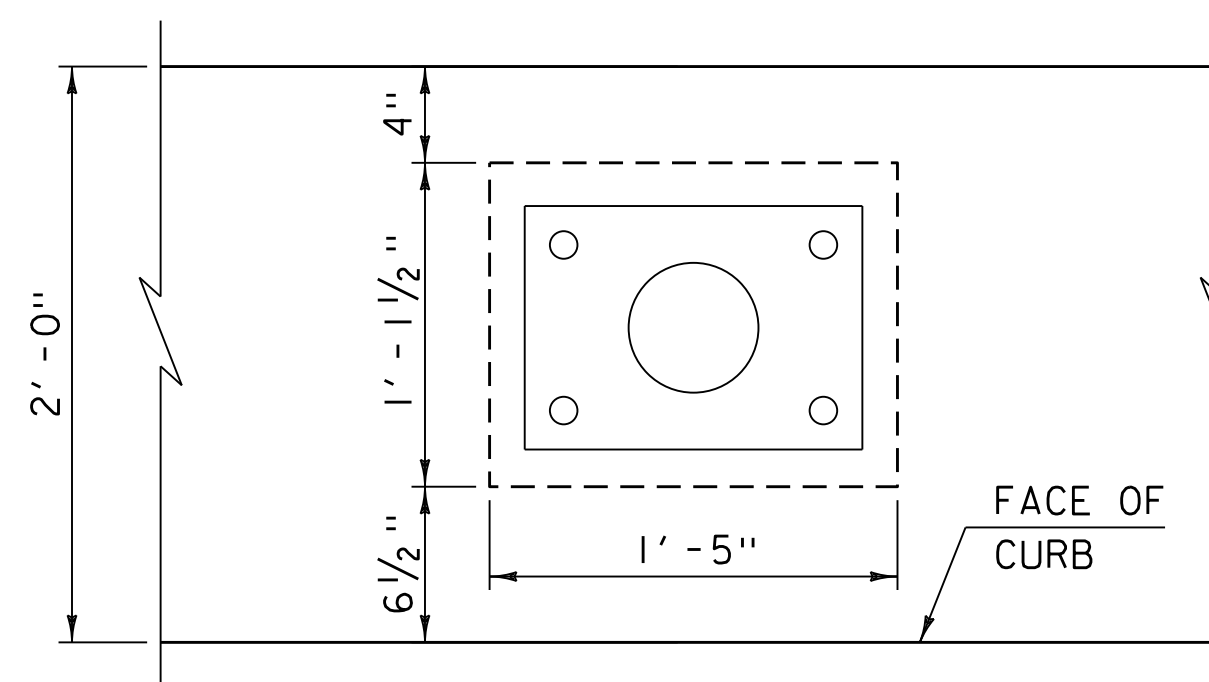
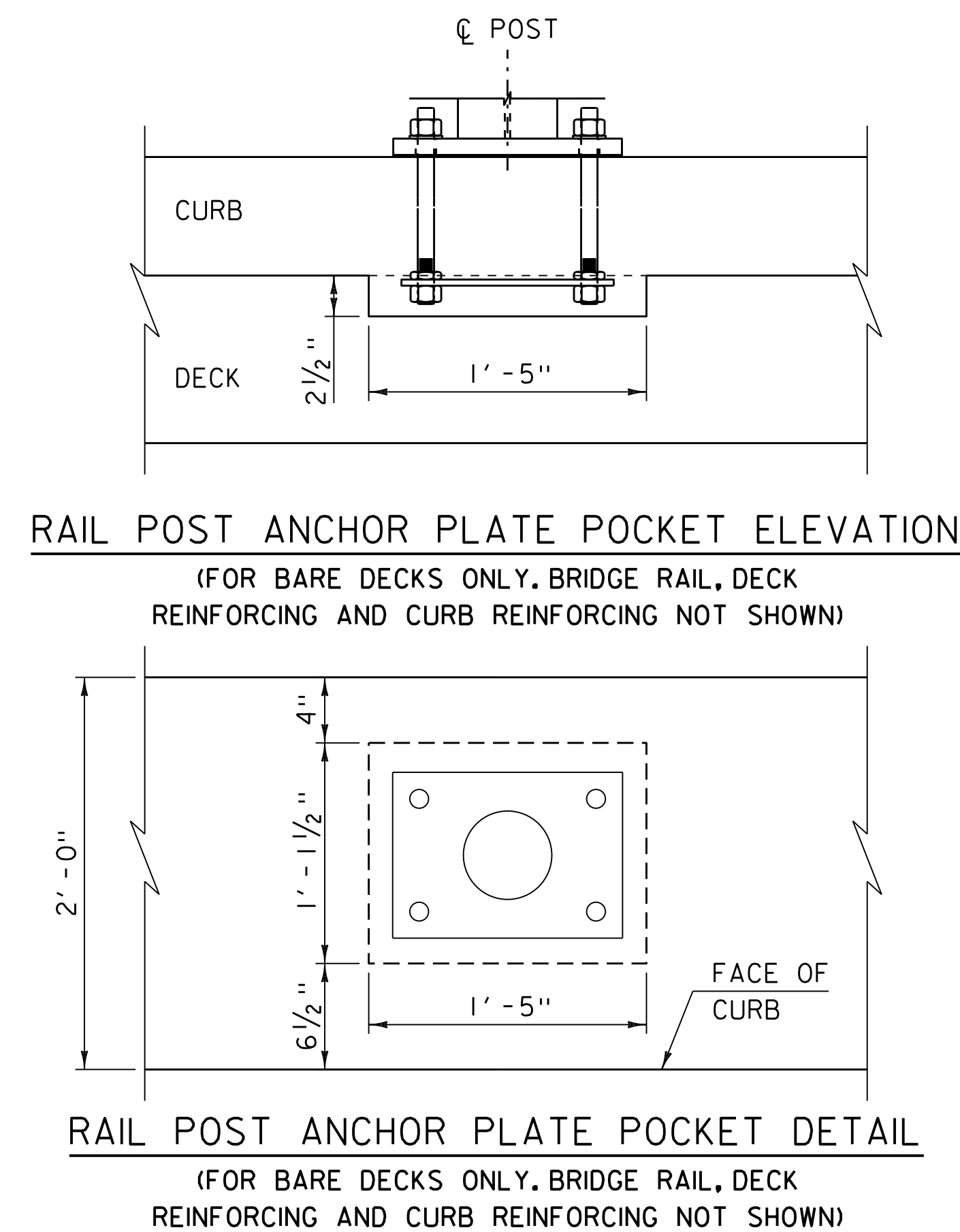
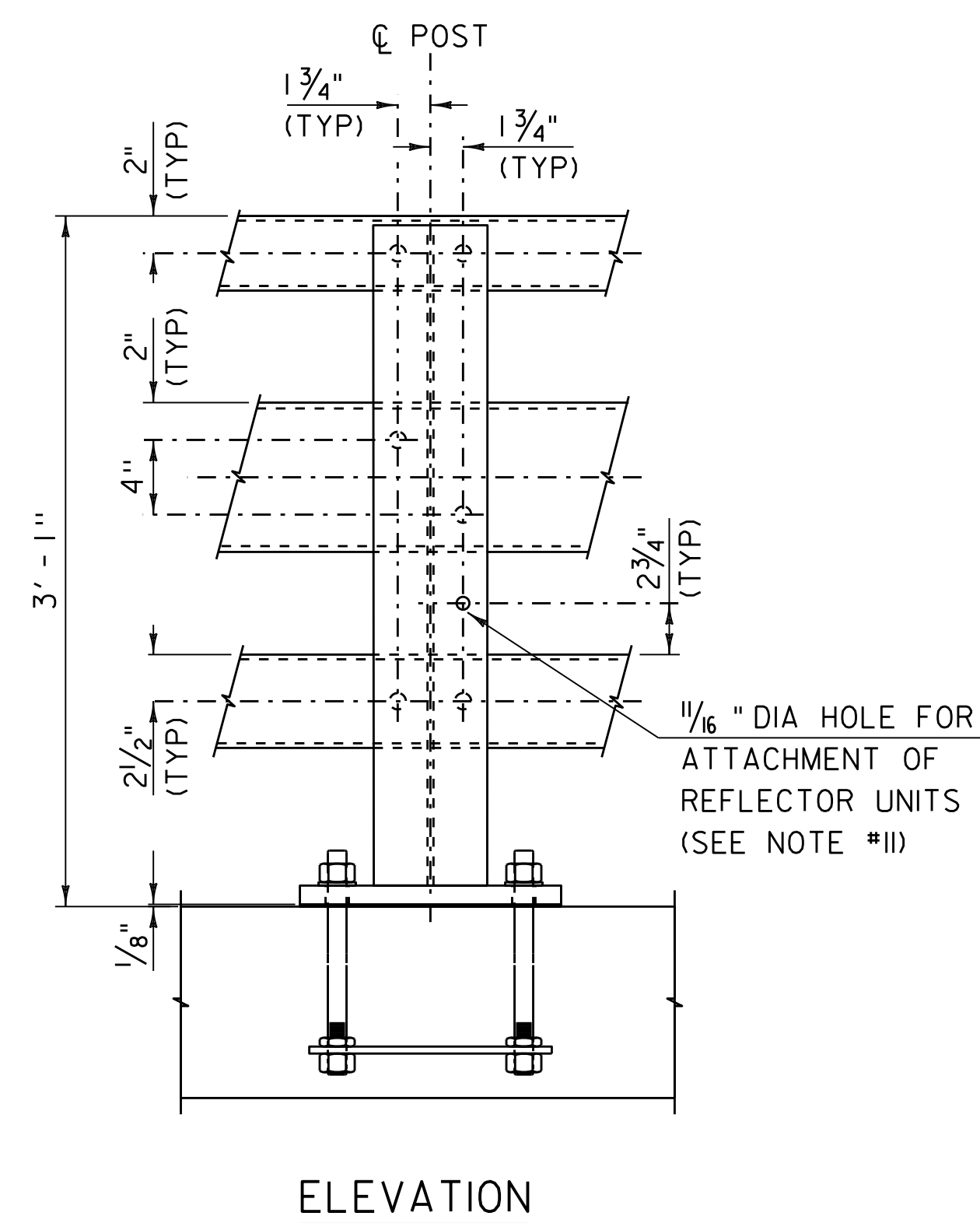
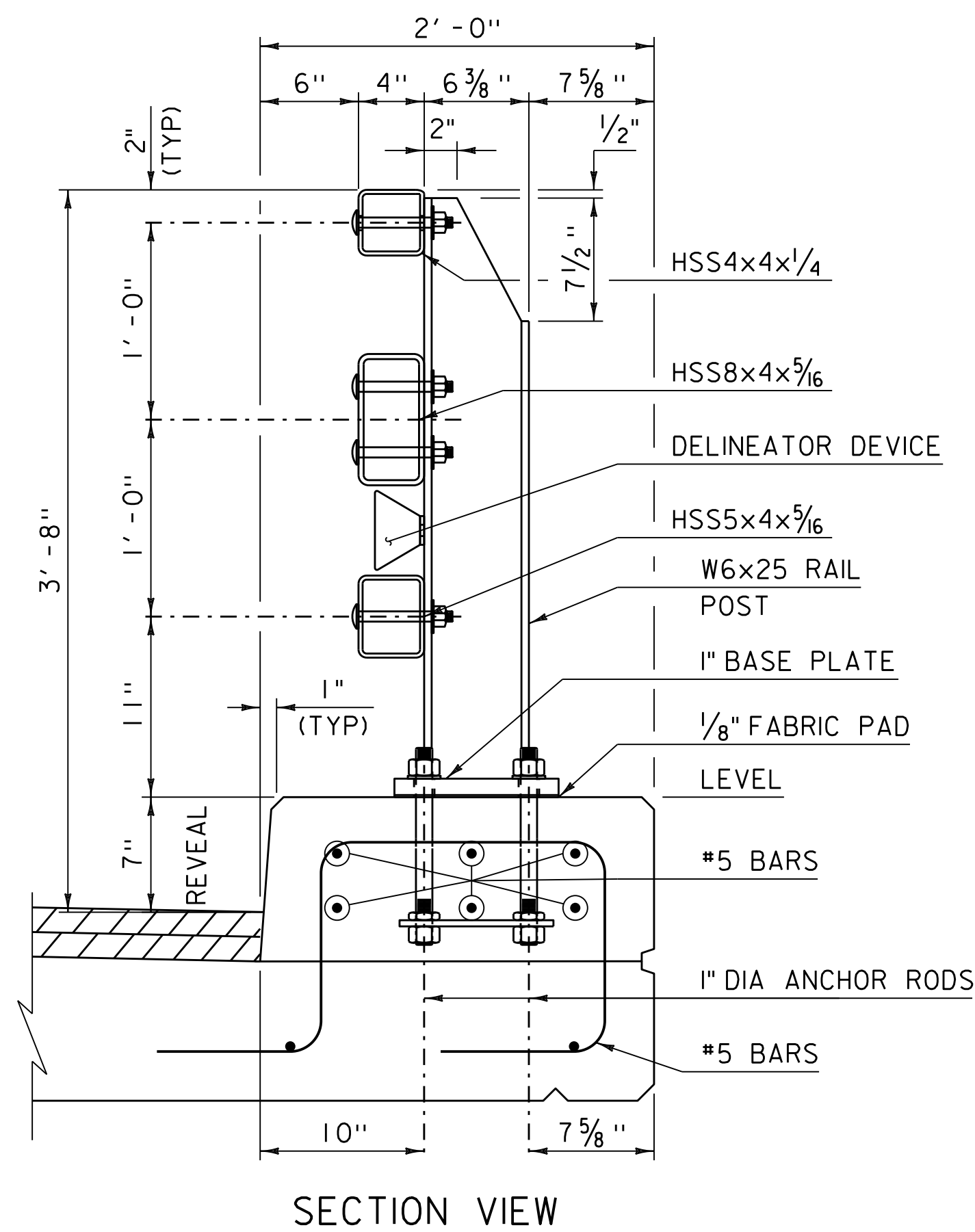


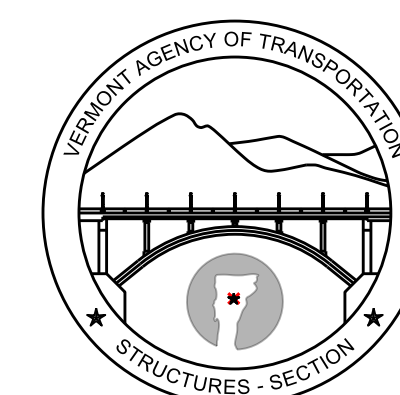


- NOTES:

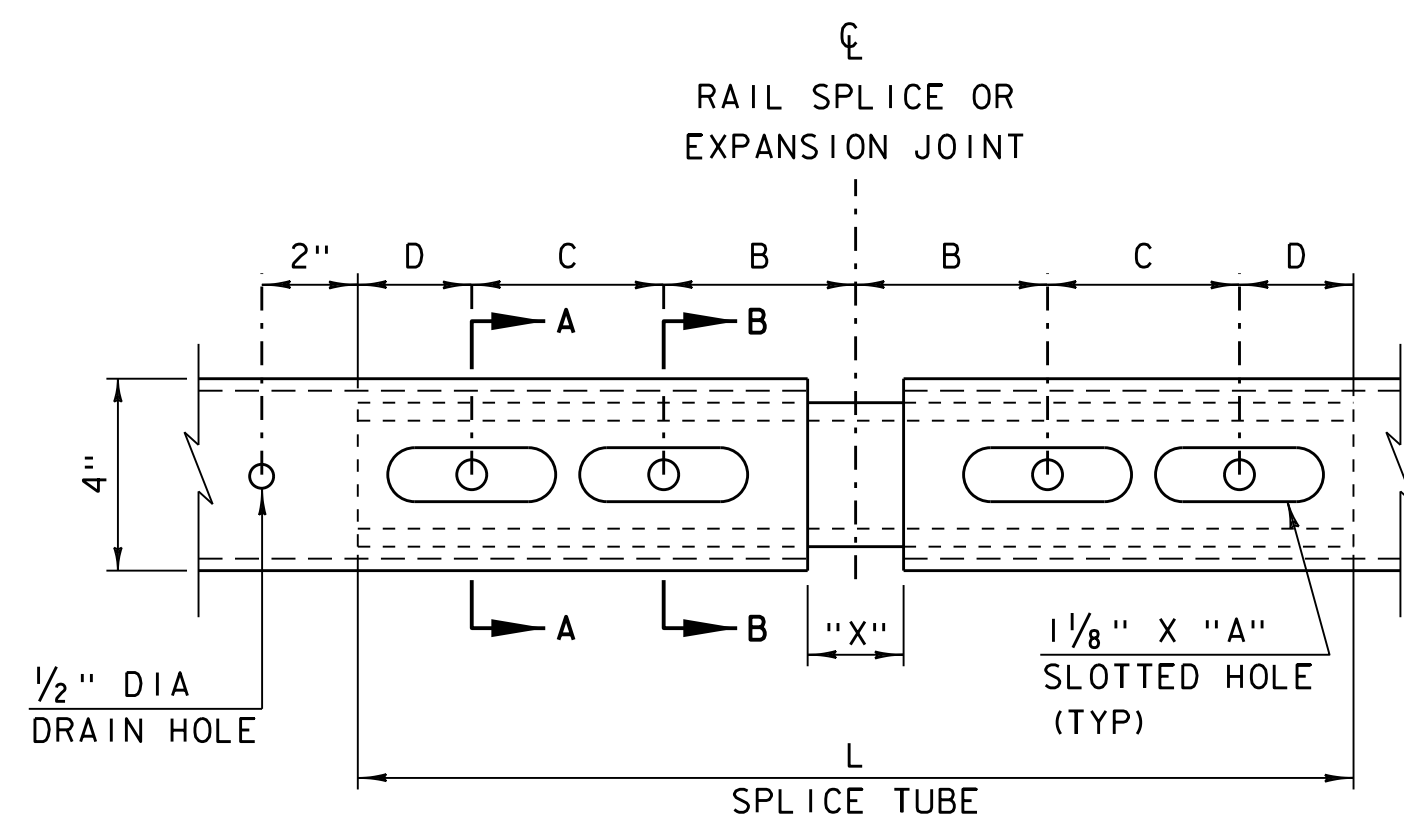
1. ALL WORK AND MATERIALS SHALL CONFORM TO SECTION 525.
2. PRIOR TO GALVANIZING, GRIND ALL EDGES TO A MINIMUM RADIUS OF $\frac{1}{16}$ ".
3. ALL POSTS SHALL BE SET NORMAL TO GRADE.
4. SECTIONS OF RAIL TUBE SHALL BE ATTACHED TO A MINIMUM OF TWO BRIDGE RAIL POSTS AND PREFERABLY TO AT LEAST FOUR POSTS.
5. RAIL TUBE EXPANSION JOINTS SHALL BE PROVIDED IN ANY RAIL BAY SPANNING THE END OF AN INTEGRAL ABUTMENT BRIDGE AND AT ALL SUPERSTRUCTURE EXPANSION JOINTS. EXPANSION JOINT WIDTH SHALL BE "X" AT 45°F AND WILL BE ADJUSTED IN THE FIELD BY THE ENGINEER FOR OTHER TEMPERATURES. REFER TO DETAIL AND TABLE ON SD-361.00B FOR DIMENSION "X".
6. HOLES IN RAILS FOR RAIL TUBE ATTACHMENT AND HOLES IN POSTS FOR DELINEATORS MAY BE FIELD-DRILLED. HOLES SHALL BE COATED WITH AN APPROVED ZINC-RICH PAINT IN ACCORDANCE WITH 726.08 PRIOR TO INSTALLATION.
7. RAIL POST ANCHORING NUTS SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL ONE-EIGHTH TURN.
8. RAIL TUBES SHALL BE ATTACHED USING $\frac{3}{4}$ " FULL DIAMETER BODY ASTM A 449 (TYPE 1) GALVANIZED ROUND HEAD BOLTS INSERTED THROUGH THE FACE OF THE TUBE. HOLES IN POSTS SHALL BE $\frac{1}{8}$ " LARGER THAN THE BOLT SIZE.
9. ANY BENDING OF RAIL SHALL BE DONE AT A FABRICATION PLANT ACCORDING TO A PROCEDURE PROVIDED BY THE FABRICATOR.
10. THE MINIMUM DISTANCE FROM THE POST TO AN EXPANSION JOINT SHALL BE DETERMINED BY THE MINIMUM EDGE DISTANCE OF 5" FROM ANY ANCHOR STUD TO THE END OF THE SLAB, OR TO THE EXPANSION JOINT RECESS POUR, IF ONE IS USED.
11. A DELINEATOR SHALL BE INSTALLED AT 30 FOOT SPACING OR THE NEAREST POST. WHITE IS TO BE INSTALLED ON THE DRIVER'S RIGHT. FOR ONE WAY BRIDGES, YELLOW IS TO BE INSTALLED ON THE DRIVER'S LEFT. PAYMENT SHALL BE INCIDENTAL TO OTHER ITEMS.
12. THIS RAILING MEETS THE REQUIREMENTS FOR A MASH TL-4 SERVICE LEVEL.

[illegible]

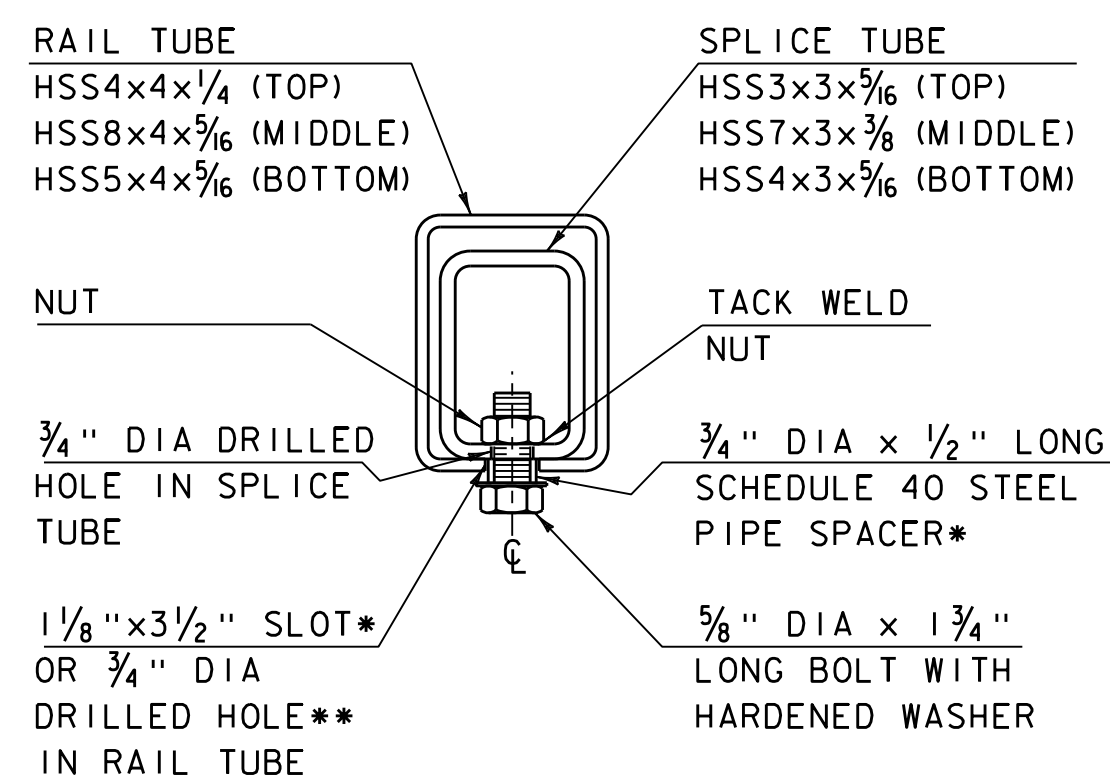
BRIDGE RAILING, GALVANIZED
3 RAIL BOX BEAM



STRUCTURES
DETAIL
SD - 361.00A

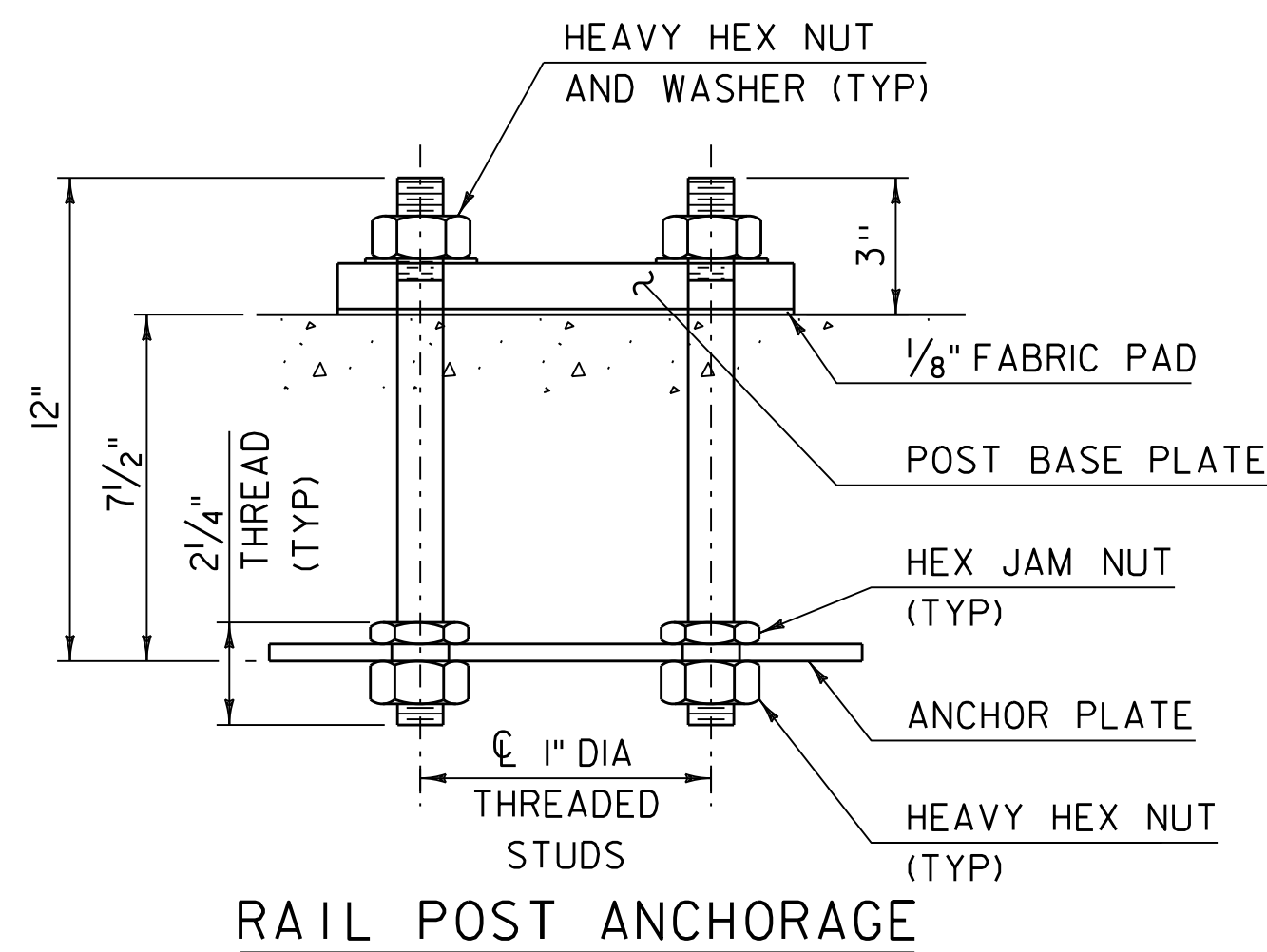


**RAIL SPLICE AND
EXPANSION JOINT DETAIL**
(BOTTOM VIEW)



SECTION A-A

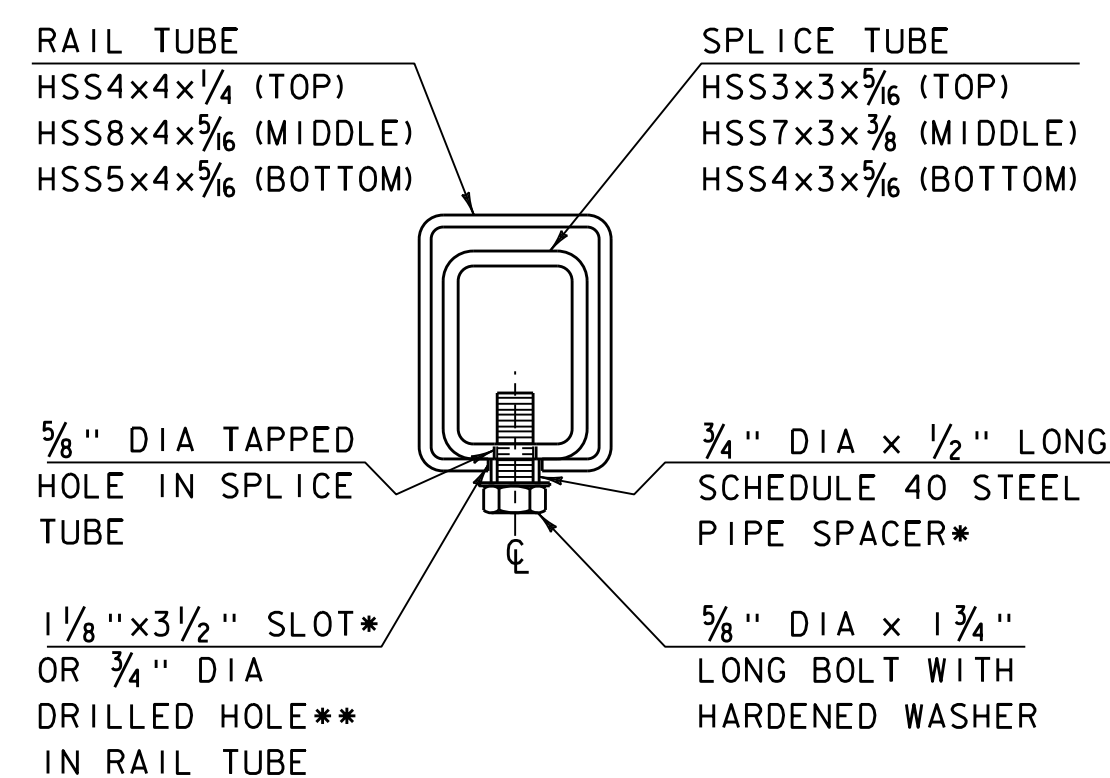
*EXPANSION JOINT ONLY
** RAIL SPLICE JOINT ONLY



RAIL POST ANCHORAGE

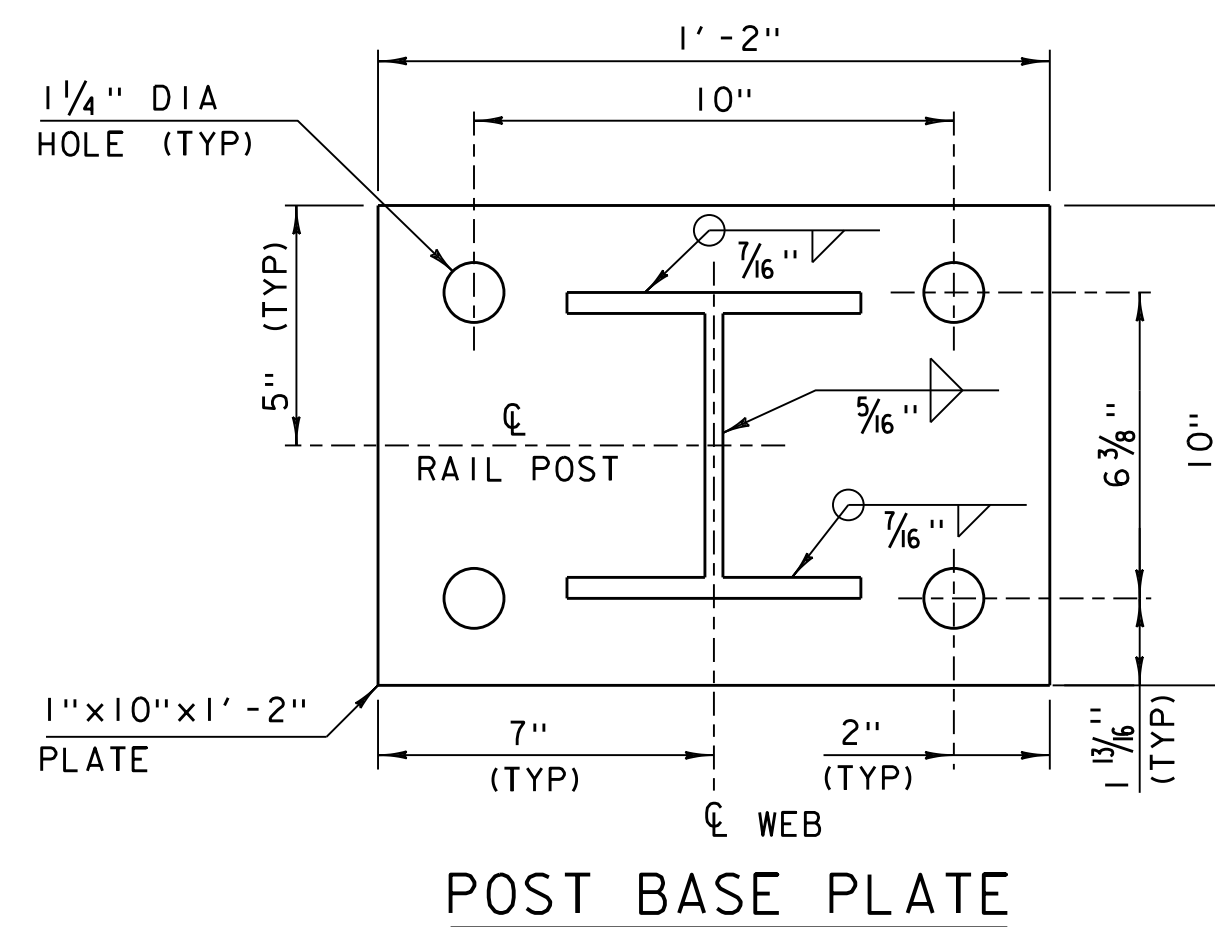
SPLICE TUBE DIMENSION TABLE						
T	A	B	C	D	X	L
SPLICE	2 1/2"	4"	4"	2"	3/4"	1'-8"
* < 3 1/4	2 1/2"	4"	4"	2"	2"	1'-8"
* 3 1/4" ≤ T ≤ 5 1/4	3 1/2"	5"	5"	2 1/2"	3"	2'-1"

T = TOTAL MOVEMENT OF BRIDGE
* = EXPANSION JOINT

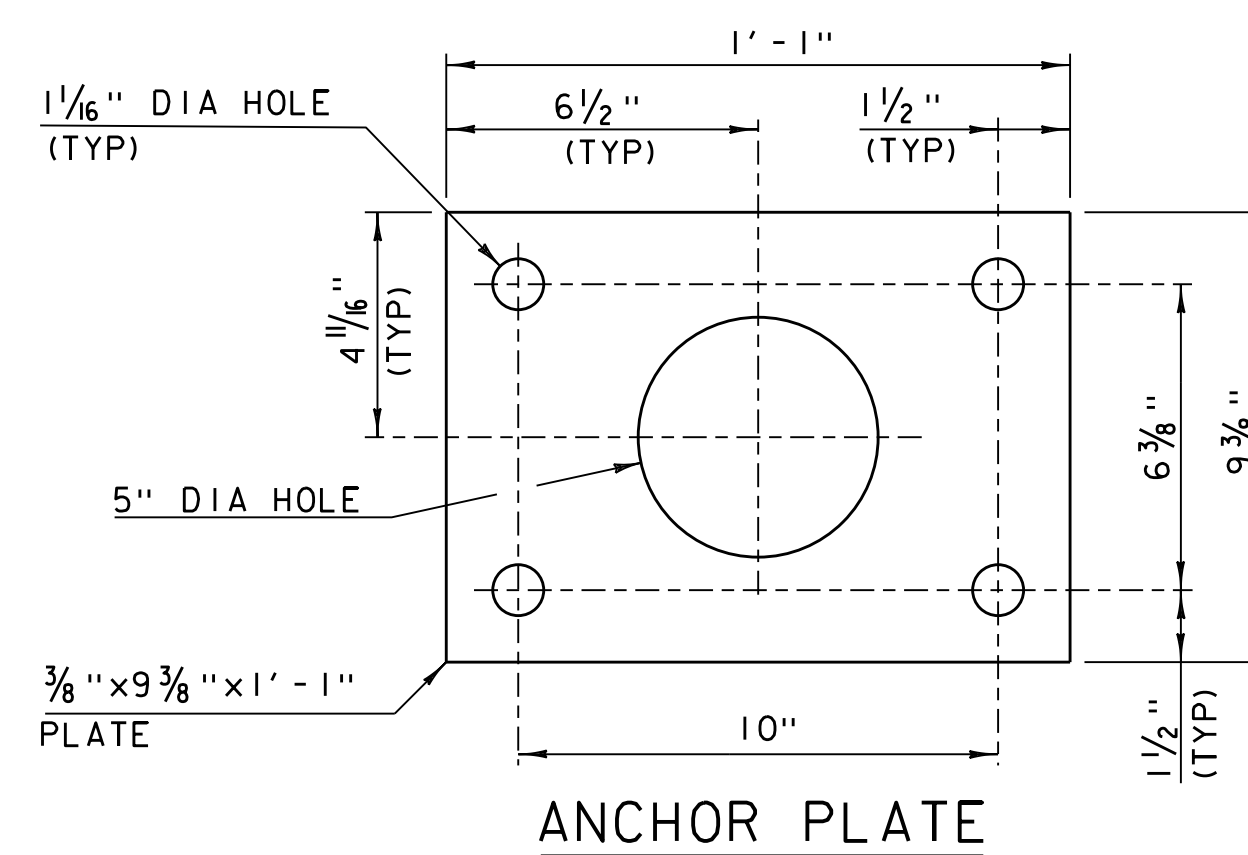


SECTION B-B

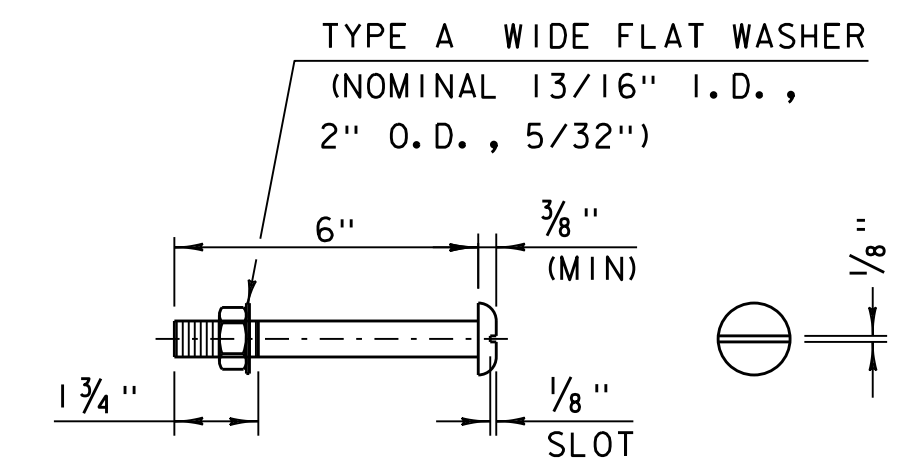
*EXPANSION JOINT ONLY
** RAIL SPLICE JOINT ONLY



POST BASE PLATE

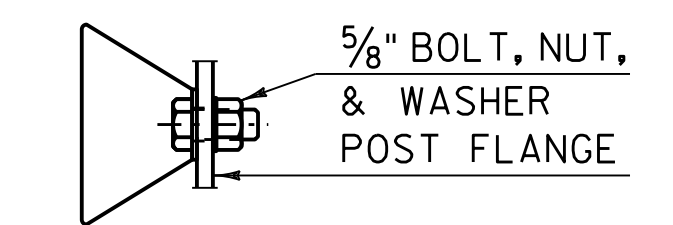


ANCHOR PLATE

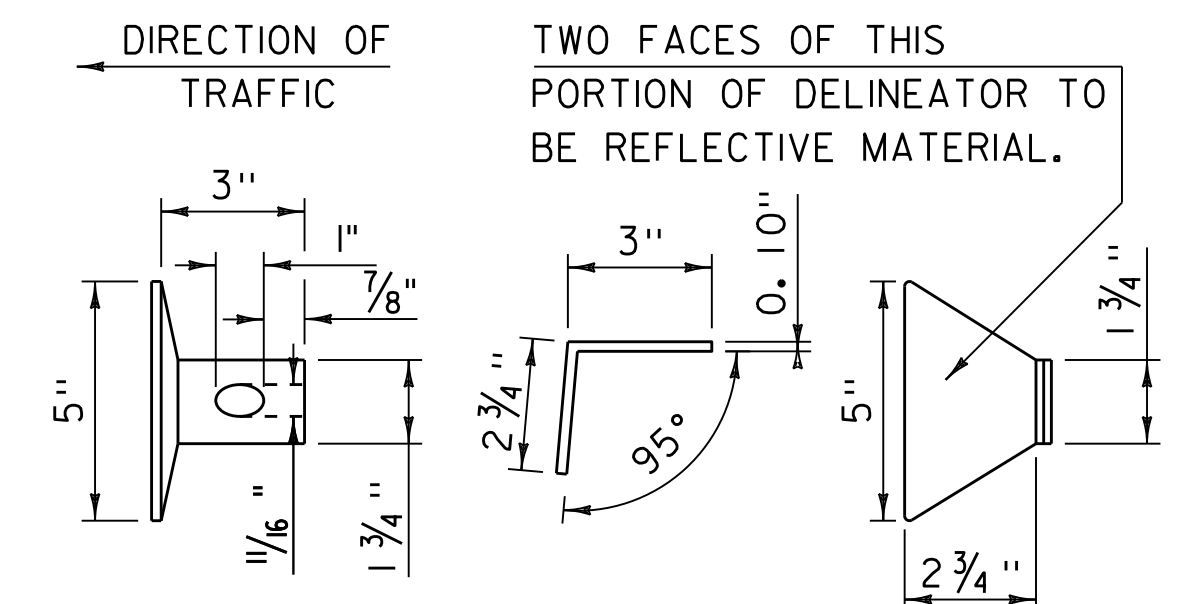


**3/4" DIA A449 (TYPE 1)
ROUND HEAD BOLT**

(WITH WASHER AND PREVAILING TORQUE TYPE LOCK NUT)
(SEE NOTE #8 ON SD-361.00A)
ONLY FULL DIAMETER BODY BOLTS WILL BE ALLOWED.



DELINEATOR MOUNTING
NTS



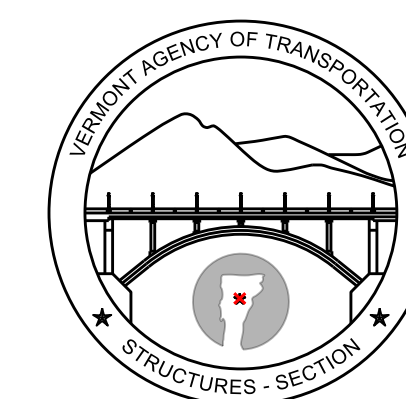
GUARDRAIL DELINEATOR
NTS

- GUARDRAIL MOUNTED DELINEATORS SHALL HAVE WHITE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING SUBSECTION 750.08(B)(3) OR YELLOW RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING SUBSECTION 750.08(B)(7).
- DELINEATOR SHALL MEET SPECIFICATION REQUIREMENTS FOR ASTM B209/B209M ALLOY 5052-H32.

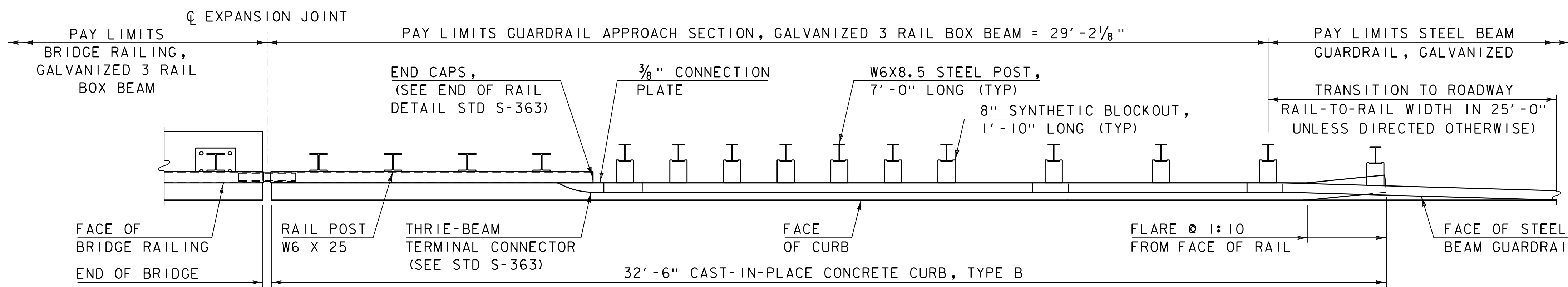
REVISIONS

APRIL 04, 2022 APPROVED FOR USE BY VAOT STRUCTURES SECTION

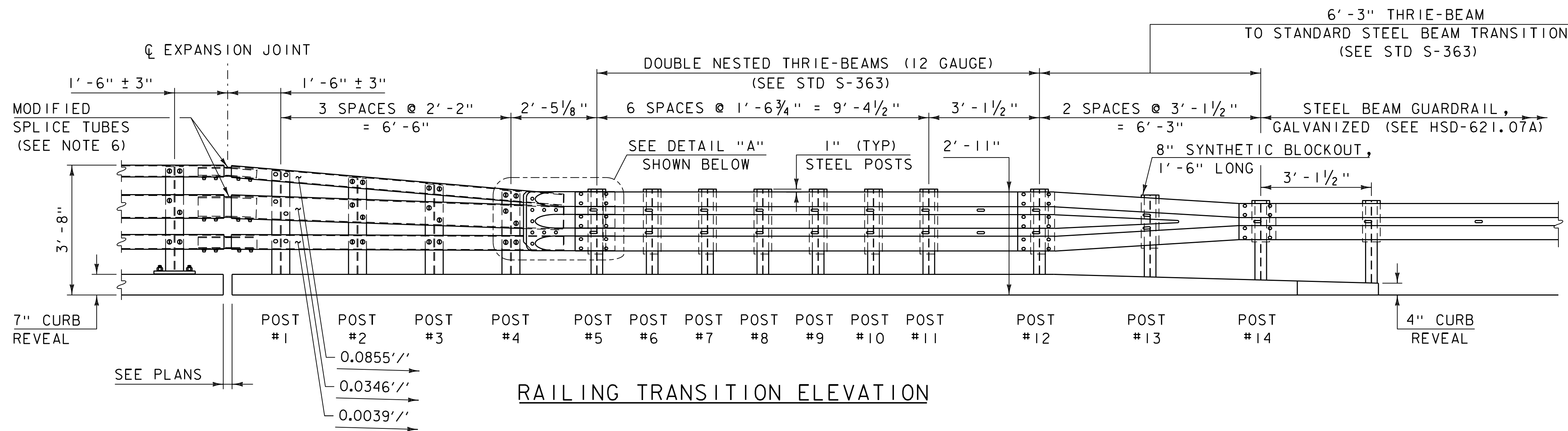
**BRIDGE RAILING, GALVANIZED
3 RAIL BOX BEAM**



**STRUCTURES
DETAIL
SD-361.00B**



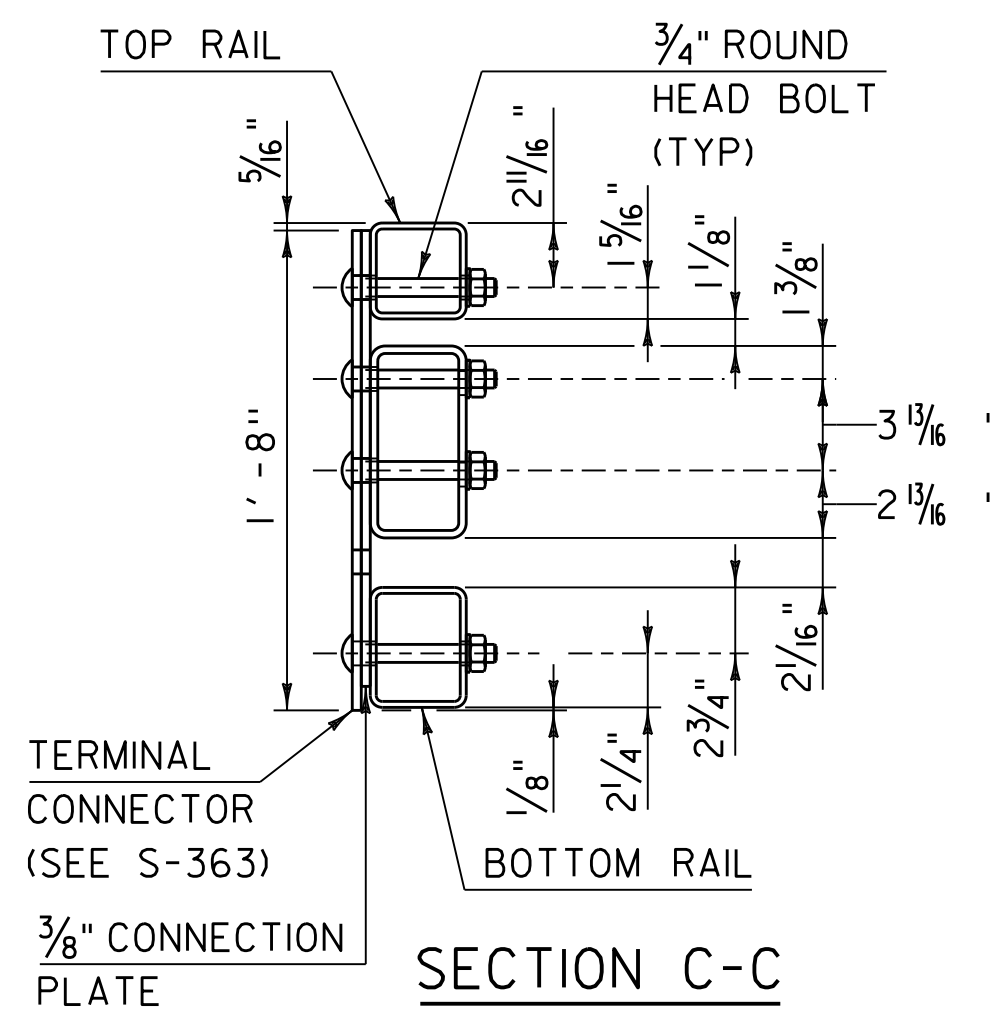
RAILING TRANSITION PLAN



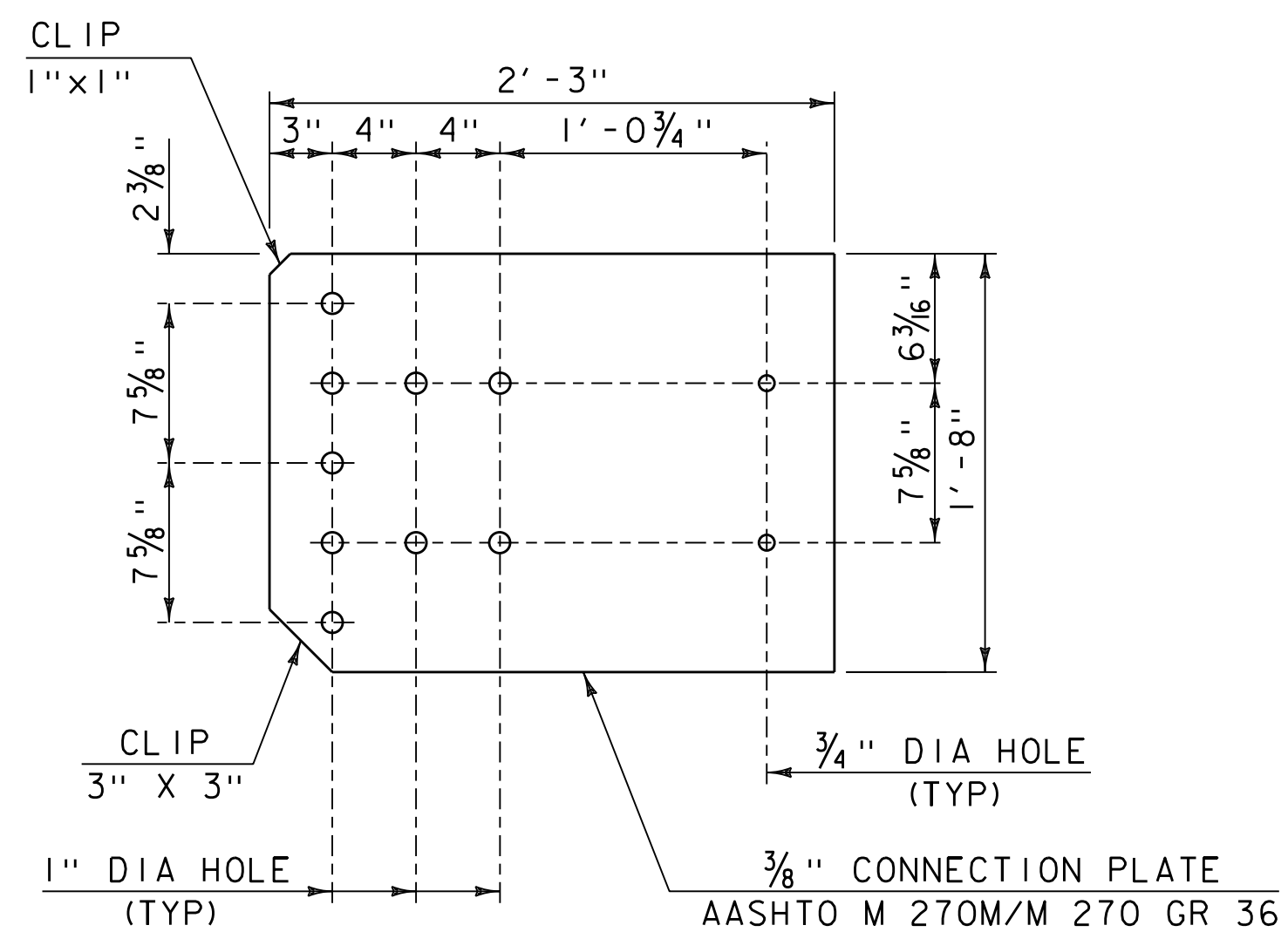
RAILING TRANSITION ELEVATION

NOTES:

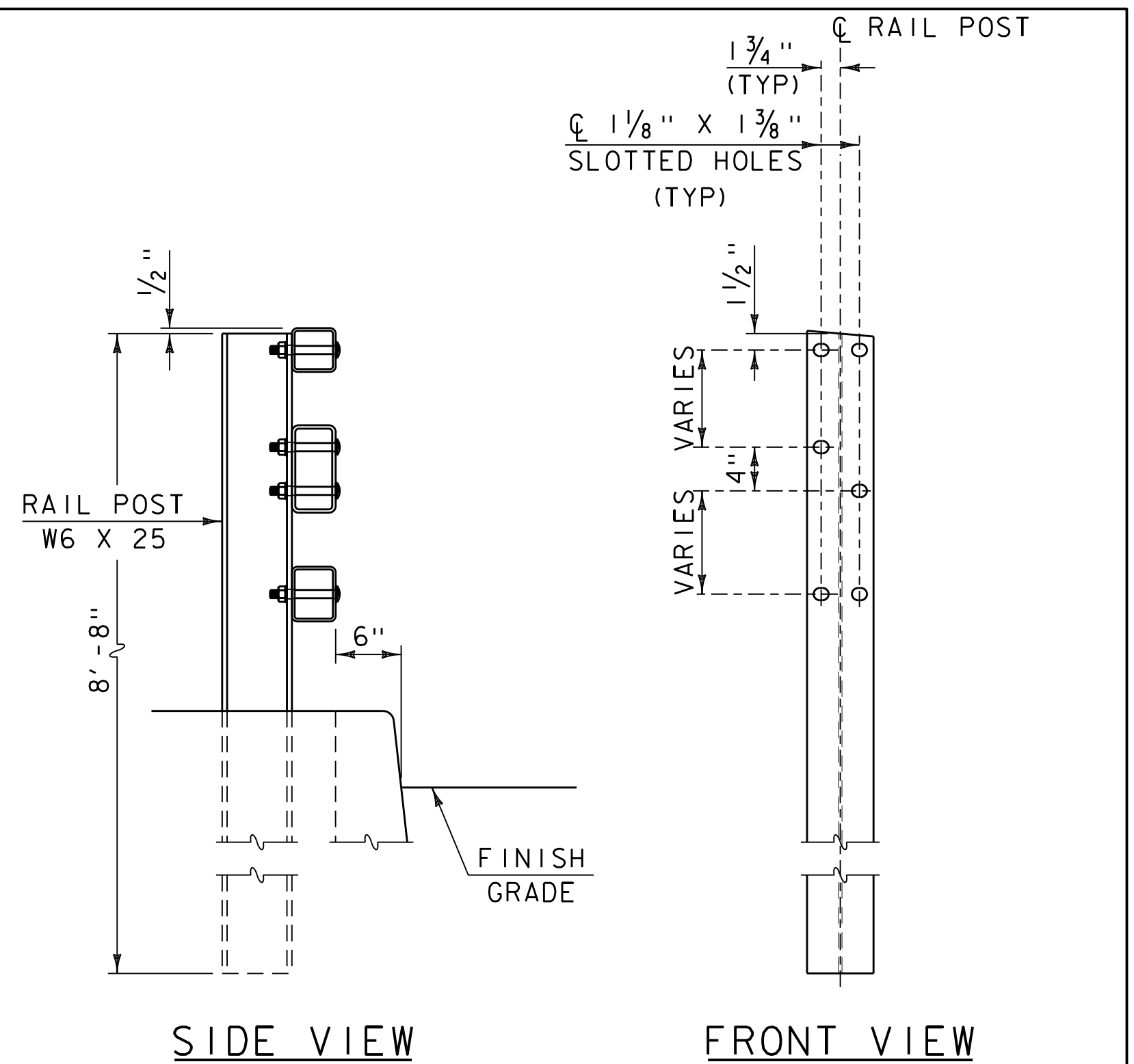
1. PAYMENT FOR GUARDRAIL APPROACH SECTION, GALVANIZED 3 RAIL BOX BEAM SHALL INCLUDE THE TERMINAL CONNECTOR, CONNECTION PLATE, DEFLECTOR PLATE, RAIL, POSTS, BLOCKS, END CAPS AND ATTACHMENT HARDWARE.
2. ALL APPROACH RAIL SPLICES SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC FLOW.
3. TUBE AND STEEL POST MATERIALS, DIMENSION SIZES AND NOTES SHALL BE THE SAME AS THOSE OF THE BRIDGE RAIL, UNLESS OTHERWISE NOTED.
4. W6x8.5 POSTS SHALL MEET THE REQUIREMENTS OF SUBSECTION 728.01(b).
5. PRIOR TO GALVANIZING, GRIND ALL EDGES TO A MINIMUM RADIUS OF 1/16\".
6. WELD EXPANSION TUBES ADJUSTED FOR SLOPE AND BEND. USE COMPLETE JOINT PENETRATION BUTT WELDS (B-U2).



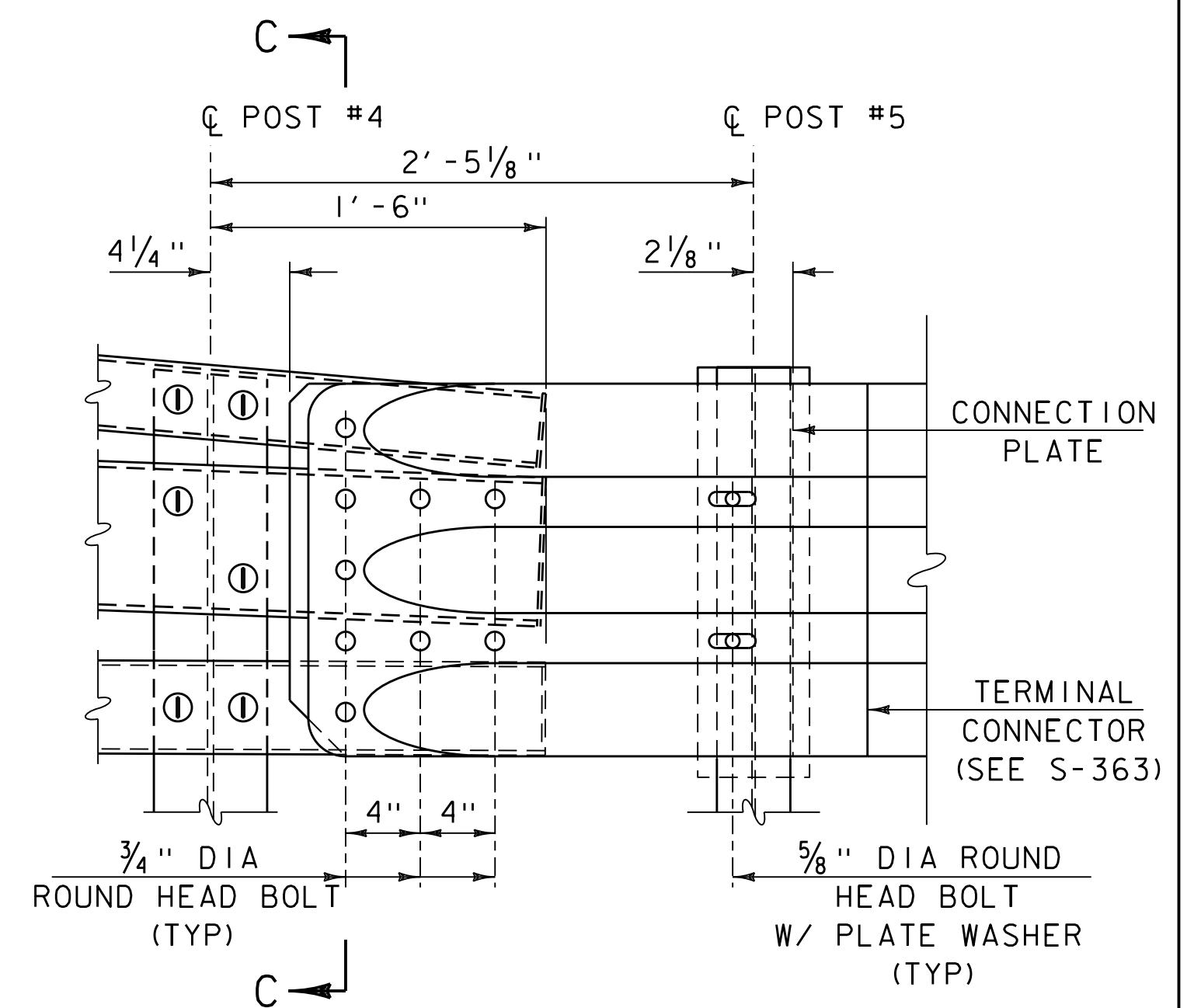
SECTION C-C



CONNECTION PLATE



RAIL POST DETAIL (POSTS 1-4)

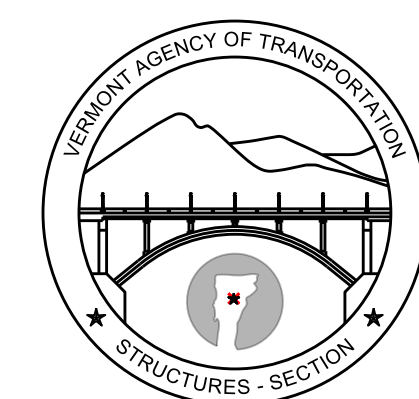


DETAIL A

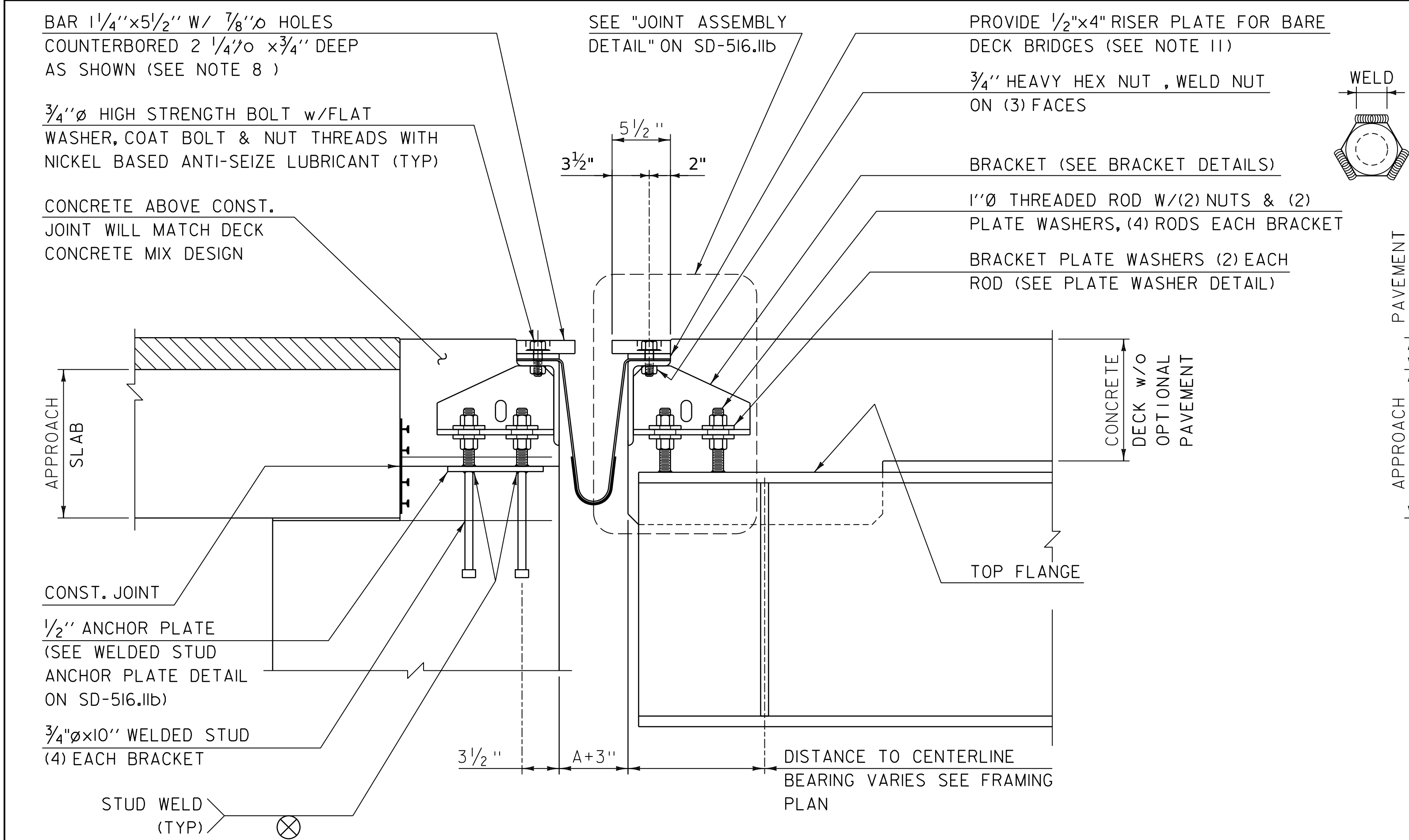
REVISIONS

APRIL 04, 2022	APPROVED FOR USE BY VAOT STRUCTURES SECTION

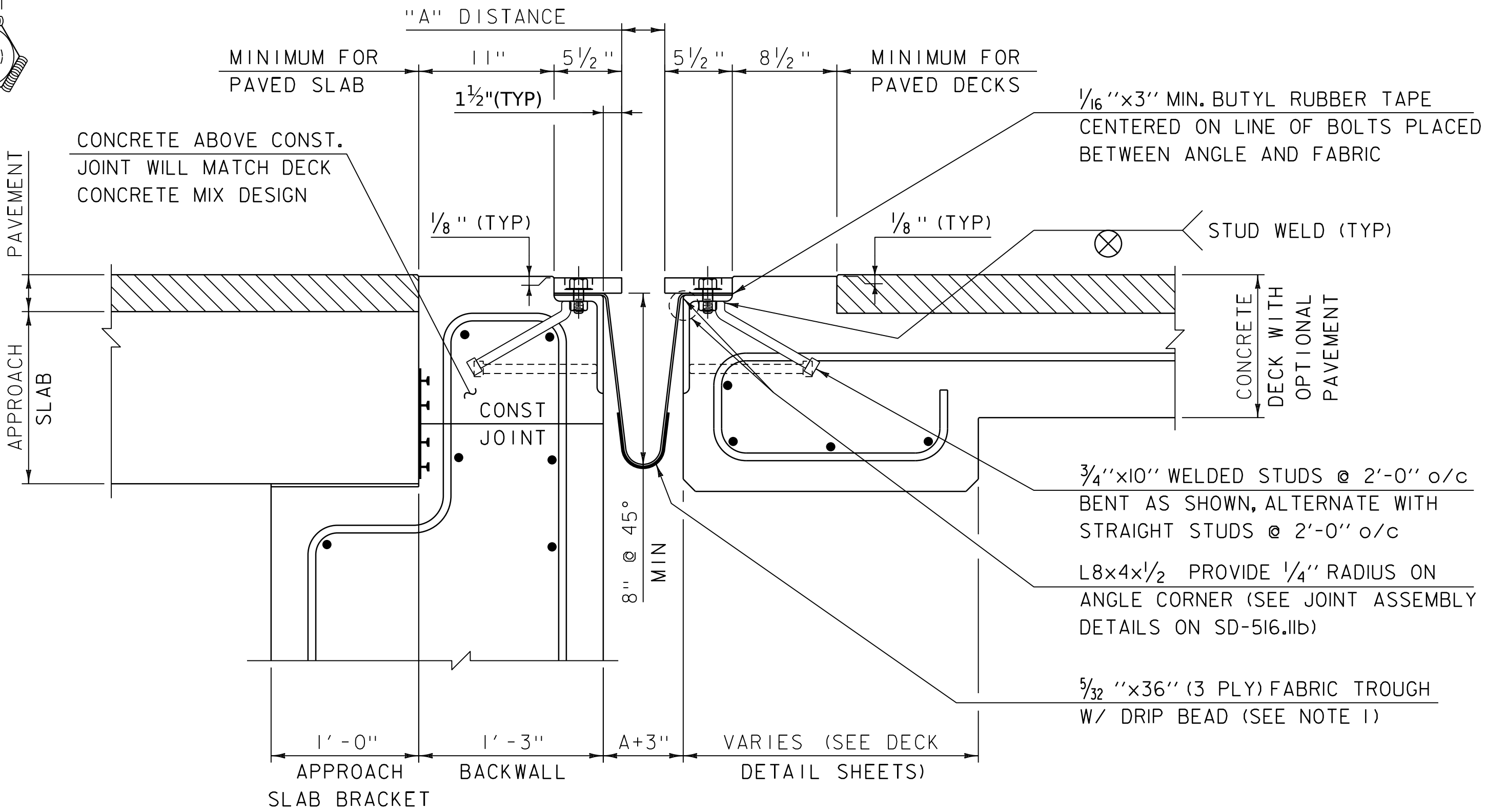
GUARDRAIL APPROACH SECTION, GALVANIZED 3 RAIL BOX BEAM



STRUCTURES DETAIL SD-361.00C



TYPICAL SECTION AT GIRDERS
SCALE 1 1/2" = 1'-0"

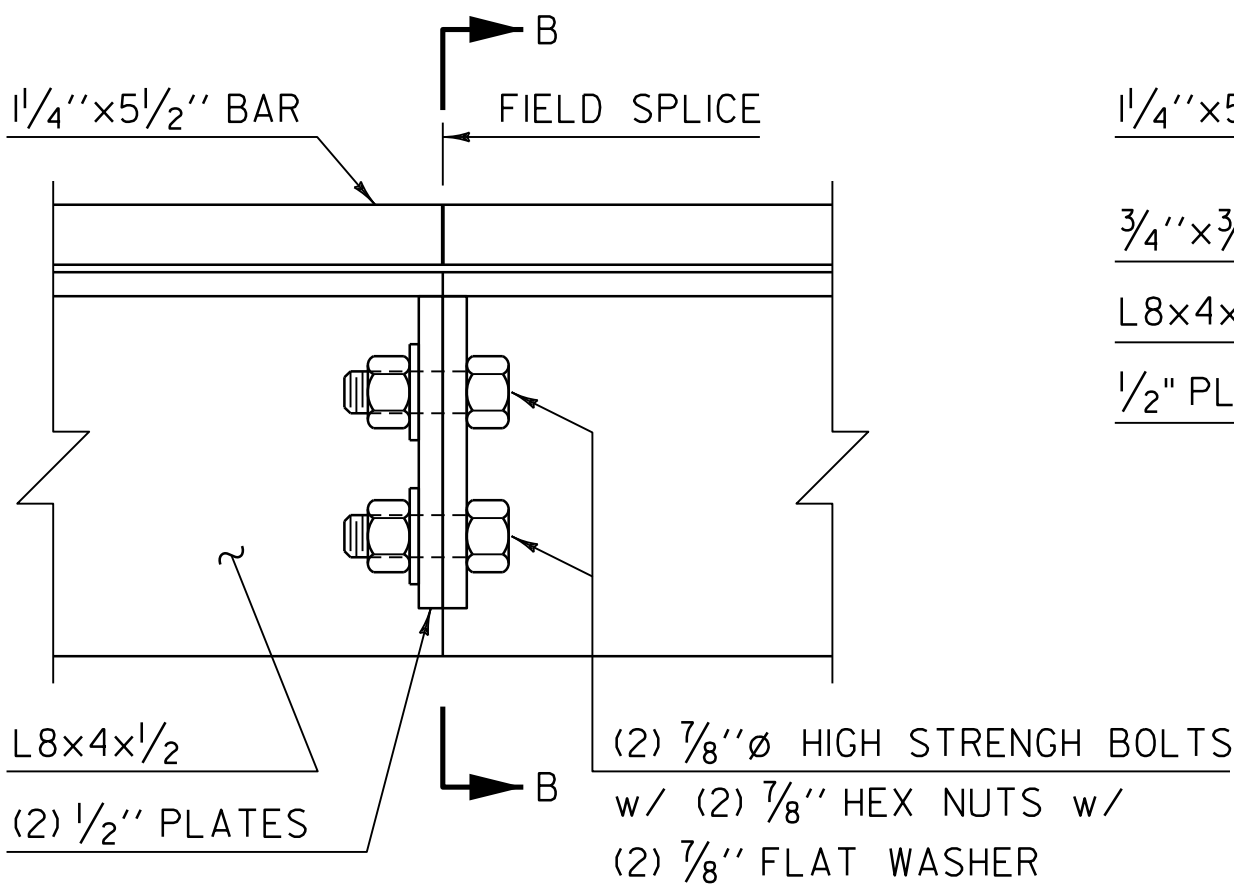


TYPICAL SECTION BETWEEN GIRDERS
SCALE 1 1/2" = 1'-0"

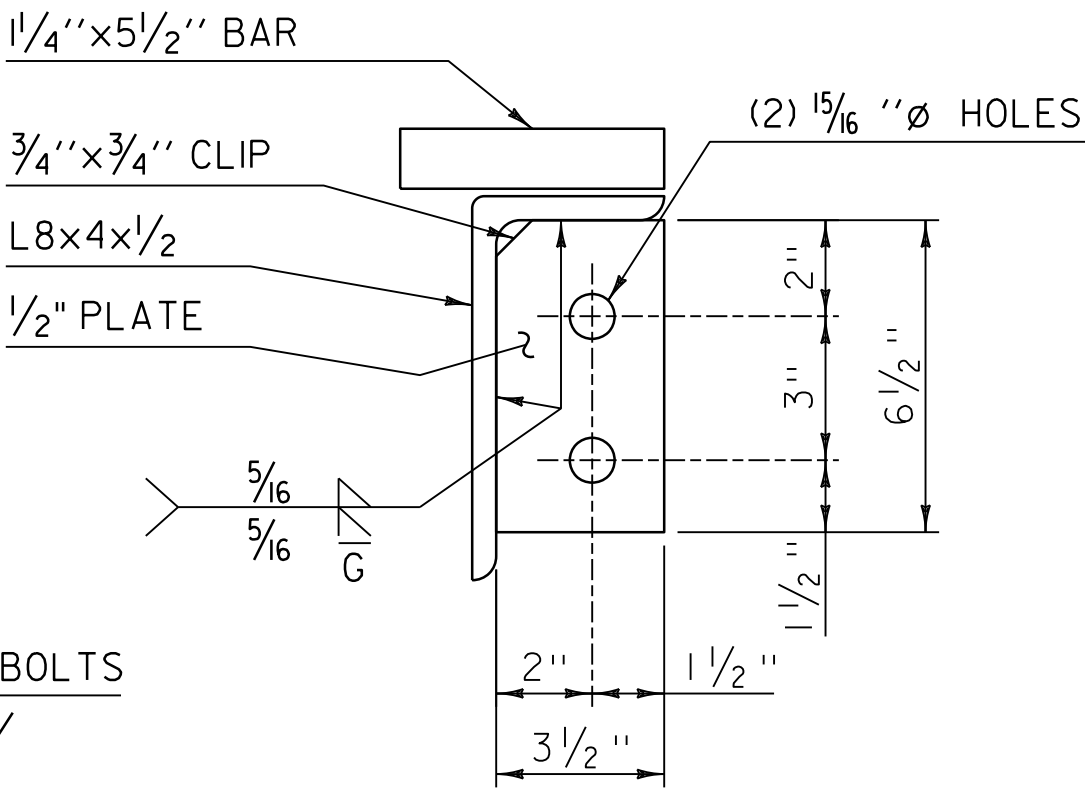
NOTES FOR ITEM 516.11 "BRIDGE EXPANSION JOINT, VERMONT"

- FABRIC TROUGH SHALL BE THOROUGHLY CLEANED AND FLUSHED AFTER PAVING OPERATION. A DRIP BEAD OF 1/4"x7" STRIP OF PREFORMED FABRIC MATERIAL SHALL BE CEMENTED TO THE BOTTOM OF THE FABRIC TROUGH USING AN ADHESIVE APPROVED BY THE MANUFACTURER. THE DRIP BEAD SHALL BE APPLIED 1" FROM THE DOWNSPOUT END OF THE TROUGH. PREFORMED FABRIC MATERIAL SHALL BE CONTINUOUS FOR THE FULL LENGTH OF THE JOINT.
- THE EXPANSION DEVICE SHALL BE COVERED TO PROTECT THE FINISH DURING PLACING OF BRIDGE DECK CONCRETE.
- SEE "JOINT GAP DIMENSION TABLE" FOR DISTANCE "A" VALUES IN TEMPERATURE RANGE PROVIDED.
- JOINT BRACKET LENGTH "X" VARIES DEPENDENT ON THE BRIDGE SKEW ANGLE. THE BRACKET MUST BE LOCATED SUCH THAT THE THREADED RODS ARE NOT LESS THAN 1 1/2" FROM GIRDERS END OR FLANGE SIDES.
- MATERIALS: UNLESS OTHERWISE NOTED, ALL MATERIALS SHALL MEET THE REQUIREMENTS OF 516.02. STRUCTURAL STEEL SHALL BE GRADE 36 OR GRADE 50. THREADED RODS SHALL CONFORM TO THE REQUIREMENTS OF 714.04. ALL STEEL SHALL BE GALVANIZED AFTER FABRICATION.

- THE 4"x8"x1/2" ANGLES SHALL BE FURNISHED AS ONE CONTINUOUS PIECE OR SPLICED AS SHOWN IN THE FIELD SPLICE DETAIL WHEN SPECIFIED. THE 1 1/4"x5 1/2" BARS MAY BE SUPPLIED IN MULTIPLE PIECES. NO PIECE SHALL BE LESS THAN 6 FEET IN LENGTH AND ALL END BOLTS HOLE LOCATIONS SHALL MEET THE REQUIREMENTS SHOWN ON SD-516.11b
- PROJECTING THREADS OF THE 3/4" Ø BOLTS IN THE JOINT SHALL BE GREASED BY THE CONTRACTOR PRIOR TO PLACING ADJACENT CONCRETE. THIS WILL FACILITATE BOLT REMOVAL IF REQUIRED IN THE FUTURE.
- FILL COUNTERBORED HOLES WITH HOT POURED JOINT SEALER (STD. SPEC. 707.02) AFTER BOLT INSTALLATION. PAYMENT FOR THE WORK SHALL BE INCIDENTAL TO ITEM 516.11 "BRIDGE EXPANSION JOINT, VERMONT".
- THE EXPANSION JOINT, INCLUDING THE FABRIC TROUGH, SHALL BE SHOP ASSEMBLED AND SHIPPED AS ONE UNIT. IF THE EXPANSION JOINT HAS A FIELD SPLICE SPECIFIED, THE FABRIC TROUGH SHALL BE SHIPPED WITH ONE UNIT AND ASSEMBLED WITH THE SECOND UNIT PRIOR TO CONCRETE PLACEMENT.
- TEMPORARY SHIPPING ATTACHMENTS SHALL BE ATTACHED BY BOLTING; WELDING WILL NOT BE PERMITTED.
- BARE DECK "RISER PLATE" AS SHOWN IN "TYPICAL SECTION AT GIRDERS" DRAWING SHALL BE INCLUDED ON BRIDGES WITH BARE CONCRETE DECK SPECIFIED. RISER PLATES SHALL BE INCLUDED FOR BOTH SIDES AND MATCH THE LENGTHS OF THE 1 1/4"x5 1/2" BARS. THE RISER PLATE CAN BE REMOVED IF THE DECK IS MILLED IN THE FUTURE.



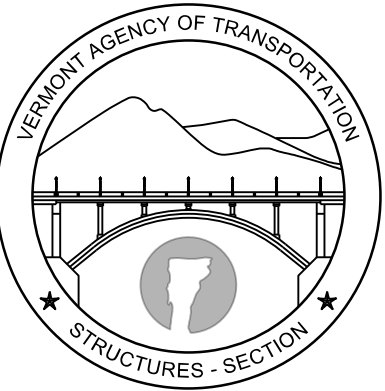
FIELD SPLICE DETAIL
SPLICE ONLY WHEN SPECIFIED ON PLANS.



SECTION "B-B"

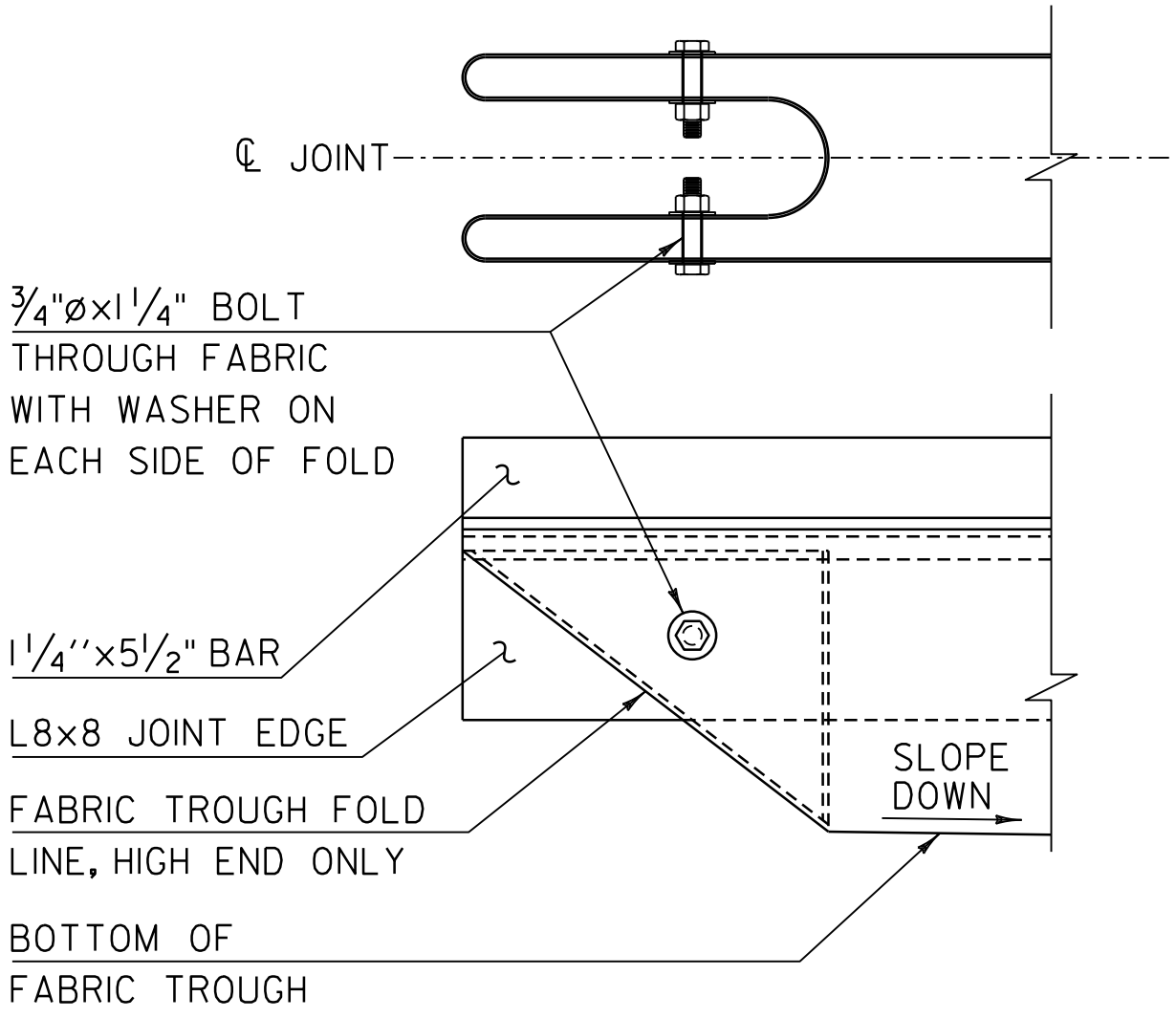
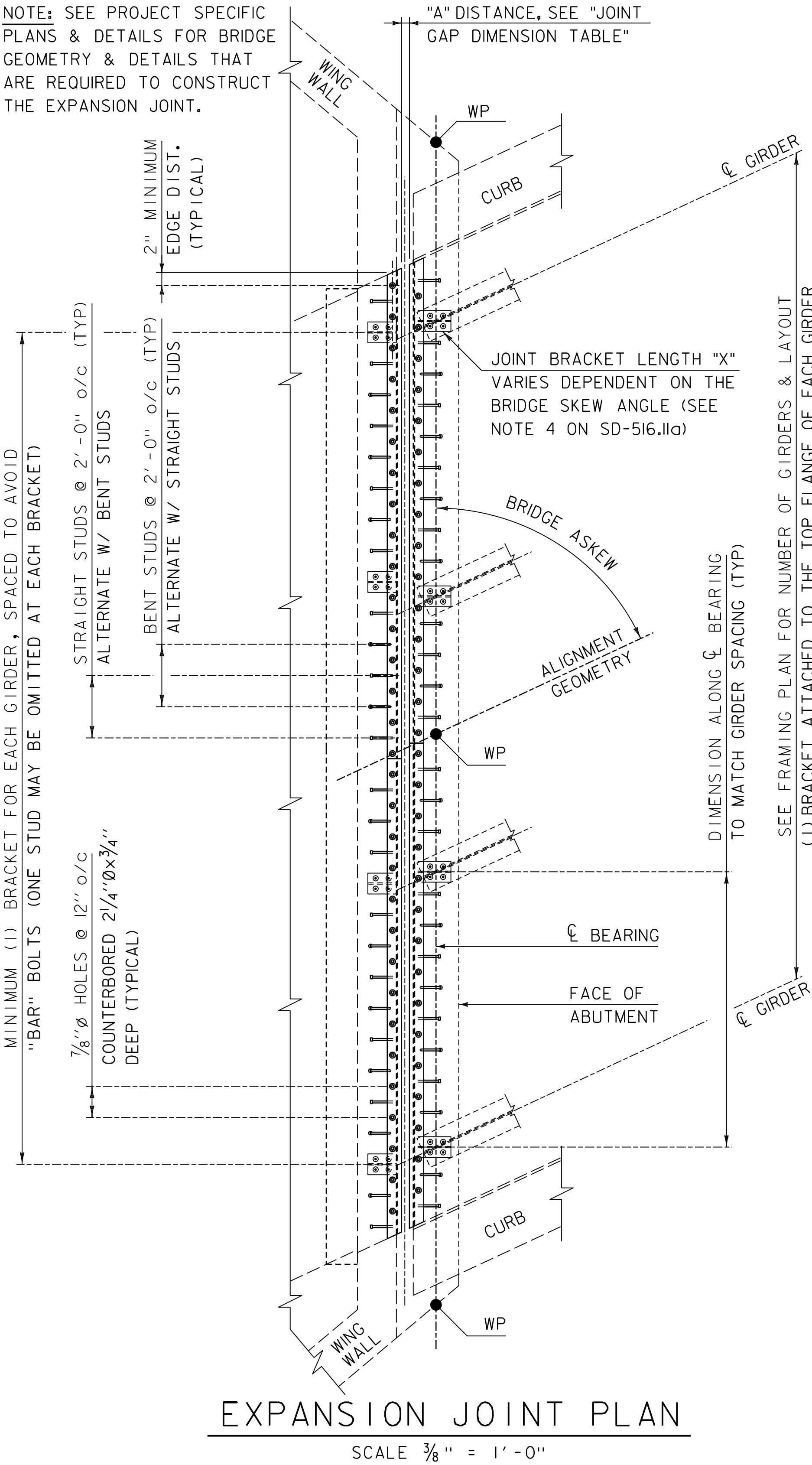
REVISIONS	
FEBRUARY 24, 2011	APPROVED FOR USE BY VAOT STRUCTURES SECTION
MARCH 23, 2023	UPDATED MATERIALS AND WELDING REQUIRMENTS
MAY 28, 2026	UPDATED MATERIALS, DETAILS AND NOTES

BRIDGE EXPANSION JOINT,
VERMONT



STRUCTURES
DETAIL
SD-516.11a

NOTE: SEE PROJECT SPECIFIC PLANS & DETAILS FOR BRIDGE GEOMETRY & DETAILS THAT ARE REQUIRED TO CONSTRUCT THE EXPANSION JOINT.



FOLDED TROUGH END DETAIL

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

1. TROUGH SHALL BE FOLDED AT HIGH ENDS. TROUGH SHALL SLOPE AT MIN 2% DOWN TOWARD THE NEAREST DRAINAGE SPOUT HOPPER LOCATION.
2. BOLTS, NUTS AND WASHERS FOR FOLD SHALL MEET REQUIREMENTS OF SUBSECTION 714.04 AND SHALL BE GALVANIZED.

JOINT GAP DIMENSION TABLE						
"A" Distance (in)						
Temp (°F)	Expansion Length (ft)					
	100 - 120	>120 - 140	>140 - 160	>160 - 180	>180 - 200	
0	1 5/8	1 13/16	1 7/8	1 15/16	2 1/8	
15	1 1/2	1 5/8	1 11/16	1 3/4	1 7/8	
30	1 5/16	1 1/2	1 1/2	1 1/2	1 5/8	
45	1 3/16	1 5/16	1 5/16	1 5/16	1 7/16	
60	1 1/16	1 1/8	1 1/8	1 1/16	1 3/16	
75	15/16	1	15/16	7/8	15/16	
90	3/4	13/16	3/4	11/16	11/16	
105	5/8	11/16	9/16	7/16	1/2	

- 1) Expansion Length: Length of span, from Expansion Joint to nearest Fixed Bearing.
- 2) "A" Distance: measured distance during joint placement.
- 3) Temp: Approximate temperature of steel during joint placement.

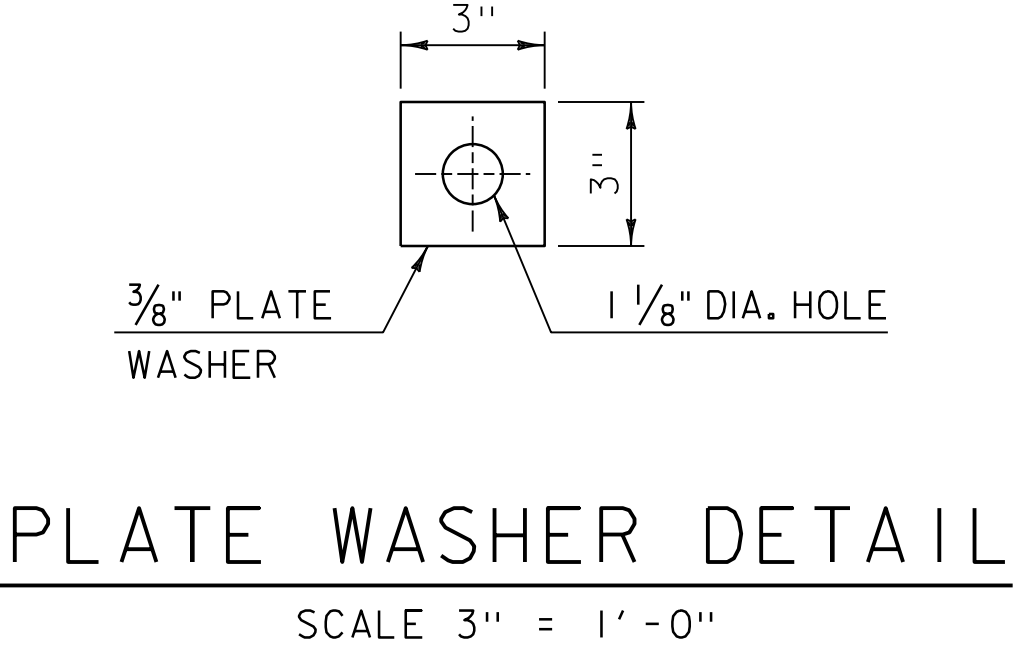
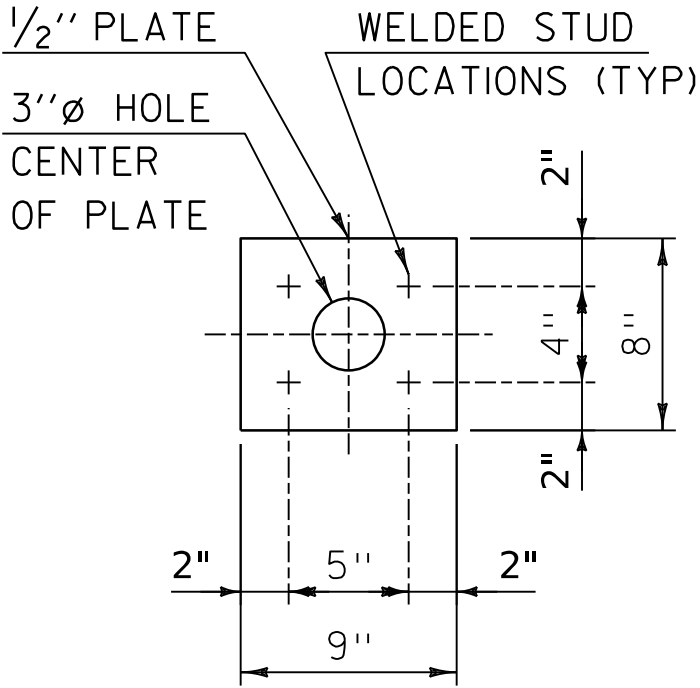


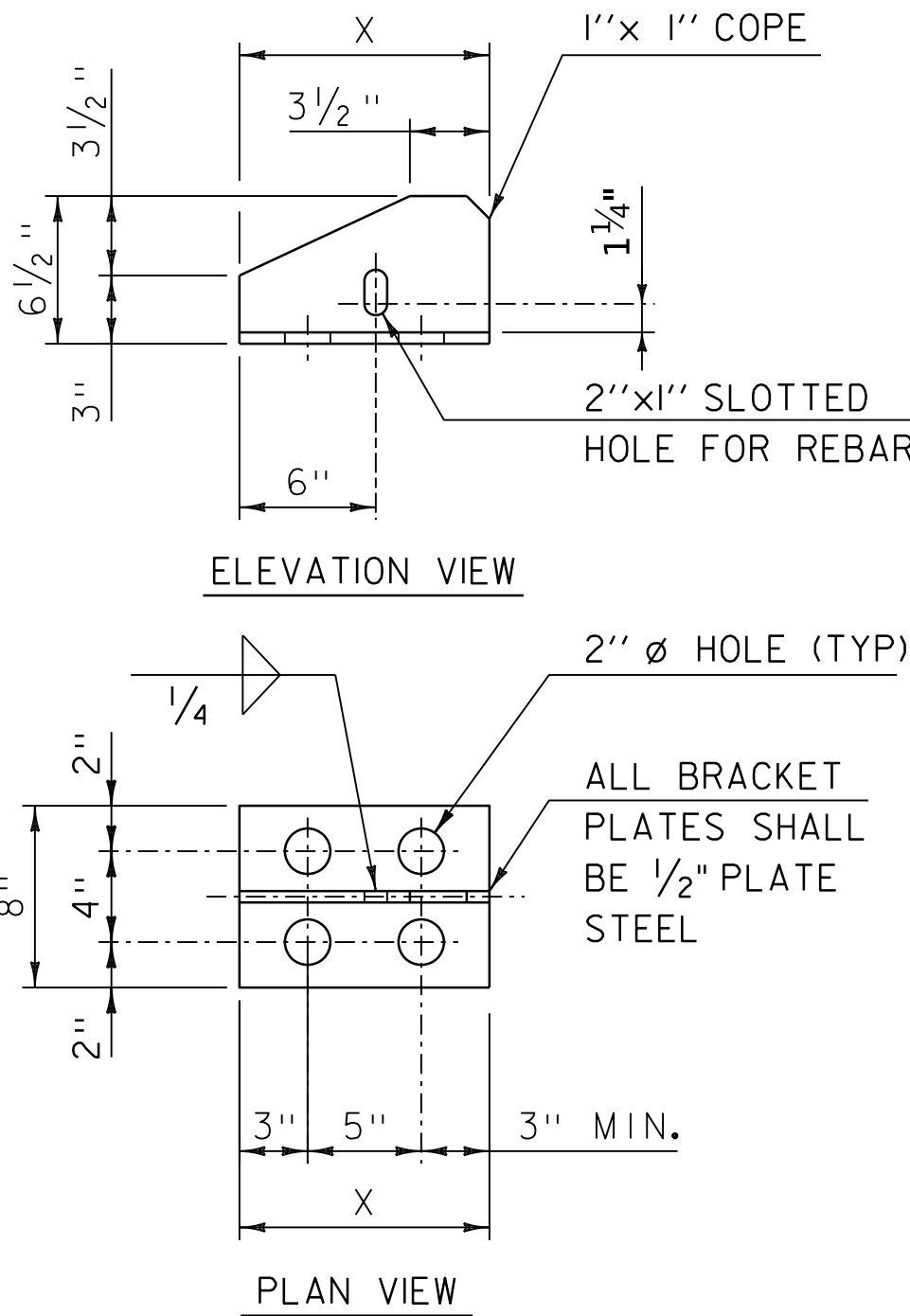
PLATE WASHER DETAIL

SCALE 3" = 1'-0"



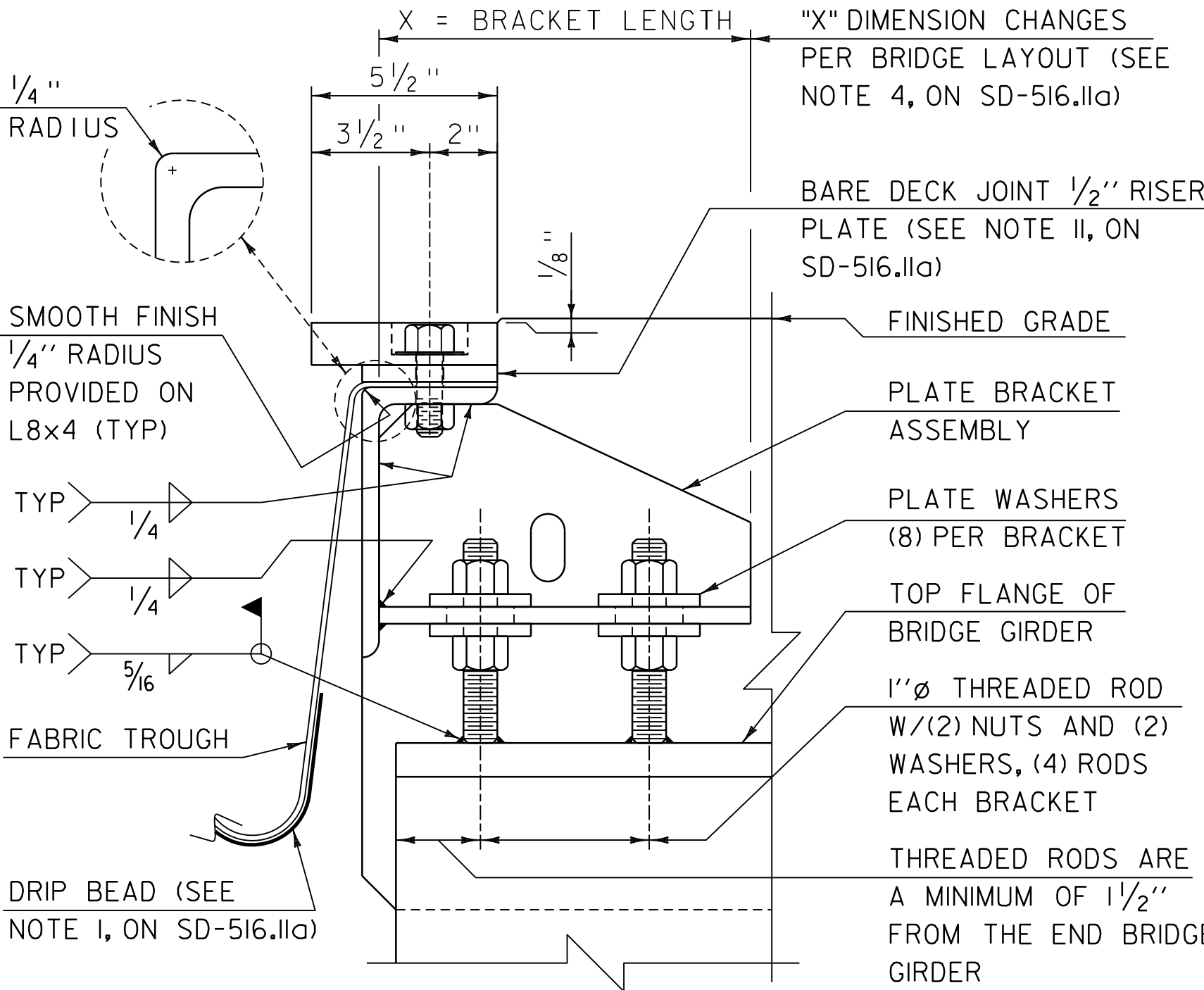
WELDED STUD ANCHOR PLATE DETAIL

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



BRACKET DETAILS

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

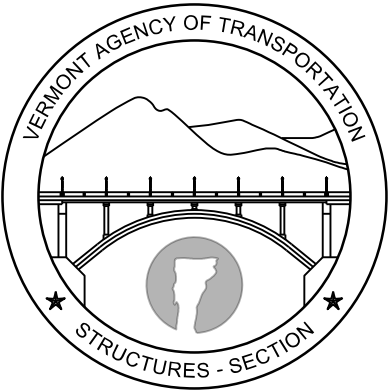


JOINT ASSEMBLY DETAIL

SCALE 3" = 1'-0"

REVISIONS	
FEBRUARY 24, 2011	APPROVED FOR USE BY VAOT STRUCTURES SECTION
MARCH 23, 2023	UPDATED MATERIALS AND WELDING REQUIREMENTS
MAY 28, 2026	UPDATED MATERIALS, DETAILS AND NOTES

BRIDGE EXPANSION JOINT,
VERMONT



STRUCTURES
DETAIL
SD-516.11b