DATE:
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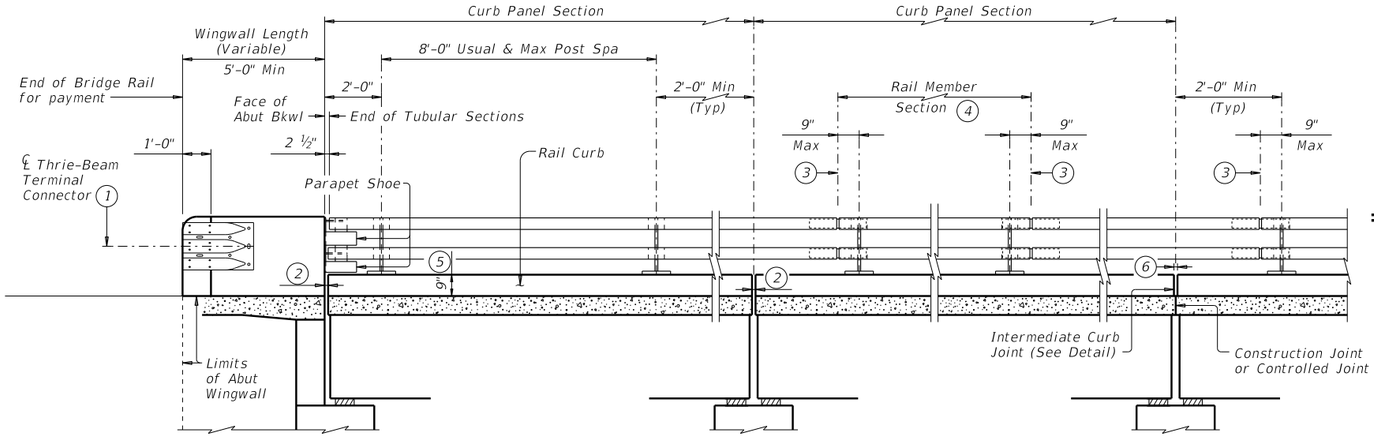
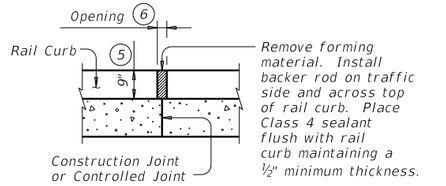
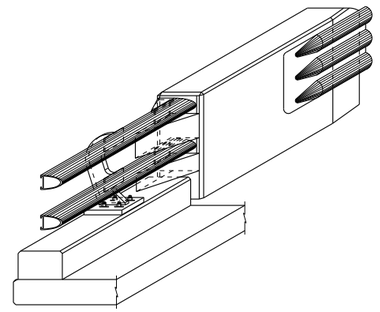


ROADWAY ELEVATION OF RAIL



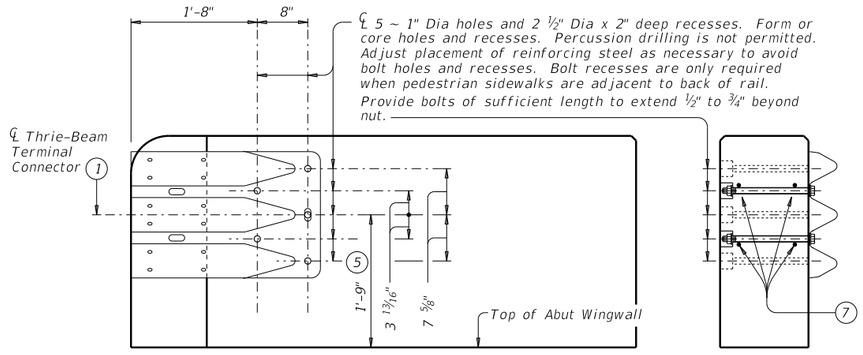
INTERMEDIATE CURB JOINT DETAIL

Provide at all interior bents without slab expansion joints.



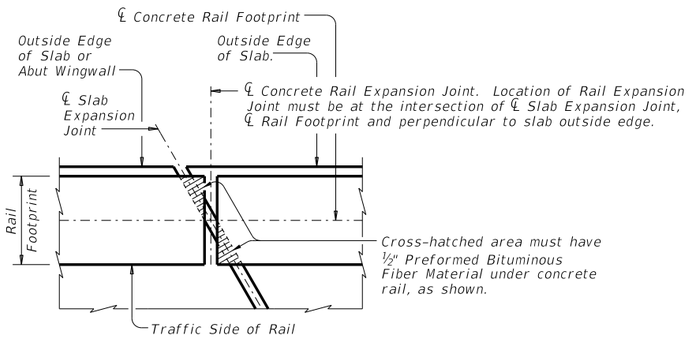
ISOMETRIC VIEW AT END OF BRIDGE

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence." Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. Same as slab joint opening. (5" Max Exp Jt).
3. ℄ Expansion joint or splice joint as required.
4. Rail member sections must have at least two posts but not more than four.
5. Increase 2" for structures with overlay.
6. ¼" Min, ¾" Max
7. Place 4 additional Bars R(#5) 3'-8" in length inside Bars U(#5) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.
8. Anchor bolts must be ⅞" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with heavy hex nuts and one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".
9. Install Parapet Shoe after rail has been placed. To ease installation, temporarily brace parapet shoe until the anchorage system achieves manufacturer's recommended curing time. Anchorage system must be assembled with one hardened steel washer (ASTM F436) and one heavy hex nut (ASTM A563) each. Remove temporary bracing after anchorage systems has been firmly tightened.



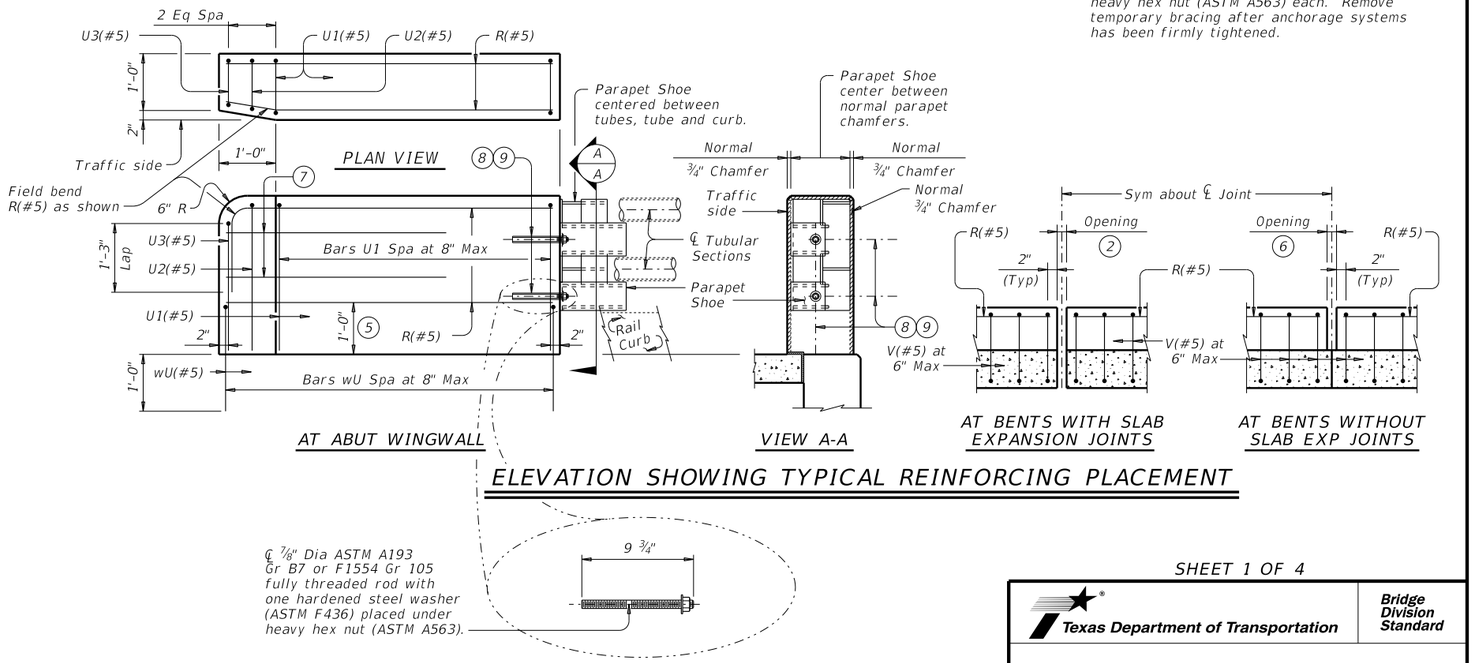
ELEVATION SECTION

TERMINAL CONNECTION DETAILS



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

SHEET 1 OF 4

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T1F

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REVISIONS	DIST	COUNTY		SHEET NO.

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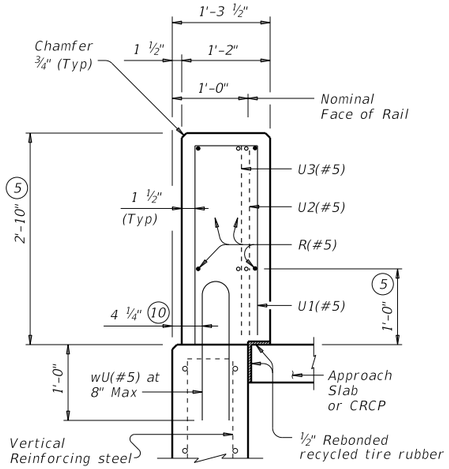
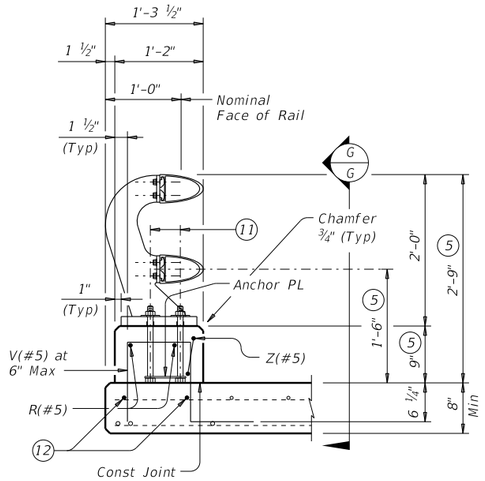
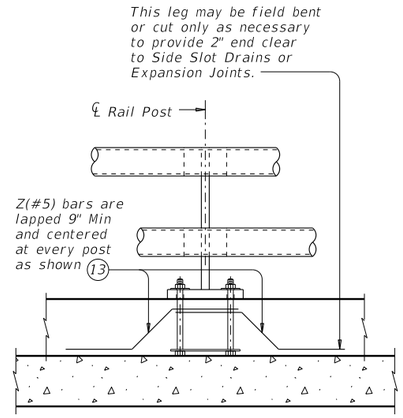


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

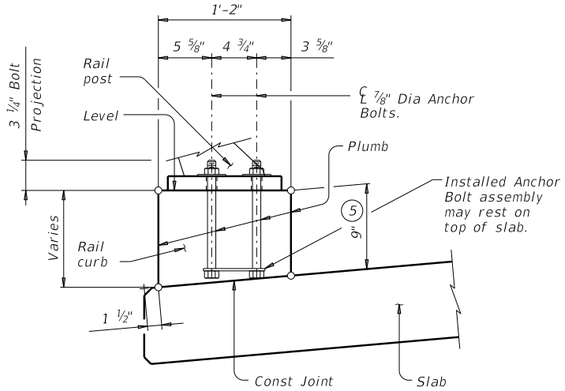


ON BRIDGE SLAB



VIEW G-G

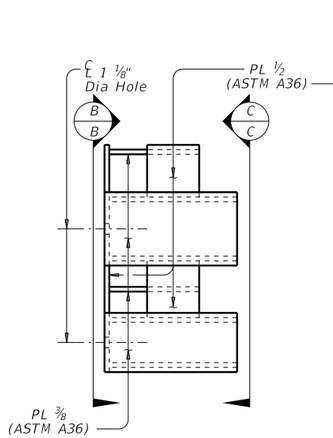
Bars V and R omitted for clarity.



RAIL CURB FORMING DETAIL

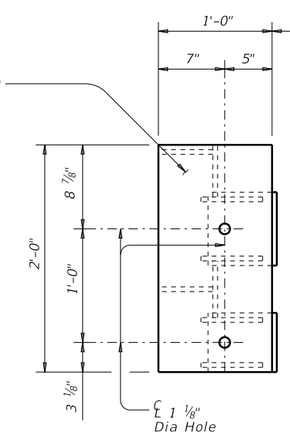
Reinforcing steel and rail curb chamfers not shown for clarity.

SECTIONS THRU RAIL

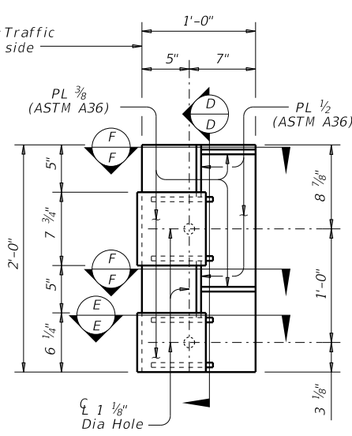


PARAPET SHOE

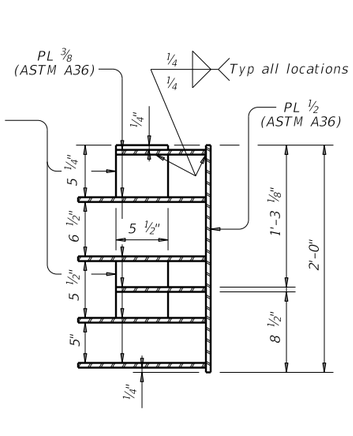
Parapet Shoe shown is detailed for one side only, other side similar. For other side shoe must be built for opposite hand. (Parapet Shoe weight = 120 lb each, for contractor's information only).



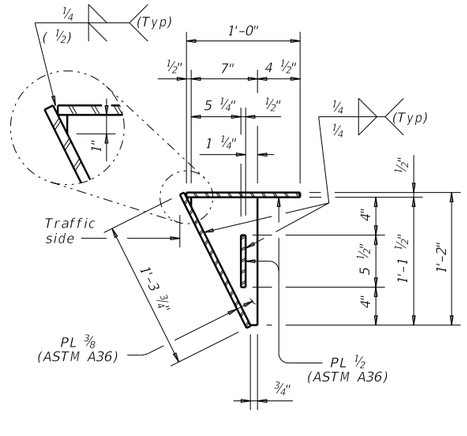
VIEW B-B



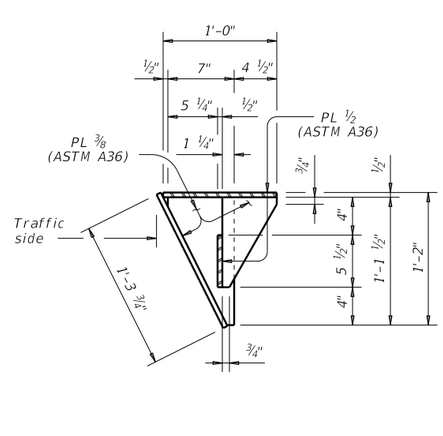
VIEW C-C



SECTION D-D



SECTION E-E



SECTION F-F

(5) Increase 2" for structures with overlay.

(10) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(11) ℄ ⅞" Dia Anchor Bolts. See "Anchor Bolt Assembly Details."

(12) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(13) Adjust Bars Z(#5) as necessary to avoid Bars V(#5).

SHEET 2 OF 4

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T1F

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REVISIONS				
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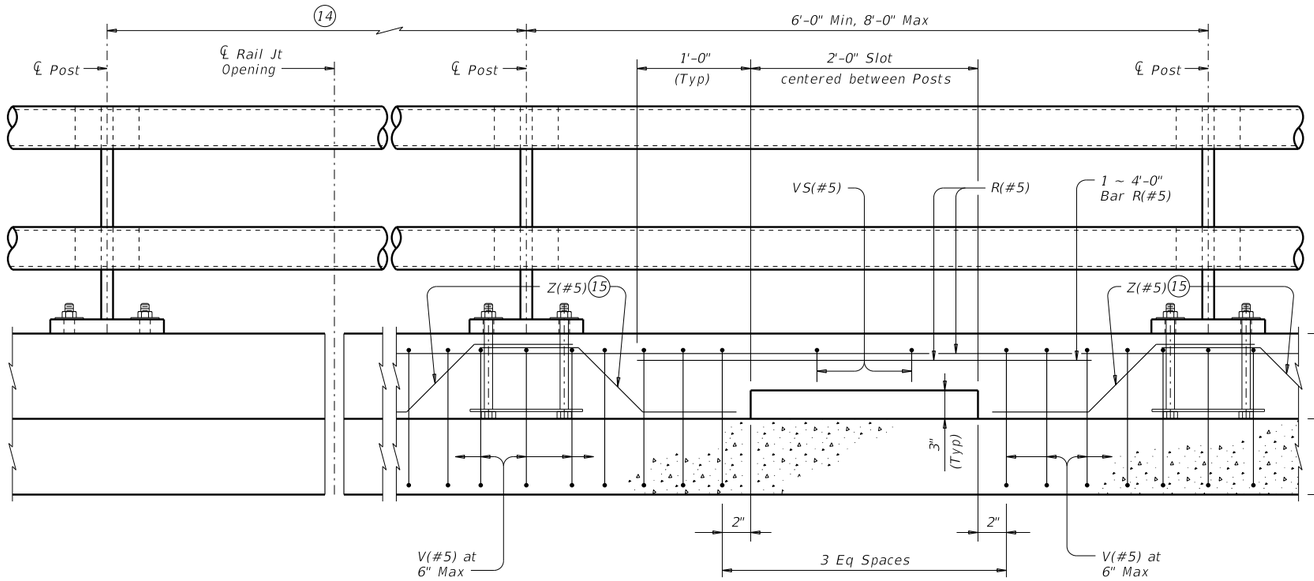
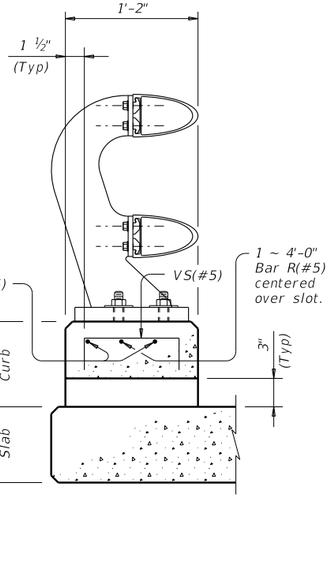


ELEVATION



SECTION THRU SIDE SLOT DRAIN

OPTIONAL SIDE SLOT DRAIN DETAILS 16

6'-0" Min post spacing with side drain slot. Center drain between posts.

5 Increase 2" for structures with overlay.

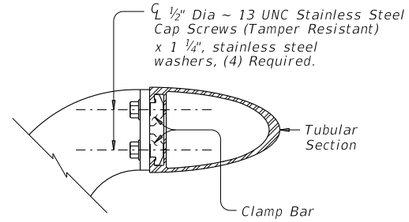
14 Side slot drains are not allowed in areas where there is a joint in the concrete curb between rail posts.

15 Bars Z(#5). See Section Thru Rail on Bridge Slab and View G-G for Bar Z placement and spacing.

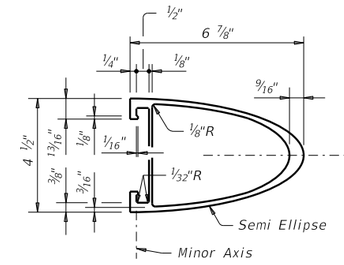
16 Center Side Slot Drains between rail posts within the limits shown. Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway and a sidewalk, side drain slots are not permitted.

17 Length shown for 6 ¼" Min bar embedment with no overlay. Adjust as required.

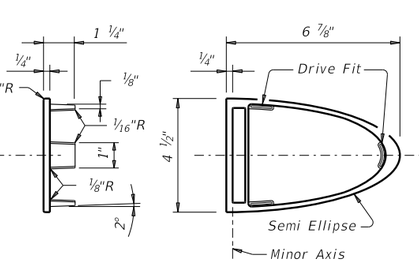
18 Increase 2 ¾" for structures with overlay.



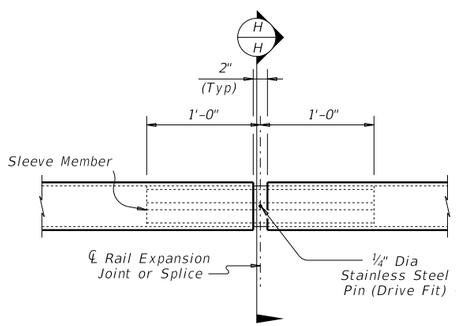
TUBE ASSEMBLY DETAIL



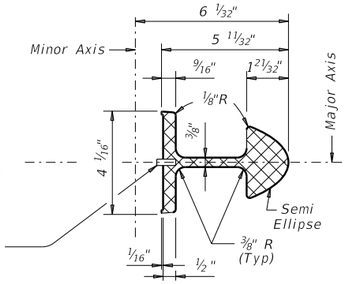
SECT THRU TUBULAR EXTRUSION



END PLUG DETAILS

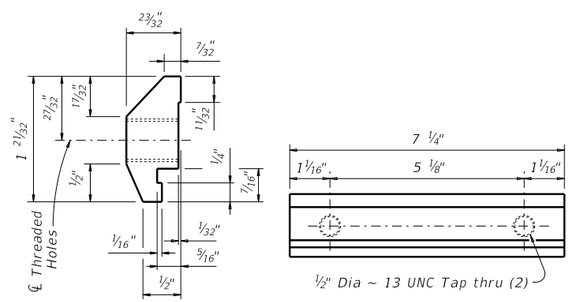


AT SPLICE OR EXP JTS



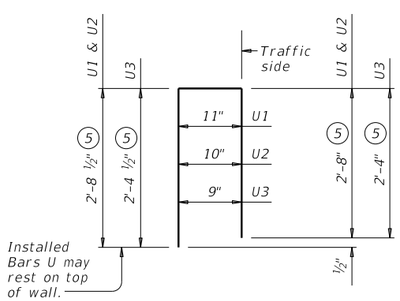
SEC H-H THRU SLEEVE MEMBER

TUBE FABRICATION DETAILS

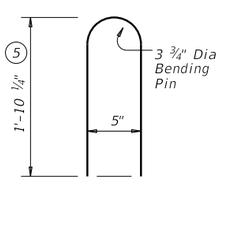


SECTION ELEVATION

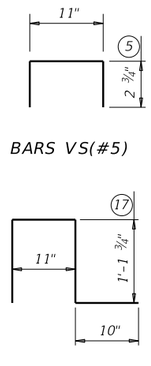
CLAMP BAR DETAIL



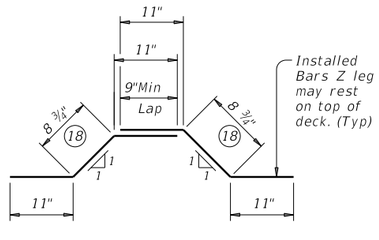
BARS U(#5)



BARS wU(#5)



BARS VS(#5) BARS V(#5)



BARS Z(#5)

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Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T1F

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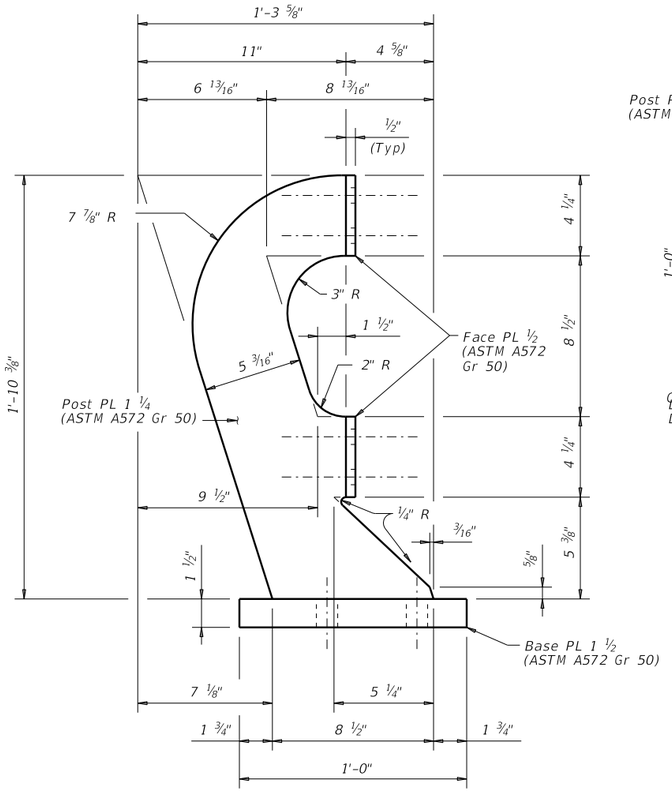
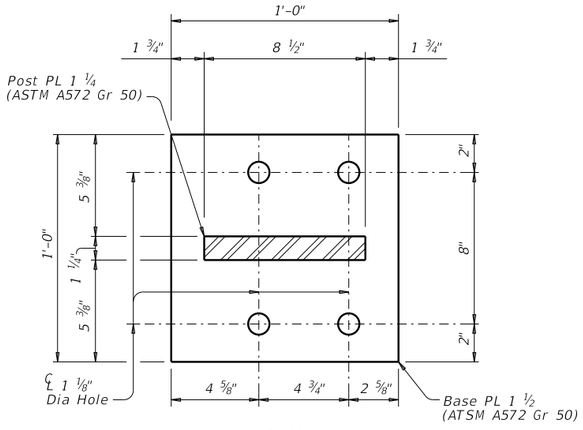
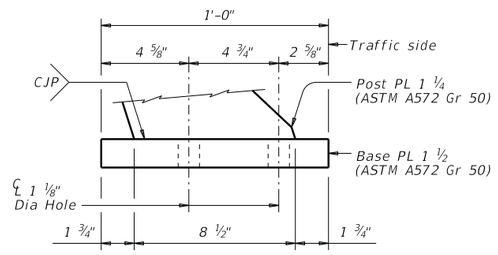


POST DETAIL

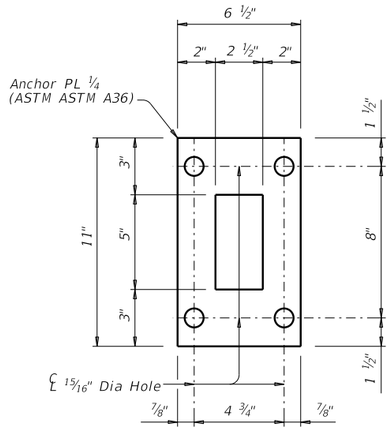


PLAN

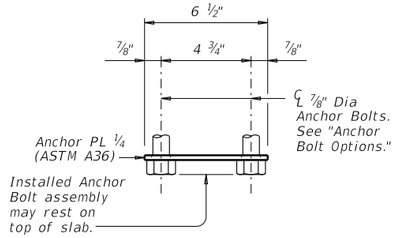


ELEVATION

BASE PLATE DETAILS

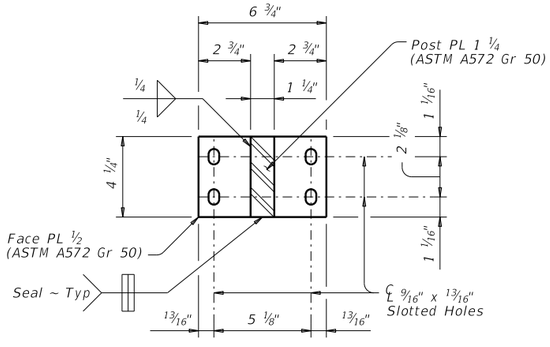


PLAN OF ANCHOR PLATE

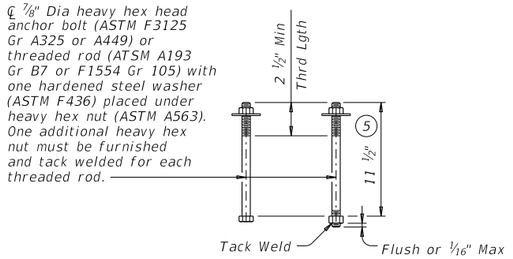


ELEVATION

ANCHOR BOLT ASSEMBLY DETAILS



FACE PLATE DETAIL



ANCHOR BOLT OPTIONS

(Showing Anchor Bolts for Base Plate)

5 Increase 2" for structures with overlay.

CONSTRUCTION NOTES:

Cap all ends of tubular sections at parapet.

For horizontal curves of radius less than 1,000 feet the tubular sections must be fabricated to follow the curvature of the roadway. For radii greater than 1,000 feet the tubular section must be field bent during installation.

The face of tubular sections and rail curb must be plumb unless otherwise approved. Steel posts must be square to the top of curb. Use Type VIII epoxy mortar under post base plates if gaps larger than 1/16" exist.

Round or chamfer exposed edges of rail members and rail posts to approximately 1/16" by grinding.

Chamfer all exposed concrete corners.

MATERIAL NOTES:

Galvanize all metal components of steel rail system except stainless steel and aluminum. Apply additional coatings when shown elsewhere on the plans. When plans require paint over galvanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel." Anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.

Provide 7/8" Dia ASTM F3125 Gr A325 or A449 bolts (or ASTM A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each) with one hardened steel washer (ASTM F436) placed under each heavy hex nut that conforms to ASTM A563 requirements.

Material for tubular sections (semi ellipse), including sleeve members and clamp bars must be aluminum ASTM B221 alloy 6061-T6. Anodize tubular sections (semi ellipse), Aluminum Association Class 1, Type A41 Clear.

Material for end plugs must be cast aluminum alloy ASTM B108, A444-T4.

Tamper resistant cap screws and washers for tubular section attachment must be stainless steel meeting ASTM F879.

Provide Class "S" concrete. When Class "S" concrete for slab is HPC, include a minimum of 3 gallons of calcium nitrite inorganic corrosion inhibitor per cubic yard of Class "S" concrete.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-0"
Epoxy coated ~ #5 = 3'-0"

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

This railing cannot be used on bridges with expansion joints providing more than 5" movement or on cast-in-place retaining walls, unless otherwise noted.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings for approval are not required.

Submit erection drawings showing panel lengths, rail post spacing, and anchor bolt setting, to the Engineer for approval.

Average weight of railing with no overlay: 157 plf total
131 plf (Conc)
15 plf (Steel)
11 plf (Alum).

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T1F

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