

PARAPET/RAILING COMBINATION MEETS TL-4 REQUIREMENTS OF NCHRP REPORT 350 ON BRIDGE DECK AND TL-3 ON APPROACH PANEL

DESIGNER NOTE
(REMOVE PRIOR TO PRINTING FINAL PLAN):
FOR BRIDGES WITH SUPERELEVATION EXCEEDING 2%, SHOW DIMENSIONS FOR BOTH THE FRONT AND BACK FACE OF THE PARAPET. ALSO VERIFY THAT BAR R501E HAS 10" MIN. PROJECTION WHEN CROSS SLOPE VARIES FROM NORMAL 0.02 FT/FT

DESIGNER NOTE
(REMOVE PRIOR TO PRINTING FINAL PLAN):
MINIMUM BARRIER LENGTH ON APPROACH PANEL IS 13'-4" WITH MINIMUM OF 20 R502E & R503E DOWELS WITH ACCOMPANYING APPROPRIATE PARAPET VERTICAL BARS. VERIFY APPROACH PARAPET LENGTH WITH ROADWAY DESIGNER. REFER TO MEMO TO DESIGNERS #2020-01 FOR ADDITIONAL REQUIREMENTS REGARDING BARRIER PLACEMENT.

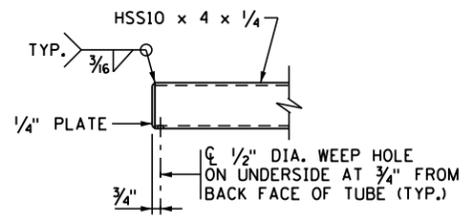
- NOTES:**
- F.F. DENOTES FRONT FACE
B.F. DENOTES BACK FACE
 - (A) SEE SHEET 2 OF 2 FOR DETAILS.
 - (B) PLACE BAR ON TOP OF BOTTOM REINFORCEMENT MAT IN DECK.
 - (C) STRUCTURAL TUBE RAIL CANTILEVER DIMENSIONS ARE BASED ON SUCCESSFUL CRASH TESTS AND SHOULD NOT BE MODIFIED.

REVISED:
APPROVED: APRIL 09, 2020
Kevin Westrom
STATE BRIDGE ENGINEER

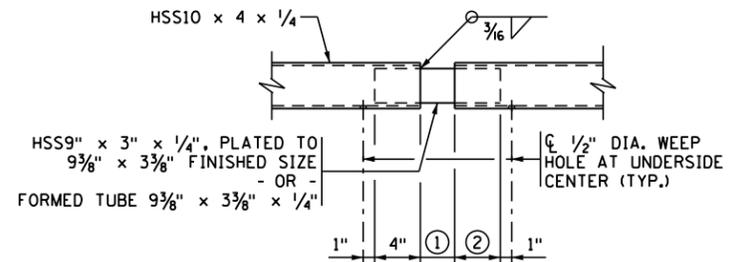
CERTIFIED BY _____ DATE _____
LICENSED PROFESSIONAL ENGINEER
NAME: _____ LIC. NO. _____

TITLE: STRUCTURAL TUBE RAILING (DESIGN T-1) AND CONCRETE PARAPET (TYPE P-2, TL-4) PARAPET ABUTMENT WITH GUARDRAIL CONNECTION (WITHOUT CONCRETE WEARING COURSE)

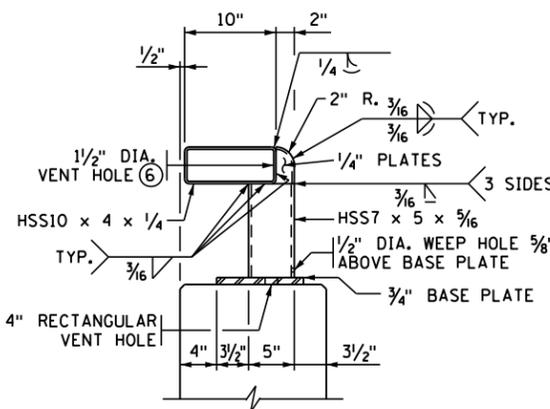
DES: _____ DR: _____
CHK: _____ CHK: _____
APPROVED: _____
SHEET NO. OF SHEETS
BRIDGE NO. _____



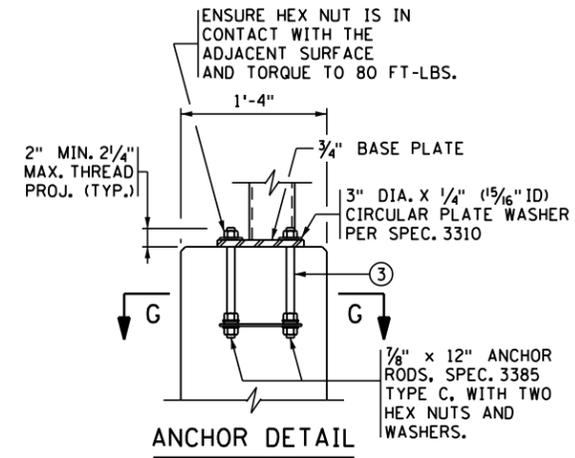
RAIL END DETAIL



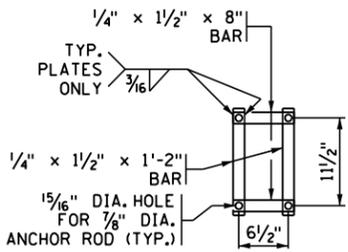
RAIL SLEEVE DETAIL



STRUCTURAL TUBE RAIL DETAIL

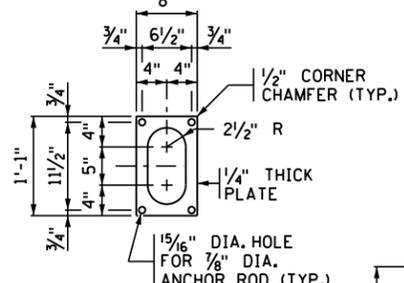


ANCHOR DETAIL



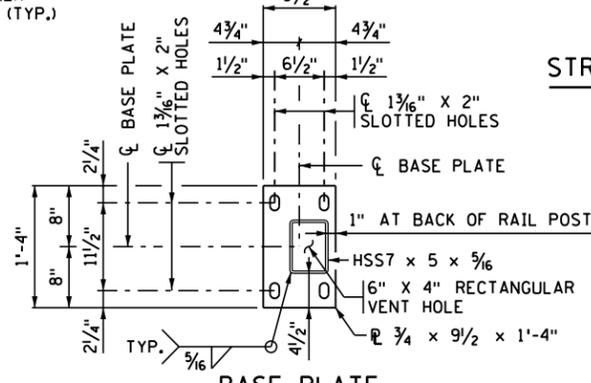
SECTION G-G

(ANCHOR BAR ALTERNATE)

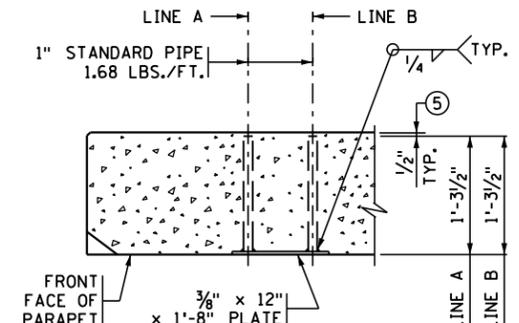


SECTION G-G

(ANCHOR PLATE ALTERNATE)

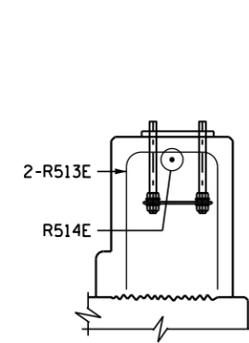


BASE PLATE

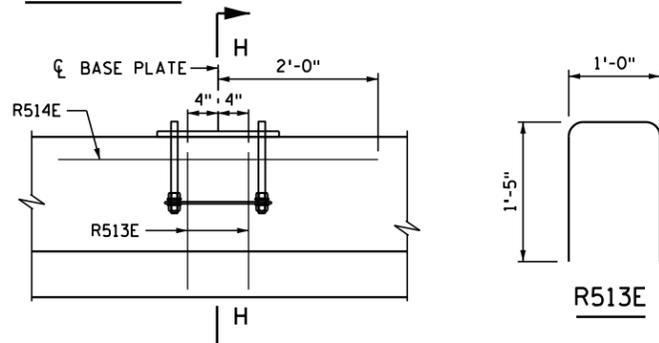


SECTION C-C

(REINFORCEMENT NOT SHOWN)
TRIM GUARDRAIL BOLTS SUCH THAT NO MORE THAN 1/2" PROTRUDES FROM BACK FACE OF PARAPET.
☆ DIMENSIONS INCLUDE 3/8" PLATE

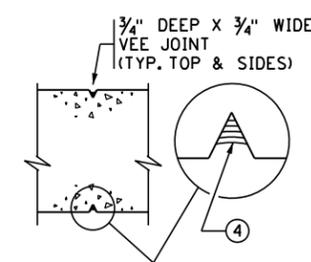


SECTION H-H



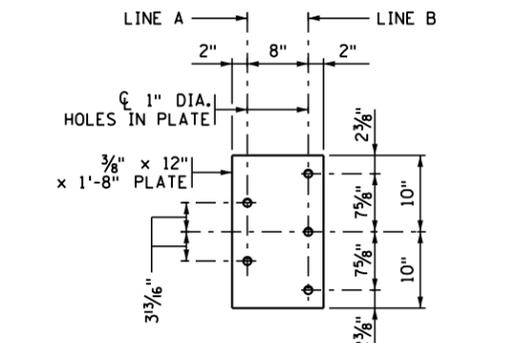
DETAIL "B"

(TYP. AT ALL RAIL POST ANCHORAGES)



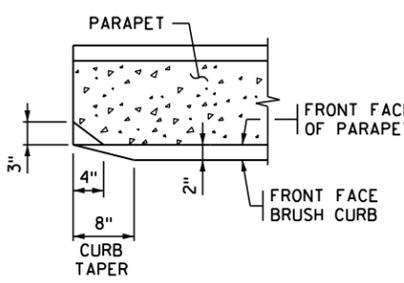
SECTION D-D

CONTROL JOINT DETAIL

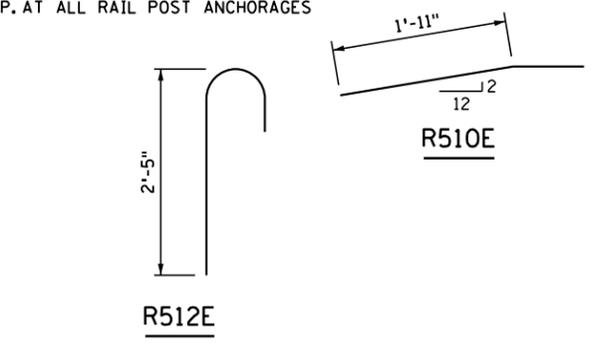


GUARDRAIL CONNECTION DETAIL

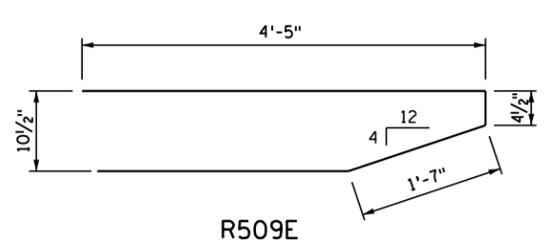
GALVANIZE AFTER FABRICATION PER SPEC. 3394
ESTIMATED WEIGHT = 37 LBS.



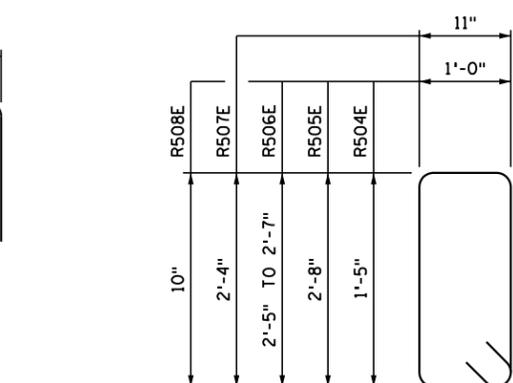
SECTION F-F



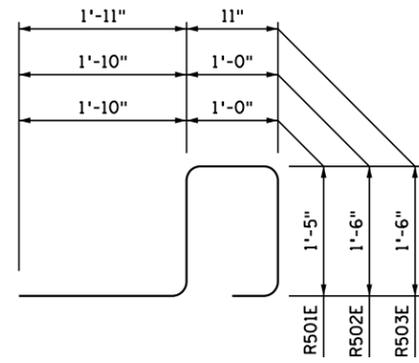
R510E



R509E



R504E, R505E,
R506E, R507E, R508E



R501E, R502E, R503E

BILL OF REINFORCEMENT FOR PARAPET

BAR	NO.	LENGTH	SHAPE	LOCATION
R501E		6'-2"		PARAPET DOWEL
R502E		6'-4"		PARAPET DOWEL
R503E		6'-4"		PARAPET DOWEL
R504E		5'-9"		PARAPET VERTICAL
R505E		8'-3"		PARAPET VERTICAL
R506E	SER. OF 3	7'-9" TO 8'-1"		PARAPET VERTICAL
R507E		7'-5"		PARAPET VERTICAL
R508E		4'-5"		PARAPET VERTICAL
R509E		9'-1"		PARAPET LONGITUDINAL
R510E		2'-8"		PARAPET LONG. IN TAPER
R511E		2'-5"		PARAPET VERTICAL B.F.
R512E		3'-0"		PARAPET VERTICAL F.F.
R513E		3'-10"		VERTICAL @ BASE PLATE
R514E		4'-0"		LONGIT. @ BASE PLATE
R5_E				PARAPET LONGITUDINAL
R5_E				PARAPET LONGITUDINAL
R5_E				PARAPET LONGITUDINAL
R5_E				PARAPET LONGITUDINAL

GENERAL NOTES

- MEASURE PAYMENT LENGTH OF "TYPE P-2 (TL-4) BARRIER CONCRETE (3S52)" BETWEEN THE OUTSIDE ENDS OF THE PARAPET.
CONCRETE PARAPET = 362 LBS./FT. (0.090 CU. YDS./FT.)
- MEASURE PAYMENT LENGTH OF "STRUCTURAL TUBE RAILING DESIGN T-1" FROM END TO END OF TUBING. DO NOT DEDUCT FOR JOINTS.
- FINISH ALL EDGES OF PARAPET WITH 1/2" CHAMFER, EXCEPT WHERE OTHERWISE NOTED.
- SPACE CONTROL JOINTS AT 10 FT. MAXIMUM. REFER TO SUPERSTRUCTURE SHEET FOR SPECIFIC SPACING INFORMATION.
- PROVIDE CORRECT ALIGNMENT FOR ANCHORAGES BY PLACING THEM ACCURATELY AND NORMAL TO GRADE. SEE SPECIAL PROVISIONS.
- INSTALL RAIL POSTS NORMAL TO GRADE.
- PROVIDE STRUCTURAL STEEL AND PLATE WASHERS IN ACCORDANCE WITH SPEC. 3310. PROVIDE STRUCTURAL TUBES PER ASTM A500, GRADE B IN ACCORDANCE WITH SPEC. 3361.
- GALVANIZE BOLTS, NUTS, AND WASHERS IN ACCORDANCE WITH SPEC. 3392.
- GALVANIZE ALL OTHER STRUCTURAL STEEL IN ACCORDANCE WITH SPEC. 3394, AFTER FABRICATION.
- GUARDRAIL CONNECTION TO BE STRUCTURAL STEEL IN ACCORDANCE WITH SPEC. 3306.
- GUARDRAIL CONNECTION AND NAMEPLATE TO BE CONSIDERED INCIDENTAL.
- PRICE BID FOR "STRUCTURAL TUBE RAILING DESIGN T-1" INCLUDES ANCHORAGES AND ALL MATERIAL ABOVE TOP OF CONCRETE PARAPET.
- ALL MATERIAL IN THE CONCRETE PARAPET IS LISTED IN SUMMARY OF QUANTITIES FOR SUPERSTRUCTURE.
- SEE SPECIAL PROVISIONS FOR COATING TO BE APPLIED TO METAL RAILING.
- CONTINUOUSLY GROUND ALL METAL RAILINGS, SEE THE SPECIAL PROVISIONS. REFER TO THE ELECTRICAL PLANS AND ELECTRICAL SPECIAL PROVISIONS FOR DETAILS REGARDING BONDING MULTIPLE ELECTRICAL GROUNDING SYSTEMS.

- ① 1" AT RAILING JOINTS. AT EXPANSION JOINTS, MAKE 1" LARGER THAN GAP IN EXPANSION JOINT.
- ② 5" AT RAILING JOINTS AND 8" AT EXPANSION JOINTS.
- ③ SUBSTITUTION OF ADHESIVE ANCHORAGE FOR CAST-IN-PLACE ANCHORAGE IS NOT PERMITTED.
- ④ JOINT SEALANT PER MnDOT APPROVED/QUALIFIED PRODUCTS LIST - CRACK AND JOINT MATERIALS - SILICONE JOINT SEALERS.
- ⑤ REMOVE CONCRETE FROM PIPE ENDS AFTER FORM REMOVAL.
- ⑥ CENTER HOLES 1/4" FROM TOP OF TUBE.

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